DIFFERENCES IN CAREER ENGAGEMENT SCORES AMONG MID-ATLANTIC HIGH

SCHOOL SENIORS WITHIN CAREER READINESS PROGRAMS OF STUDY

by

Glenn R. Mathias III

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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APPROVED BY:

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ABSTRACT

Employers are having problems filling vacancies with qualified workers. While secondary education has placed an emphasis on students being college ready, a majority of Career Technology Education students indicate they are not getting career knowledge as a part of their career technology education experience. Currently, the prevailing idea is that some educational systematic shortfall exists. In this quantitative causal comparative study, the researcher sought to determine if there was a difference between the levels of career engagement among career readiness pathways of schools located in the Mid-Atlantic region. Recent high school graduates from a Mid-Atlantic school district were administered the Career Engagement Scale online to determine if the level of engagement varied by proactively developing future career endeavors as expressed through career development autonomy during class time. A convenience sample of 260 participants was used. A one-way analysis of variance was implemented to determine if any differences exist between career engagement for three different career readiness pathways. No significant differences were found in career engagement scores in various career pathways. Implications of the findings are examined and recommendations for future research are made.

Keywords: Career Engagement, Project Lead the Way, Career Technology Education, General Education, Career Readiness Pathway, and Career Behaviors

Dedication

This work is dedicated to my Lord and Savior, Jesus Christ, who gave up his life, was buried, and rose on the third day to save all who rely on Him. His sacrifice allowed God to give any person, who believes, the Holy Spirit, which has encouraged me to have the faith to successfully finish this process.

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Analysis of Variance (ANOVA)

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Career Engagement Scores (CESc)

Career Technology Education (CTE)

Comparative Fit Index (CFI)

General Education (GE)

Institutional Review Board (IRB)

Life-Span Career Development (LSCD)

Personal Constructivism (PC)

Project Lead the Way (PLTW)

Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC)

Root Mean Square Error of Approximation (RMSEA)

Satorra-Bentler χ^2 statistic (SB- χ^2)

School-To-Work Opportunities Act (STWOA)

Science, Technology, Engineering, and Mathematics (STEM)

Social Constructionism (SC)

Standardized Root Mean Square Residual (SRMR)

Tucker-Lewis index (TLI)

CHAPTER ONE: INTRODUCTION

Overview

Chapter One of this study will examine various pathways and student career engagement scores for the 2018-2019 school year in the Mid-Atlantic region among graduating seniors in a large school district. The historical, social, and theoretical contexts frame the background information for the driving of career engagement. Chapter One of this study contains the background, problem statement, purpose statement, significance of the study, the research question, and the definitions.

Background

A common complaint among employers is the lack of qualified applicants to fill their company's needs (Cappelli, 2014). Educational stakeholders such as students, graduates, employers, and governments have differing expectations on the concepts and the definitions that surround students' future employment such as objective-subjective duality of career, career indecision, and career success (Scurry & Blenkinsopp, 2011). Both subjective understandings, from stakeholders and legislative bodies, have led to a general theme of mismatched expectations when entering the vocational realm. Additionally, secondary education has placed an emphasis on students being college ready, but a majority of Career Technology Education (CTE) students indicate that they are not getting career knowledge as a part of their Career Technology Education experience (DeFeo, 2015).

The United States has had a long history of adapting the educational reforms to achieve perceived lacking levels of student's success (Handel, 2003; Kessinger, 2011). For example, the National Commission on Excellence in Education of 1958 reported declines in student achievement and quality of the United States schooling system based on the rise of American

mediocrity, which was defined as below average student world rankings, a large population illiteracy rate, a 16-year unbroken decline in SAT scores, a 72% increase in remedial math for college classes, and many Army recruits reading below a ninth grade level (Goldberg & Harvey, 1983).   In addition, academic research convinced the country that the educational structures needed systematic reforms (Berg, 1970). Thus, national attention has been placed on educational initiatives over the past decades. Most educational initiatives are steeped in essentialism, a theory emphasizing the teacher as authority and core subjects to be studied by all students (Kessinger, 2011). National Assessment of Educational Progress, American 2000, and No Child Left Behind are derived from the theory of essentialism (Johnson, Musial, Hall, Gollnick, & Dupuis, 2008).

Another area that education has had to address is the skills gap. The skills gap comes from the idea that due to the failure of the educational system, students are not provided with the basic important skills to enter the work force successfully (Cappelli, 2014). The skills gap employment stories rose after the 2008 Great Recession, when recently-unemployed job seekers exceeded the jobs available (Bureau of Labor Statistics, 2013). For example, the chemical engineering process has changed considerably, but the chemical engineering graduate curriculum has changed very little over the past few decades (Frangenberg, 2017). Furthermore, the skills gap ideas espouse the following: education does not impart working as a team, leading a group, adapting to change, and solving problems creatively as effective as acquiring academic knowledge and subject-specific skills (Ramanathan, 2017).

On the other hand, there are several ideas that are contrary to the concept of the educational skill gap. First, some researchers believe that the skills gap comes from business lobbies that influence public opinion to benefit industry (Waterhouse, 2014). The rise of

company expectations demanding new hires be workforce ready has created work terms that translate into difficulty in hiring and addressing appropriate wages (Cappelli, 2014). Employer work terms could be setting an unrealistic standard for their new hires. A modification of employer work terms could provide an opportunity to assess potential employee talent (Chhinzer, & Russo, 2018). Second, the problem is not the skills gap, but rather over-skilled workers (Cappelli, 2014). Wage penalties for over-skilled and over-educated workers showed a significantly lower job satisfaction than workers with equally matched abilities to work function (McGuinness & Sloane, 2011). Third, another alternative idea suggests that employers' dissatisfaction with new hires corresponds to effort levels and work attitudes of younger employees (Handel, 2003). Supervisory support expectations have contributed to a significant impact on entitlement perceptions of employer obligations from the next generation of workers (Hurst & Good, 2009). Furthermore, the view of responsibility for developing workplace skills has been transferred from the workplace to the academic institutions (Cappelli, 2014). Employers want potential hires to be professionally mature, have soft skills and problem solving, be continuous learners, and achieve high academic levels as well as have generic skills, such as time management, teamwork, and attention to detail (Chhinzer & Russo, 2018). Ironically, both parties expect the educational system to supply the above characteristics without the others' input. An adaptive solution is to have employers understand new hire expectations and select strategies (both in training and mentoring) that reduce gaps in job expectations and job realities (Hurst & Good, 2009).

Employers are failing to find employees that have the skills that are crucial for corporate success (Ramanathan, 2017). As technology advances, education has a difficult time keeping up with specific skill needs in the labor market (Makarius & Srinivasan, 2017). By nature, the

educational process evaluates learning needs that lead to reforms which has become part of governmental policy (Grant, 2002). A change in pedagogy is required to bridge the skills gap (Ramanathan, 2017). Individual and group learning needs are different, and educational approaches must be tailored to the student (Grant, 2002). Secondary schools are implementing strategies to further incorporate science, technology, engineering, and mathematics (STEM) curriculum into their educational practices. While most studies have focused on the width of the skills gap between educational institutions and employers, students perhaps need to be more academically assertive when searching for a career path (Moon, 2009).

Social Context of Education

The aim of education is to create a competent and skilled individual (Kessinger, 2011). But, a substantial proportion of graduates are employed in jobs for which a degree is not required (McGuinness & Sloane, 2011). Regardless, the social understanding of education has extrapolated into two approaches to education. The initial approach was to see if labor earnings and socioeconomic positions were linked to demographic, socioeconomic, and academic backgrounds (Hu & Wolniak, 2010). To answer the question, research was developed to enhance academic achievement (Kenny, Blustein, Haase, Jackson, & Perry, 2006). The second approach was to address mechanisms of social mobility through college education (Hu & Wolniak, 2010). Career development and school engagement were highlighted as indicators of student success (Kenny et al., 2006). Student engagement was found to play an integral role in the quality of education and important desirable outcomes, such as learning, satisfaction, and personal development (Hu & Wolniak, 2010). In some educational circles, enhancement of curriculum design was driven by certification completion thought to give students more employment opportunities (Gardiner, 2015). School reforms involved continually linking

student learning to future expectations (Antonio & Tuffley, 2015). As these lines of thought started to become implemented in educational practices, undervalued workers who were overeducated and mismatched with their careers were found to have significantly worse job satisfaction (Cappelli, 2014).

As the years progressed, the skill mismatch in the overeducated was found to be more common. The STEM curriculum was developed to influence students' desire to pursue a STEM career through STEM activities (Franz-Odendaal, Blotnicky, French, & Joy, 2016). As STEM moves forward, students are relying on their educational structures to expose career ideas and opportunities based on curricular information (Gardiner, 2015). The development of STEM curriculum design and high-engagement activities has been designed to influence students to seek STEM based careers, but competency in STEM subjects does not predict that the student will pursue a STEM career (Franz-Odendaal et al., 2016). Being engaged in a STEM classroom does not precipitate an ideal career match. Career mismatch and over-education can still occur when the student lacks future orientation (Greenback, 2012).

Currently, reform constructs have been derived from four different educational movements. The first movement was Neoliberalism. Neoliberalism makes schools dependent and organized around the corporate structure of models, markets, and competition (Apple, 2016). Second, Neo-conservatism wants to restore common culture with an ideological past based on race, empire, and diasporic populations (Apple, 2004). Third, New Managerialism seeks to audit cultures into a reductive accountability through standardized testing (Apple, 2016). Lastly, the Authoritarian Populist religious movements are committed to a limited number of sacred texts that revere ultraconservative positions in education and society (Apple, 2006).

Beyond the movements, there has been an overlay of governmental reforms. America 2000: An Educational Strategy was introduced by President H. W. Bush to Congress in 1991 (Kessinger, 2011). President Clinton adopted some of the previous strategy into his new reform called Goals 2000: Educate America Act (Webb, 2006). No Child Left Behind was introduced in 2001 by President G. W. Bush (Kessinger, 2011). Race to the Top was introduced by President Obama (McGuinn, 2011).

One approach to educational reform is Project Lead the Way (PLTW), which is a collection of classes that have been developed by a non-profit organization that partnered with schools, private sector organizations, and higher education institutions. Their goal is to increase the number and quality of engineers, technologists, and biomedical professionals graduating from the American educational system (Project Lead the Way [PLTW], 2017).

Another approach to educational reform is curriculum reorganization based on trades. This reform is called career technology education (CTE). Career technology education classes specialize in the skilled trades, applied sciences, modern technologies, and career preparation. Career technology education classes are the organization of curriculum around a career concept, such as manufacturing, construction, or agriculture (Stone & Alfeld, 2004). Work relationships are developed, encouraged, and enhanced in the career technology education curriculums. Career technology education programs develop professional relationships that create a more efficient and effective understanding of community work (Wang, 2011).

Another approach to educational reform is the push back to general education. General education (GE) classes are traditional education courses including (but not exclusive to) music, drama, English, world language, and science. Traditionally thought, general education's objective was to develop responsible human beings as citizens (Kridel, 1945). Building upon

this idea, identifying the characteristics that all citizens were engaged helped define general education. In 1953, The book *General Education in Action* (which was considered seminal) identified 12 areas in which general education distills foundational knowledge, skills, and attitudes needed to be a productive member of society (O'Banion, 2016). As society became more complex, general education followed suit. Current thoughts about general education have become very complex due to the growing complexity in society. Most foundational ideas of general education are summarized by the theory of ensuring the students are equipped to earn a good living and live a good life (O'Banion, 2016).

Foundational to developing a solid model for insuring employment is the career construction theory. The career construction theory (CCT) is explained as the interpretive and interpersonal process that a person develops which creates a direction for their work and develops a personally significant career endeavor (Brown, 2014). The career construction theory is based on an idea that a person conceptualizes their career development by environmental factors. Environmental factors from a career perspective are based upon self-construction. Self-construction is described as how people make themselves into their functional personality (Brown, 2014). With this context, the person composes their current vocational perspective by reflecting on their experiences. If proactively used, a student's environment (i.e. the classroom) creates a narrative and career conceptualization that could help develop an individual cohesive identity, adapt to their environment, and construct their future career story (Corso & Rehfuss, 2011).

In career counseling, career construction theory addresses how individuals build their careers. This is done through the lens of personal constructivism and social constructionism (Savickas, 2012). Personal constructivism is the ordering of the world developed by one's

individual experience (Wilson & Tagg, 2010). Kelly (1955) suggested that personal understanding of a human being comes from within his or her own worldview. The foundation of a person's worldview is the mental map which is formed from his or her collection of experiences and actions. These mental maps are called "constructs" (Wilson & Tagg, 2010). It was thought that a person who gets personal meaning from their experiences is using personal constructivism (Kelly, 1955).

Social constructionism is the theory based on knowledge is developed jointly in understanding the world (Galbin, 2014). The social constructionism perspective describes interpersonal influences and social interactions to determine the essence human existence. Social constructionism focuses on the communal factors determine reality (Walker, 2015).

Personal constructivism is different than social constructionism in three ways (Bächtold, 2013). First, personal constructivism focuses on personal interaction while social constructionism targets group interactions. A personal constructivist looks at how an individual relates to a situation. A social constructionist focuses on the communal dynamic of a situation. Second, personal constructivism determines the construction process based on the learner's interaction, and social constructionism's knowledge construction process is based upon the social environment exchanges. A personal constructivist will determine behavior modification based on an individual's actions. A social constructionist will see change based on a group's interactions. Third, personal constructivism's emphasis is on concepts and knowledge, while social constructionism's emphasis in on language and communication. A personal constructivist will look toward newly acquired data, while a social constructionist will analyze language for changes in interactions. The integration of both personal constructivism and social constructionism is the foundation of career construction theory.

Career construction theory implements self-agency to discover self in their work environment (Savickas, 2012). For example, an individual asserts his or her development by continuous adaption to social interactions with the goal of personal-environment integration (Xie, Xia, Xin, & Zhou, 2016). As time moves forward, career construction theory continually revises one's work patterns to better connect in social context. As a person starts to think about work activities, he or she starts to realize that performance impacts possible career steps. Career construction theory employs concepts of vocational personality work (Holland, 1997) and the life-span development of work (Super, 1980) with the motivational spirit of self-completion (Bloch & Richmond, 1997). Furthermore, vocational personality work focuses on how the individual is shaped by their occupation. Life-span development of work focuses on the decisions made by an individual for progressing through life vocational choices. Lastly, the motivation of spirit of self-completion addresses the sense of calling, which could positively relate to an individual's career adaptability, work engagement, and career satisfaction (Xie et al., 2016). In summation, the career construction theory is the anchor that explains student career engagement and the theory could possibly explain the in-classroom choices, activities, and expression of a student as the main driver for educational success.

As educators wrestle with the growing complexity of a rapidly-changing technological society and as cost for college rises, decisions about higher education are becoming more important. Career readiness pathways are steeped in quality educational theories and may be a viable solution for meeting student future career needs.

Problem Statement

In secondary education, career technology education (CTE) has become the formal grouping for all vocational programs, which addresses the American society's need to be more

efficient in competing technological tasks (Wang, 2011). However, the American public's term for the mismatch of first-time employees' skillsets with available entry level work is called a skills gap (Prucha, 2017), and the public's perception of the skills gap is that some educational systematic shortfall exists between student and employer. This lack of skills connection may cause students to be misinformed about the adaptability of their personal abilities, causing frustration as they seek fulfillment in a chosen career field (Savickas, Porfeli, Hilton, & Savickas, 2018).

As technology rapidly changes, developing high school students with proactive career experiences may serve to strengthen student adaptability to problem solve in future professions. While secondary education has placed an emphasis on students being college ready (Schwartz, 2016), some career pathways, such as Project Lead the Way, are being effective at causing students to feel confident in making complex math or science-based decisions (Finkel, 2016). Yet, most career pathways have focused on intrinsic student academic needs in the area of self-esteem, and educational self-efficacy (Antonio & Tuffley, 2015) over a practical occupational skill set. Further research is needed to identify causes and consequences of proactive classroom career behaviors for high levels of career engagement (Hirschi, Freund, & Herrmann, 2014), examine the validity of developing criterion-related measures of proactive adaptability resources (Savickas et al., 2018), and define mediating roles of different types of engagement-relevant behaviors (Le, Jiang, & Nielsen, 2016). High school students who are in career pathway programs are more likely to graduate, and interestingly with each additional credit of career technology education, the likelihood of graduation increases another 4% (Castellano, Richardson, Sundell, & Stone, 2017). The current study will expand upon previous research by focusing on variance in career engagement outcomes within various career pathways. Gardiner

(2015) stated that there are specific gaps between specific curriculum design and career engagement in career's literature. Also, it is understood that the influence of academic sub-environments does bear on student experience, development, and early career earnings, but the literature needs more empirical exploration (Hu & Wolniak, 2010). The problem is there is little known about the practical ramifications of different career pathways centered on career engagement (Gardiner, 2015; Hu & Wolniak, 2010; Kenny et al., 2006).

Purpose Statement

The purpose of this study was to determine if there is a difference in career engagement scores between three career readiness pathways among high school seniors. The quantitative research method was a non-experimental, causal-comparative design (Gall, Gall, & Borg, 2006). The independent variable was career readiness pathway, which is defined as an educational vehicle that is designed to connect young people to middle-skill jobs in such growing fields as information technology, health care, and advanced manufacturing (Schwartz, 2016). The independent variable has three levels. The career readiness pathway levels were Project Lead the Way (PLTW), career technology education (CTE), and general education (GE). The dependent variable was the career engagement score (CESc), which is defined as proactivity in developing a career, as articulated by diverse career behaviors (Hirschi et al., 2014). The dependent variable was measured by the Career Engagement Scale (Hirschi et al., 2014).

Significance of the Study

This study is important because it will to add to the body of knowledge of student career engagement in three ways. First, the study will add to the literature to the extent in which a subject's curriculum design enhances students' career intent (Gardiner, 2015). With a numeric assignment, curriculum designers can tailor activities that enhance proactive career pursuits by

the student. Second, this study may deepen society's understanding of how to better cultivate

engagement for secondary students (Antonio & Tuffley, 2015). The scholarly debate has

focused on student agency and career self-management as the core foundation of career

development (Akkermans & Kubasch, 2017). This study could help quantify these theoretical

concepts. Third, this study may better enhance proactive student curriculum decisions to

actualize higher levels of impact in their career choice (Franz-Odendaal et al., 2016).   If a

student could self-determine and enhance their learning activities to better fit their chosen career

path, starting workers would be better qualified to meet labor demands. Therefore, curriculum

writers and administrators could maximize school resources by targeting specific educational

pathways that are known to have less student career engagement. The changes to programs of

study could better empower students in their career behaviors (Schwartz, 2016) and possibly

raise retention rates at no cost to achievement (Castellano et al., 2017). Student self-reliability to

career activity enhancement could be a key to enhancing the quality of American schools

(Stringfield, Shumer, Stipanovic, & Murphy, 2013).

Research Question

RQ: Is there a difference in career engagement scores among high school seniors in a

Mid-Atlantic school system whose program of study is in Project Lead the Way (PLTW), Career

Technology Education (CTE), or General Education (GE) classes?

Definitions

1. *The Broaden-and Build-Theory* – The broaden and build theory suggests that
   experiences of positive emotions build their enduring particular assets, such as
   physical and intellectual resources, to social and psychological resources
   (Fredrickson, 2001).

2. *Career Construction Theory* – Career construction theory is an interpretive and interpersonal process that a person develops which creates a direction for their work and develops a personally significant career endeavor (Brown, 2014)

3. *Constructionism* – Constructionism is the perspective that human interpersonal interaction influences an individual's perspective (Gergen, 1985).

4. *Constructivism* – Constructivism is knowing an object or event by interaction, and schema developed around the action (Piaget, 1967).

5. *Essentialism* – Essentialism is a theory that emphasizes that the teacher is the authority and there are core subjects that must be studied (Kessinger, 2011).

6. *The Job Demands-Resources Model* – The job demands-resources model indicates that the higher career engagement leads to less exhaustion (though realistic career expectations) and lower disengagement (through adequate occupational resources), thus building higher educational satisfaction (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001).

7. *Life-Span Career Development* – Life-span career development illustrates the interactive nature of a variety of roles that constitute a career through self-actualization from a composite of various life role combinations (Super, 1980).

8. *Occupational Engagement* – Occupational engagement is behaviors that contribute to the career decision-maker's fund of information and experience of the larger world, not just the world as processed when a career decision is imminent (Krieshok, Black, & Mckay, 2009).

9. *Self-Construction Theory* – Self-construction theory indicates that a person constitutes self (reflexivity – both dual and trinity) and a life-long vocation by

reflecting on experiences and using a distinctive human capability to be meta-conscious (Guichard, 2005).

10. *Self-Determination Theory* – Self-determination theory indicates that relevance for autonomy, providing choice, filtering external controls, acknowledging the actor's perspective are important factors in developing positive intrinsic motivation, and are the bedrock of career control aspects (Ryan & Deci, 2017).

11. *Skills gap* – The skills gap is the idea that students are not provided with the basic important skills to enter the work force successfully (Cappelli, 2014).

12. *The Spirit behind Self-Completion of Work* – The spirit behind self-completion of work is the activating force that helps give movement towards a goal based in a career capacity (Savickas, 1997b).

13. *Stage-Environmental Fit Theory* – Stage-environmental fit theory, previously called person-environmental fit, provides a way to link the individual with institutional levels, to understand how the school influences development (Eccles & Roeser, 2009).

14. *Student Career Engagement* – Student career engagement is the amount to which a student is proactively develops his or her career as articulated by various career activities (Hirschi et al., 2014).

15. *Student Efficacy* – Student efficacy is a student's confidence in his or her abilities to be successful with academic tasks (Chemers, Hu, & Garcia, 2001).

16. *Student Involvement* – Student involvement is the amount of physical and psychological energy spent for a student to develop academic experiences (Astin, 1999).

17. *Theory of Developmental Self-Determined Striving* – The theory of developmental self-determined striving is the subject developed a self-concept by an interaction with work roles and developing interests to better match their self and vocational narrative (Savickas, 2011).

18. *Unified Life Story* – In terms of the vocational narrative, unified life story defines the person and explains the driving force of the plot (Savickas, 2012).

19. *Vocational Identity* – Vocational identity is an amalgamation of likes, dislikes, strengths, limitations, values and skills based upon occupational activity (Cox, Bjornsen, Krieshok, & Liu, 2016).

20. *Vocational Personalities and Work Environment* – Vocational personalities and work environment is the idea that individuals can be categorized meaningfully as one of six personality types — Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (Holland, 1997).

CHAPTER TWO: LITERATURE REVIEW

Overview

Chapter Two of this study will explore the literature related to career engagement. The underpinning theories for the development of the Career Engagement Scale are explained. Project Lead the Way, career technology education, and general education pathways related to career engagement will be also explored. Chapter Two of this study contains the conceptual framework, theoretical framework, related literature, and summary.

Conceptual and Theoretical Framework

Career Engagement

Throughout the years, education constantly tries to improve individuals through the academic process (Kessinger, 2011). One new area of academic research is in the area of career engagement (CE). Career engagement is the extent to which a person proactively develops their future vocation, as conveyed by various current occupational activities (Hirschi et al., 2014). If an educational institution can assess a student's independent role in curriculum structures, proactive vocational classroom behaviors could enhance personal career development. While student career involvement is a fundamental part of a quality college education (Astin, 1999), current educational knowledge concerning determinates and flexibility of school career engagement is currently inadequate (Kenny et al., 2006). To add complexity, implementation of student career engagement differs from major to major (Hu & Wolniak, 2010), and many students have little or only generalized knowledge of their careers, even when a major has been chosen (Gardiner, 2015).

In the literature, another definition of career engagement is found. Neault and Pickerell (2011) found career engagement as the amount an individual strives to find meaningful work that

can fully engage their skills. They derived career engagement from the work of Csikezentmihalyi's (1997) low of life and Vygotsky, Cole, Stein, & Sekula's (1978) book on zone of proximal development. Their concept of career engagement detailed a relationship between personal capacity and challenge complexity. The main difference between Neault & Pickerell's (2011) and Hirschi et al.'s (2014) work is the concept of future self (Strauss, Griffin, & Parker, 2012). While career engagement demonstrates importance in the present tense, personal future career conceptual planning could lead to a more effective career (Gould, 1979). Gould (1979) stated that self-awareness in future career planning is positively related to career effectiveness (i.e. salary and level, career involvement, adaptability, and identity resolution). Future career planning includes exploring options, setting goals, developing skills and abilities, and accumulating experiences (Straus et al., 2012). High situational relevance of defining self is important in developing a concept of future career behaviors.

Another similar type of engagement is occupational engagement. Occupational engagement employs the student in a breadth of activities and interactions; a clearer understanding becomes self-revelatory about their vocational identity (Krieshok et al., 2009). The vocational identity is an amalgamation of likes, dislikes, strengths, limitations, values, and skills (Cox et al., 2016). Occupational engagement differs from career engagement in two ways: First, while occupational engagement involves a self-reflective practice, the process is not proactive. Curriculum activities are prescribed to the student. Career counselors are encouraged to de-emphasize students making academic decisions (Cox et al., 2016). While similar to career engagement, the student's pro-activity is unique to career engagement, and seeks areas in the curriculum where their career interests could be developed. Students actively seek to build their skill set in an academic environment, which is chosen by the student. From this approach, career

counselors are more concerned with getting students to think more about their classes from a career management standpoint (Greenhaus, Callanan, & Godshalk, 2010).   Second, occupational engagement formulates a student's vocational identity. Adolescents develop their vocational identity as they explore themselves and the working world and get ready to make commitments to crystallizing work choices and personal values and interests (Porfeli, Lee, Vondracek, & Weigold, 2011). Vocational commitment and reconsideration of commitment predicted career adaptabilities in time (Negru-Subtirica, Pop, & Crocetti, 2015). Curriculum aligns predictively with an individual's career fit, while career engagement seeks to strengthen their vocational identity once a career pathway is chosen.

Another analogous concept is student involvement. Student involvement is the amount of physical and psychological energy spent for a student to develop academic experiences (Astin, 1999). While this seems similar to career engagement, three differences are as follows: First, student involvement encompasses more than vocational activities (Wolf-Wendel, Ward, & Kinzie, 2009). Students are ranked by their involvement in areas such as time on campus, organizational interactions, and interactions beyond the classroom. Career engagement looks solely at the actions based on vocational obtainment. Second, student involvement implies a behavioral context. Student involvement is based on physical and psychological energies that a student invests in their academics (Sharkness & DeAngelo, 2011). Career engagement is based on a proactive motivational aspect (Parker, Bindl, & Strauss, 2010). Career engagement looks at the first aspect of proactive motivation, which is a student's ability to take control to achieve a better fit within their future conceptual career organization (Wolf-Wendel et al., 2009). Third, student involvement takes into account that there is a limit to a learner's time and energy (Astin, 1999). Educators are competing with other forces outside of the educational experience for this

limited resource. While career engagement can optimally utilize any of the student's time or energy for vocational expression (Wolf-Wendel et al., 2009), career engagement can be implemented simultaneously while developing various career behaviors (Hirschi et al., 2014). Career engagement is both inclusive and affirming (Wolf-Wendel et al., 2009). For example, students who want to be a carpenter can be in a geometry class doing Pythagoras' theorem and realize this information could be used to calculate material lengths for their roof trusses. The student proactively starts to see the problem as a direct link to their vocation, and they are intrinsically motivated to develop their skills to become a better carpenter and apply their math class to help better their calculation skills for their future vocation.

It is important for students to link academic activity to career engagement. First, career aspirations help define a student's perception of the quality of their educational experiences (Antonio & Tuffley, 2015). When a student has a clear vocational goal and can express it through academic curriculum, their educational involvements will be more fitted to their career targets. Second, today's employers are looking for a self-initiating type of employee (Hirschi, Lee, Porfeli, & Vondracek, 2013). As the job market becomes more competitive, employers are raising their expectations from their employees. A student who maximizes their academic activity to leverage into their occupation will be in high demand. Third, as link between self-direction and career management becomes stronger, the educational process becomes more satisfying to the student. At the university level, students are already focused on career engagement (Hirschi et al., 2014). Allowing a high school curriculum to help initiate proactive career activities enhances a student's ability to actualize their possible career potential.

Career engagement is derived from the career construction theory (CCT). While engagement is understood to be solely behavioral (Nilforooshan & Salimi, 2016), career

engagement is moderately correlated to both vocational identity and career self-efficacy, which are attitudinal career constructs (Hirschi et al., 2014). Career engagement was linked to motivational and social-cognitive factors (Hirschi & Freund, 2014). Hirschi and Freund's (2014) correlational study illustrated that when above average scores of career engagement were present, so were high levels of social support and positive emotions. Career engagement was created to find out if there was a way to enhance students' sense of work meaningfulness and occupational identity in order to increase their positive work experiences. Career construction theory emerged, which positions the individual as the central regulator of vocational behavior (Brown, 2014).

Career Construction Theory

Career constructional theory (CCT) describes the interpretive and interpersonal process through which people conceptualize their being, focus their occupational conduct direction, and extrapolate importance of their vocation (Brown, 2014). Career construction theory comes from the career counseling fields. The theory addresses self-actualizing career construction through personal constructivism and social constructionism. These constructs set the stage for a holistic approach to vocational behavior. From the holistic approach, the individual can develop a personal, self-constructed career narrative. Self-construction is separated into perspectives and career construction. The personal career construction narrative divides self into actor, agent, and author (Brown, 2014). The concept of integrative frameworks of narratives has been gaining considerable traction in psychology over the past decade (McAdams & Pals, 2006). These developmental layers sketch a dispositional outline of psychological individuality through social-cognitive processes to, at first, explain motivation, then to developing a personal life narrative in which an individual can construction a full life meaning (McAdams & Olson, 2010).

Personal Constructivism and Social Constructionism

Constructivism and constructionism, while are sometimes treated as synonyms, are not the same. Each word corresponds to a different category of interaction (Bächtold, 2013). Constructivism originates from the work of Piaget and is both epistemological and philosophical (Hyde, 2015). Piaget (1967) described constructivism as knowing an object or event by interaction, and schema developed around the action. Ultimately, constructivism is the view on the theory of learning rather than teaching (Fosnot, 1996). Constructivism focuses on cognitive development and deep understanding of an active learner. In constructivism, new learning implies an active learning involvement of the individual as they develop knowledge. Constructionism originates from the field of sociology undergirded by the field of postmodernism (Hyde, 2015). Constructionism states that humans together create and sustain social phenomena though communal interaction (Berger & Luckmann, 1996).

Career construction theory uses personal constructivism to address the self-actualizing method of career construction. Personal constructivism's assumptive structure is developed from a fundamental postulate (Kelly, 1955). Various corollaries are facets and elaborate on the formal postulate. For example, construction corollary is the way a person anticipates the world based on personal past experiences. Individual corollary is how each person exclusively sees the world. Organizational corollary is how a person's view evolves by their construct previously embraced. In other words, personal constructivists understand the world around them by ordering their experiences into a schema based on their personal worldview (Wilson & Tagg, 2010). The individual develops a mental map from the amalgamation of their experiences and actions. An individual's reality is given meaning by engagement of stimuli, and significance is developed by the interconnections personal relevance (Leitner, 2005). Career construction theory implements

personal constructivism to substantiate personal connections between the individual and the career behavior.

Career construction theory uses social constructionism to illustrate interpersonal societal interactions that are instrumental to developing running knowledge. Social constructionism is the viewpoint that human interpersonal interaction influences an individual's perspective (Gergen, 1985). While social constructionism does not disregard influences, such as genetic factors, the theory just focuses on the social interaction for constructing knowledge (Galbin, 2014). Meaning is derived from speech, which is interpreted from a cultural consensus. The main ideas of social constructionism can be summed up in the following statements (McLeod, 1997): First, an individual's primary perception is found in terms of a dominant thought from the social world. The current majority social filter is used to develop insight into a situation. Second, the theory rejects the methodology of positivistic approaches, which state that knowledge cannot be reflexive. Social constructionism employs a careful analysis of past events to develop an individual's present construct. Third, the goal of research is redefined as an acceptance of what is possible. Scholarly information is not seen as universal and static but rather able to be advanced and mutated from different levels of social understandings. Fourth, a deep underlying assumption is that our understandings are a product of past interactions and historical events between people groups. For example, Russia has a different past than the United States. Social constructionists would be interested in the differences between Russian and American cognition of current day events based on differences in cultural and historical social interactions. Lastly, the "mind," "self," and "emotion" are developed from a social construction process, which can be mutated through social discourse. One's emotions about a situation can change when discussing the event with a person who has a different social

construct. With all these social construction concepts, career construction theory can build off the social interaction between people to create a representation of reality (not reality itself) to develop a vocational direction (Brown, 2014).

Holistic Approach to Vocational Behavior

Career construction theory also uses a holistic approach to understanding vocational behaviors. The three holistic approaches are vocational personalities and work environment (Holland, 1997), life-span development of work (Super, 1980), and the motivation of the spirit behind self-completion of work (Savickas, 1997b). Career construction theory uses the above three holistic approaches to create a narrative that addresses how people identify their work roles (Corso & Rehfuss, 2011).

Vocational personalities and work environment (Holland, 1997) is one of the most esteemed and extensively used concepts in employment counselors, career counselors, and other career development occupations (Toomey, Levinson, & Palmer, 2009). The core of Holland's theory of personalities and work environment is the six personality types: realistic, investigative, artistic, social, enterprising, and conventional (Holland, 1997). The realistic personality is conforming, hardheaded, and practical. Investigative individuals are analytical, critical, and rational. Artistic individuals are disorderly, emotional, and expressive. The social personality is agreeable, friendly, and understanding. Adventurous, ambitious, and assertive describes the enterprising personality. The last personality type, conventional, is careful, conforming, and persistent. The level in which individuals can have a personality type that matches their work environment is called congruence (Gottfredson & Duffy, 2008). Differentiation is the variance from the six personalities. Both congruence and differentiation are considered when predicting professional outcomes, such as satisfaction, performance, and stability (Toomey et al., 2009).

According to this theory, these six dispositions help determine which work activities are better fits. Ultimately, Holland's theory is used to describe, understand, and predict vocational choices that individuals make in their succeeding career choices. Career construction theory uses Holland's vocational personalities and work environment theory as a component of occupational prediction. While Holland's theory looks at work preferences, life-span career development looks at the sequence of occupational positions to determine future work preference (Super, 1980).

Life-span career development (LSCD) illustrates the interactive nature of a variety of roles that constitute a career through self-actualization from a composite of various life role combinations (Super, 1980). Life-span career development is not determined by age. Biosocial development and life situations determine the stage of life in which the individual is currently situated (Jepsen & Dickson, 2003). Life-span career development assigns theaters, positions, and roles to an individual to conceptualize the multidimensional calculus for predicting career development (Super, 1980). The life-span career development approach uses five stages to explain the progression of career and life choices: Disengagement, growth, exploration, establishment, and maintenance (Super, Savickas, & Super, 1996). Some disengagement actions are letting go of old work identity, loss of work interest, and discouragement. Various behaviors in the growth stage are awareness of job dissatisfaction, emotional expressions, and weighing cost/benefit of a career change. The exploration stage has willingness to explore skills through assessment, increased motivation, and seeking educational opportunities. Managing stress, redefining self, and consolidating are all behaviors in the establishment stage. Lastly, maintenance entails building coworker relationships, finishing educational degrees, and innovation in their current position (Super et al., 1996).

The motivation of the spirit behind self-completion of work (Savickas, 1997b) is another component used to build career construction theory. The spirit behind self-completion of work is defined as the activating force that helps give movement towards a goal based in a career capacity (Savickas, 1997b). Career counselors use this principle to identify work as a personal journey towards self-fulfillment. A person's self-fulfillment concept can be used to assist clients to find the fuller meaning of life (Kinjerski & Skrypnek, 2008). The theory reflects upon the state of well-being, a meaningful work contribution, a connection through a common goal, an awareness of other's goals, and self-transcendence (Kinjerski & Skrypnek, 2004). The spirit is derived from words characterizing blow, breath, and wind (Savickas, 1997b). The Bible defines man's spirit as inward personal action. It states, "For what person knows the thoughts and motives of a man except the man's spirit within him?" (1 Corinthians 2:11a, Amplified), which helps to conceptualize the essence of the Spirit discussed in the theory. The four dimensions of spirit behind self-completion of work are engagement, connection, community, and transcendental experience (Kinjerski & Skrypnek, 2006). Career construction theory relies on the spirit behind self-completion of work's four-dimensional aspects of personal internal motivators to help holistically define individual intent in a vocational format.

Self-Making (Self-Construction)

The concept of self and developing a vocation is central to career construction theory (Savickas, 2012). The concept of self-construction claims that a person constitutes self (reflexivity – both dual and trinity) and a life-long vocation by reflecting on experiences, using a distinctive human capability to be meta-conscious (Guichard, 2005). In order to be reflective, a person implements language and inner dialog to construct and develop a social reality (Neuman & Nave, 2010). In this interactionist theory, quantum theory is applied to understand that the

mind is a multilevel, recursive-hierarchical system that expresses its abstract character through

mathematics. From the visual aspects of mathematical modeling, the concept of a mental space

is born (Nueman & Nave, 2010). In this theory, the self is co-constructed from external

experiences and the interpersonal process on which a person reflects (Savickas, 2012). The

development of self and career construction can be observed from three different standpoints.

Theses perspectives are from the vantage point of object, subject, and project (McAdams, 1995).

Consecutively, each perspective has risen during the time frame in which it was socially and

culturally significant.

Perspectives

Moving from an agricultural to an urban society, the concept of meeting vocational needs

was a high priority. People needed a new dynamic in order to know how they fit into society. It

was thought at the time that people should pursue life from a moral framework (Taylor, 1989).

The modern identity (or self) becomes an object to be studied. The perspective of self as an

object treats a person as a thing to be studied from factors called personality traits. These traits

are broad and non-conditional impressions from an observer. Traits provide the personality

description signature (McAdams, 1995). As they relate to career construction theory, vocational

traits are discovered by the realistic, investigative, artistic, social, enterprising, and conventional

(RIASEC) assessment (Holland, 1997) and paired with possible occupations. Factor analysis is

implemented to study multiple traits called personality structures (Savickas, 2011). Advantages

to knowing personality from traits are as follows (McAdams, 1995): First, traits are based on

careful observation and reflect real differences in personality. Individual described behaviors

and measures are based on a conversance of observations which create insights that are intuitive

and consistent judgments about the individual of interest's traits (Moskowitz, 1990). Second,

personality traits demonstrate a remarkable consistent stability over time. Cross-sectional analysis of behavior traits has been found not to be time sensitive and is long term dependable (Funder & Colvin, 1991). Third, there is a strong correlation between traits and individual differences based in aggregated behaviors. Even with varying scenarios, situational specificity and behavioral consistency are not necessarily in opposition (Funder & Colvin, 1991). Fourth, trait effects are generally equal to situational effects. It was found that taking multiple measures of appropriately interrelated behaviors and combining them into behavioral indexes is a high predictor of power (Funder & Ozer, 1983). Fifth, trait psychologists have accepted the big five as an adequate expression of personality. The big five model is a truly comprehensive description of the trait domain. The big five's domains are extraversion/intraversion, neuroticism, openness to experience, conscientiousness, and agreeableness (Digman, 1990).

As humanistic theories gained a foothold, the emergent concept that a person trusts their subjective experience leads from non-directive to client-centered to person-centered career counseling (Savickas, 2011). The perspective of subject personality was born. The developmental shifts in vocational activities became the driver for shaping careers rather than external demands (Borgen, 1991). Additionally, this theory of developmental self-determined striving has stages and tasks (Super, 1951). The subject (person) developed a self-concept by an interaction with work roles and developing interests to better match their self and vocational narrative (Savickas, 2007). A holistic-dynamic theory emerged that builds a hierarchical structure that categorizes vocations into levels of success (Maslow, 1954). Over time, the perspective of subject as a self-concept became simply too vague in terms of its meaning to be useful either theoretically or practically without careful definition and specification (Betz, 1994).

As the Information Age started to develop, a new concept in self-making began to take shape (Savickas, 2007). This innovative perspective viewed the self as a project. Because the normal long-term corporate structure had eroded, individuals could not build a 30-year career, retiring from the original organization (Savickas, 2012). The individual was changing their perspective to see their vocation as flexible and willing to learn in order to maintain employment in the modern workforce. Rather than taking a career path, employees were innovating on their skill sets in order to stay vocationally competitive.

This conceptual shift was not the only thing taking place currently. Psychologists were starting to recognize that women were excluded in earlier understandings of self-actualizing. The concept of modern identity was being questioned (Savickas, 2007). The main proposition is that the person's struggles are formed from his or her social environment and not the individual's intrapsychic characteristics. The plight of many women was manifested into a problem beyond the scope of what they society was willing to socially accept as traditional femininity (Friedan, 1963). Earlier vocational concepts did not regard women in their process. To overcome this deficit, feminist psychology was developed with the basis in *Psychology Constructs the Female* (Weisstein, 1971). The author asserted that psychology does not know women, because it has never addressed women's characteristics or their desires. With one societal paradigm challenged, others were starting to manifest. Gender identity challenged traditional mothering through psychological methods of social structure (Chodrow, 1978). In Chodrow's book, traditionally accepted biological models were being redefined by new cultural interactions defined by societal interactions. Identity politics were introduced (Hanish, 1969). This idea created a new woman's standard around the ideas of perceiving gender, age, race, class, and sexual orientation. All concepts were being challenged through the influence of psychological

ideas using a social paradigm (Herman, 1995). The idea used deconstruction to challenge

political inequalities and champion the psychological narrative as the doctrine of modern times.

As it applies to career construction theory, the concept of identity can be constructed from social

interactions as well as vocational activities.

As the digital age started to emerge, identity began to be segmented into two other areas

of study. The literature focused on race and ethnicity (among others), which was called a

person's culture categories (Frable, 1997). But as these areas were emerging, vocational

research of race and ethnic considerations were not readily addressed (Delgado-Romero, Galván,

Maschino, & Rowland, 2005). But as the 1990s were ending, race and ethnic identities were

starting to be addressed in the vocational behavior literature. Race is used by social scientists to

denote differences drawn from physical form (skin color, eye shape, physiognomy). Ethnicity is

used to denote discrepancies based on region of origin, first language, and family religion. The

literature suggests that gender, racial, ethnic, sexual, and class identities are dynamic and could

be multidimensional based on the individuals' current social structure (Frable, 1997). With these

constructs, two models for race and ethnic identity have emerged. They are called the linear

model and the two-dimensional model. The linear model creates a new identity in the current

culture while weakening the old culture. The two-dimensional model suggests that both old and

new cultural models work independent of one another and thus are not affected by the other's

influence. Integrating race and ethnicity has a positive effect on interventions that promote

growth and change, such as educational practice (Delgado-Romero et al., 2005). While race and

ethnicity do not play a role in vocational ambitions, cultural categories do affect appearance of

vocational opportunities and perceived occupational obstructions (Fouad, & Byars-Winston,

2005). In regard to career construction theory, either identity model proposes that students'

cultural categories are able to import their racial and ethnic identities into vocational activities at school and developing a new cultural identity based upon occupational constructs, which disrupts perceived obstacles to achievement (Frable, 1997).

Recently, social class has been empirically addressed with attention to vocational decision making and educational aspirations (Thompson & Subich, 2007). How a person reacts to traumatic events can be related to social class perspective (Diemer & Ali, 2009). Social class is an individual's level of education and occupation, behaviors, thoughts, and feelings that express a value system that dictate social interactions (Storck, 1997). It plays a role in how researchers comprehend sensitivity to coping with outside stressors in social situations. Social class may influence worldview more than race and ethnic identity (Krieger, Williams, & Moss, 1997). Social class has a significant impact on a youth's level of professional hopes and expectations (Brown, 2014). Career construction theory has integrated differential status identity to help to address perceived barriers of social class with career decision self-efficacy and related career direction (Thompson & Subich, 2011).

A subjective career bears a resemblance to self-constructive tasks. A career emerges from social activity that is spurred on by mental processing that develops a personal narrative. Much work has been done in personal psychology over the past decade in integrative frameworks (McAdams & Pals, 2006; Singer, 2005; Sheldon, 2004) implementing a personal narrative. A personal narrative is comprised of the self as an actor, agent, and author (Savickas, 2012). This understanding of psychological personal narrative comes from behaviors as an actor, strivings as an agent, and explanations as an author (McAdams & Olson, 2010).

Self as an Actor

From birth, a child develops his or her family personality from biological characteristics and heredity (i.e. gender, race, class, birth order). As time moves on, family personality is integrated with social interactions from individuals (such as caregivers), neighbors, and school settings (Savickas, 2012). Traits start to emerge that are expressed through temperament unveiled as actors via a social construct (McAdams & Olson, 2010). Culture dictates rules and norms for expression of the individuals' trait expression. In regard to career construction theory, two main methods of internalizing models for self-construction are utilized. They are introjection of guides and incorporation of models (Savickas, 2012). Children engage in dialogues with the guide (parent or caregiver) regarding goals they have internalized. To build upon a self-structure, an individual will interject their goals or solutions found during a discovery process. Actors incorporate familiar past models to similar current problems. Role models provide input to advise and form their identities. In self as an actor, a child takes meaning from a highly-regarded person and incorporates their perceived ideals into their own situation.

As a person continues to grow and solve more problems, a reputation develops rehearsing the interjected guides and incorporation of models. A child's behaviors become more consistent over time and these behaviors are recognized as a personality, or a person's essential features (Rangel & Keller, 2011). Skills, abilities, and habits are developed from rehearsing personality traits. While personality traits contribute to a person's being, career construction theory views reputation as deriving from the individual's social network (Savickas, 2012). As related to work, reputation (or trait ascriptions) will reside within the connection of workers within a person's occupation and the level of acquaintance interaction (Hampson, 1983). According to person-environment fit theory, a person could find their roles in labor based on what type of reputation

is associated with the individual (French, Rodgers, & Cobb, 1974). Personality types can be tested from external factors using the realistic, investigative, artistic, social, enterprising, and conventional model (Holland, 1997) and categorized into professional personality types. In regard to career construction theory, actors use these types to express socially constructed roles and expectations of vocational attitudes and skills (Savickas, 2012).

For a social constructionist determining a person's essential features, the self-construction process involves continuous interaction between the underlying forces of a system and situational contexts of interaction (Mischel & Morf, 2003). Similar vocational goals, interpersonal competencies, and situational processing can be categorized as self-constructing types, which overtime can be construed into self-construction strategies (Savickas, 2012). As these social inputs help shape an individual's theme, the individual must implement these strategies in adapting to tasks, transitions, and traumas.

Self as Agent

In the second personal narrative stage of self, the individual is regarded as an agent. In this stage, culture shows a stronger link between the types of actions, importance of motives, and achievement of goals than in the prior stage (McAdams & Olson, 2010). As the person grows, the individual takes their self-construction process into arenas beyond the home. Goals, motives, and values are more vivid than in the prior schema. Goals are linked to autonomy, competence, and relatedness as related to higher levels of satisfying events (Sheldon, Elliot, Kim, & Kasser, 2001). Goals are the building blocks that personality constructs are developed. From the social cognitive context, goals are the main procedure to develop an individual's being. Self-determination theory states that in the same way a parent is the main support for development as an actor, the school and the classroom, through the implementation of goals, are the main support

for an individual's development, achievement, and well-being as an agent (Ryan & Deci, 2017).

Chosen actions, whether planned or reactive, (that achieve any goal) are valued to enhance

personal agency (Little, StryJei, & Wehmeyer, 2006). Individuals who are participating as an

agent make choices, plan, and will their self-concepts into being (McAdams & Olson, 2010). As

a career construction theory agent, children make active choices (or self-extensions) about

ascribed goals, then projects, and eventually career ambitions (Savickas, 2012). The agentic self

has various levels of abstraction, breadth, and difficulty that are expressed through educational

and vocational narratives for the individual's social ecology of life (McAdams & Olson, 2010).

 Agent challenges. Career construction theory identifies three types of change challenges

when transitioning through a personal development process (Savickas, 2012). The first

impediment is vocational development tasks. Vocational development tasks are social

expectations of an achievable assignment that is normally age-driven. Career adaptability can be

measured by two characteristics (Hartung, Porfeli, & Vondracek, 2008). The first measure is

degree. The degree of vocational development is defined by the tasks the child has faced and is

currently attempting to complete. The second measure is the rate. The rate is defined as the

coping behavior of similar developmental tasks over time as related to other social peers. While

career exploration is not associated with vocational identity, children participate in major

developmental task work in an applicable position, determine vocational preferences, and think

about future endeavors that could develop identity goals for future knowledge (Rogers, Creed, &

Praskova, 2016). Surprisingly, adolescents can identify their specific preferences based on a

heightened sensitivity to issues of employment security or employment equality of changing

labor market conditions (Vondracek, Silbereisen, Reitzle, & Wiesner, 1999).

The second change challenge to vocational development is occupational transitions. Occupational transitions can be a continuum of wanted or unwanted, planned or unplanned, and promoted or demoted movements in an individual's vocation (Savickas, 2012). Over the life span of a modern worker, vocational competences have had to be expanded and broadened by the market's quick fluctuating demands (Fouad & Bynner, 2008). Fluctuating demands include, but are not exclusive to, the following: office work expectations, government policies, and global competition. Vocational transitions can have an impact on personal mental health conditions (McKee-Ryan, Song, Wanberg, & Kinicki, 2005).

The third change challenge to vocational development is work traumas. Work traumas are agonizing events such as office closings, on-the-job accidents, and social work schisms (Savickas, 2012). Expressions of vocational trauma can be expressed as blaming, scapegoating, and social isolation (Marton, 2016). Post vocational trauma can be manifested in safety perception, changes in behavior, and preparedness behaviors which can affect occupational output. Resiliency to vocational trauma is expressed in high levels of optimism, good recovery skills, and positive self-regulation of emotions (Charney, 2004).

In career construction theory, adaptation to the change challenges are based in five behavior sets. These behavior sets are as follows: orientation, exploration, establishment, management, and disengagement (Savickas, 2012). Understanding these behaviors can help an individual better meet change challenges. In terms of goal assimilation and accommodation, students who have higher levels more positive self-perceptions of attainability and optimism will have a higher level of satisfaction with career progress and life satisfaction (Haratsis, Creed, & Hood, 2016).

Career construction theory describes adaptation outcomes from four personal characteristics called readiness, resources, responses, and results (Savickas, 2012). Readiness (adaptive) is the flexibility or willingness to attack change challenges with an appropriate response. Resources (adaptability), such as planful (or intentional) attitudes, future orientation, and decision making, denote psychological coping responses to changes in social integration (Savickas, 1997a). Responses (adapting) are the coping behavior to vocational development tasks, occupational transitions, and traumas. Results (adaptation) are better outcomes based upon a willing to embrace change challenges with positively modified characteristics.

In regard to career construction theory, there are dimensions of career adaptability (Savickas, 2012). At the global dimension, the general level of career adaptability is concern, control, curiosity, and confidence. The attitudes, beliefs, and competence (ABCs) of career construction are the intermediate level. The attitudes, beliefs, and competence shape the concrete actions associated with change challenges. At the lowest level, concrete actions are the competencies based on the ability to cope with developmental tasks, occupational transitions, and work traumas.

 Career concern describes an individual who contends with issues regarding future orientation and the optimistic feelings around such dilemmas (Hartung, Porfeli, & Vondracek, 2008). Attitudes of planfulness and positive outlook planning help individuals become cognizant of occupational task and transitions to be addressed in the upcoming possible prospects (Savickas, 2012). Lack of career concern involves apathy, pessimism, and planlessness. These are the opposite of a positive outlook and are sometimes labeled as indifference. Career control increases self-regulation though vocational decision making and taking responsibility for the decisions made (Hartung et al., 2008). Career construction theory determines control through

social factors, such as the presence of others, the frequency of interaction, and comparative monitoring, to be an aspect of intrinsic processes that impact self-regulation (Fitzsimons & Finkel, 2010). According to self-determination theory, relevance for autonomy, providing choice, filtering external controls, and acknowledging the actor's perspective are important factors in developing positive intrinsic motivation, and are the bedrock of career control aspects (Ryan & Deci, 2017). Positive intrinsic coping behaviors are being assertive, disciplined, and willful. Lack of career control can lead to confusion, procrastination, or impulsivity, which are aspects of career indecision (Savickas, 2012).

Career curiosity is the attitude of inquiry an individual embraces when exploring career options for a realistic future occupation (Hartung et al., 2008). Attitudes and beliefs that are curiosity positive lead to experiences that increase self-knowledge and vocational concepts (Savickas, 2012). In a vocational setting, risk-taking, explorative activities, and inquiry facilitate a student's familiarity and boundaries in the domain of work (Little & Sweller, 2015). From a lack of career curiosity, a student can have inaccurate or unrealistic concept around the self in the terms of vocational accuracy (Savickas, 2012).

Career confidence is the positive self-efficacy belief in the individual's problem-solving prowess (Hartung et al., 2008). The attitudes, beliefs and competence of career confidence is illustrated though problem solving daily activities such as housework, homework, and hobbies (Savickas, 2012). As a student becomes more comfortable with their problem solving, the individual increases in self-acceptance and is able to broaden their experiences to larger tasks that need more persistence, striving, and industriousness. A lack of career confidence leads to inhibition, self-consciousness, and timidity about future endeavors (Hartung et al., 2008). Also,

misconceptions about gender, race, and social roles can produce internal conflicts that can create more inhibitions in an individual experiencing a change challenge (Savickas, 2012).

As characteristics start to emerge through goal construction, the agency of an individual is formed from the social influences for self-realization. From a vocational standpoint, the agent is furthering their constructive adaptation through occupational interactions which precipitate career adaptability dimensions to further enhance goal achievement.

Self as Author

As vocational traits and occupational goals continue to be acquired, the person develops a narrative that eventually is the defining factor of their life (McAdams & Olson, 2010). The worker authors a narrative identity by selectively appropriating and personalizing his or her experiences. In order to develop an identity narrative, work activities must be acquired. These activities are called micro-narratives (Savickas, 2012). They can be described as occupation positions in a chronological order (i.e. resume). Alone, these micro-narratives do not have a theme, but as goals emerge, the collection of consecutive jobs could be explained in a subjective career objective. A subjective career objective develops a directed action toward a conclusion called a plot. As milestones accumulate, meaning is amplified and autobiographical reasoning helps craft thematic unity from these events, as well as from contradictory interactions. Once articulated by the author, the career theme provides the unifying idea that makes a whole life. The thematic pattern is woven by career theme and is the primary unit of meaning to understand the job story and occupational plot. New experiences filtered through the career theme impose meaning to the occupational plot. If a plot ruptures, the macro-narrative theme and recurrent pattern are used to restore order and direct action. From this high-level view, the narrative

approach allows career counselors to address what, why, and how without addressing individual traits in an ever-changing workplace (Corso & Rehfuss, 2011).

Career theme traces how a person remains consistent with self-ideals, despite diversity across micro-narratives (Savickas, 2012). The author's identity narrative supports both the actor's continuous story and the flexible agent of change. Narrating a career allows the individual to be reflective and consider competing positions to a situation (LaPointe, 2010). In career construction theory, the theme is what matters in the story. There are two types of meaning in a theme (Savickas, 2012). First is public meaning. It is the social contribution from the individual and occupational function the person gives to the vocational action. The second is private meaning. This is the context or career theme behind the vocational actions. Vocational identity is an amalgamation of performance and co-construction interactions that are developed from the individual (LaPointe, 2010). Beyond the career theme is the career arc. It is the overarching narrative thread that extends through the entire vocational macro-narrative (Savickas, 2010). The process of developing a career arc comes from the need to transform an individual's aim into a conceptual script as they forge a character that addresses their preoccupations and solves their vocational problems. The career arc gives the individual a sense of significance and importance in their life (Corso & Rehfuss, 2011). In terms of the vocational narrative, it defines the person and explains the driving force of the plot, sometimes called a unified life story (Savickas, 2012). Life themes imply how a person can directly solve a problem by growing towards self-completion, developing more security, power, or love as they build their careers. Additionally, life stories can indirectly point to hurt or problems which still need to be solved in the protagonist's narrative (Corso & Rehfuss, 2011). Not surprisingly, dispositional traits, goal adaptations, and life narratives should relate to each other in complex and meaningful

ways (McAdams & Olson, 2010). Applying to practice the perspectives of self-construction structures can improve the scheme of career intervention (LaPointe, 2010), and drives individual career choices from what a person has come from, who are they now, and where are they going next.

The development of career engagement can affect career behaviors (self-efficacy and context belief, autonomous career goals, and positive affect). First, positive emotions contribute to an increase in career engagement (Hirschi & Freund, 2014). Using educational experiences to develop a positive perception about education, a student can build a proactive positive motivational attitude into a more personalized occupation educational experience. Second, networking is another important exchange in developing a dynamic perspective on future career success (Wolff & Moser, 2009). As students construct the self-initiated career concept, they will integrate with people that could have an influence on the future career opportunities. Lastly, student career engagement is expressively associated with career articulations of individuality and self-efficacy (Hirschi et al., 2014). Students who have a personal scholastic experience in their chosen career will have a higher level of self-identity and ability to achieve their goals. If implemented correctly, these characteristics could advance student career engagement in educational practices throughout the country.

Related Literature

The Related Literature section of this study will explore the scholarly information associated to career engagement connected with career pathways. A Career pathway is the prioritization of curriculum design to a specific career focus. Project Lead the Way, career technology education, and general education are three pathways that will be explored in regard to

career engagement. In each section, the effects of career pathways upon career engagement will be articulated.

High School Graduate and Career Engagement

The high school graduates' past educational expectations and school engagement have the strongest relationship to academic performance (Sirin & Rogers-Sirin, 2004). In this transition to adulthood, these experiences shape their adult career aspirations and future engagement (Upadyaya & Salmela-Aro, 2013). With the expectation of graduation, career engagement is found to increase and career satisfaction decreases (Upadyaya & Salmela-Aro, 2015). While the satisfaction of work decreases in high school graduates, the key factors of schoolwork engagement (energy, dedication, absorption) have a way to be measured and related to potential for transformation into work engagement (Salanov, Agut, & Peiro, 2005). Energy is the high mental resilience to studying/working, a willingness to invest in effort, and a positive approach. Dedication is a cognitive sense of significance, enthusiasm, pride, and inspiration regarding school/work as meaningful. Absorption is characterized by behavior accomplishments, fully concentrating, and being engrossed in one's studies/work (Salmela-Aro & Upadyaya, 2012). Because of the size of most high schools, there is a lower change of mentor-like relationships in the academic setting. The stage-environmental fit theory (previously called person-environmental fit) provides a way to link the individual with institutional levels to understand how the school influences development (Eccles & Roeser, 2009). Supporting this theory is the following finding: Young adults who enter occupational life and feel their person-environment fit are good find that their stability in work engagement has a positive corollary relationship (Upadyaya & Salmela-Aro, 2015).

The interplay of career engagement and other factors have an interesting scholarly dynamic. As found in the four-factorial model of work-related wellbeing, job satisfaction (indicating pleasure vs. displeasure), occupational stress (indicating anxiety vs. comfort), burnout (indicating fatigue vs. vigor), and engagement (indicating enthusiasm vs. depression) are interrelated (Rothmann, 2008). The broaden-and-build theory suggests that experiences of positive emotions build their enduring particular assets. These assets include the physical and intellectual resources to social and psychological resources (Fredrickson, 2001). As it refers to students, those who have positive emotions about career engagement and have frequent positive emotions will promote an upward spiral of success at school or work. The job demands-resources model states that the higher career engagement leads to less exhaustion (though realistic career expectations) and lower disengagement (through adequate occupational resources), thus building higher educational satisfaction (Demerouti et al., 2001).

One finding suggests that during secondary education, support from various resources (peers, teachers, and parents) increases educational engagements (Rosenfeld, Richman & Bowen, 2000). Second, students who have transitioned through many educational settings are more likely to have the will to have high levels of initial career engagement. Third, students who exhibit low initial level of career engagement will do the same after secondary school (Upadyaya & Salmela-Aro, 2015).

Graduates should anticipate having attained suitable knowledge and skills during their educational process (Lonsbury & Apple, 2012). When changes are initiated in educational practices (such as a shift towards the self-motivated student or the educational "consumer") (Labaree, 2012), career engagement should be readily observed in most classroom settings. On the other hand, the educational scope for society has broadened to include democratic equality,

social efficiency, and social mobility, which has inhibited the systems from accomplishing fully

any of their academic goals (Labaree, 2012). These educational issues, while important, have

divisive issues around democratic equality and have become the main focus of modern education

(Lonsbury & Apple, 2012). This could possibly be a limiting factor in regard to career

engagement for high school graduates.

Career Readiness Pathway and Career Engagement

While knowledge concerning the elements and flexibility of school engagement remains

very limited (Kenny et al., 2006), career mismatches can occur when the student does not

prioritize future career direction (Greenbank, 2012). Theoretical data has not yet examined the

central conceptual principle that school enthusiasm and engagement are associated to a student's

calculus for future career success derived from educational prospects (Solberg, Howard,

Blustein, & Close, 2002). While the association between curriculum design and career

engagement are understated in career literature, curriculum design can transform a student's

understanding into a logical, emotional, and intuitive decision process based upon career

engagement (Gardiner, 2015).

There are many ways that improve career engagement from a focused career pathway.

One way to positively enhance student attitudes toward education and increase student

engagement is through culturally responsive career development services and programming,

such as career pathways (Lapan, 2004). While products like School-To-Work Opportunities Act

(STWOA) ended in 2002 due to a lack of career engagement, some literature stated that

enhanced career pathways can boost student achievement (Kenny et al., 2006). Second, it was

found that students enrolled in a career educational track attained higher grades and viewed the

education as more applicable than other students with less comprehensive guided curriculums

(Lapan, Gysber, & Petroski, 2001). Third, students who had processes for developing meaningful goals and assessing their development toward those goals (sometimes called the feedback loop) can provide higher purpose and motivation (Carver & Scheler 2000). Fourth, hhigher levels of career planfulness and expectations at the beginning of the year were associated with increases in school engagement over the course of the year (Kenny et al., 2006). While high school students explore career prospects and come to understand that their academic subjects have future value, their motivation for mastering what was otherwise an uninteresting subject may increase (Lapan, Kardash, & Turner, 2002).

On the other hand, other factors can contribute to lower levels of CE. One factor is school climate. Student perceptions of school climate (i.e. victimization or hostility) can be an indicator of the level of engagement (Ripski & Gregory, 2009). Second, school size can also determine effective learning with a more direct effect on educational institutions with lower-socioeconomic students or with high concentrations of minority students (Lee & Smith, 1997). Third, a negative school transition could indicate negative outcomes (i.e. decreased academic motivation). Also, ethnic and minority students are affected more by a negative transition than Caucasian students (Akos & Galassi, 2004).

Project Lead the Way and Career Engagement

Project Lead the Way (PLTW) is a 21st-century curriculum designed to engage students in STEM (science, technologies, engineering, and math) activities. PLTW tries to relate these educational experiences to the real world. It employs the activities as a pedagogical tool used to develop student interest (Tran & Nathan, 2010). The program introduces students to the scope, rigor, and routine of engineering though hands-on learning experiences to develop independent problem solvers (Project Lead the Way [PLTW], 2018).

Engineering education programs like PLTW face both challenges and opportunities to effectively integrate academic content as they strive to prepare students for college engineering programs and careers (Tran & Nathan, 2010). On the positive side, STEM projects influence higher levels of student engagement (Franz-Odendaal et al., 2016). Second, many educators, parents, and adolescents believe that STEM-centered schools could develop student educational ambitions (Bottia, Stearns, Mickelson, & Moller, 2017). Third, PLTW might help students make a transition into a successful collegial prospect (Finkel, 2016). Some literature suggests that PLTW may offer a pathway to encourage and inspire students to go into STEM occupations (Tai, 2012). Lastly, Bottia et al.'s (2017) research suggested that peers affect student choices in which STEM program is selected by a friend. In this way, attending a PLTW high school may foster the development of stronger STEM-related self-concept and ultimately higher career engagement (Bottia et al., 2017).

With any new curriculum, the antagonists have challenges to the PLTW curriculum. First, the current PTLW research has found no connection between student enrollment (in PLTW) and student achievement for mathematics and science (Tran & Nathan, 2010). Second, students are not attracted to PLTW because the course lessons are not perceived as associated to learners' lives outside the school (Christidou, 2011). Third, there currently is no empirical research that illustrates the relationship between attending a PLTW high school program and achieving a higher outcome from a STEM college (Bottia et al., 2017). Fourth, there is a negative association between students' STEM class participation and STEM success in the states of Florida and North Carolina (Hansen, 2104). Lastly, some PLTW students did not feel qualified to apply for summer internships (Finkel, 2016). The above reasons are the antithesis of good career engagement practice.

Career Technology Education and Career Engagement

Career technology education (CTE), which was formerly known as vocational education, began with apprenticeships in an effort to confirm that aspects of public work were efficiently and effectively accomplished (Barlow, 1974). Over the years, vocational education has gone through many changes in importance and scope (Wang, 2011). At first onset, vocational education was determined to be one method for educating students (Keller, 1984). As civilization started to advance, apprenticeships were developed, which created a relationship between a mentor and a student in mastering a skill or trade (Barlow, 1974). The main driver in the changes to vocational education has been the changes or growth of a nation's technology over time (Wang, 2011). Over the years, federal legislation has adapted to the changes in technology to guide the next workforce generation. Acts, such as educational amendments, the Carl D. Perkins Education and Applied Technology, and National School-To-Work Opportunities, have been the federal Government's response to modern advances in technology (Wang, 2011). Additionally, vocational education has been increasingly known as CTE (Stringfield et al., 2013).

While there is a shortage of studies containing student outcomes in regard to CTE, because of a shift emphasis on educational reform efforts (Stringfield et al., 2013), some data is starting to emerge. First, the CTE focuses more on hands-on and practical activities, which might lead to improved classroom engagement (Salmela-Aro & Upadaya, 2012). Second, CTE's ability to engage the student has long been assumed to reduce failure rates among high school learners (Stone & Alfeld, 2004). Third, CTE pathway programs facilitate close relationships with businesses and offer students work-based educational experiences (Stone & Alfeld, 2004). Results indicate that when a role model is engaged more directly with inspiring and supporting

students' educational and career decisions, students are more able to make educational and career choices (Loera, Nakamoto, Youn Joo, & Rueda, 2013).

On the other hand, for a CTE program to be beneficial to students, it needs to contain rigorous academics and thoughtful occupational development (Stringfield et al., 2013). While American educational institutions are responsible for preparing the youth, CTE programs lack the theoretical and formal cognitive processes needed to support life-long scholarship (Tran & Nathan, 2010). CTE's overemphasis of vocational courses may increase the risk of dropping out (Stone & Alfeld, 2004), but the reasons for dropout remain to be discovered. The government's response to changes in technology has been not as precise as expected. For example, in the 1990s, the Perkins II Act constrained vague ideas about the CTE curriculum articulation, and technology preparation were slow to be developed (Cuetara, 1995). Even still, students of technology (called tech prep) were more likely to work than their non-tech prep peers (Bragg, Puckett, Reger, Thomas, Ortman, & Dornsife, 1997).

Many students are developmentally ready to prepare for occupations in a secondary setting. Some academics have argued that job preparation should be central to preparing students for occupational life (Stringfield et al., 2013). If educational systems offer teaching and learning opportunities that foster critical thinking, high schools could have both physical and instructional structures that make seamless the transition from high school to real-world applications (Kuo, 2010). To capitalize on this advantage, CTE has been rebranded to the public as a magnet program or school. In regard to magnet schools utilizing CTE as an educational driver, qualitative results suggest that treatment schools have created school cultures around programs that appear to explain the improvement of student engagement and achievement scores (Castellano, Sundell, Overman, & Aliaga, 2012). CTE-related classes, when combined with

academic curricula and work experience (such as a magnet program), have the possibility to boost students' academic engagement, which can most likely be transferred into refining skills success in the ever-changing economy (Stone & Lewis, 2012).

General Education and Career Engagement

From very early times, educators have attempted to define the key areas of knowledge that constitute the core of what is work learning. Harvard started their curriculum based on Plato's *Republic* (O'Banion, 2016). General education (GE) classes are traditional education majors, including (but not exclusive to) music, drama, English, world language, and science. Traditionally, GE was thought to define a student's whole education objective as a responsible human being and citizen (Kridel, 1945). Building upon this idea, identifying similar characteristics that engaged all citizens were helpful for defining GE. In 1953, Johnson identified twelve areas in which GE distills foundational knowledge, skills, and attitudes needed to be a productive member of society. As society becomes more diverse, GE has had to follow suit. Current thoughts about GE have become much generalized. Most foundational ideas of GE run on the theory of ensuring that students are equipped to earn a good living and live a good life (O'Banion, 2016).

GE has shown to improve levels of CE in many different areas. First, GE's grade point average (GPA) and retention rates have a modest, positive relationship with engagement (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008). As students score higher on their classes and miss fewer classes than other students, higher levels of engagement are present. Second, GE programs that enable students more by agency than relationships should have higher levels of student engagement (Zepke, Leach, & Butler, 2010). If GE classes create an area to express ideological career concepts, student engagement should be higher. Lastly, wwhile feelings of

competence, agency, and relatedness are important student motivational needs, GE pathways that emphasize feelings of competence most are more likely to see higher level of engagement (Zepke, Leach, & Butler, 2010).

Conversely, GE has shown to decrease levels of career engagement in various factors. First, a uniform curriculum approach, such as GE, could create pressure to conform in certain ways which could decrease student engagement (Zepke, 2015). Second, lower levels of cognitive engagement are associated with school and general delinquency (Hirschfield & Gasper, 2011). As shown by the literature, dropout risk was closely linked to school disengagement (Janosz, Archambualt, Morizot, & Pagani, 2008). As students are going to school less frequently, levels of career engagement could be significantly lower than students who have less truancy. Third, upon entering a compulsory GE program, levels of engagement become varied. As found in the literature, disengagement increased among unexpected dropouts but decreased among expected graduates (Blondal & Adalbjarmardotir, 2012). In addition, by age 15, male students from lower socioeconomic backgrounds were more disengaged; males emotionally disengaged during their last year of compulsory school (Blondal & Adalbjarmardotir, 2012) when compared with their peers. Also, lower levels of engagement were found in high achievers (who dropped out unexpectedly) compared to students who completed the programs.

In summation, GE has various factors that could affect level of career engagement. On the positive, GE curriculum can quickly demonstrate which students are engaged in school activities. Allowing a space for ideological agency and career competence should drive student cognition. On the negative side, GE conformity, consistency, and expectancy could lower levels or accelerate a downward trajectory of career engagement. While there can be a variance

between education systems, student motivation seems for career engagement to be the common thread in regard to understanding how GE pathway affects students' perceptions.

Summary

In current society, for lively and practical engagement in a vocational career, life-long learning, whether formal, as in post-secondary institutions, or informal, as general work experiences, is a necessity (Abeles, 2014). In the educational environment, career engagement helps promote proactive development in future vocational experiences. Whether the career pathway is PLTW, CTE, or GE, the educational experiences could affect career engagement based upon the above literature review. In the current understanding of education, student engagement occupies an important place on the accountability agenda as a surrogate for educational quality (Hagel, Carr, & Devlin, 2012). Teachers analyze what students can produce to evaluate student educational activity, but career engagement quantifies the active career management level of the individual (Hirschi & Freund, 2014), which is usually beyond the scope of any curriculum. Traditionally, academic thought suggested that educational systems that achieve high levels of successful course completions and attain a passport to employment have engaged students by contributing to student success through an attitude of lifelong learning (Yorke, 2006), but career engagement shows that there is a more complex picture than previously regarded between education and early career development (Hu & Wolniak, 2010).

CHAPTER THREE: METHODS

Overview

Chapter Three of this study will explore the various pathways and Student Career Engagement Scores for the 2018-2019 school year in a Mid-Atlantic state among graduating seniors in the ABC school district. Chapter Three of this study contains the design, research question, null hypothesis, participants and setting, instrumentation, procedures and data analysis.

Design

The research design was a causal comparative, non-experimental design (Gall et al., 2006). The design choice was justified due to naturally occurring groups are based upon pathway selection of the participants (Warner, 2013). The use of ex post facto data and the lack of manipulation of the independent variable offered further rationale for the design choice (Gall et al., 2006). The independent variable was the pathway categories and has three levels. The three pathways levels were Project Lead the Way (PLTW), career technology education (CTE), and general education (GE) classes. The dependent variable was career engagement, which is the amount to which a student is proactively developing his or her career as articulated by varied career activities (Hirschi et al., 2014). The dependent variable was measured by assessing the general degree of engagement in various career behaviors using the Career Engagement Scale (Hirschi et al., 2014).

Research Question

The research question for this study was:

RQ: Is there a difference in career engagement scores among high school seniors that are from a Mid-Atlantic school system whose program of study is in Project Lead the Way (PLTW), career technology education (CTE), or general education (GE) classes?

Null Hypothesis

The null hypothesis for this study was:

H$_0$: There is no significant difference in career engagement scores among high school seniors in a Mid-Atlantic school system whose program of study is in Project Lead the Way (PLTW), career technology education (CTE), or general education (GE) classes.

Participants and Setting

The population of this study was high school seniors from a rural/suburban county in a Mid-Atlantic state. A convenience sample for this study consisted of graduating students from three high schools near the researcher's location during the 2018-2019 school year. The researcher was a teacher of school district and had accessibility to the population. The total enrollment for the district was 11,311. In 2016, there were 5,464 females and 5,847 males enrolled in the district. See Table 1 for 2011 to 2016 enrollment for students by race/ethnicity of the district.

Table 1

2011 to 2016 Enrollment for Grades 9-12 | Students by Race/Ethnicity

	Race/Ethnicity						
Year	Am.Ind/AK	Asian	African Am.	Hispanic	HI/Pac.Isl.	White	2+
2016	27	383	2,088	649	25	7,606	533
2015	29	390	2,062	657	28	7,850	541
2014	40	369	2,026	643	19	8,003	501
2013	46	370	2,039	619	27	8,298	491
2012	50	352	2,089	596	18	8,469	462
2011	60	310	2,203	584	14	8,585	411

Students take four classes a day (eight classes total a year) with a 26-minute lunch. In their sophomore year of high school, students must select a pathway, and the pathway must be completed to graduate high school. The graduation rate of the school district is greater than 95%. In 2017, the SAT graduating class mean score trends were evidenced-based reading and writing means were 555, math means were 562, total means were 1117, and student count were 1472.

In 2017, there were 709 females and 760 males enrolled in School A of the district. See Table 2 for 2011 to 2017 enrollment for students by race/ethnicity of High School A.

Table 2

2011 to 2017 Enrollment for Students by Race/Ethnicity of High School A

	Race/Ethnicity						
Year	Am.Ind/AK	Asian	African Am.	Hispanic	HI/Pac.Isl.	White	2+
2017	<10	62	106	75	<10	1177	45
2016	<10	55	92	56	<10	1187	55
2015	<10	61	94	59	<10	1157	53
2014	<10	52	95	56	<10	1133	64
2013	<10	60	97	56	<10	1218	59
2012	<10	60	99	58	<10	1218	50
2011	<10	52	79	52	<10	1322	42

In 2017, there were 444 females and 553 males enrolled in School B of the district. See Table 3 for 2011 to 2017 enrollment for students by race/ethnicity of High School B.

Table 3

2011 to 2017 Enrollment for Students by Race/Ethnicity of High School B

			Race/Ethnicity				
Year	Am.Ind/AK	Asian	African Am.	Hispanic	HI/Pac.Isl.	White	2+
2017	<10	41	179	60	<10	665	46
2016	<10	37	172	69	<10	695	37
2015	<10	41	155	72	<10	713	35
2014	<10	40	140	57	<10	735	34
2013	<10	32	126	61	<10	753	32
2012	<10	30	130	49	<10	773	30
2011	<10	20	132	59	<10	778	28

In 2015, there were 825 females and 843 males enrolled in School C of the district. See Table 4 for 2011 to 2015 enrollment for students by race/ethnicity of High School C.

Table 4

2011 to 2015 Enrollment for Students by Race/Ethnicity of High School C

	Race/Ethnicity						
Year	Am.Ind/AK	Asian	African Am.	Hispanic	HI/Pac.Isl.	White	2+
2015	<10	81	115	92	<10	1313	66
2014	<10	76	104	91	<10	1320	61
2013	<10	72	88	86	<10	1336	61
2012	<10	70	92	83	<10	1326	59
2011	<10	69	85	76	<10	1299	41

The participants who made up the sample participated in one of the three pathways (Project Lead the Way, career technology education, or general pathway) during their senior year of high school. Each pathway category had a set of required classes that help the students' career choice to be explored and expressed in a classroom environment. For example, PLTW pre-engineering pathway had five classes that help students actualize activities associated with engineering and are required to complete in order to graduate from that program. The class names were as follows: Intro to Engineering Design, Principles of Engineering, Digital Electronics, a specialized course (Aerospace or Civil Engineering/Architecture), and Engineering Design and Development. CTE classes specialized in the skilled trades, applied sciences, modern technologies, and career preparation. GE classes were traditional education majors including (but not exclusive to) music, drama, English, world language, and science (see Appendix A for completers and pathways).

Sample

The minimum required sample size for the study was 126 for a statistical power of .7 at the .05 alpha level (Gall et al., 2006). The total participants were 260, which exceeds the minimum required sample size for a medium effect size. The average age of participants was 18.03 years old. The sample consisted of two American Indian/AK Native, 11 Asian, 20 African American, 13 Hispanic/Latino, one HI/Pacific Islander, 197 Caucasian, and 16 two or more races. Their socioeconomic status ranged between upper middle-to-middle incomes. Gender demographics for the sample were 137 males and 123 females. A student's major determined in which pathway sample group the participant was placed (see Appendix B for total school career pathway). The groups were naturally occurring based upon the students' preference in their sophomore year; this selection occurs years prior to this study. PLTW has six possible graduation majors. See Table 5 for PLTW pathway majors.

Table 5

Project Lead the Way (PLTW) Pathway Majors

Majors	School
Cyber Security	H
Homeland Security and Emergency Preparedness	I
Biomedical Sciences	C, G
Pre-Engineering	A, D
International Baccalaureate	E
Science/Math Academy	A

CTE has 26 possible graduation majors. See Table 6 for CTE pathway majors and school locations.

Table 6

Career Technology Education (CTE) Pathway Majors

Majors	School
Health Occupations	H
Academy of Health Professions	H
Food Preparation and Management	H
Licensed Cosmetology	H
Certified Welding	H
Computer-Aided Design and Drafting	H
Computer-Aided Machining/High Performance Manufacturing	H
Computer and Network Technology	H
Brick and Block Masonry	H
Carpentry	H
Electricity	H
Heating, Air Conditioning, and Refrigeration Technology	H
Horticulture/Floral Design	H
Automotive Diagnostics and Systems Repair	H
Automotive Refinishing and Collision Repair	H
Agriculture/Animal Science	H, K
Natural Resources & Agricultural Sciences	K
Accounting and Finance	All
Marketing	All
Computer Programing	All
Business Management	All
Career Research and Development (Work Study)	All
Early Childhood Education	All
Food & Beverage Management (Foods)	All
Teacher Academy of Maryland	All
General Engineering (Tech)	All

GE has 12 possible graduation majors. See Table 7 for GP majors and school locations.

Table 7

General Education (GE) Pathway Majors in the School District

Majors	School
Literary Arts (English)	All
Music	All
Drama	All
Dance	All
Visual Arts (Fine Arts Prep)	All
General Education	F, G, I
Social Sciences	All
Fire/Rescue EMT	All
Medical Services	All
World Languages	All
Environmental Science	All
Science and Mathematics Advanced Studies	All

Group One (PLTW)

The PLTW group had a total of 37 participants. The average age of participants for this group was 18 years old. The group consisted of zero American Indian/AK Native, one Asian, three African American, two Hispanic/Latino, zero HI/Pacific Islander, 30 Caucasian, and one two or more races. Gender demographics for the sample were 30 males and seven females.

Group Two (CTE)

The CTE group had a total of 133 participants. The average age of participants for this group was 18.05 years old. The group consisted of one American Indian/AK Native, five Asian, 11 African American, seven Hispanic/Latino, one HI/Pacific Islander, 102 Caucasian, and six two or more races. Gender demographics for the sample were 63 males and 70 females.

Group Three (GE)

The GE group had a total of 90 participants. The average age of participants for this group was 18.02 years old. The group consisted of one American Indian/AK Native, five Asian,

six African American, four Hispanic/Latino, zero HI/Pacific Islander, 65 Caucasian, and nine two or more races. Gender demographics for the sample were 44 males and 46 females.

Instrumentation

The instrument used in this study was the Career Engagement Scale (CES) developed by Hirschi et al. (2014). The purpose of the instrument was to measure students' career engagement (Hirschi et al., 2014). See Appendix C for the instrument. The instrument was developed due to an absence of certified methods that directly assess general career proactive actions (Hirschi et al., 2014). The CES was developed to aid researchers (and career counselors) who wanted to assess the degree of active career management on a general level (Hirschi et al., 2014). The main focus of CES was based on self-determining career fulfillment. The researchers differentiated characteristics of career engagement in six career behavior categories. The categories are as follows: career planning, career self-exploration, environmental career exploration, networking, voluntary human capital/skill development, and positioning behavior (Hirschi et al., 2014). Although many instruments exist with distinct career behaviors, each distinct behavior correlates significantly to the others (Strauss et al., 2012). With an extensive review of the literature, the researchers created an abbreviated, consistent, and valid assessment that distilled career engagement characteristics into a simple testable format. Since this instrument's creation, CES has been utilized in several peer-reviewed studies (e.g. Nilforooshan & Salimi, 2016; Le et al., 2016). The study has been referenced in peer reviewed research journals repeatedly (e.g. Akkermans & Kubasch, 2017; Chan, 2017; Qi, Liu, & Chen, 2017; Savickas et al., 2018) where the instrument was implemented on high school seniors.

The construct validity was determined by Hirschi et al. (2014) implementing six different studies using the CES. In the first study, the researchers developed and validated the factor

structure. Content validity as secured by creating questions based of existing verified scales. University students ($N = 24$) piloted the five-scale Likert instrument (64% female, age $M = 22.5$, $SD = 2.3$). In feedback of initial instrument, the researchers found that they needed a wider generalizable concept of career engagement. Hence, three questions were added. Testing the factor structure, 146 German university students (42% female, age $M = 23.48$, $SD = 3.32$) from a research class were sampled. Implementing an exploratory factor analysis using principal axis factors extraction with a promax rotation, the scree test and factor eigenvalues illustrated a clear one factor solution. The first factor first factor had an eigenvalue of 4.45 and the second factor had an eigenvalue of 0.95. Factor loadings on the first factor ranged from .37 to .85. Cronbach's α corrected item-total correlation ranged from .35 to .77. A one-dimensional construct of career engagement was established, and the nine question Likert scale was implemented throughout the other five tests.

In the second study, the goal was to analyze the factor structure and measure invariance across university students' gender. The sample of university students ($N = 2,027$) were tested (63.8% female, age $M = 23.74$, $SD = 2.39$, and study semester $M = 4.29$ and $SD = 2.32$). Forty-one majors were represented. Using the nine question Likert scale, the descriptive scores were gathered (total sample: $M = 3.08$, $SD = 0.86$). Separated group data was extracted (female: $M = 3.09$, $SD = 0.87$; male: $M = 3.04$, $SD = 0.85$). A CFA was conducted. For the assessment of the model fit, the researchers used the Satorra-Bentler χ^2 statistic (SB- $\chi^{2)}$, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Found in the analysis was SB- $\chi^2 = 324.79$, $df = 27$, $p < 0.01$; CFI $= 0.96$; TLI $= 0.94$; RMSEA $= 0.07$ (90% CI at [.07, .08]); and SRMR $= 0.04$. Verifying test one, the CFA results established that the one-factor solution could

be confirmed from an independent data set. For assessing gender invariance, the researchers

fitted a sequence of nested CFA models and imposed increasing restrictions on the equalities of

the model parameters. Model 1 was the baseline data. Model 2 introduced equal factor loading.

Model 3 assumed equal intercepts. Because restricting all item intercepts for gender were too

strong, Model 4 set free one intercept from each group, leading to partial intercept invariance.

Model 5 identified equal residual variances. Model 6 assumed equal factor variance and Model

7 presumed equal factor means. Finding of the models were two-fold. First, the researchers'

findings substantiated that the equal scale measures of the same construct demonstrate the

absence of a gender bias. Results from Models 6 and 7 indicated that there were no significant

gender differences in the degree of career engagement.

In the third study, a fitting a series of nested CFA models over two points of time was

implemented to quantify invariances across time and if degree of career engagement changes

during the educational process. Participants from the last survey were contacted six months later

with a follow-up survey using the CES. Forty-five percent of the students responded ($N = 951$)

to the second survey (65.5% female, age $M = 23.70$, $SD = 2.93$, study semester $M = 4.24$, and SD

$= 2.38$).

The findings of study three confirm that CES could be utilized from long-term research.

Measurement invariance similar across same constructs over time. Similarly, CES could detect

changes at different points in time. While career engagement does rise over time, this change

could be affected by the drawing near of the graduation date (Heckhausen & Tomasik, 2002).

In the fourth study, researchers wanted to demonstrate the appropriateness of CES among

a sample of working professionals and university students. Because the professionals were

currently in their careers, the assumption of complete invariance was not possible, but the

researchers targeted at establishing partial measurement invariance by expecting to find the

factor structure and factor loadings to be similar across both groups. The sample consisted of

responses from derived two German University alumni ($N = 290$). Descriptive statistics were

56% female (age $M = 29.61$, $SD = 6.06$; 32% had a bachelor's degree, 63% had a master's

degree, and 1% had a PhD). A CFA was conducted to find invariance in working professionals

(similar to study one). The results were suitable (SB- $\chi^2 = 54.91$, $df = 27$, $p < 0.01$; CFI $= 0.97$;

TLI $= 0.95$; RMSEA $= 0.06$ (90% CI $= [.04, .08]$); and SRMR $= 0.04$). The findings indicated

that a one-factor solution was confirmed among working professionals. A measurement of

invariance was implemented (similar to study two). The results showed that the assumption of

equal factor loadings were significant. (Model 1: SB- $\chi^2 = 377.63$, $df = 54$, $p < .01$; CFI $= .96$;

TLI $= .94$; RMSEA $= .07$ (90% CI $= [.07, .08]$); SRMR $= .04$; Model 2: SB- $\chi^2 = 399.03$, $df = 62$,

$p < .01$; CFI $=.95$; TLI $= .95$; RMSEA $= .07$ (90% CI $= [.06, .08]$); SRMR $= .04$; DSB- $\chi^2 =$

14.17, $df = 8$, $p > .05$). However, Models 3 and 4 fit significantly poorer than Model 2 (Model 3:

SB- $\chi^2 = 450.82$, $df = 70$, $p < .01$; CFI $= .95$; TLI $= .95$; RMSEA $= .07$ (90% CI $= [.06, .08]$);

SRMR $= .05$; Model 4: SB- $\chi^2 = 410.50$, $df = 65$ (intercepts for Items 1, 2, 3, 8, and 9 were set

free in both groups), $p < .01$; CFI $= .95$; TLI $= .95$; RMSEA $= .07$ (90% CI $= [.06, .07]$); SRMR

$= .04$). This was theoretically expected because of differences in applying the measure to

students' verses professionals (Vandenberg & Lance, 2000).

In the fifth study, the researchers wanted to provide evidence for establishing concurrent,

discriminant, and incremental validity. There were four hypotheses. Hypothesis One was that

career engagement is significantly and positively related to (a) career planning, (b) career self-

exploration, (c) environmental career exploration, and (d) networking. Hypothesis Two was that

career engagement shows modest positive correlations with (a) career self-efficacy beliefs and

(b) vocational identity clarity. Hypothesis Three was that career engagement explains variance in (a) career self-efficacy beliefs and (b) vocational identity clarity beyond measures of career planning, self-exploration, environmental exploration, and networking. Lastly, Hypothesis Four was that career engagement explains variance in (a) job satisfaction and (b) career satisfaction beyond measures of career planning, self-exploration, environmental exploration, and networking. The student sample was German University students across all majors in their second and third year at the sample universities (similar to Studies 1 and 2) with a response rate of 36% ($N = 681$, 62.3% female, age $M = 23.51$, $SD = 5.49$, study semester $M = 4.56$, $SD = 3.86$). The working sample was comprised of university alumni from five universities in northern Germany resulting in a response rate of 56% ($N = 271$, 62% female; age $M = 29.07$, $SD = 5.91$; 34% held a bachelor's degree, 59% a master's degree, and 2% a PhD).

The results show a positive correlation in Hypothesis 1a to 1d affirming concurrent validity. In Hypothesis Two, the positive correlation supported discriminant validity. To test Hypotheses Three and Four, a hierarchical linear regression analyses was conducted. In the student sample, career engagement explained 1.7% additional variance in career self-efficacy, $\Delta F(1, 675) = 14.73$, $p < .001$, beyond the four measures of career planning ($R^2 = .22$, $F(4, 676) = 47.33$, $p < .001$). Career engagement explained 0.4% additional variance in vocational identity clarity, $\Delta F(1, 675) = 5.70$, $p = .017$, beyond the variance explained by the four specific measures ($R^2 = .53$, $F(4, 676) = 192.75$, $p < .001$). In the working sample, career engagement explained an additional 2.8% variance in job satisfaction, $\Delta F(1, 265) = 210.94$, $p = .001$, beyond the variance explained by the four specific measures ($R^2 = .29$, $F(4, 266) = 28.04$, $p < .001$). Lastly, career engagement explained the additional 6.5% variance in career satisfaction, $\Delta F(1, 265) = 27.43$, p

$< .001$, beyond the variance explained by the four specific measures ($R^2 = .31$, $F(4, 266) = 29.14$, $p < .001$).

In total, the results of Hypotheses Two and Three illustrated that although the CES is significantly related to measures of specific career behaviors, it is not repetitive with more finite current measures.

In the final study, the researchers wanted to establish incremental predictive utility of the measure. Hypothesis Five stated higher career engagement while at university will predict higher (a) job satisfaction and (b) career satisfaction several months later while working, beyond the effects of career planning, self-exploration, environmental exploration, and networking while at a medium-sized German university in their last semester of study, approximately one month before graduation, to participate in a study on career development (T1). The final participation rate of T1 was 48% ($n = 436$). Contact six months later (T2), the response rate was 44% ($N = 141$). Career engagement, career planning, self-exploration, environmental exploration, and networking were assessed at T1. Job and career satisfaction were assessed at T2. The final sample was 70% female (age $M = 27.17$, $SD = 4.23$). The researchers conducted a two hierarchical linear regression analyses. Job satisfaction was significantly predicted by the four specific measures, $R^2 = .15$, $F(4, 136) = 7.37$, $p < .001$, and career engagement explained an additional 3.7% of variance beyond the other four scales in the outcome measure, $\Delta F(1, 135) = 6.40$, $p = .013$. Similarly, career satisfaction was predicted by the specific career behaviors, $R2 = .14$, $F(4, 136) = 5.54$, $p < .001$, but career engagement explained an additional 8.1% of variance beyond the other four scales in the outcome measure, $\Delta F(1, 135) = 14.00$, $p < .001$. In conclusion, Hypothesis Five shows the incremental predictive utility of the CES regarding job

and career satisfaction in the transition from university to work outside more finite current measures.

The culminating reliability statistic for the CES is Cronbach's α of .89 (Hirschi et al., 2014). See Appendix C for instrument and Cronbach's α for each question. There are nine questions on the Career Engagement Scale. Three of the questions are general, and the other six are specific items, which characterize a one-dimensional construct of Career Engagement. Since the instrument was general in nature, there is only a one-factor consideration. The scale of measurement was a five-point Likert scale. The subjects could answer the questions in the following ways: (1) not much; (2) little; (3) somewhat; (4) much; (5) a great deal. Scoring procedures for the CES involve adding the total point values of the responses from the questionnaire. The total range of scores for the CES is nine to 45. A low score of nine indicates the participant has low engagement in career management activities related to educational career development. A high score of 45 indicates a participant had high engagement in career management activities related to educational career development. The approximate time to administer a CES survey is one to three minutes. The CES survey will be administrated through Survey Monkey. Permission to use the instrument was granted by Sage Publishing (see Appendix D for instrument permission).

Procedures

The first step in preparing for the study was to contact selected principals to have access to their student population. Then, the researcher applied for IRB approval. While securing IRB conditional approval, an application for conducting research was sent to the district's main office for approval through the legal office (see Appendix E for guidelines of conducting research activities in ABC County public schools). After full district approval, selected principals were

formally asked to allow the researcher to conduct the study in their schools (see Appendix F for permission from principals). Once the three official approvals were returned from the principals, the researcher sought IRB final approval.

After IRB final approval was obtained (see Appendix G), participants were contacted through their 12th grade classrooms through a school liaison. The schools' liaisons coordinated with all 12th grade English teachers to decide which was the best time to distribute the survey. The week before the survey, an email was sent out to each school liaison about the nature of the study (see Appendix H). On the day of the survey, each 12th grade English teacher received directions for the study from the school liaison (see Appendix I). The 12th grade English teachers read the Student Recruitment Request Document to the 12th grade English classes (see Appendix J). The 12th grade English teachers directed the students to the Student Consent Form (see Appendix K), which was located on the district's shared drive. All student participants had access to the Internet through a phone or a computer. If a student wanted to participate, they opened the Student Consent Form, read its contents, and clicked on the survey link at the bottom. For students who are 17 years old or younger, ABC County required parental permission in writing for the student to participate. Because of the overwhelming problems associated with distributing, collecting, and tracking approximately 400 separate permission forms, any students who were 17 years old or younger were not be allowed to participate in the survey. A list of students and their ages were supplied with the Student Recruitment Request Document (see Appendix L for Student List). The list for each school was generated from each school guidance counselor. Each student's birthday was matched to the date of the survey to determine their actual age at the time of the survey. Teachers were able to identify which students were eligible to participate and only allow students who were 18 years old or older to participate in the study.

If a student who was 17 years old or younger participated, the researcher deleted their survey responses when first looking over the data.

By using the 12th-grade English teachers as intermediaries and the school as the point of contact, the researcher did not have direct contact with any possible participants. After IRB and ABC County approval, the surveys were administered within three weeks. The administration date was in the middle of the 2018-2019 spring semester. The survey included the Career Engagement Scale (CES) developed by Hirschi et al. (2014). During 12th-grade English, students were instructed to complete the survey in its entirety, and they were advised that all surveys are private and confidential. Students' consent was verified by students clicking the link to the survey which is at the bottom of the consent forms. If participants agreed to take the survey and clicked on the link, a new page appeared. Students were given the instructions to complete the survey (see Appendix M). The survey included demographics questions regarding gender, ethnicity, and age, as well as pathway decisions during their secondary school years (see Appendix N). The survey was completed when the participant pressed the 'done' button. The survey was accessible to the students for 14 days once the survey was made known the student.

The survey was distributed though the shared documents system using Survey Monkey. The scores were downloaded from Survey Monkey and placed into a spreadsheet. Per federal regulations, data must be retained for three years upon completion of the study. The spreadsheet was kept on a separate flash drive that will be destroyed after three years. After the study, a "Thank You" email was sent to the superintendent, the principals, and the other administrators for their cooperation (See Appendix O).

Data Analysis

A one-way analysis of variance (ANOVA) was conducted to compare the means of three groups on levels of career engagement. Since this study looked for differences between multiple groups, the one-way ANOVA was the best statistical analysis technique for this study (Warner, 2013). Post hoc comparisons were conducted using a Tukey Test as necessary. All data was checked from extreme outliers (Lund & Lund, 2018). The box and whiskers plot can screen data for extreme outliers (Warner, 2013).

In the one-way ANOVA, four assumptions must be held tenable for any results to be considered valid (Warner, 2013). The first assumption is the level of measurement (Lund & Lund, 2018). The dependent variable should be quantitative and measured on the interval or ratio (Warner, 2013). The dependent variable was career engagement score and was measured as an interval or continuous value.

The next assumption is that the dependent variable data has a normal distribution in the entire sample and within each group (Warner, 2013). To determine the assumption of normality with a population above 50, a Kolmogorov-Smirnov test was implemented (Warner, 2013). Further analysis for normality was implemented using a series of histograms (Lund & Lund, 2018).

The third assumption is that the observations should be independent of each other, both within groups and between groups (Warner, 2013). There were different participants in each group with no participant being in more than one group. In this study, there were different participants in each group with no participant being in more than one group. Since there was no relationship between the observations in each group or between the groups themselves, this assumption was met (Gall et al., 2006).

The last assumption of homogeneity of variance be met prior to the main analysis (Lund & Lund, 2018). A homogeneity of variance among groups was tested using Levene's Test for Equality of Variance (Gall et al., 2006).

All data was randomly sampled, and a single omnibus test was preformed to limit the risk of Type I errors (Warner, 2013).   In this ANOVA, a *F* test was implemented between-S at an alpha level of $p < .05$, and the effect size was reported in terms of the partial Eta Squared statistic and interpreted in light of Cohen's *d* (Warner, 2013).

CHAPTER FOUR: FINDINGS

Overview

Chapter Four of this study will examine the data collected for the various pathways and Student Career Engagement Scores for the 2018-2019 school year in a school district in a Mid-Atlantic state. The participants included both male and female students and students of multiple ethnicities who were high school seniors from a rural/suburban county. The data was collected from an online survey created from the Career Engagement Scale. Chapter Four presents the research question, null hypothesis, descriptive statistics, and results from the analysis of the data collected.

Research Question

The research question for this study was:

RQ: Is there a difference in career engagement scores among high school seniors in a Mid-Atlantic school system whose program of study is in Project Lead the Way (PLTW), Career Technology Education (CTE), or General Education (GE) classes?

Null Hypothesis

The null hypothesis for this study was:

H_0: There is no significant difference in career engagement scores among high school seniors in a Mid-Atlantic school system whose program of study is in Project Lead the Way (PLTW), Career Technology Education (CTE), or General Education (GE) classes.

Descriptive Statistics

Data was obtained for the dependent variable, career engagement score, among secondary students in a school district in the Mid-Atlantic state. Participants ($N = 260$) were

enrolled in one of three career pathways: Project Lead the Way (PLTW), Career Technology

Education (CTE), and General Education (GE). Descriptive statistics can be found in Table 8.

Table 8

Descriptive Statistics

Pathway	Mean	SD	N
PLTW	30.89	7.027	37
CTE	29.71	8.077	133
GE	28.41	8.779	90
Total	29.43	8.204	260

Results

Data Screening

Data screening included visual examination for inconsistencies and extreme outliers

(Warner, 2013). The researcher sorted the data on each variable and scanned for inconsistencies

using a box and whiskers plot (Lund & Lund, 2018). The initial box and whisker plots were

used to identify extreme outliers for each group (PTLW, CTE, and GE) on each dependent

variable. Two extreme outliers were found in PTLW's data set (see Figure 1). They were data

numbers 89 and 130. Extreme outliers are defined as data points lying outside the adjacent

values and are graphed using small circles (Warner, 2013). Thus, both extreme data points were

removed from the data set.
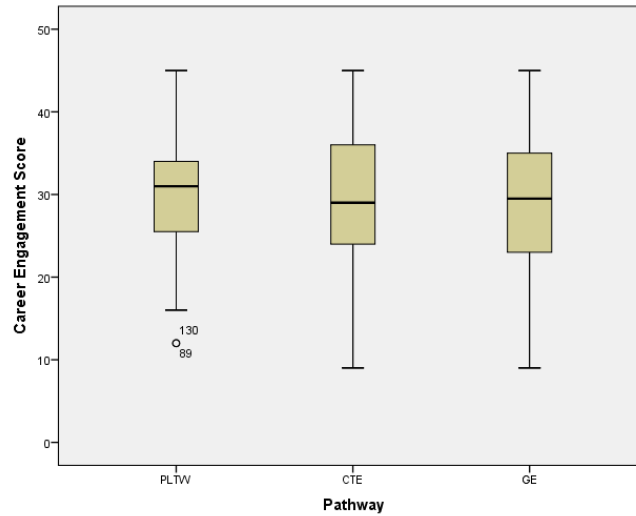
Figure 1. Initial box and whisker plot for career engagement by group.

After removing the data errors and rerunning the box and whisker plots, no extreme

outliers were identified making the total sample size 260 participants (see Figure 2).
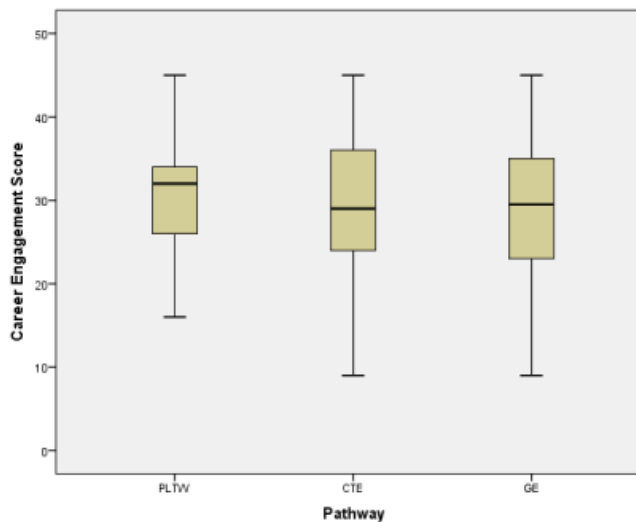
Figure 2. Box and whisker plot for career engagement by group.

Assumptions

In the one-way ANOVA, four assumptions must be held tenable for any results to be

considered valid (Warner, 2013). The first assumption is the level of measurement (Lund &

Lund, 2018). The dependent variable should be quantitative and measured on the interval or

ratio (Warner, 2013). The dependent variable is a career engagement score and is measured as

an interval numeric value. Hence, the level of measurement was met.

The next assumption is that the dependent variable data has a normal distribution in the

entire sample and within each group (Warner, 2013). Normal distribution was examined using a

Kolmogorov-Smirnov test, as the sample size was more than 50 ($N = 260$) (Warner, 2013). No

violations were identified (see Table 9).

Table 9

Tests of Normality

| | | Kolmogorov-Smirnov[a] | |
Pathway	Statistic	df	Sig.
PLTW	.097	37	.200*
CTE	.073	133	.081
GE	.072	90	.200*

Notes. *This is a lower bound of the true significance. [a] = Lilliefors Significance Correction

The researcher further checked normality using a series of histograms. Normal

distribution was held tenable using a histogram (Lund & Lund, 2018). Using a histogram, the

distribution of data for each group created three "bell shaped" parametric curves. The PLTW

curve was skewed to the negative (skewness = -0.155). Its distribution was leptokurtic (kurtosis
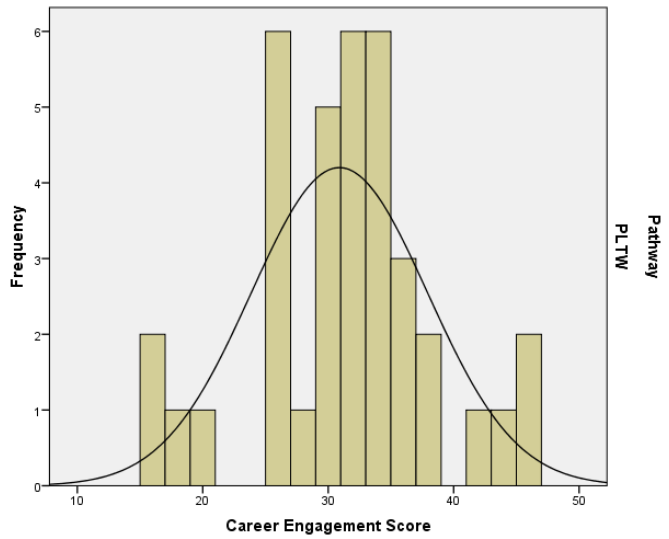
= 0.257). See Figure 3.

Figure 3. A histogram for career engagement for PLTW.

The CTE curve was skewed slightly to the negative (skewness = -0.008). Its distribution was platykurtic (kurtosis = -0.411). See Figure 4.
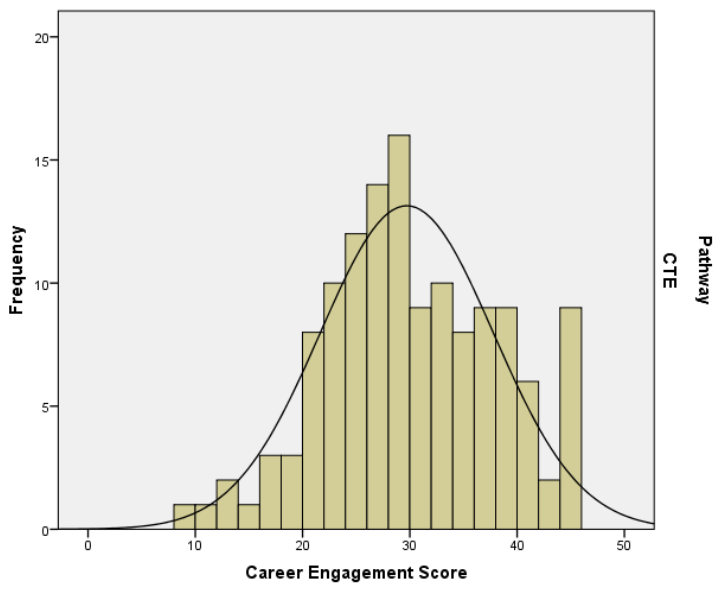

Figure 4. A histogram for career engagement for CTE.

The GE curve was skewed to the negative (skewness = -0.243). Its distribution was platykurtic (kurtosis = -0.526). See Figure 5. All data was in normal distribution, and the assumption was met.
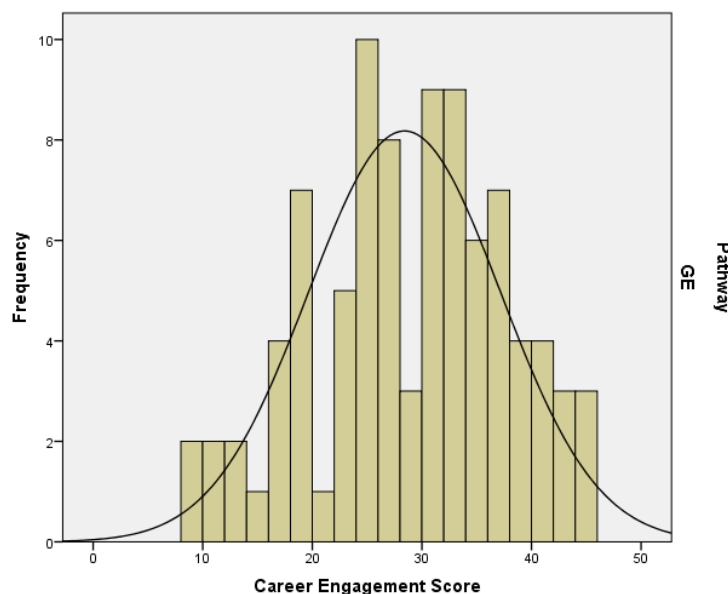

Figure 5. A histogram for career engagement for GE.

The third assumption is that the observations should be independent of each other, both within groups and between groups (Warner, 2013). There were different participants in each group with no participant being in more than one group. Since there was no relationship between the observations in each group or between the groups themselves, this assumption was met (Gall et al., 2006).

The last assumption, homogeneity of variance, must be met prior to the main analysis (Lund & Lund, 2018). Levene's Test for Equality of Variance was used to test the homogeneity of variance (Warner, 2013). Results of the Levene's test indicated that the assumption of equal variance was tenable ($p = 0.112$) (see Table 10).

Table 10

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
2.123	2	257	.122	

Note. *a. Design: Intercept + Pathways*

Results for Null Hypothesis

The null hypothesis stated there is no significant difference in career engagement scores among high school seniors in a Mid-Atlantic school system whose program of study is in Project Lead the Way (PLTW), Career Technology Education (CTE), or General Education (GE) classes. The mean career engagement score for seniors in the Project Lead the Way group was ($M = 30.89$, $SD = 7.027$, $n = 37$). The mean career engagement score for seniors in the Career Technology Education group was ($M = 29.71$, $SD = 8.077$, $n = 133$). The mean career engagement score for seniors in the General Education group was ($M = 28.41$, $SD = 8.779$ $n = 90$).

A one-way ANOVA was used to test the null hypothesis which looked at the difference in the mean of career engagement scores based on graduation pathway group: PLTW ($M = 30.89$, $SD = 7.027$), CTE ($M = 29.71$, $SD = 8.077$), and GE ($M = 28.41$, $SD = 8.779$). All data is randomly sampled, and a single omnibus test was performed to limit the risk of Type I errors (Warner, 2013). The ANOVA was run at a 95% confidence level. Results of the ANOVA were not significant where $F(2, 257) = 1.365$, $p = 0.257$, $\eta^2 = 0.011$. The effect size was small. Therefore, the researcher failed to reject the null hypothesis (see Table 11).

Table 11

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	*F*	Sig.	Partial Eta Squared
Pathways	183.255	2	91.627	1.365	.257	.011
Error	17248.499	257	67.115			
Total	242636.000	260				

Notes. R squared = .011, Adjusted R Squared = .003.

CHAPTER FIVE: CONCLUSIONS

Overview

Chapter Five of this study will explore the conclusions of various pathways and Student Career Engagement Scores for the 2018-2019 school year in a Mid-Atlantic state among graduating seniors in the ABC school district. Chapter Five of this study contains the discussion, implications, limitations, and recommendations for future research.

Discussion

The purpose of this study was to investigate if there was a difference in career engagement scores among high school seniors from a Mid-Atlantic school system whose program of study was in Project Lead the Way (PLTW), career technology education (CTE), or general education (GE) classes. The research design was a causal comparative, non-experimental design (Gall et al., 2006) which used the Career Engagement Scale to determine the amount to which a student is proactively developing his or her career as articulated by varied career activities (Hirschi et al., 2014).

Based on the following theories, career engagement expected levels should be observably present and elevated in this Mid-Atlantic school district. When educational practices are student centric, career engagement should be readily observed in most classroom settings (Labaree, 2010). Since the main focus of this Mid-Atlantic district educational practice is student centered learning, career engagement should be observable. Second, Hirschi et al. (2014) suggested that in which a person proactively develops their future vocation, as conveyed by various current occupational activities, their career engagement score should increase. Since students are defining their future career aspiration through career pathways, their scores should be higher on the career engagement scale. Also, with the expectation of graduation, career engagement is

found to increase (Upadyaya & Salmela-Aro, 2015). As the survey was targeting seniors, career engagement scores could be elevated. Another way to increase student engagement is through culturally responsive career development services and programming, such as career pathways (Lapan, 2004). Since the groups were designated career pathway models, all career engagement scores should be higher on the career engagement scale. Additionally, school size can also be a determiner of effective learning with a more direct effect on educational institutions with lower-socioeconomic students or with high concentrations of minority students (Lee & Smith, 1997). Since the sampled population had a low density of lower-socioeconomic students or minority students in this Mid-Atlantic district, effects of these large school sizes on career engagement scores could be mitigated.

Additionally, expected differences between various career pathways and their career engagement scores are also found in the literature. As PLTW is a new STEM initiative, PLTW programs are strongly supported by peers, teachers, and parents (Bottia et al., 2017). This backing should reflect in higher educational engagements scores (Rosenfeld et al., 2000). Additionally, students who had processes for developing meaningful goals and assessing their development toward those goals (sometimes called the feedback loop) can provide higher purpose and motivation (Carver & Scheler, 2000). Both PTLW and CTE utilize the engineering design process, which is a formalized method to develop a product. Along the engineering design process are teacher checks for progress and quality, peer assessment, and clearly-delineated goals. Moreover, STEM projects influence higher levels of student engagement (Franz-Odendaal et al., 2016). Hence, PLTW and CTE career pathway students should have higher career engagement scores than GE.

While PLTW does have a lot of hands-on projects, CTE focuses more on practical activities, which might lead to improved classroom engagement (Salmela-Aro & Upadaya, 2012). Hence, this perception could lead CTE to higher career engagement scores than PLTW. Additionally, CTE pathway programs facilitate close relationships with businesses and offer students work-based educational experiences (Stone & Alfeld, 2004). The literature indicates that when a role model is engaged more directly with inspiring and supporting students' educational and career decisions, students are more able to make educational and career choices (Loera et al., 2013). This could lead to higher career engagement rates for CTE.

Conversely, the research has shown that GE could have decreased levels of career engagement. First, a uniform curriculum approach, such as GE, could create pressure to conform in certain ways which could decrease student engagement (Zepke, 2015). Moreover, upon entering a compulsory GE program, levels of engagement become varied. Because GE is for everybody, all levels of motivation are represented by the students in the program (Johnson, 1938). For this factor, GE could have lower career engagement scores. Also, GE is a complex construct which requires an enormous amount of time, energy, and funding to be effective (Hersh & Merrow, 2006). Since the current public-school system has become very complex in philosophical ideology, curriculum implementation, and administrative oversight (Johnson, 1938), GE is more likely to have lower career engagement scores than other curriculums.

Research Question

In the research question, "Is there a difference in career engagement scores among high school seniors in a Mid-Atlantic school system whose program of study is in Project Lead the Way (PLTW), career technology education (CTE), or general education (GE) classes?", the researcher focused on student personal career engagement levels over three different high school

pathways. The data collected was as follows: Project Lead the Way group was ($M = 30.89$, $SD = 7.027$, $n = 37$), career technology education group was ($M = 29.71$, $SD = 8.077$, $n = 133$) and general education group was ($M = 28.41$, $SD = 8.779$, $n = 90$). Results of the ANOVA were as follows; $F(2, 257) = 1.365$, $p = 0.257$, $\eta^2 = 0.011$. When comparing career engagement scores to PLTW, CTE, and GE pathways, no significant differences were found between the groups based on Career Engagement Scale scores. Therefore, the researcher failed to reject the null. The results suggest that career engagement scores do not vary based upon the chosen student pathway in the population under study.

The results of this target population did not affirm a finding of differences various career pathways, and their career engagement scores are also found in the literature. While PLTW programs are strongly supported by the peers, teachers, and parents (Bottia et al., 2017). This backing did not reflect in higher educational engagements scores as Rosenfeld et al. (2000) stated. Additionally, while students in PTLW and CTE utilize the engineering design process, have processes for developing meaningful goals and evaluate their development toward those goals, the results did not illustrate higher levels of purpose and motivation as Carver and Scheler (2000) found. While it was found by Franz-Odendaal et al. (2016) that STEM projects influence higher levels of student engagement, it was not shown in this population. Additionally, while CTE focuses more on practical activities, this study did not find improved classroom engagement as stated by Salmela-Aro and Upadaya (2012). Even though CTE pathway programs facilitate close relationships with businesses and offer students work-based educational experiences (Loera et al., 2013; Stone & Alfeld, 2004), the results did not indicate that when a role model is engaged than other career pathways.

As GE was not found to have differences in career engagement for this population, the results did not agree with Zepke (2015), who stated that GE was a uniform curriculum approach

that could create pressure to conform in certain ways which could decrease student engagement. The results did not affirm Blondal & Adalbjarmardotir (2012), who stated upon entering a compulsory GE program, levels of engagement become varied. For a hypothetical wide range of student engagement, this study did not find that GE could have lower career engagement scores. Lastly, GE is a complex construct, which requires an enormous amount of time, energy, and funding to be effective (Hersh & Merrow, 2006). The results did not conclude with Johnson (1938) that GE is more likely to have lower career engagement scores than other curriculums because of the current public-school system complexity of philosophical ideology, curriculum implementation, and administrative oversight.

Implications

This research does contribute to the knowledge base on STEM education in several important ways. First, while secondary education has placed an emphasis on students being college ready (Schwartz, 2016), this study differed from Finkel (2016) who found that some career pathways, such as PLTW, are more effective at causing students to feel confident in making complex math- or science-based decisions that other pathways. Since there was no difference between groups, modern curriculum writers could incorporate complex math and science-based decisions in every new program of study. The conclusion of this study could provide some insight into the effect of modern curriculum development. Second, while it is true that further research is needed to identify causes and consequences of proactive classroom career behaviors for high levels of career engagement (Hirschi et al., 2014), this study did not identify a distinctive career pathway that was different in levels of career engagement using the Career Engagement Scale. It could be possible that the Career Engagement Scale does not show distinction between specific career paths. The conclusion of this study could provide some

insight into the effect of the Career Engagement Scale with distinctive career pathways (such as

PTLW, CTE, and GE). Third, because there were no significant differences between groups, this

study did not clarify the validity of developing criterion-related measures of proactive

adaptability resources (Savickas, Porfeli, Hilton, & Savickas, 2018) or define mediating roles of

different types of engagement-relevant behaviors (Le et al., 2016). New educational approaches

may have to be developed to create a significant measure for proactive behaviors. The

conclusion of this study could provide some insight into the effect of career engagement

resources or interventions. Fourth, while Gardiner (2015) stated specific gaps between specific

curriculum design and career engagement in career's literature, this study could not evaluate this

finding. The conclusion of this study could provide some insight into the effect of the gaps

between curriculum design and career engagement activities. Nevertheless, the study did

correspond with Hu and Wolniak (2010), who stated that it is understood that the influence of

academic sub-environments does bear on student experience, development, and early career

earnings, but the literature needs more empirical exploration. And this study does contribute

important information about the effect of the practical ramifications of different career pathways

centered on career engagement (Gardiner, 2015; Hu & Wolniak, 2010; Kenny et al., 2006) with

more empirical evidence.

Limitations

There are three approaches to the research that could be contributed to this study for not

being a significant outcome. First, student expectations matter (Kornell, 2013). As all students

are in the final year of secondary education and while the students have had little experience in

their chosen fields, the expectation is high that their educational pathway has had a high level of

career engagement. For each career pathway, this exuberance could lead to an over-enthusiastic

response to the Career Engagement Scale. The researcher could have given the survey after the school year had concluded and when the participants were in the work force. This could have minimized the halo effect of graduation. Second is the problem of realistic comparison (Kornell, 2013). The population does not have an idea what activities that could have been substituted to affect their career engagement levels. For example, by knowing what activity would be sacrificed in favor of time spent testing or having evidence on hand comparing testing to that activity (Kornell, Rabelo & Klein, 2012), students could have a better understanding of how to rate their abilities to the Career Engagement Scale. With a foundational understanding of activity variables, a student's understanding of his or her pathway's classroom career engagement could have been different than what was reported. Third, the sample population was not diverse. School size can also be a determiner of effective learning with a more direct effect on educational institutions with lower-socioeconomic students or with high concentrations of minority students (Lee & Smith, 1997). The school sizes were large, and the lack of a diverse population could have contributed to no significant findings. The researcher could have targeted a more diverse population set. For these three reasons, the research could have had a different outcome.

Recommendations for Future Research

There are several areas related to this study in which future research could be addressed. First, future research could be explored in the areas of school climate variances in career engagement scores. Student perceptions of school climate (i.e. victimization or hostility) can be an indicator of levels of engagement (Ripski & Gregory, 2009). Analysis could provide possible areas of advancement in understanding career engagement from a school climate perspective level. Second, future research could explore differences in cultural demographics and career

engagement. Since career engagement was developed in 2014, little is known about cultural

differences in personal career engagement (Hirschi et al., 2014). There could be possible

differences in the definition of how each culture determines career engagement.   Third, another

area of future research is the effect of career engagement perspectives on blue-collar workers.

The Career Engagement Scale was developed for students going into white-collar jobs (Hirschi

et al., 2014). Future research might discover possible differences of what defines career

engagement in terms of future social career choice. Fourth, while this study did collect data for

gender, the focus of the study was not on the differences between male and female career

engagement scores. The instrument was validated to measure both male and female populations

(Hirschi et al., 2014), but there could be some career engagement differences between

populations in terms of motivation, perception, and success. Future research could analyze

qualitative differences between gender populations.

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APPENDICES

Appendix A: School Completers and Pathways

World Language Two credits in same **World Language** (Spanish, French, or German) **Must also take Alg II**	**Advanced Technology** Two credits in: Tech. Design Advanced Design Apps. Advanced Tech Applications	*If you choose pathway from page 1, you must ALSO choose either World Lang. box or Adv. Tech. box on left*

Since the programs on page 2 are a combination of both completers and pathways, World Language or Advanced Technology courses are NOT required. You must select 4 credits in the pathway.

HEALTH & HUMAN SERVICES

Government/Public Service	Health Services and Personal Care	Environmental, Agricultural and Natural Resources	Science and Technology Advanced Studies
Social Sciences **Four Credits In:** Psychology Law in America* Contemporary Issues* College Sociology AP Psychology AP Government & Politics AP Comparative Gov & Pol 3rd and/or 4th level World Lang AP World Language AP Microeconomics AP Human Geography AP Art History * = 1/2 credit	**Medical Services** **At Least Two Credits In:** Advanced Health 4th credit Biological Science: AP Biology OR Anatomy/Physiology Two credits in: Psychology Math beyond Alg II 3rd and/or 4th yr World Lang. AP World Language AP Psychology	**Environmental Science** **At Least One Credit In:** Environmental Science I Environmental Science II AP Environmental Science Up to Three credits in: Earth Science Chemistry Geohazards Botany* Marine Science* Zoology* Advanced Health 3rd and/or 4th year World Lang AP World Language *=1/2 credit	Four credits - in addition to required Math and Sciences: Anatomy/Physiology AP Biology Earth Science Environmental Science(II or AP) Chemistry or AP Chemistry Physics or AP Physics Forensic Science Astronomy* Marine Science* Botany* Zoology* Geohazards Trigonometry AP Statistics /Statistics Precalculus AP Calculus AB AP Calculus BC AP Computer Science/Principles 3rd and/or 4th year WL / AP *=1/2 credit

ARTS, MEDIA & COMMUNICATION

Literary Arts	Performing Arts	Visual Arts
Four credits in: Journalism 1,2, 3 AP Eng 11 Creative Wrt 1, 2, 3 AP Eng 12 Yearbook Drama I	**Music** **Three-Four credits in:** ONE of the following: Band,Chorus,Orchestra, Perc, Guitar 4th credit option: Piano, Music theory, Music Technology, Guitar -Or- **Drama** Drama I, II, III 4th credit option: Chorus, Guitar, Piano, Fine Art Prep, Dance -Or- **Dance (at least 3 or in):** Dance I,II,III,IV,Dance Comp 4th credit option: Drama I, Guitar, Piano, Chorus, Fine Art Prep	(Prerequisite-Fine Art Prep) **Three credits in Drawing:** -Drawing & Painting -Advanced Drawing -Advanced Studio Drawing AP Studio Art-Drawing Portfolio -Or- **Three credits in Painting:** -Drawing & Painting -Advanced Painting -Advanced Studio Painting AP Studio Art-2-D Design Portfolio -Or- **Three credits in 3D:** -3D Design -Advanced 3D Design, Crafts -Advanced Studio 3D Design **Or 4th credit option:** AP Art Hist or any course beyond Fine Art Prep not in strand

*Students must be enrolled in a math **ALL** four years of high school.*

HEALTH & HUMAN SERVICES

Education	Government/Public Service	Hospitality, Tourism, and
Early Childhood Education Learning about Children Working with Children Independent Family Living Working with Children II	**World Languages** Four credits in: ONE of the World Languages: French, Spanish, German	**Food & Beverage Management** Introduction to Food Prep & Hosp Advanced Food Prep & Hosp Food & Hospitality Management Food & Hospitality Practicum

BUSINESS, FINANCE, AND INFORMATION TECHNOLOGY	SCIENCE, ENGINEERING, AND TECHNOLOGY
Marketing Prin of Bus Mgt Prin of Acct & Finance Intro to Marketing Adv Marketing or Business Capstone **Bus Mgt** Prin of Bus Mgt Prin of Acct & Finance Adv Business Mgt Business Capstone *Students must be enrolled in a math **ALL** four years of high school.*	***Engineering/Manufacturing and Construction*** **General Engineering** At least TWO credits in - Advanced Technology courses: Technological Design Advanced Design Applications Advanced Technology Applications *Remaining one or two credits in:* Physics or AP Physics Chemistry Algebra II Trigonometry Geometry 3rd and/or 4th level World Language/and/or AP World Language **Pre-Engineering** (5 credits) (must be in Geometry in Grade 9) Intro to Engineering Design (fulfills Tech. requirement) Principles of Engineering Digital Electronics 1 Specialization course: (Aerospace OR Civil Engineering/Architecture) Engineering Design and Development

Updated February 2017

Updated February 2017

Appendix B: Total School Career Pathway Chart

All Majors and Pathway Correlation

Major	Pathway
Academy of Health Professions	CTE
Accounting and Finance	CTE
Agriculture/Animal Science	CTE
Automotive Diagnostics and Systems Repair	CTE
Automotive Refinishing and Collision Repair	CTE
Brick and Block Masonry	CTE
Business Management	CTE
Career Research and Development (Work Study)	CTE
Carpentry	CTE
Certified Welding	CTE
Computer and Network Technology	CTE
Computer Programing	CTE
Computer-Aided Design and Drafting	CTE
Computer-Aided Machining/High Performance Manufacturing	CTE
Early Childhood Education	CTE
Electricity	CTE
Food & Beverage Management (Foods)	CTE
Food Preparation and Management	CTE
General Engineering (Tech)	CTE
Health Occupations	CTE
Heating, Air Conditioning, and Refrigeration Technology	CTE
Horticulture/Floral Design	CTE
Licensed Cosmetology	CTE
Marketing	CTE
Natural Resources & Agricultural Sciences	CTE
Teacher Academy of Maryland	CTE
Dance	GE
Drama	GE
Environmental Science	GE
Fire/Rescue EMT	GE
General Education	GE
Literary Arts (English)	GE
Medical Services	GE
Music	GE
Science and Mathematics Advanced Studies	GE
Social Sciences	GE
Visual Arts (Fine Arts Prep)	GE
World Languages	GE
Biomedical Sciences	PLTW
Cyber Security	PLTW

Homeland Security and Emergency Preparedness	PLTW
International Baccalaureate	PLTW
Pre-Engineering	PLTW
Science/Math Academy	PLTW

Appendix C: Instrument

The instrument was removed to comply with copyright.

Appendix D: Instrument Permission

Appendix E: Guidelines of Conducting Research Activities in ABC County Public Schools

**APPLICATION FOR CONDUCTING RESEARCH IN
XXX COUNTY PUBLIC SCHOOLS**

PART ONE: GENERAL INFORMATION OF THE RESEARCH STUDY

Date of application: 11/14/17

Name: Glenn R. Mathias

Address: 116 Spruce Woods Ct.
Abingdon, MD 21009
Telephone: (410) 515-0528

Email address: glenn.mathiasiii@hcps.org

Present Position: Technology Education Teacher

Present Employer:

Highest Degree(s) Earned: □ Bachelor's x Master's □ Doctorate

Name of Institution: Liberty University
Advisor: Philip Alsup

Telephone Number:

Address:

Has the research proposal been approved by your institution? □ Yes □ No
(If "Yes", please include a copy of the approval letter with your application.)

Title of research project:
DIFFERENCES IN STUDENT CAREER ENGAGEMENT AMONG VARIOUS
SECONDARY PATHWAY CLASSES

Purpose(s) of research project: The purpose of the research project is to determine if there is a difference in student career engagement among different pathways

Start date: 11/14/18   End date: 07/31/19
(Please allow up to four weeks for the application review process. Researchers are encouraged to submit their applications well in advance of their anticipated start date.)
Hypotheses of the research project:

The null hypothesis for this study is as follows:
H01: There is no significant difference in Career Engagement Scores of graduating secondary students who participated in Project Lead the Way (PLTW), Career Technology Education (CTE), or General Pathway (GP) classes.

Of what value is this study to the school system?

The value for the study is to allow the school system to see how their pathway programs allow students to be pro-active in gaining career experiences.

PART TWO: STUDENT AND PARENT PARTICIPATION

Will students be involved in this study? x Yes □ No
(If "No", please skip to Part III.)

Number and name(s) of involved school(s):
CMWHS
EHS
HTHS

Number of total students involved: ~800   Grade level: 12 grade

Will students be selected on the basis of any particular characteristic? If so, please explain:

No, students will not be selected based off any particular characteristic.

How many sessions will each student be involved?
The students will be involved in one session.

What is the approximate length of time per session?
The approximate length is two minutes.

Will parents be involved in this study? If so, please explain:

No parents will be involved in this study.

PART THREE: STAFF PARTICIPATION

Will any HCPS staff members be involved in this study? □ Yes x No
(If "No", please skip to Part IV.)

What staff members will be involved?

How will staff members be involved?

What is the total approximate amount of time that staff members will be involved?

PART FOUR: DATA COLLECTION INSTRUMENTS

What assessments or instruments will be used in this project and to whom will they be administered?
(Please include a copy of any data collection instrument or survey that may be administered at any time during your research activities.)

The assessment instrument will be the Career Engagement Scale. It will be distributed to all graduating seniors of each school. Appended is the data collection instrument.

If there is any additional data that will be collected, please explain below:

Yes, additional data will be demographic information (i.e. age, gender, race, pathway selection, and career selection).

Please explain how you will maintain confidentiality of any information gathered during this research study.

No student, school, or district name(s) will be associated with the data. Any names that appear in the paper will be pseudonyms.

PART FIVE: TIMEFRAME

Please provide your timeline of activities below.

Spring 2018:
Apply for IRB / HCPS approval

Summer 2018:
Reciew permission from HCPS Principals for access to student population

Spring 2019:
Implement study through HCPS Guidance

Spring 2019:
Send "thank you" letters

Summer 2018:
Get IRB / HCPS approval

Fall 2018:
Implement pilot study / Troubleshoot process

Spring 2109:
Collect and compile data

Summer 2019:
Defend dissertation

Please provide any additional information relevant to this study that was not provided in the previous sections.

I acknowledge that research activities in HCPS may not be conducted in any manner until formal approval has been granted by the Office of Accountability. If my application is approved or approved with restrictions, I ensure that I will follow all HCPS guidelines provided above. I understand that I will bear the cost of all research activities.

_____   _____
Signature of Applicant   *Date*

Appendix: Survey Questions

Demographic Info___(check by radio buttons)
1. What is your age?
2. What is your gender?
3. What is your ethnicity?
4. What is your school pathway? (Drop down menu)

Orientation question___(write in answer)
5. What career do you want?

During your time at HCPS you___(Likert scale, (1) not much; (2) little; (3) somewhat; (4) much; (5) a great deal)
6. Actively sought to design your professional future
7. Undertook things to achieve your career goals
8. Cared for the development of your career
9. Developed plans and goals for your future career
10. Sincerely thought about personal values, interests, abilities, and weaknesses
11. Collected information about employers, professional development opportunities, or the job market in your desired area
12. Established or maintained contact with people who can help you professionally
13. Voluntary participated in further education, training, or other events to support your career
14. Assumed duties or positions that will help you progress professionally

Appendix F: Permission from Principals

[Insert Date]

[Recipient]
Principal of [Title] High School

Dear [Recipient]:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The title of my research project is the following: DIFFERENCES IN CAREER ENGAGEMENT SCORES AMONG MID-ATLANTIC HIGH SCHOOL SENIORS WITHIN CAREER READINESS PROGRAMS OF STUDY. The purpose of my research is to determine if there is a difference in career engagement scores between three career readiness pathways among high school seniors.

I am writing to request your permission to conduct my research at [school name].

Dependent on [ABC District] Public School's official approval and your consent, a list of participants and their ages will be gathered from your school's career counselor. Participants who are 18 years or older will be asked to participate during their 12th grade English class. Students, who are 17 years and younger, will not participate in the survey. The students' 12th grade English teacher will be given an Excel list with all the students and their ages to determine who can participate. All coordination will be made through [school's liaison].

Participants who are graduating seniors and enrolled in a career pathway in Project Lead the Way (PLTW), Career Technology Education (CTE), or General Education (GE), will be asked to go to the Student Consent Form (http://tiny.cc/3v133y), click on the link provided, and complete the attached survey.

The week before the survey:
- An email will be sent to [school's liaison]. Attached will be the student list, directions for the 12th grade teacher, and the consent form with the survey link.
- To familiarize all 12th grade English teachers with the study procedures, the [school's liaison] will forward all information.

The day of the study:
- An email will be sent to [school's liaison] that will be forwarded to all 12th grade English teachers to start the survey. Attached will be the student list, directions for the 12th grade teacher, and the consent form with the survey link.

The survey will take approximately 3 minutes to complete.

Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. If you choose to grant permission, please respond by email to glenn.mathiasiii@hcps.org stating that you are willing to allow your seniors to participate.

Sincerely,

Glenn Mathias
Technology Educator

School A's permission

RE: Official permission to conduct a survey...

Komondor, Greg
Tue 3/12/2019 7:02 PM
To: Mathias III, Glenn <Glenn.MathiasIII@hcps.org>
Yes you have my permission.

School B's permission

RE: Official Permission to conduct the survey...

Thatcher, Mike
Tue 3/12/2019 6:22 PM
To: Mathias III, Glenn <Glenn.MathiasIII@hcps.org>
You have my blessing --all the best Glenn; as much as possible, try not to burden the support staff—they have been dealing with so much with he reduction in staffing, especially the secretaries.

School C's permission

RE: Official permission to conduct a survey...

Collins, Joseph
Tue 3/12/2019 6:11 PM
To: Mathias III, Glenn <Glenn.MathiasIII@hcps.org>
Cc: McMichael, Sandra <Sandra.McMichael@hcps.org>; Taylor, Tammy <Tammy.Taylor@hcps.org>
Permission is granted and I have included Ms. McMichael and Tammy Taylor, English Department Chair on my response. Please let us know what you need and we will make it happen.

Appendix G: IRB Final Approval

IRB Exemption 3596.031419: Differences in Career Engagement Scores among Mid-Atlantic High School Seniors within Career Readiness Programs of Study

IRB, IRB
Thu 3/14/2019 2:56 PM
To: Mathias, Glenn <gmathias2@liberty.edu>
Cc: Alsup, Philip (Doctor of Education) <palsup@liberty.edu>; IRB, IRB <IRB@liberty.edu>

3 attachments (258 KB)
Mathias_3596Exemption_03_19.pdf; Change in Protocol_Template.docx; Mathias_3596CIPStampedConsent.pdf;

Dear Glenn Mathias,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under exemption category 46.101(b)(2), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

> (2) Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if . . . the following criteria is met:

>> (i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects;

Please retain this letter for your records. Also, if you are conducting research as part of the requirements for a master's thesis or doctoral dissertation, this approval letter should be included as an appendix to your completed thesis or dissertation.

Your IRB-approved, stamped consent form is also attached. This form should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document should be made available without alteration.

Please note that this exemption only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

Appendix H: Email – Directions for School Liaison

[Insert Date]

[Recipient]
Assistant Principal of [Title] High School

Dear [Recipient]:

Thank you for helping to implement this survey.
Attached are the following pieces of information needed for your 12th grade teachers to implement the study:
- Recruitment Form – 12th grade English teachers will read it at the start of the survey.
- Student Consent Form – place in a shared location for the students to access the survey link.
- Student list – 12th grade English teachers can determine who is able to participate.

All attached files are located at http://tiny.cc/q9kv3y so that your teachers can have any information needed to administer the survey.

The Student Consent Form is located at http://tiny.cc/3v133y so that the students can access the survey.

All student participants must have access to the internet through a phone or a computer. Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time. Only students who are 18 years old or older can participate. No student who is 17 years old or younger should participate in this survey. Ask your teachers to check the students' ages with the enclosed Student List file for qualification.

The survey should take approximately 3 minutes.

The day of the survey:
- I will send you an email with the 12th grade English teacher directions which you will forward to each teacher administering the survey.
- Student participants must have internet access through a phone or computer.
- Have the 12th grade English teachers…
  o Display in a visible location the link to the Student Consent Form.
    ▪ It is http://tiny.cc/3v133y
  o Using the Student List, identify the students who are 18 years old or older.
    ▪ Only these students can participate in the survey.
  o Read the Student Recruitment Form to the class.
  o Allow student participants to access the internet through a phone or a computer.
  o Allow approximately 3 minutes to complete the survey.

Contacts and Questions: The researcher conducting this study is Glenn Mathias. You may ask any questions you have now. If you have questions later, you are encouraged to contact him at

glenn.mathiasiii@hcps.org. You may also contact the researcher's faculty advisor, Dr. Alsup, at palsup@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Thank you,
Glenn Mathias

Appendix I: Email – Directions for 12th grade English teachers

[Insert Date]

[Recipient]
12th grade English Teacher of [Title] High School

Dear [Recipient]:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The title of my research project is the following: DIFFERENCES IN CAREER ENGAGEMENT SCORES AMONG MID-ATLANTIC HIGH SCHOOL SENIORS WITHIN CAREER READINESS PROGRAMS OF STUDY.

The purpose of my research is to determine if there is a difference in career engagement scores between three career readiness pathways among high school seniors.

Thank you for helping implement this survey.

In http://tiny.cc/q9kv3y are all the forms needed to complete the survey. The forms are also attached to this email.

They are as follows:
- Recruitment Form – please read at the start of implementing the survey
- Student list – you can determine who is able to participate.
- Student Consent Form – place in a shared location for the students to access

Only students who are 18 years old or older can participate. No student who is 17 years old or younger should participate in this survey. You can check the students' ages with the enclosed Student List file for qualification.

All student participants must have access to the internet through a phone or a computer.

Before starting the survey:
- Please Display in a visible location the link to the Student Consent Form.
  - It is http://tiny.cc/3v133y
- Using the Student List, identify the students who are 18 years old or older.
  - Only these students can participate in the survey.
  - List for student ages are accessible at http://tiny.cc/q9kv3y
- Allow student participants to access the internet through a phone or a computer.

Starting the survey:
- Please read the Recruitment Form to the class.
- Have only students who are 18 years old or older take the survey.
  - List for student ages are accessible at http://tiny.cc/q9kv3y

- Have the student participants go to the Student Consent Form at http://tiny.cc/3v133y
- For the students to start the survey, they must…
  - Go to http://tiny.cc/3v133y on an internet browser either by phone or computer
    - If student is not on the district's network, they will be prompted to log in. They must log in to their student account continue.
  - Read the Student Consent Form
  - Scroll to the bottom
  - Click the link at the bottom of the page
  - If the student is on a computer…
    - Press 'allow' to allow Internet Explorer to pop up the survey

During the survey:
- For their data to count, have all participants complete the entire survey.
  - In some sections, an 'ok' button must be pressed to move to the next section.
- Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time. The student must simply close the browser. Discontinuation of the survey will not count against the student in any way.

Completing the survey:
- Once the participant has completed all parts of the survey, have the student press the 'done' button on the bottom of the page.
- Internet Explorer should change to a 'thank you' screen.
- The student's participation has ended.

The survey should take approximately 3 minutes.

Contacts and Questions: The researcher conducting this study is Glenn Mathias. You may ask any questions you have now. If you have questions later, you are encouraged to contact him at glenn.mathiasiii@hcps.org. You may also contact the researcher's faculty advisor, Dr. Alsup, at palsup@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Thank you,
Glenn Mathias

Appendix J: Student Recruitment Request Document

Dear Students:

As a graduate student in the School of Education at Liberty University, I (Glenn Mathias) am conducting research as part of the requirements for a doctoral degree. The title of my research project is the following: DIFFERENCES IN CAREER ENGAGEMENT SCORES AMONG MID-ATLANTIC HIGH SCHOOL SENIORS WITHIN CAREER READINESS PROGRAMS OF STUDY.

The purpose of my research is to determine if there is a difference in career engagement scores between three career readiness pathways among high school seniors.

If you are graduating from a Harford County Public School this year, you are 18 years old or older, and you are willing to participate in the study, you will be asked to complete a 14-question survey (via Survey Monkey). Students who are 17 years old and younger will not be able to participate in the survey.

It should take approximately 3 minutes for you to complete the procedure listed.

Your participation will be completely anonymous, and no personal, identifying information will be collected.

To participate, you will go to http://tiny.cc/3v133y

This link is the Student Consent Form document. This document contains all information about the study, who to contact with any concerns, and the link to the survey.

How to participate in the study:
- You will need internet access from a phone or a computer.
- Please type the URL (http://tiny.cc/3v133y) into your device. The link will take you to the Student Consent Form document.
    - o If you are not on the school network, you will be asked to log in to your school email account to access the document.
    - o You will read the document, scroll to the bottom, and click the link at the bottom of the document to access the survey.
- When you click the link, a new web browser should pop-up with the survey. For your data to count, you must complete the entire survey.
    - o In some sections, an 'ok' button must be pressed to move to the next section.
- When you have completed all sections, please press the 'done' button on the bottom of the page.
    - o If there is a response missing, the survey will bring you back to the missing section.
- When your browser changes to a 'thank you' screen, your participation has ended.

Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time. You may simply close your browser. Discontinuation of the survey will not count against you in any way.

Please complete all 14 questions on the survey or it will be voided and not count towards the research.

The Student Consent Form contains additional information about my research, but you do not need to sign and return the form.

The survey should take approximately 3 minutes.

Do your best.

Sincerely,
Glenn Mathias

Appendix K: Student Consent Form

CONSENT FORM

DIFFERENCES IN CAREER ENGAGEMENT SCORES AMONG MID-ALANTIC HIGH
SCHOOL SENIORS WITHIN CAREER READINESS PROGRAMS OF STUDY
Glenn R. Mathias
Liberty University
School of Education

You are invited to be in a research study about career engagement of the school system. The purpose of this study is to determine if there is a difference in career engagement scores between three career readiness pathways among high school seniors. You were selected as a possible participant because you are a senior and you have chosen a pathway for graduation. Please read this form and ask any questions you may have before agreeing be in the study.

Glenn R. Mathias, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to focus on differences in career engagement outcomes within various high school majors (career pathways).

The research question is as follows: Is there a difference in career engagement scores among high school seniors in a Mid-Atlantic school system whose program of study is in Project Lead the Way (PLTW), Career Technology Education (CTE), or General Education (GE) classes?

There is little known about the practical ramifications of different career pathways centered on career engagement. So, this study would like to see if there are any differences between PTLW, CTE, and GE pathways.

Procedures: If you agree to be in this study, I would ask you to do the following thing:
1. Take the survey (via Survey Monkey) which includes demographic questions and the Career Engagement Scale. This action will take about three minutes to read and answer all 14 questions.

Risks: The risks involved in this study are minimal, which means they are equal to the risks would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include allowing the school system to analyze which career pathways are effective toward student career engagement.

Confidentiality: All survey responses are anonymous. The records of this study will be kept private. Research records will be stored securely and only the researcher will have access to the records.

For privacy purposes, the student can take the survey at any time and in any location where there is internet access.

Because the survey is distributed though the email system using Survey Monkey, the scores will be downloaded from Survey Monkey and placed into a spreadsheet on one flash drive. The flash drive, which contains the spreadsheet, will be lock in a safe in the researcher's house. Only the researcher will have access to any information produced from the surveys. Per federal regulations, data must be retained for three years upon completion of the study. The spreadsheet will be kept on a separate flash drive that will be destroyed after 3 years.

Conflicts of Interest Disclosure: The researcher serves as a teacher in Harford County. To limit potential conflicts, the study will be anonymous, so the researcher will not know who participated. This disclosure is made so that you can decide if this relationship will affect your willingness to participate in this study. No action will be taken against an individual based on his or her decision to participate in this study.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether to participate will not affect their current or future relations with Liberty University or Harford County Public Schools. If you decide to participate, you are free to not answer any question or withdraw at any time, prior to submitting the survey, without affecting those relationships.

How to Withdraw from the Study: If you choose to withdraw from the study, you should exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

Contacts and Questions: The researcher conducting this study is Glenn Mathias. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at glenn.mathiasiii@hcps.org. You may also contact the researcher's faculty advisor, Dr. Alsup, at palsup@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers.

By clicking this link, you voluntarily agree to participate.
https://www.surveymonkey.com/r/97XB2YR

Appendix L: Student List

Appendix M: Student Instructions

Webpage instructions, webpage survey screen shots, and emailed instructions

https://www.surveymonkey.com/r/97XB2YR

Appendix N: Demographics and Survey Questions

Demographic Info…(check by radio buttons)

1. What is your age?

2. What is your gender?

3. What is your ethnicity?

4. What is your school pathway? (Drop down menu)

Orientation question…(write in answer)

5. What career do you want?

During your time at HCPS you…(Likert scale, (1) not much; (2) little; (3) somewhat; (4) much; (5) a great deal)

6. Actively sought to design your professional future

7. Undertook things to achieve your career goals

8. Cared for the development of your career

9. Developed plans and goals for your future career

10. Sincerely thought about personal values, interests, abilities, and weaknesses

11. Collected information about employers, professional development opportunities, or the job market in your desired area

12. Established or maintained contact with people who can help you professionally

13. Voluntary participated in further education, training, or other events to support your career

14. Assumed duties or positions that will help you progress professionally

Appendix O: "Thank You" Email

[Send Date]

Hello [Recipient],

Thank you for giving me the permission to study the students at [ABC District] Public Schools. After getting your permission and implementing the study, I am further convinced that [ABC District] Public Schools has a great staff, students, and parent support.

I really appreciate the time students took to answer the survey questions. I have learned a great deal from them and certainly enjoy this process.

With the countless loads on your time, I hope my study has added to understanding our pathway programs at [ABC District] Public Schools without contributing to more resource demands.

Your permission and access to students were greatly appreciated. Thank you!

Sincerely,

Glenn Mathias
Technology Educator