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Determining the Degree to Which Ideational Behavior Predicts Occupational Identity Achievement in Emerging Adult College Students Preceding Entry into the Fourth Industrial Revolution Workforce

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DETERMINING THE DEGREE TO WHICH IDEATIONAL BEHAVIOR PREDICTS

OCCUPATIONAL IDENTITY ACHIEVEMENT IN EMERGING ADULT COLLEGE

STUDENTS PRECEDING ENTRY INTO THE FOURTH INDUSTRIAL REVOLUTION

WORKFORCE

by

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ABSTRACT

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Old Dominion University, 2023
Director: Dr. Michael Kosloski

As emerging adults transition into the Fourth Industrial Revolution (4IR) workforce, it is essential to understand the factors that predict successful occupational identity achievement, as automation will impact human occupational identity crises. This descriptive cross-sectional study implemented a correlation design to determine the degree to which ideational behavior predicts occupational identity achievement preceding entry into the 4IR workforce. Using a sample of 166 emerging adult college students from a Mid-Atlantic, diverse, four-year university, data were collected using Runco's Ideational Behavior Scale (RIBS) and Melgosa's Occupational Identity Achievement subscale (OIA). Results showed that ideational behavior significantly predicted occupational identity achievement ($p < .016$), as it was uncovered that emerging adults' degree of ideational behavior explains 3.5% of the variance of their occupational identity achievement ($R^2 < .035$), as higher levels of ideational behavior are related to higher levels of occupational identity achievement. The results also concluded that emerging adults' demographics showed no significance after a multiple linear regression analysis ($p < .246$), but total ideational behavior scores remained significant ($p < .015$). These findings suggest that

ideational behavior is a strong predictor of emerging adults' occupational identity achievement proceeding entry into the 4IR workforce.

Keywords: emerging adults, Fourth Industrial Revolution (4IR) workforce, ideational behavior, occupational identity achievement

This thesis is dedicated to creativity in education & the workforce.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Our work is linked directly to our sense of self, our way of life, and our course of being (Hughes, 1958). Job loss generates substantial challenges to individual occupational identity (Fraher & Gabriel, 2014). Arellano-Vega et al. (2018) defined occupational identity as the perception of occupational abilities, interests, values, and goals and the structure of the meanings that link these self-perceptions to career role. Our once human-only workforce has become increasingly inundated with machines as unprecedented technological change and evolution are occupying our workforce. World Economic Forum (2018) reported that the shift between work tasks performed by humans and those performed by algorithms and machines could lead to a new age of good jobs, good work, and improved quality of life. Still, if poorly managed, machines and algorithms pose the risk of widening skill gaps, broader polarization, and greater inequality (World Economic Forum, 2018). This period of technological growth and occupational identity uncertainty is known as the 4th Industrial Revolution (4IR). Deloitte (2018) stated that the term 4th Industrial Revolution was first used by Klaus Schwab, the executive chairman and founder of the World Economic Forum, who calls the 4IR a fusion of technologies that blur the lines between the digital, physical, and biological spheres. Davenport and Kirby (2015) noted that unless we find as many tasks for humans as we automate away from them, the psychological and social ills of joblessness will grow from economic recession to youth unemployment to individual identity crises.

What makes the 4IR different from all other industrial revolutions is that the gap between the digital, physical, and biological worlds is shrinking, and technology is changing faster than ever (Schulze, 2019). The rapid technological change of the 4IR is witnessed through Moore's

Law, which Mack (2011) noted as a remarkable evolutionary trend where the number of semiconductor circuits doubled each year for the first few years in the industry and has come to represent the inexhaustible capacity for exponential growth in electronics. Because of the rate of technological change and growth during the 4IR, the researcher hypothesizes that workers in the 4IR will have to achieve their occupational identities multiple times throughout their work life. Charland (2010) noted that individuals alternate or shift between different statuses from foreclosure to the diffusion identity status, from foreclosure to moratorium status, and from diffusion to foreclosure identity status. It is important to note that employing the everyday soft skill of occupational identity achievement during the 4IR workforce will be continuous and not static, as Bogaerts et al. (2019) stated that an individual's occupational identity structure is revised continually through ongoing processes of occupational identity exploration and commitment. This system will help workers transition between careers and adjust to the pressures of the new creative knowledge economy and escape the claws of technological unemployment (Clark and Gevorkyan, 2020).

The work of determining individual identity evokes the plight of those who are frequently on the move and often called to reinvent themselves (Fraher & Gabriel, 2014). Davenport and Kirby (2015) stated, what new feats might humans achieve if they had better-thinking machines to assist them in their reinvention? Augmentation, in contrast with automation, means starting with what humans do today and figuring out how human work can be deepened rather than diminished by a greater use of machines (Davenport & Kirby, 2015). Davenport and Kirby stated that some knowledge workers will step up to higher levels of cognition; others will step aside and draw on aspects of intelligence that machines lack. While some will not meet the changing market demands, some will step in to adjust and monitor computers' decision-making; others

will step narrowly into highly specialized realms of expertise, while inevitably, some will step forward to create next-generation machines and find new ways for them to augment human strengths (Davenport & Kirby, 2015). It is this imbalance that poses important questions to the workforce community, a community that is preparing for the future of work but simultaneously acknowledges that its future workforce may not be ready for the 4IR or know that it is upon us (Deloitte, 2018).

Mbilini et al. (2019) noted that the future of our workforce, undergraduate college students, rarely considered automation when making career decisions. The transition from high school to college, and then from college to career, marks the developmental period called emerging adulthood. (Lannegrand-Willems et al., 2018). Swanson and Walker (2015) stated that individuals between 18 and 25 years of age classify emerging adulthood, where traditional markers of adulthood, such as leaving home and being economically dependent, are slowly approaching. Emerging adulthood and adolescence are life periods when individuals define and question their place in society and form their identity. Erickson (1968) defined identity as a direct perception of our continuity and consistency over time and the possibility of reaching identity achievement. Wim (1993) noted that identity achievement indicates that adolescents overcame their identity crises and committed to an identity, as the researcher hypothesizes that emerging adults will need to develop the soft skill of achieving an occupational identity preceding entry into the 4IR workforce, to survive and thrive amid job loss caused by automation.

Barbot and Heuser (2017) noted that one particular line of research focused on the possible input of creativity on self-definition and the formation of a person's identity. Sica et al. (2017) stated that identity and creativity could proceed as intertwined dimensions that support

late adolescents in exploring, elaborating, reconsidering, and elaborating individual answers again while transitioning to adulthood developmental tasks, in a creative adaptive way or as a creative life design. Sica et al. noted that, on the contrary, when creativity is lacking, the commitments do not follow the reconsideration or exploration processes but cease self-discovery work. An individual's ideational behavior is a universal component of creativity in that all levels of creativity involve ideation (Batey et al., 2010). Batey et al. (2010) noted that to adequately capture the essence of ideational behavior, offering a self-report measure of a person's perceived ability to be flexible, original, and fluent with ideas are all facets of divergent thinking. Reiter-Palmon et al. (2012) noted that self-perceptions of creativity had been used as both predictors and criteria of creative performance. However, there has been limited to no research in the United States of America that specifically connects emerging adults to ideational behavior.

Problem Statement

The problem of this study was to determine the degree to which emerging adult college students' ideational behavior predicts their occupational identity achievement preceding entry into the 4th Industrial Revolution (4IR) workforce.

Research Questions

- **RQ1:** How do emerging adult college students perceive their degree of ideational behavior?

- **RQ2:** How do emerging adult college students perceive their occupational identity achievement?

- **RQ3:** How will emerging adult college students' ideational behavior predicts their occupational identity achievement?

Background and Significance

Microsoft (2018) stated that the true power of artificial intelligence's ability to transform the workplace will come as the cognitive power of people combines with the computational power of machines, enabling companies to do more. New forms of artificial intelligence characterize the 4IR, changing the understanding of human-machine interaction and developing new models for production where machines and man form hybrid teams with virtual agents (Richert et al., 2017). Given this dynamic, robots are increasingly replacing and working alongside humans in the workforce (You & Robert, 2018). Clark and Gevorkyan (2020) noted that over 82 percent of Americans anticipate wide-scale introductions of robots in the workplace by the year 2050, with 37 percent of adults convinced robots will take over their current jobs. The strategy that will work in the long-term is for employees and employers to view smart machines as our collaborators and partners in knowledge work by emphasizing augmentation and removing the threat of automation (Davenport & Kirby, 2015).

Although adolescents are unlikely to give much thought to the risks of automation when contemplating their careers, they may consider other job characteristics related to automation risks (Hoff et al., 2022). Symonds et al. (2011) stated that the most fundamental obligation of society is to prepare our young adults and adolescents to lead productive and prosperous adult lives. The problem is, Deloitte (2018) noted that more than half of the two-billion youth worldwide will not possess the qualifications or skills necessary to participate in the emerging global workforce, translating to more than 50 percent of the human capital being potentially ill-prepared to enter the workforce. Shanklin (2014) noted employers have determined youth entering the workforce lack essential soft skills. 'Human' soft skills such as creativity, originality, and critical thinking will likely increase their value during the 4IR (World Economic Forum,

2018). Deloitte stated that the growing number of youths who lack the basic skills to contribute to the workforce correlates to the rising rates of youth unemployment. Dietrich et al. (2012) noted that the post-high school transition has more recently been associated with uncertainty as adolescents seek to meet various developmental tasks in a timely manner, as their decisions at this juncture may chart the course of their adult life.

Those college students between the ages of 18 and 25 are in a period called emerging adulthood. Emerging adulthood is the developmental period where achieving a vocational identity is highly relevant (Taber & Blankemeyer, 2015). Karwowski and Kaufman (2017) noted that the representation of self is key to the exploration of an individual's future professional life or occupation and vocational decisions. It is critical for emerging adults to develop ideas on how they might interact and collaborate with machines, as it will help to shape their occupational identity during the 4IR. Bang (2015) noted that emerging adulthood is an important period where individuals have a chance to think deeply about their life in ways that could eventually help them mature. If emerging adults do not take the time to develop their identity, it could lead to identity confusion or crisis. Fraher and Gabriel (2014) noted that identity can fragment and mutate, shrink and grow, shed and incorporate elements, and become a path rampant with crises, struggles, and fantasies.

Charland (2010) noted that late adolescents must resolve two major identity concepts: crisis when choosing between various ideologies or occupations, and the second being commitment, which highlights the choices made and devotion to a particular ideology or occupation. Karwowski and Kaufman (2017) stated that identity formation could be seen as a creative process. As such, creativity is an essential resource in constructing an individual's identity (Lubart & Getz, 1998). The three main aspects of creativity that may contribute to

identity development are the creative thinking process, domains of commitment that lead to positive self-definition, and adaptive self-expression (Karwowski & Kaufman, 2017). Karwowski and Kaufman (2017) noted that these mechanisms are present during adolescence, which is when the development of both creativity and identity are particularly vital.

Caroff and Lubart (2012) stated that the capacity to be creative is considered a latent ability, or potential which can be taught. Kaufman and Beghetto (2009) famously distinguished between four types of creativity: mini-c (the creativity involved in meaning-making and learning), little-c (the creativity of everyday, mundane activities; Pro-C (the creativity that powers professional activities), and Big-C (the revolutionary creativity that transforms society and culture). Identity formation utilizes little-c creativity, the everyday creativity (Vlad, 2018). One way to measure everyday creativity is through divergent thinking, which requires the formulation of multiple possible answers to problems that have more than one possible solution and allows for diverse ideas (Mayseless et al., 2015). Yang et al. (2020) stated that the core of a creative mindset is divergent thinking which produces multiple novel and unusual solutions to a single problem. An et al. (2016) noted that divergent thinking is a concept of creativity, defined as creative expert performance and the motivation to engage in creative behavior, including ideation and activity. Karwowski and Kaufman (2017) stated that although divergent thinking starts to develop very early in adolescence, it represents a new developmental turn in creative potential. Creative potential is characterized by multifaceted, discontinuous, and task-specific development, including factors such as complexity, curiosity, or risk-taking, which align logically with identity formation (Karwowski & Kaufman, 2017).

Limitations

- The researcher was not able to ask clarifying or probing questions, as the survey was completed online.

- The researcher incentivized each instructor that helped administer the survey by awarding the instructor with the highest participant total with a $100 Amazon gift card, and the runner up with a $50 Amazon gift card.

- The use of self-reported creativity measures might reflect the perception of the participant's self as creative based on stereotypical creative personality or creative self-efficacy (Silvia et al., 2021).

- The researcher is using a single university to collect data.

- The participants' current majors may or may not be an accurate reflection of their majors upon graduation.

Delimitations

- The researcher focused on occupational identity achievement alone, and not the other three identity statuses (moratorium, foreclosure, diffusion), or occupational identity as a whole.

- The researcher focused on divergent thinking (ideational behavior) alone, and not convergent thinking.

Assumptions

- It is assumed that each participant will answer the inventory truthfully and honestly, and that their self-perceptions accurately depict their true self.

Procedures

This study was quantitative and utilized a sample of emerging adult college students from a Mid-Atlantic, diverse, four-year university. The researcher in this study targeted a demographically diverse participant sample which contained emerging adult college students from all available 100-level Oral Communications courses within this Mid-Atlantic, diverse, four-year university. Instructors were incentivized to have their students complete the survey in its entirety because the instructor who had the most students complete the survey in its entirety would win a $100 Amazon gift card, and the runner-up would win a $50 Amazon gift card.

The instruments used to compile the survey for this study were twofold. First, the Runco Ideational Behavior Scale (RIBS-S) is a 19-item Likert-type rating scale that asks respondents to rate themselves by reflecting on their appreciation of, use of, and skill with ideas (Runco et al., 2001). Paek et al. (2016) noted that the RIBS-S is intended to measure how often (never, daily, weekly, monthly, yearly) a participant has thoughts of a certain type as a measure of creative ideation. The RIBS-S can be used as a criterion of creative ideation (Runco et al., 2001). The second instrument used for this study was the measure of occupational identity achievement. Occupational identity achievement was measured using the Occupational Identity Scale (OIS) which is a 28-item Likert scale that offers an individual measure of identity status of occupational development. The OIS is comprised of four separate scales: achievement, moratorium, foreclosure, and diffusion. Taber and Blankemeyer (2014) noted that each of the subscales measures the degree of resemblance to all four vocational identity statuses based on the varying degrees of occupational commitment and exploration. In this study, the researcher only used the occupational identity achievement scale (OIA), which employs just seven of the 28 total OIS questions.

Design

This study was a descriptive cross-sectional study that implemented a correlational design to determine the degree to which emerging adult college students' ideational behavior predicted their occupational identity achievement preceding entry into the 4th Industrial Revolution (4IR) workforce. The researcher computed the total ideational behavior (IB) score and the total occupational identity achievement (OIA) score by summing the individual scores before utilizing a linear regression analysis in SPSS to determine if the sample of emerging adult college students' total IB scores predicted their total OIA scores.

The researcher also investigated the relationship between the dependent variable of occupational identity achievement (OIA total scores) and the six independent variables of age, gender, college year, major (STEM, Non-STEM, and Undecided), and ideational behavior (IB total scores), including ethnicity, a categorical variable which was dummy coded from seven ethnicity levels into three binary variables, through the use of a multiple regression analysis. The three binary variables were ethnicity = White, ethnicity = Other (Asian, Hispanic or Latino, Mixed with Black and White, Arab, and Native American), and ethnicity = Black, which served as the reference category. The dependent variable (OIA total scores) and the independent variables used in this portion of the study are all continuous variables except for ethnicity, which was categorical. A multiple linear regression analysis was conducted to examine the contribution of each independent variable to the model. Hayes (2022) stated that multiple linear regression is a statistical technique that uses several independent variables to predict the outcome of a dependent variable.

Definition of Terms

The following terms are defined to assist the reader with the study:

4th Industrial Revolution (4IR): a way of describing the blurring of boundaries between the physical, digital, and biological worlds. It's a fusion of advances in artificial intelligence (AI), robotics, the Internet of Things (IoT), 3D printing, genetic engineering, quantum computing, and other emerging technologies (Deloitte, 2018).

Achievement (Identity Status): one has experienced a crisis period and is committed to an ideology and occupation (Marcia, 1966).

Artificial Intelligence (AI): the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages (Joiner, 2018).

Career and Technical Education (CTE): provides students of all ages with the technical and academic skills, training and knowledge necessary to succeed in future careers and to become lifelong learners. In total, about 12.5 million high school and college students are enrolled in CTE across the nation. CTE prepares these learners for the world of work by introducing them to workplace competencies and makes academic content accessible to students by providing it in a hands-on context (Advance CTE, 2022).

Convergent Thinking: the opposite of divergent thinking. The nature of tests where items are converging toward one right answer (Guilford, 1957).

Creative Performance: generating insights, ideas, and solutions that are both useful and novel and are vital to human prosperity and survival (Kleibeuker et al., 2013).

Creative Potential: a latent ability to produce original, adaptive work, which is part of an individual's human capital (Lubart et al., 2013).

Creative Self: the combination of attributes that each of us forms to make a unique place among others in our social interactions. There are five components to this factor: thinking, emotions, control, work, and positive humor (Karwowski & Kaufman, 2017).

Diffusion (Identity Status): a period when an individual does not have an established identity, nor is actively searching for one (Marcia, 1966).

Divergent Thinking: can facilitate the production of sufficiently original and diverse material from which a single solution can be developed (Cropley, 2006).

Foreclosure (Identity Status): the stage where adolescents may adopt different qualities and traits from relatives and friends but have not yet settled on their own (Marcia, 1966).

Future of Work: the growing adoption of artificial intelligence in the workplace, and the expansion of the workforce to include both on- and off-balance-sheet talent (Deloitte, 2022).

Generation Z: individuals born after 1995 who are at the stage of completing college and entering the workforce (Randstad, 2017).

Gig Economy: a labor market characterized by the prevalence of freelance work or short-term contracts (i.e., gigs) as opposed to permanent jobs, where numbers of people, including well-educated workers, who held multiple part-time jobs, freelanced, or were employed by temporary agencies (Kuhn & Galloway, 2019).

Human Augmentation: technologies that enhance human productivity or capability, or that add to the human body (Techopedia, 2020).

Ideation: the process of generating original ideas, where an idea is understood as a basic element of thought that can be either visual, concrete, or abstract (Basadur, 2018).

Ideational Behavior: self-reported creative ideation or behavior that clearly reflects an individual's use of appreciation of, and skill with ideas (Runco et al., 2001).

Identity Exploration: individuals who have the opportunity to explore several aspects of their identity during a period of relatively free experimentation before assuming lasting responsibilities (Erikson, 1968).

Identity Formation: involving both commitments and decision points with respect to ideologies (e.g., politics, religion) and occupations (Marcia, 1966).

Internet of Things (IoT): the interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data (Grinn, 2022).

Knowledge Economy: an economy where growth is dependent on the quality, quantity, and accessibility of the information available, rather than the means of production (IGI Global, 2022).

Knowledge Worker: someone who generates value through their knowledge (Forbes, 2020).

Moratorium (Identity Status): is a period of active searching for one's occupational, ethnic, religious, or another form of identity to determine who they really are (Marcia, 1966).

Occupational Identity: the perception of occupational abilities, interests, values, and goals, and the structure of the meanings that link these self-perceptions to career role (Arellano-Vega et al., 2018).

Occupational Identity Achievement: indicates that students have explored different occupational options and as a result have committed to an occupational choice. (Berrios-Allison, 2005).

Workplace Readiness: a number of commonly expected skills and behaviors that employers seek from most employees which are necessary for any job. Work readiness skills are sometimes called employability skills, soft skills, or job readiness skills (Workforce Innovation Technical Assistance Center, 2016).

Summary and Overview

Chapter I introduced the concept of ideational behavior and its relationship to occupational identity development in the 4IR. The increased use of automation and artificial intelligence in the workforce is overviewed, as technological evolution has advanced at a detriment to the human workforce. While there are gaps in our knowledge about augmenting an occupational identity in the 4IR, concentrating on how ideational behavior predicts emerging adult college students' occupational identity achievement is focused upon. Chapter I introduced the use of a 30-question survey, which will be administered to diverse, four-year university college students, all of which are emerging adults. Chapter I also established research goals, the background, and significance of the study, its limitations and assumptions, the procedures used, and a list of contextual definitions that will be useful during this study and a future workforce.

Chapter II will review the literature. Chapter III will address the methods and procedures used to conduct this study. Chapter IV will present the findings of this study. Chapter V will summarize the results of the research, draw conclusions on the research findings, and list recommendations based on the conclusions.

CHAPTER 2

REVIEW OF LITERATURE

This literature review first investigates the 4th industrial revolution (4IR) workforce and the future of work. Next, the literature on automation, artificial intelligence, and augmentation is explored. From there on, the literature review delves into career and technical education (CTE), with explicit attention to the origins of CTE, key events of CTE, and future projections of CTE. After that, the literature on workplace readiness and soft skills is examined, followed by an investigation into Generation Z and emerging adulthood, specifically targeting identity development in emerging adulthood, adolescence to emerging adulthood, and the high school to college transition.

From there on, the literature review inspects occupational identity and occupational identity status, followed by a look into each of the four identity statuses (diffusion, foreclosure, moratorium, and achievement). Next, the literature review analyzes occupational identity achievement and identity achievement & creativity. After that, the literature review examined creativity, 4-C creativity, creative thinking, creative potential, creative performance, and creative skills. Following creative potential, the literature review explores divergent thinking, ideational behavior, originality, fluency, flexibility, and convergent thinking. Lastly, the literature review investigates self-perceived creativity, creative self-efficacy, and self-efficacy.

4th Industrial Revolution (4IR) Workforce

Our workforce is rapidly changing. Deloitte (2019) noted that the Fourth Industrial Revolution would bring disruption to the economic, political, and social fabric, with the ramifications of this disruption impacting work, workers, and employers like never before. As the 4IR unfolds, companies seek to harness new and emerging technologies to reach higher

levels of efficiency, production, and consumption, in hopes of expanding into new markets and competing on new products (World Economic Forum, 2018). Anderson (2018) stated that most experts expressed concern about the long-range impact of these new tools on the vital elements of being human, no matter how optimistic they are or not. Deloitte (2018) noted that the growing number of youths who lack the basic skills to contribute to the workforce correlates to the rising youth unemployment rates.

Many millennials and Generation Z are looking to increase their work flexibility because staying connected through digital means is central to their lives (Microsoft, 2018). Horney (2018) noted that by 2019, close to half of U.S. workers will work in a temporary, contract, consultant, or freelance capacity. Deloitte (2019) stated that in the U.S., more than 40 percent of the American workforce now works on a contingent basis, and over two-thirds of millennial and Generation Z workers have "side hustles" to make ends meet. While we would like to foresee exactly how jobs will evolve, automation outcomes are not predetermined, so instead of speculating about what could happen due to automation, we should focus on what should happen (Servoz, 2019). A common thought is to launch a reskilling imperative (World Economic Forum, 2018). Deloitte stated that 86 percent of respondents from this year's Global Human Capital Trends survey believe they must reinvent their ability to learn new skills.

Microsoft (2018) stated that for the first time in the modern history of the labor market, the workforce spans five generations: from the Silent Generation to now Generation Z. These workers are in search of greater fulfillment, freedom, and flexibility in their jobs, and may describe their work as more of a calling than as a career (Microsoft, 2018). Davenport (2015) noted that those workers who can collaborate with a computer without interruption or difficulty would be the ultimate winners. Horney (2018) also noted that these independent workers are not

the "temp" workers of previous decades because they can be found at every level of an organization--from unskilled to top executive roles. The key to navigating this new gig economy is to craft a robust in-company lifelong learning system, invest in human capital, and collaborate with other stakeholders on workforce strategy (World Economic Forum, 2018). Microsoft noted that as technology handles the time-intensive and routine tasks, human workers can spend their brain power on innovative inquiry, proposing radical ideas, solving impossible problems, questioning the status quo, and exploring new ways to drive growth.

As the Fourth Industrial Revolution evolves, companies are looking to harness new and emerging technologies to reach higher levels of production efficiency and consumption, to expand into new markets, and to compete on new products for a global consumer that is increasingly composed of digital natives (World Economic Forum, 2018). World Economic Forum (2018) stated that the shift between work tasks performed by humans, and those performed by algorithms and machines, could lead to a new age of good jobs, good work, and improved quality of life for all, but if poorly managed, machines and algorithms pose the risk of widening skill gaps, broader polarization, and greater inequality. Spataro (2020) noted that work would likely be a fluid mix of remote and in-person collaboration. Spataro also noted that the global shift from in-person to remote work had created both challenges and opportunities for the future of our workforces, as remote work can lead to longer work hours, missed in-person connections, meeting fatigue, and loss of spontaneous conversation which leads to team bonds, making collaboration feel easier.

Hadad (2017) noted that technological revolutions and globalization transform the contemporary economy into the "knowledge economy," as globalization has helped easily distribute data, knowledge, and information, largely due to modern technology. Ricceri (2008)

noted that the knowledge economy means greater information and knowledge resources are abundant rather than scarce, as scarcity was the case in the traditional economy. The new form of work and organizations govern the world of business in this economy where there is a demand for solid knowledge, fast-developing skills, and greater responsibility (Hadad, 2017).

Kuhn and Galloway (2019) noted that the term "gig economy" was created during the great recession as a description for numbers of people, including well-educated workers, who held multiple part-time jobs, freelanced, or were employed by temporary agencies. Wood et al. (2019) stated that the gig economy has emerged as a major theme of modern employment practices. However, in the past several years, gig work has become a more novel type of contingent labor, either remotely or in-person, where individuals find short-term projects or tasks via mobile apps or websites that connect them to clients and online payment (Kuhn & Galloway, 2019). Although the exact number of gig economy workers remains relatively small, there has been a concern among policymakers and the public about its implications for the future of work, as it has been argued to fragment work and undermine the standard employment relationship (Wood et al., 2019).

Automation

A key factor contributing to job loss in the 4IR is automation. Matthews and Greenspan (2020) stated the undeniable fact that robotics and automation had impacted each individual's work and life. Gronsund and Aanestad (2020) noted that automation could be applied to several different functions of an organization, such as analysis, decision, information acquisition, and action. Jobs replaced by machines have incited a visceral reaction in many people, as massive technological improvements in technologies, both software and hardware, have led to automation and robotics improvements (Casey & Nzau, 2019). Matthews and Greenspan stated that artificial

intelligence is one of the enabling technologies for automation and decision-making. Hardware improvements with smaller and faster chips, better power consumption, and graphical processing units are among the technologies making robotics faster (Ackerman, 2021).

As humans, we create machines to amplify our endurance, strength, mobility, dexterity, and, more recently, our intelligence and communications (Matthews & Greenspan, 2020). European Parliamentary Research Service (2020) noted that what is significant about this next machine technology phase is integrating semi-autonomous, intelligent robotics into the workplace, transforming cognitive tasks once considered human only, such as business process design, social interactions, and strategic decision-making. Automation, robotics, and artificial intelligence represent the first massive-scale substitution for human cognition (Matthews & Greenspan, 2020).

Smith and Anderson (2014) noted many conflicting opinions about automation's impact on the working population and economic and government policies. Production no longer depends solely on human labor, as automation accomplishes most production, leaving human workers without work (Smith & Anderson, 2014). Unlike previous mechanical technology, information technology replaces not physical labor but repeatable and predictable cognitive labor, as we are entering the era of intelligent robotics (Matthews & Greenspan, 2020). Matthews and Greenspan (2020) also stated that the middle class might become obsolete in this scenario, increasing wealth disparity, making wealth contingent upon investment and inheritance. Even in less extreme cases, automation will be disruptive as jobs will be transformed or replaced (Manyika et al., 2017). Matthews & Greenspan noted that this could mean massive unemployment for many or an opportunity for engaging in more satisfying creative work. Automation has made our

operations more efficient, but that means profitability will depend more than ever on people's creativity (Davenport & Kirby, 2015).

Artificial Intelligence

Along with automation, artificial intelligence has been a major influence to the workforce. Grosz and Stone (2018) stated that artificial intelligence (AI) technologies are becoming more ubiquitous, and opinions on their impact on societies and individuals widely vary. AI has brought to light several innovations and applications, such as autonomous vehicle navigation and image and speech recognition, to near-human levels of performance (Anthes, 2017). Grosz and Stone (2018) stated that if AI can help to drive our cars, then it should also be able to wash and fold our laundry, but these two are very different activities and demand different types of reasoning, algorithms, and capabilities, along with a full range of equally distinct intelligence requirements. Machines have a new capability that no human or biological species has, sharing skills and knowledge almost instantaneously with others (Kietzmann et al., 2018). Kietzmann et al. (2018) noted that the rise of cloud computing has made it easier to scale ideas and advance the economic impact of machine learning because it enables cloud robotics, which is the sharing of knowledge among robots. Parnas (2017) stated that there are three types of AI research: those that build programs that play games well, those that build programs to understand human thinking and imitate human behavior, and those that show that practical computerized products can use the same methods humans use. Anthes (2017) noted that AI could become the embodiment of the human dream of having a helpful, patient, and collaborative companion.

Despite AI's broad appeal, the assessment that machine-human interactions are, and continue to be, exclusively about augmenting teams of humans and machines, or humans alone,

lacks vision and underestimates the potentially transformative power of AI (Galloway &

Swiatek, 2018). Augmenting human capabilities is a less frightening prospect than a future

where machines dominate to the point where they might evolve beyond what humans can control

(Bridle, 2018). Parnas (2017) noted that those who use the term "artificial intelligence" have not

even defined the term, that AI remains a buzzword that many think they understand but nobody

can define. Some worry that AI will affect the future of work and the feelings of worth that

individuals derive from what they do for a living (Wright & Schultz, 2018).

Augmentation

Human workers must evolve and learn to collaborate with technology in the workplace.

Gronsund and Aanestad (2020) stated that artificial intelligence (AI) enabled automation may

range from task substitution, where AI replaces humans, to task augmentation, where AI and

humans complement each other, to task assemblage, where humans and AI are dynamically

woven together to function as an integrated unit. In situations such as problem-solving, where

algorithms provide alternative courses of action to resolve a problem, rather than making a

decision, the algorithms choose to augment rather than substitute humans in their performance

tasks (von Krogh, 2018). Gronsund and Aanestad noted that, especially in complex situations

where solutions would benefit from the strengths of both algorithms and humans, an

"assemblage" of team automated solution generation and problem-solving seems to be optimal.

There is a widespread incorrect assumption that human beings and computers have

complementary problem-solving capabilities and strengths (Gronsund & Aanestad, 2020).

Pavlou (2018) noted that humans generally outperform machines when dealing with vagueness,

ambiguity, and incomplete information. Algorithms have long been suggested to be more

suitable for structured problem solving where outcomes can be clearly described, while human

processing is more equipped for ill-structured problem solving where solutions tend to require human judgment and interpretation (Simon, 1973). Gronsund and Aanestad (2020) stated that we need to move from categorical debates on these issues to more empirical investigations of solid practices where machines and humans act together. Davenport and Kirby (2015) noted the new feats humans might achieve if they had better thinking machines to assist them and what it could mean to reframe the threat of automation as an opportunity for augmentation.

Career & Technical Education (CTE)

Origins of CTE

During the 4IR, our education system must have strong ties to the workforce by teaching employability skills and training for current and future jobs. Since the late 1800s, three learning theory metaphors have dominated education: learning through the acquisition of stimulus-response pairs (behaviorism), learning through the processing of information (information processing), and learning by constructing knowledge (constructivism), and the constructivist framework may reasonably provide an adequate undergirding for the practice of career and technical education (Doolittle & Camp, 1999). Dortch (2014) noted that Career and Technical Education (CTE) is often referred to as vocational education in that it provides non-occupational and occupational preparation at the secondary, postsecondary, and adult education levels to play a significant role in the American workforce development system to reduce unemployment and temper social and economic ills. Rose (2008) noted that vocational education had racial segregation and stereotyping, as girls were funneled into clerical courses and home economics, and Black Americans were excluded from technical and mechanical training. Doolittle and Camp (1999) noted that the established theoretical framework that still guides CTE is based primarily upon the work of Charles Prosser and David Sneeden from the early 1900s, which was based

upon broad policy and political issues and seemed to have given little consideration for a learning theory to provide a foundation to their vision for career and technical education. Prosser believed that public education's purpose in a democratic society was not individual fulfillment but to prepare its citizens to meet labor needs and serve society in business and industry (Rojewski, 2002). Rojewski (2002) noted that Prosser's approach to career preparation had been criticized in recent years for it tracking specific segments of society and being class-based, throwing certain segments of society into second-class citizenship based on class, race, and gender. Rose (2008) stated that racial minority students with comparable achievement to their mainstream peers were frequently placed in vocational and general education courses. Rojewski noted that John Dewey, a progressive and pragmatist educator, disagreed with Prosser and argued that education should prepare people for life in a democratic society and meet the needs of individuals. Rose stated that Dewey was one of the first to raise concerns about the focus on job training and its separation of young people by social class. Dewey believed that society's principal goal for public education was to meet individual needs for life preparation and personal fulfillment and that all students should receive vocational education, taught to solve problems, and have individual differences equalized (Rojewski, 2002)

Regarding CTE policy, Rojewski (2002) stated that the passage of the Vocational Education Act of 1963 marked a significant change in career and technical education and federal policy, from a focus on job preparation exclusively to a shared purpose to meet economic and social demands. The Carl D. Perkins Career and Technical Education Improvement Act (Perkins IV) provided individuals with a lifetime of opportunities to develop while collaborating with other training and education programs, to keep the United States competitive (Association for Career and Technical Education, 2006a). The Carl D. Perkins Vocational Education Act of 1984

made a dramatic shift in federal policy around vocational education, as this reform was grounded in using federal funds to improve student achievement and performance (Rojewski, 2002). Gray (2004) acknowledged that if the federal administration's recommendation regarding the reauthorization of the Perkins CTE funding legislation is to scrap it, then the administration will instead redirect federal funding for high school CTE, and postsecondary technical education. Following the Carl D. Perkins Act, the Workforce Innovation and Opportunity Act (WIOA) was intended to change the way workforce development services were provided across the United States by consolidating programs, transferring authority to the state and local levels, establishing business-led state and local workforce boards, developing an accessible and comprehensive One-Stop system, and strengthening a performance-based measurement system that requires continuous improvement (Clagett, 2006).

Dortch (2014) stated that practitioners at the federal, state, and local levels organize CTE into 17 Career Clusters and multiple Career Pathways inside of each Career Cluster. Torpey (2015) noted that Career Clusters contain occupations that require similar skills and are in the same field of work. Career Pathways are defined as a series of connected training and education support services and strategies that enable individuals to secure industry credentials which help them obtain employment within an occupational area and advance to lighter levels of employment and future education in that area (Dortch, 2014).

Key Events of CTE

There are some key CTE events that must be acknowledged. Sublett (2019) stated that career and technical education is reaping new attention from practitioners and policymakers as part of the shift away from "college for all" to "readiness for college and career," as almost 90 percent of today's high school students take one CTE course or more. Association for Career and

Technical Education (2006a) stated that CTE could provide the relevance that may be lacking in traditional courses for many high school students to help increase graduation rates and increase students' future earnings. Dortch (2014) noted that CTE teaches general employment skills and prepares students for roles outside of the paid labor market. Association for Career and Technical Education (2006b) stated that every student should go through a process of career and academic exploration, awareness, and planning. Lynch (2000) noted that nearly all parents want their children to go to college, and they expect their children to be ready to do so, all while providing their children with the technical skills and knowledge to be successful in contemporary workplaces. If young people are not venturing far from their hometowns, CTE needs to do a better job preparing them for succeeding in local careers and at local colleges, as this helps to support their own and nearby communities (Sublett & Griffith, 2019). Rosen et al. (2018) stated that the growing economic gap between those without a college degree and those with a college degree has contributed to class polarization and overall increases in income equality.

Martin and Halperin (2006) stated that America's school dropout problem is a scourge on the nation's social, moral, and economic life and a blemish on our nation's future, but there are thousands of committed social entrepreneurs, educators, and community leaders across the United States who are doing whatever it takes to connect with out-of-school youth and bring them back to the economic mainstream. Those adolescent students who have weak community and family connections are prone to withdraw into the shadows inside schools while becoming more vulnerable to negative peer reinforcements such as alcohol, drugs, sex, and crime (Association for Career and Technical Education, 2006b). Association for Career and Technical Education (2006a) noted that too many students leave school when they have yet to earn a high

school diploma, but most 21st Century skills will require students to pursue and achieve some type of postsecondary education.

Symonds et al. (2011) noted that U.S. employers complain that today's young people are not equipped with the skills necessary to succeed in the 21st Century workforce. Wagner (2006) stated that a highly qualified workforce contributes to a nation's economic competitiveness, especially when a large part of the workforce has acquired knowledge and skills through higher education. All 21st Century jobs will require increasing levels of technical knowledge, and CTE can provide exposure to kids, regardless of the future career goals or exposure to technical skills (Association for Career and Technical Education, 2006a). Sublett and Griffith (2019) noted no clear relationship between concentrations for which a field accounts for its national employment share and the proposition of total CTE course-taking. Rose (2008) stated that vocational education was not doing a great job preparing students for industry.

Career and technical education administrators are challenged to fill faculty vacancies with qualified and prepared CTE instruction (Bartlett, 2002). Association for Career and Technical Education (2006b) stated that CTE teachers must demonstrate content mastery through methods appropriate to their area of expertise by utilizing assessments aligned with Career Clusters or industry-based credentials. Bartlett (2002) noted that to relieve the shortage of occupational skills for teachers at the secondary level, provisional certificates were issued, programs for emergency and alternative certification have increased, and more than 250 colleges are involved in alternative certification programs. National Center on Education and the Economy (2007) noted that we recruit a disproportionate amount of our teachers among the less able high school students who have been to college. Career and technical teacher preparation

programs have reported a decrease in the number of programs and a shortage of teachers across the nation (Bartlett, 2002).

CTSOs (career and technical student organizations) are an important aspect of CTE, as these nonprofit organizations provide co-curricular programs that give students practical instruction, experience, and opportunities to network with business and industry leaders (Dortch, 2014). Association for Career and Technical Education (2006a) noted that CTE programs engage students in projects that help shape the future of productivity and innovation in the American economy. Dortch (2014) stated that CTE providers often collaborate with businesses and industries to develop programs that offer curriculum relevance and employable graduates. Knox (2002) stated that a critical consideration for ineffective program evaluation is the involvement of key stakeholders, the participants, policymakers, funders, and coordinators of an effort most likely important to them. A result of collaborating with industry and business is developing industry-recognized credentials (IRCs) that establish a set of competencies, knowledge, and skills that are recognized as desired or necessary for a particular occupation by the relevant industry (Dortch, 2014).

Future Projections of CTE

Secretary's Commission on Achieving Necessary Skills (1991) stated that the future depends on a highly competent workforce and high-performance organizations, as today's most advanced workplaces and work is different from Henry Ford's assembly line. Association for Career and Technical Education (2006a) stated that America has changed from an industrial economy to a knowledge economy. Wonacott (2003) noted that in the future, all work will be knowledge work. If the United States is to succeed economically in the future, they must ensure

that all Americans have access to high-quality training and education throughout their lifetime (Clagett, 2006).

It is not possible to get to where America needs to go by patching up a broken system; there is not enough money available at any level of our intergovernmental system to fix the current system's problems; we can only get to where we need to go by changing the system itself (National Center on Education and the Economy, 2007). Kazis (2005) stated that part of the broader CTE policy debate to reform K-12 education is based around questioning if CTE has a place in American education, what role it should play in educating American adolescents, which students should CTE be designed for, what is its economic and educational goals, and under what terms should CTE be modernized and supported. Because there is not a national vision for the direction of CTE, policymakers and program developers on the state and local levels should sharpen their own institution's vision for high school career and technical education for the 21st century (Lynch, 2000). Today's schools must determine new curricula, standards, materials, and teaching methods (Secretary's Commission on Achieving Necessary Skills, 1991). Kazis noted that career-focused schools and programs that emphasize career and technical education, work-based learning, and career exploration remain a significant component of America's high school education.

In order to ensure America's future competitiveness, it will need high-quality CTE that increases engagement, integrates science, math, and literacy skills, and meets the needs of both the economy and employers as a whole (Association for Career and Technical Education, 2006a). High school career and technical education programs must respond quicker and more effectively to where the economy is headed, as the occupations that offer opportunity in local labor markets are the jobs of tomorrow's economy rather than yesterday's (Kazis, 2005).

Association for Career and Technical Education (2006a) noted that an increasingly substantial investment into CTE could generate innovation and knowledge to spark economic growth.

Workplace Readiness

We must prepare our youth and emerging adults for the 4IR workforce. Teng et al. (2018) stated that youth unemployment (individuals aged 15-24) is a global issue, with this workforce segment absorbing three times the unemployment than adults. Symonds et al. (2011) noted that college readiness alone does not equip young individuals with all the abilities and skills needed for the workplace or transition from adolescence to adulthood successfully. Symonds et al. also noted that the problem is seen most in our high schools, which are inundated with astonishingly high dropout rates. Education is the most vital vehicle for development and improving housing, health, transportation, peace, and stability (Ilori & Ajagunna, 2020). Symonds et al. stated that we need to widen our lens to build a more articulated pathways system that aligns with the interests and needs of young people today and is designed for a 21st Century economy. Ilori and Ajagunna (2020) noted there are many vacant jobs globally because qualified individuals with the proper training are not available. Teng et al. noted that there is still not an optimal way to equip students with the necessary hard and soft skills required for employment in an ever disruptive and changing job market. The 4th Industrial Revolution era will bring forth changes to how students are educated and what these students need to learn to keep pace with technological development, or else they will be left behind (Ilori & Ajagunna, 2020).

Another way individuals can get left behind is by not developing the soft skills needed in today's workforce. Moss and Tilly (1996) defined soft skills as abilities, skills, and traits that pertain to attitude, personality, and behavior rather than to technical or formal knowledge, which are associated with demonstrating social skills, self-reflection, and confidence. Coet et al. (2017)

noted that soft skills are presented as a constellation of personality traits and skills that contribute to an individual's professional and personal effectiveness. Teng et al. (2018) stated that young individuals lacked the soft skills needed for employment. Chaka (2020) noted that creativity is at the epicenter of the top three soft skills needed, followed by proactive thinking and emotional intelligence. Mareque et al. (2019) stated that creativity is a vital factor in company recruitment processes, plays a significant role in business and innovation, and is worth investigating to identify the skills most beneficial for student preparation. Coet et al. noted that soft skills are necessary for Industry 4.0 regarding machine tools/manufacturing systems, robotics, and logistics.

Generation Z

The future of our workforce is Generation Z. Lanier (2017) stated that Generation Z consists of people born after 1995. Randstad (2017) noted that individuals in Generation Z are at the stage of completing college and entering the workforce. The majority of Generation Z are the children of millennials, which means they possess the qualities of millennials like being thoughtful, loyal, determined, and responsible (Chillakuri & Mahanandia, 2018). Deloitte (2017) stated that this group would account for over 20% of the workforce in the next four years. Chillakuri and Mahanandia (2018) noted that Generation Z differs from the millennial generation, as they strive for their own identity and are considered to be more entrepreneurial. This generation enjoys being independent and manages their expenses (National Center for Education Statistics, 2017). Chillakuri and Mahhanandia stated that they still have the responsibility of paying off their student loans, so they look to join an organization that not only gives them freedom but a competitive salary.

Generation Z is considered novices at work and therefore is assigned low-value or tactical work (Chillakuri & Mahanandia, 2018). This generation embraces team spirit, portrays self-confidence, seeks happiness in the workplace, requires assurance for their future, and desires independence over authority (Ozkan & Solmaz, 2015). Chillakuri and Mahanandia (2018) noted that while Generation Z is assigned one task and focuses on the quality of their work, they are multitaskers and like to do more than a single task. Deloitte (2017) stated that generation Z is poised to work hard but also expect to move up the ladder quickly in their career. Unlike earlier generations, Generation Z is not content with what they do and will often become bored of repetitive jobs (Chillakuri & Mahanandia, 2018). Chillakuri and Mahanandia also stated that Generation Z is not shy about learning new things and likes to spend time on their laptops, smartphones, and other gadgets learning and researching new things. Goh and Lee (2018) also noted that this group is familiar with and depends on technology, as they have been exposed since birth to the internet. Generation Z is efficient, quick, and can easily switch gears from one job to another, making job rotation programs of great interest to advance their skills (Chillakuri & Mahanandia, 2018).

Emerging Adulthood

A key stage for Generation Z youth is emerging adulthood. Arnett (2000) noted that individuals between the ages of 18 and 25 are considered to occupy a unique developmental period named emerging adulthood. Nelson et al. (2007) stated that emerging adults are slowly approaching the traditional markers of adulthood like starting a family, leaving home, and being economically dependent. Swanson and Walker (2015) noted that this life phase between adulthood and adolescence is not just a transition but a separate period of an individual's lifetime and is influenced by social and cultural elements. Nelson et al. stated that an example of these

cultural and social influences is seen in industrialized western nations, where many have experienced shifts due to twentieth-century technological changes. Emerging adults are commonly engaged in university life, where they need experiences that reach them where they are, yet stretch them academically and personally so they are responsible for their futures (Flowers, 2014).

Swanson and Walker (2015) noted that emerging adults need environments that offer revelation, relevance, relationships, and responsibility during this developmental stage. Developmental changes in emerging adults today are based on their connections to technology, as new technologies impact their everyday academic progression and potentiality for relationships (Levine & Dean, 2013). Swanson and Walker stated that the way technology is used non-academically in the everyday lives of emerging adults could impact how they interact and think. Klopfer et al. (2009) suggested that using simulations and digital games can shape how emerging adults collaborate, operate, learn to communicate, and form social relationships.

Arnett (2000) noted that the demographic area that reflects the exploratory nature of emerging adulthood is residential status, as most young Americans leave their childhood home by the age of 18 or 19. Goldscheider and Goldscheider (1994) stated that emerging adults have diverse living situations that range from remaining at home while attending college to living in a combination of independent and dependent living situations, such as in a college dormitory or sorority or fraternity house, to living with a romantic partner. Frequent residential changes reflect emerging adult's exploratory nature, as these changes often happen at the beginning of one period of exploration or at the end of another, such as leaving or entering college, beginning a new job in a new city, or ending a period of cohabitation (Arnett, 2000). Arnett noted that

emerging adults live in a space where they do not see themselves as adolescents and do not see themselves as full adults.

Identity Development in Emerging Adulthood

For youth, there are key developmental milestones that need to be met. Johnson et al. (2011) noted that although identity development issues have been considered central to adolescence, identity development has now been known to continue well past adolescence and into emerging adulthood. Arnett (2006) stated that emerging adulthood is where individuals work on their identity, given that identity issues arise for this group in all areas of life. Emerging adults establish what type of person they are, their dislikes and likes, and explore what they are good at and how they are different from and similar to their parents (Johnson et al., 2011). Arnett noted that identity development experiences in adolescence are qualitatively different from emerging adults in that emerging adults are free from constraints most adolescents experience, such as living with their parents and required education.

Adolescence to Emerging Adulthood

The transition from youths to adulthood is a rite of passage. Arnett (2004) stated that emerging adulthood and adolescence are life periods when people define and question their place in the larger society and form their identity. Lannegrand-Willems et al. (2018) noted that this is also when individuals develop a sense of their identity as citizens and community members. There is a relationship between civic engagement and identity formation; developing an understanding of membership is a component of social identity (Lannegrand-Willems et al., 2018). Erikson (1968) stated that identity development is the centralized process in adolescence and emerging adulthood where individuals create a clear understanding of self across place and time. In adolescence, advancing cognitive abilities and expanding social circles are encouraged,

as individuals take on increased sociocultural pressure to locate their place in society while dealing with the onset of puberty (McAdams & McLean, 2013). Nelson et al. (2018) noted that puberty is accompanied by a sense of identity confusion where the body changes rapidly, as identity confusion sparks identity exploration.

High School to College Transition

Identity exploration is a key aspect marking the high school to college transition. The post-school transition is defined as leaving general education and entering work, college, an apprenticeship, or other vocational or tertiary education (Dietrich et al., 2012). Oswald and Clarke (2003) stated that the post-school transition is a major milestone for young people's development and is associated with many developmental tasks. The transition to adulthood has recently been associated with the diversity of meeting various developmental tasks appropriately and is also linked to uncertainty (Zarrett & Eccles, 2006). The post-school transition happens at a critical transition point, where individuals complete high school or another form of full-time schooling (Crockett & Beal, 2012). Dietrich et al. (2012) noted that the exact timing could be different, depending on what educational system a student is in or enters into, during earlier high-school transition points (e.g., university track or vocational). During this time-specific transition, a crucial developmental task is to formulate different vocational or educational pathways about making career decisions (Erikson, 1968). Checchi (2008) stated that choices made regarding career choice at the post-school transition are vital, given their influence on outcomes throughout adult life.

Occupational Identity

A developmental milestone for emerging adults is developing an occupational identity. Lent and Brown (2013) noted that profound meaning and identity are found through our work,

and many define their profession as a calling. This view of identity positions our occupations to achieve purpose, growth, meaning, and self-actualization. Dollarhide and Oliver (2014) stated that professional identity is defined as the integration of personal attributes with professional training in the context of a professional community. Factors pertaining to occupational identity include the scope of professional activities, values unique to the profession, theoretical orientation, the focus of scholarship, credentials, training, and understanding of the profession's history (Calley & Hawley, 2008). Professional identity collectively captures what we value, what we believe, and how those values and beliefs are operationalized throughout professional activities, and how meaning is built within the profession (Dollarhide & Oliver, 2014). Greening (2006) stated that human beings have basic tenets, the first being that human beings supersede the sum of their parts and cannot be reduced to components. The second basic tenant is that humans look at their existence in a uniquely human context, as well as in a cosmic sense (Greening, 2006). Greening noted that human beings are conscious, and human consciousness always includes an awareness of oneself in the context of others. Fourth, humans have some choice, and with choice comes responsibility. Lastly, Greening noted that human beings are intentional; they aim to seek meaning, value, and creativity and are aware that they cause future events. The human need to seek meaning causes individual professionals to reflect on what they stand for personally and collectively (Greening, 2006).

Ashcraft (2012) stated that identity is a contested and ambiguous concept that has been used differently across various social science arenas and has generated various meanings. The original meaning of the word identity was "sameness," and in psychology identity means "selfsameness," which is a disposition of basic personality features acquired chiefly during childhood, and once integrated, are more or less fixed (Sokefeld, 1999). Cooper et al. (2016)

noted that in addition to the analytical categories of ethnicity, gender, sexuality, class, and age, frequently used in academic definitions of individual identity, it is legitimate to include a person's work/occupation as a significant contribution to personal identity primarily because of the centrality of work to many individual's lives in industrialized societies. Cooper et al. (2016)noted that the question of "Who am I?" is increasingly seen in an occupational sense by many social interpreters.

An examination of the relationship between identity and work roles is seen as an anchor to studying identity formation (Fraher & Gabriel, 2014). Cooper et al. noted that social thinkers have always shown some concern for the relationship between identity and work. An individual's occupational identity is tied to the interrelationship between a person's self-image, sense of self-worth, and the societal status conferred to their occupation (Saunders, 1981). Cooper et al. stated that in response to criticisms directed at occupational sociologists, studies of occupational communities do not generalize the appropriateness of work identity formation to all sectors of work but focus instead on occupational identification within occupational communities. Strangleman (2012) noted that despite changes in how the world of work looks post-industrial era, generalizations about the loss of work identity in the workplace are unfounded in the face of shared workplace cultures for many occupational groups and the enduring significance of work.

Fraher and Gabriel (2014) stated that occupational identity could be viewed as a narrative web nestled within the identity narratives of each member of the occupational community, merging elements from their profession's past trials and successes, future hopes and aspirations, and present challenges. Occupational identity also blends variously idealized and other myths and images, which could be regarded as institutionalized occupational fantasies that shape the occupation's members (Fraher, 2004). Occupational groups usually resort to new rhetorical and

narrative means to account for the significant changes that affect them (Ashcraft, 2005). Individuals seek to develop new identity narratives that account for job loss and indicate a way forward (Parry, 2003). Fraher and Gabriel noted that how professional groups respond to challenges to their occupational identity, especially when they involve a drastic decline in working conditions and mass layoffs, has not been extensively covered in the literature.

Alvesson et al. (2008) stated that the concept of identity is manifesting itself in many areas of organizational and social studies. Identity can fragment and mutate, shrink and grow, shed and incorporate elements, and become a path rampant with struggles, crises, and fantasies (Fraher & Gabriel, 2014). Alvesson et al. noted that identity is not tainted by the philosophical assumptions of rationality and sovereignty and easily adds a social component, all while preserving the fundamental qualities of uniqueness and sameness across time. Organizations frequently demand that their employees go beyond just executing their tasks by embracing their brand, values, and narratives, expecting their employees to identify with the organization (Fraher & Gabriel, 2014). On the other hand, Lippmann (2007) noted that organizations consistently refuse to offer their employees the security of stable employment by constantly looking for opportunities to offshore and outsource. They are workers who are free from lifelong loyalty obligations to an employer but who are expected to fully identify with their organization for periods of time (Gabriel, 2005). Fraher and Gabriel stated that the concept of identity also serves those interested in how contemporary capitalism creates self-disciplined and disciplined employees who, when seeking to maintain their identities, do more.

One of the most attractive qualities of identity has been its easy narrativization (Brown & Humphreys, 2002), which is the ease by which identity is approached as the end product of different narratives and stories that people tell about themselves (McAdams & McLean, 2013).

Fraher and Gabriel (2014) noted that experiences such as job moves, academic qualifications, and severe illnesses by themselves do not encompass occupational identity, but it is when those experiences are told in stories through meaningful patterns, with reversals and triumphs, disappointments, and struggles, that they often become the basis of a narrative identity which people proceed to live out. Narrative identities are always reflexive and provisional, in that the story of one's life is constantly being recreated (Ibarra, 1999). Fraher and Gabriel stated that in addition to being provisional and reflexive, occupational identities could mutate across different templates or patterns.

Fraher and Gabriel (2014) noted that other occupational identity explorations had stretched the approach to include fantasies beyond lived experiences or unlived experiences. Occupational identities that revolve around being a member of an elite regiment, for example, have an aspirational component that requires consistently rewiring life's experiences in a genuine attempt to reach the ideal (Thornborrow & Brown, 2009). Gabriel (1993) stated that this ideal is shaped by organizational and social conversations that describe organizations' idealized qualities, such as their opulence, power, technical excellence, and prestige. These qualities can become part of a person's ego-ideal even before they are admitted into the organization and become a provisional part of their identity (Fraher & Gabriel, 2014). Cornelissen (2003) noted that it is through this ideal that individuals' occupational identities become entwined with organizational identities. When individuals talk about themselves, they are referring to their present and past experiences or future aspirations, as well as all of the possibilities, or "might have beens" in their lives that, for one reason or another, they never got a chance to live out (Obodaru, 2012). Fraher and Gabriel explained that the unlived but very real possibilities might include accidents avoided, opportunities missed, obstacles overcome, or decisions that could have gone a different

way, and the influence of any unlived possibilities may cease to end and could very well define or even shape people's occupational identities long afterward.

Occupational Identity Status

Erikson (1963) noted that individuals experience different conflicts and crises throughout their lives and that this stage of ego identity formation is called identity versus role confusion, which takes place during adolescence. Ahn et al. (2015) stated that among several measures of ego identity is the ego identity status model by Marcia (1966), which addresses the commitment and exploration dimensions of Erickson's (1963) concept of identity formation. Marcia's identity status research resulted in four separate statuses: diffusion, foreclosure, moratorium, and achievement (Ahn et al., 2015). Kroger et al. (2009) noted that the process of identity development begins with foreclosure or diffusion and continues to commitment after integration and exploration in moratorium status. Schwartz et al. (2011) stated that with the identity status model, the diffusion status roughly approximates identity confusion, and the achievement could roughly approximate identity synthesis. Ahn et al. noted that identity extends itself into several domains such as ideological, sexual, lifestyle, politics, religion, or occupational identity.

Diffusion.

The first identity status discussed in this literature review is diffusion. Schwartz et al. (2011) noted that diffusion represents a lack of interest in identity issues or a haphazard and confusing approach to identity, which tends to be associated with delinquency, low self-esteem, and alcohol or drug problems. Marcia (1966) stated that a lack of identity exploration and commitments is seen as indicators of identity diffusion, suggested by (Waterman, 1982) to be one of the points where identity formation begins. Carlsson et al. (2016) noted that people in identity diffusion are more sensitive to external pressure and less autonomous than individuals in

other identity statuses. Identity diffusion is experienced differently between individuals (Kroger & Marcia, 2011), and several studies suggest that there are subcategories of this identity status (Marcia, 1989).

Troubled people in identity diffusion show psychological distress and signs of mental health problems (Carlsson et al., 2016). Other individuals in identity diffusion seem unbothered by their situation (Luyckx et al., 2005), but when they sometimes lash out with physical aggression or show psychological distress (Schwartz et al., 2011), it may suggest that they may not always be as carefree as they seem. Carlsson et al. (2016) stated that among emerging adults in post-industrial societies, flexibility characterizes them as culturally adaptive (Sica et al., 2014); however, this adaptiveness can diminish as they get older and are expected to make adult life decisions that require long-term commitments such as parenthood or occupational positions.

Foreclosure.

The next identity status examined is foreclosure. Kroger and Marcia (2011) defined foreclosure as adopting commitments without prior identity exploration and is associated with feelings of high self-worth and close-mindedness, authoritarianism, and rigidity. Murphy et al. (1996) stated that those who commit to roles without engaging in identity exploration are said to be in a state of foreclosure. Identity foreclosure may be brought on by expectations and demands of the environment or could be the result of individual choice (Danish et al., 1993). Blustein and Phillips (1990) noted that undergraduate college students in identity foreclosure are associated with a dependent decision-making style, where they defer the responsibility for important decisions, such as career choices, to others. Blustein and Phillips also noted the negative correlation between career maturity and identity foreclosure, as (Super, 1957) showed the importance of exploratory behavior for career development.

Moratorium.

Moratorium is the next identity status discussed. Schwartz et al. (2011) noted that moratorium is actively considering alternative identities without strong commitments. Meeus et al. (2012) stated that individuals in moratorium are not characterized by temporary indecision but by their inability to find solid commitments and indecisiveness. Crocetti et al. (2008) noted that moratoriums and searching moratoriums contradict themselves, as searching moratoriums have an optimistic view of moratorium and are truly on their way to making final identity choices from a set of well-defined and alternative commitments. Searching moratoriums are no longer evident in the middle to late adolescence, as this suggests they find stable commitments by combining with high levels of searching for alternatives and coming to an end in early to middle adolescence (Meeus et al., 2012).

Achievement.

Lastly, identity achievement will be examined. Berzonsky (2014) noted that achievement represents commitments established following an exploratory period and is associated with mature interpersonal relationships, balanced thinking, and thoughtful consideration about potential life options. Achievers embody a progressive shift toward a synthesized identity, which is ideal for experiencing identity growth (Wendling & Sagas, 2021). Marcia et al. (1993) stated that people established a sense of constructed self in identity achievement, where those in foreclosure acquired a sense of conferred self due to their lack of identity exploration. Wendling and Sagas (2021) noted that achievers scored high on purpose and meaning in life and internal control compared with lower scores in each area for foreclosed individuals. Identity achievers exhibited better developmental and functioning outcomes than those who are foreclosed (Schwartz, 2007). Wendling and Sagas stated that given the importance of self-direction, identity

work, and adaptation in forming a synthesized identity, identity foreclosure is seen as a less mature status than identity achievement, as achievers are considered to occupy the most optimal identity status.

Identity Exploration

One of the most important periods of an emerging adult's path to adulthood is identity exploration. Erikson (1968) stated that individuals who have the opportunity to explore several aspects of their identity during a period of relatively free experimentation before assuming lasting responsibilities are beneficial psychologically. Johnson et al. (2011) noted that this period of psychosocial moratorium is in the adolescent domain, but for some, this period of identity development extends well into the age chronologically associated with adulthood. Arnett (2006) stated the importance of identity development during emerging adulthood and argued that identity issues come up in response to a wide variety of interview questions and issues. Although emerging adulthood has been researched extensively, some still wonder how much active identity exploration occurs during this transition to adulthood (Cote, 2009). Arnett claimed emerging adulthood as a new developmental stage based upon the importance of active exploration. Marcia (1966) noted that exploration is the process of choosing and considering among meaning alternatives. Luyckx et al. (2008) stated there are degrees and variations to which adolescents search for differing alternatives associated with their values, convictions, and goals. Klym and Cieciuch (2015) noted that the identity exploration process involves discovering and exploring who and what an individual can be and is followed by engagement and commitment making.

Identity Commitment

The time must come for an adolescent to commit to their identity in order to step into adulthood. Campbell et al. (2019) noted that identity commitment refers to the degree to which a person has made a somewhat firm commitment to identity roles. Crocetti and Meeus (2015) stated that reconsidering commitments tap into the confusion part of the identity formation process, as current commitments are evaluated, compared to alternatives, and abandoned. Campbell et al. stated that the process of making commitments to and exploring vocational training or education is an intrapersonal and self-driven process that is driven by a person integrating and seeking out personally relevant information based on values, personal goals, and desires to inform a pathway or choice that the person can pursue before reassessing the viability of that choice. This individual commitment or self-certainty establishes a person's behavior in situations where they are tempted to change because it provides them with a sense of direction and purpose (Berzonsky, 2003).

Occupational Identity Achievement

The optimal status for individuals to reach in the 4IR workforce is occupational identity achievement. Regarding the basis of individuals' engagement in exploration (low vs. high) and their level of commitment (low vs. high), Marcia (1993) identified four statuses or types for identity development, which are achieved, moratorium, foreclosed, and diffused (Perez et al., 2014). Identity does not develop simultaneously or in the same way in various domains such as relationships, careers, or religion (Perez et al., 2014). Perez et al. (2014) noted that a college student might be currently exploring several careers without firm commitments to a precise career (i.e., moratorium) but may be committed to their religious beliefs after a self-exploration process.

Cross and Allen (1970) stated that the school performance of those students who have reached identity achievement status is quite better than those students in other statuses. As a college student, having a successful school career reduces status insecurity because an adolescent can justifiably anticipate attaining an attractive job and be less likely to experience downward occupational mobility (Wim, 1993). Wim (1993) noted that in terms of Marcia's identity status model, good school performance should lead to a higher identity status concerning occupation, either moratorium or identity achievement.

Identity Achievement & Creativity

Now we take a look at how identity achievement relates to creativity. Traditional approaches noted that creativity is a component or domain of identity, as most recent researchers highlight how creativity applies to positive self-definition and supports identity achievement (Sica et al., 2017). The need to achieve leads individuals to make decisions to approach challenging and difficult situations, while the need to avoid failure pushes individuals to make decisions that avoid failure (Schoen, 2015). Ng and Feldman (2009) noted that creativity and identity commitment could interact negatively, which supports the hypothesis that less creative adolescents are less involved in their identity development and prolong their exploration, leading to potential adverse consequences and the instability of their identity. Sica et al. (2017) noted that creativity could enhance the exploration processes and that complexity and risk-taking could also be involved in decision-making processes, leading to late adolescents attaining high scores on creativity dimensions and arriving at the more committed identity statuses like moratorium or achievement.

Creativity

Creativity is an essential aspect to forming an identity. Maley and Bolitho (2020) stated that creativity consists of core ideas such as perceiving old things in new ways, locating new connections, making something new, or evoking a euphoric surprise. Japardi et al. (2018) defined creativity as the generation of valuable, novel, and surprising products. Mayseless et al. (2015) defined creativity as the capacity that allows us to develop new technologies, conduct new cutting-edge research, and create art. Schutte and Malouff (2020) noted that creativity is a personal flow of creative idea generation that results in products, making some researchers link flow and creativity. Metzl and Morrell (2008) stated that although early attempts to measure creativity are few, researchers became engaged in trait areas such as initiative, flexibility, ingenuity, spontaneity, adaptability, and originality. Batey et al. (2010) noted that an individual's creativity relies upon multiple components such as cognitive ability, cognitive style, personality factors, environment, motivation, and knowledge, which are all sources of evaluation and stimulation.

4-C Creativity

There is not just one level of creativity. Karwowski and Brzeski (2017) noted four distinct levels of creativity, in which mini-c creativity provides a personal insight, little-c creativity offers creative solutions for everyday problem solving, Pro-c creativity involves professional activity, and Big-C creativity is reserved for eminent forms of creative achievements. Wang et al. (2014) stated that human creativity is complex and can take on numerous forms that may be recognized in various ways, depending on the criteria and context we impose.

The construct of mini-c helps distinguish and recognize between the genesis of creative expression and the more recognizable expressions of little-c creativity (Kaufman, 2009). Along with mini-c creativity, there is also another facet of creativity that has little to do with the arts and is the creativity involved in solving practical problems in engineering and discovery (Vlad, 2018). Vlad (2018) described it as the creativity of invention, often associated with science and technology.

Creative Thinking

The creative process is important to idea generation. Sowden et al. (2015) noted that most theories define the creative thinking process as a method to generate novel ideas and evaluate them to produce valuable ideas. Gundry et al. (2014) defined creative thinking as the process of communicating and forming connections that allow people to think of various alternatives and possibilities from many different perspectives. Li noted that in linking thinking and creativity, this suggests that creativity is the key to all learning. Navarrete (2013) stated that educators are advocating for creative thinking to be included in modern education as acting and thinking in a creative manner is considered essential for twenty-first century learners. Otto (n.d) noted that creative thinking and problem solving are the most valuable skills for future workspaces, and educators acknowledge that creative problem-solving skills are vital to career success in the age of automation.

Creative Potential

In preparing for the 4IR workforce, it is crucial to cultivate humans' creative potential. Walberg (1998) stated that creative potential refers to a latent state where creativity may be considered part of a person's human capital and a resource for society at large or an individual's social group. Barbot et al. (2011) noted that there is no single trait or ability that is the key to

creativity, as creativity involves a combination of conative traits (personality traits and motivation), cognitive traits (information processing), and emotional factors that dynamically interact with the environment to inhibit or stimulate how an individual expresses their creative potential. Lubart et al. (2013) noted that creative potential remains latent until it is incorporated into a specific task and that each person can have less or more potential in a task or domain of work. Storme et al. (2015) stated that knowing whether cultures impact creativity in terms of task specificity is vital when comparing different cultures based on creativity because comparing creativity scores across cultures relies on the assumption that the structure of creative ability in culture is the same.

Barbot et al. (2011) noted that research efforts have tried to identify the best psychological factors to predict creative outcomes and many of the creative potential's assessment techniques used relevant factors surrounding creative potential to measure creativity. For example, the Runco Ideational Behavior Scale (RIBS) is a self-reported measure of creative potential (Sun et al., 2020). Barbot et al. stated that even though product-based assessments are seen as a more integrated approach to creative potential, this creativity assessment method is insufficient for solely estimating an individual's overall creative potential.

Creative Performance

Creative performance is vital but misunderstood. Kleibeuker et al. (2013) defined creative performance as generating insights, ideas, and solutions that are both useful and novel and are vital to human prosperity and survival. Creativity predicts success in conflict situations (De Dreu & Nijstad, 2008), academic success (Frurnham & Bachtiar, 2008), and serves an essential adaptive purpose (Runco, 2004). Nevertheless, despite creative performance's importance for an extensive range of domains required for living life, its neurocognitive

foundations are still poorly understood (Kleibeuker et al., 2013). Said-Metwaly et al. (2020)

stated the conflicting findings on how testing conditions may contribute to the different domains

of creativity tasks. Chen et al. (2005) noted that the effects of testing conditions varied across

different domains of creative performance, as the effects of those testing conditions could be

domain dependent.

Creative Skills

It is very important for humans to continue developing their creative skills. Denervaud et

al. (2019) argued that the advantage to being human is the fundamental ability to create; to

effectively execute individually driven thoughts. Li (2010) stated that with an increasing global

focus on twenty-first century skills, re-designing education to hone in on developing creative and

critical thinking skills is happening worldwide. Jeffries (2011) noted that creativity research in

recent years has considered that a person's creativity is influenced by their domain and the extent

to which subject-specific skills, or domain-relevant skills, impact an individual's creative

potential. Jeffries stated that relevant and effective creativity training needs to contextualize

training content to the specific area trainees wish to be creative.

Divergent Thinking

Human beings were born with the mindset to create. Yang et al. (2020) stated that the

core of a creative mindset is divergent thinking, which produces multiple novel and unusual

solutions to a single problem. An et al. (2016) noted that divergent thinking is a concept of

creativity, defined as creative expert performance and the motivation to engage in creative

behavior, including ideation and activity. Japardi et al. (2018) also defined divergent thinking as

the ability to distance one's thinking from prevailing modes of expression to generate novel

solutions and ideas. Guilford (1967b) stated that divergent thinking is comprised of four main

characteristics: flexibility (the capability to consider a wide variety of approaches to a problem simultaneously), originality (the propensity to produce different ideas than most other people), fluency (the ability to produce a number of ideas at a rapid pace), and elaboration (being able to think through each detail of an idea and execute it). A factor analysis of these factors was conducted by Kharkhurin (2008), who found that they could be grouped as two types of creative functions where flexibility, fluency, and elaboration represent the ability to generate and elaborate on various and unrelated ideas, while originality represents the ability to extract unique and novel ideas.

Fink et al. (2012) noted that research in creativity does not just focus on divergent thinking, but it also surveys performing arts, visual imagery, or insightful problem solving, which are all also essential facets of creativity and learning. Tang et al. (2016) noted that one of the myths about creativity is that it is an inheritable trait that cannot be developed, as this notion endorses a fixed creativity mindset and frames one's creativity as stable and unchangeable. Current research shows that it is more important to focus on people's attitudes and state of mind when building their creative ability (Choi, 2019). Ocampo-Gonzalez et al. (2019) noted that possessing a creative growth mindset relates to adaptive performance and motivational outcomes.

Ideational Behavior

Creativity is about generating ideas. Runco et al. (2001) stated that ideas could be treated as divergent, original, and even creative thinking products. Ideas are complex, as some may not know which ideas are good, which ones are not, or which ideas solve the problems, and which ones do not. Pi and Wu (2019) noted that the originality of peers' ideas and students' openness to experience both seem to be important for creativity. Fink et al. (2012) stated that when someone

generates a single idea toward solving a specific problem, it may stimulate new ideas in others that lead to solutions. Evaluating the creativity of an idea constitutes an important step in providing a new solution to a problem (Calic et al., 2020).

Betey et al. (2010) noted that the literature on divergent thinking tests shows that ideas can be quantified in the same manner as other products. Ideas are identified as common products related to creativity across domains and suitable for understanding normally distributed traits (Runco & Richards, 1998). Batey et al. noted that the benefits of assessing ideational behavior are that everyone creates ideas and may be particularly useful for understanding everyday creativity. The underlying processes for producing ideas are domain-general (Betey et al., 2010). Runco et al. (2001) developed the Runco Ideational Behavior Scale (RIBS) to capture the essence of ideational behavior through a self-report measurement of an individual's perceived ability to be original, fluent, and flexible with ideas, all three of which are facets of divergent thinking (Betey et al., 2010). Runco and Albert (1985) stated that objectively judging the original nature of ideas is reliable and can be obtained, as the ideas of individuals can be examined, and their flexibility and originality can be objectively determined.

Originality.

Originality is key to creativity and divergent thinking. Mayseless et al. (2015) defined originality as the rarity and novelty of an idea as measured by the infrequency of the idea compared with other ideas and is one of the key aspects of creativity. Rietzschel et al. (2010) stated that an idea's quality is defined as the marriage between originality and feasibility. Dumas and Dunbar (2014) noted that originality is potentially more tied to creativity than fluency, as it has been considered a vital factor of divergent thinking for decades. Divergent thinking tasks are used as indicators for creative potential, but traditional scoring tactics of ideational originality

come up against persistent problems such as lack of convergent and discriminant validity and low reliability (Benedek et al., 2013). Rietzschel et al. noted that originality is the height of creative behavior but that an idea must be appropriate to know if creative behavior truly exists or if it is instead bizarre or erratic.

Fluency.

The goal of creativity is to be able to generate as many ideas as possible when seeking to find a solution. Guilford (1968) noted that divergent thinking could produce a wide range of associations and ideas to a given problem. Kasirer and Marshal (2018) stated that the ability to generate a spontaneous flow of as many solutions as possible is defined as fluency. Ideational fluency has been known to act as a contaminating factor for the other scores (Runco et al., 1987), such as flexibility (differing categories of ideas) and originality (idea uniqueness; Kasirer & Marshal, 2018). Benedek et al. (2013) stated that because ideational originality is seen as an essential qualitative factor for divergent thinking ability, many have suggested ways to control ideational fluency's tremendous influence. Plucker et al. (2011) noted that different methods of originality scoring had been compared in respect to validity and reliability, and the methods for uniqueness scoring include average uniqueness (dividing uniqueness by fluency), uniqueness of the last or first ten ideas, and subjective, rater-based scoring strategies for the entire response set (summative score) or the last or first ten ideas.

Flexibility.

To optimize creativity, individuals must be able to develop cognitive flexibility. Jordan and Morton (2008) stated that flexibility is considered a hallmark of intelligent behavior and human cognition and was acknowledged in earlier models of creativity and intelligence (Guilford, 1962). Ionescu (2012) noted that many behaviors are considered flexible, such as

multitasking, flexible problem solving, or novelty generation, and it is difficult to pick anyone as prototypically flexible. Ionescu also noted that to advance our knowledge of flexibility, we need to uncover commonalities involved in flexibility within the various contexts where it appears. Best et al. (2009) stated that shifting is considered one of the executive functions that reflect a person's ability to change rapidly from one task, rule, or criterion to another when offering up a response. Studies have investigated shifting concerning mathematical skills, bilingualism, physical exercise, and recreational cocaine use, as they all equate shifting with cognitive flexibility (Ionescu, 2012).

Convergent Thinking

Divergent thinking's other half is convergent thinking. Convergent and divergent thinking refers to two orthogonal modes of thinking that can be involved in generating creative ideas (Cropley, 2006). Guilford (1957) noted that convergent thinking originally was defined as "the nature of tests where items are converging toward one right answer" (p.112). Cropley (1999) rephrased the meaning of convergent thinking later as the "production of singularity." Runco and Jaeger (2012) reminded us that convergent and divergent thinking are the creation of ideas that are both effective and original.

Convergent thinking can be the compliment and the opposite of divergent thinking (Cropley, 2006). De Rooij and Vromans (2020) stated that during idea generation, the diverse set of material that divergent thinking generates could form the basis of deriving a single best solution through convergent thinking. Cropley (2000) noted that tests of convergent (e.g., Mednick & Mednick, 1971) and divergent thinking (e.g., Guilford, 1967a) could be used as indicators of creative potential.

Self-Perceived Creativity

The key to evaluating and rating your personal creativity is through how creative you perceive yourself to be. Furnham et al. (2008) defined self-rated creativity as a person's rating of her or his creativity in performing a particular task, as it reflects how that person sees themself. In sum, self-rated creativity is one's belief that they are creative, while creative self-efficacy believes that an individual has the potential to be creative (Pretz & McCollum, 2014). Reiter-Palmon et al. (2012) noted that self-perceptions or self-evaluations of creativity were previously used as both criteria of creative performance as well as predictors. Silvia et al. (2012) noted concerns with self-report creativity measures because participants can interpret items loosely. The response criterion people used when judging each item can be compromised, as some participants give themselves too much or too little credit (Silvia et al., 2012). Biernat (2003) stated that these issues are true of all self-report items, as individuals can interpret the items in various ways and subjectively define the scale anchors. Reiter-Palmon et al. noted that self-reported creativity might communicate the perception that one is creative based on creative self-efficacy or stereotypical personality, and ultimately leaving the thought that creativity based on self-perceptions should be evaluated cautiously, as the results may not replicate with more independent or objective creativity measures.

Creative Self-Efficacy

Liu et al. (2017) stated that creative self-efficacy is the degree of confidence individuals have in their capacity to be creative. Richter et al. (2012) noted that creative self-efficacy might inspire creative efforts, but the social context where individuals reside may co-determine its influence on creativity. Tamannaeifar and Motaghedifard (2014) defined social well-being as the appraisal of one's function and circumstance in society. Liu et al. noted that creative self-efficacy

could predict creative behavior and affect creative performance. Richter et al. stated that when people understand who knows what, individuals who rank high on creative self-efficacy should be more likely to know which members solicit expertise and information best. Tamannaeifar and Motaghedifard noted that people confident in their abilities look at complex tasks as challenges that must be overcome; instead of seeing them as threatening or avoiding them altogether, they set more challenging goals and remain firm at completing them. Beghetto (2006) stated that students with higher creative self-efficacy levels were even more likely to hold more positive beliefs about their abilities in all academic subject areas and significantly more likely to state that they planned to attend college than students with lower creative self-efficacy levels. Students with higher creative self-efficacy levels were more likely to report higher levels of after-school academic participation and participation in after-school group activities (Beghetto, 2006).

Self-Efficacy

Bandura (1997) stated that self-efficacy is the essential dimension determining the effectiveness of human functioning. Cervone and Peake (1986) noted that individuals high in perceived self-efficacy have more efficient actions, resulting in them being more confident in their ability to handle problems and control situations. Self-efficacy intermediates the relationship between creative achievements and creative potential (Choi, 2004) and has become an essential topic in creativity literature (Beghetto, 2006; Beghetto et al., 2011: Jaussi et al., 2007; Putwain et al., 2012; Tierney & Farmer, 2002, 2011).

Summary and Overview

Chapter II overviewed the literature of this study. Chapter III will address the methods and procedures used to conduct this study. Chapter IV will present the findings of this study.

Chapter V will summarize the results of the research, draw conclusions on the research findings, and list recommendations based on the conclusions.

CHAPTER 3

METHODOLOGY

This chapter discusses the methods and procedures utilized to conduct this study. The chapter describes the sample of participants, university statistics, and recruitment strategy. It also discusses the research variables used, instrument usage and adoption, data collection procedures and methods, and the statistical analyses.

Problem Statement

The problem of this study was to determine the degree to which emerging adult college students' ideational behavior predict their occupational identity achievement preceding entry into the 4th Industrial Revolution (4IR) workforce.

Research Questions

- **RQ1:** How do emerging adult college students perceive their degree of ideational behavior?

- **RQ2:** How do emerging adult college students perceive their occupational identity achievement?

- **RQ3:** How will emerging adult college students' ideational behavior predict their occupational identity achievement?

Sample

The researcher attempted to solicit a sample of emerging adult college students from a Mid-Atlantic, diverse, four-year university. The Mid-Atlantic university is a public research university in Norfolk, Virginia, with over 24,176 total students and is home to well over 700 international students from more than 89 different countries (ODU, 2021). In addition, U.S. News & World Report (2021) noted that 19,372 of the Mid-Atlantic university's students are

undergraduates, with 7,571 part-time students and 16,605 total full-time students, and an undergraduate gender distribution of 10,742 female and 8,630 male students.

CollegeSimply (2021) stated that the Mid-Atlantic university's students are predominantly White (47%) with a sizable Black/African-American population (28%). Univstats (2021) noted that the remaining students are made of a mix of American Indian/Native American (.3%), Asian (4.5%), Hispanic (8%), Native Hawaiian or Other Pacific Islander (.3%), Two or More races (6.3%), and Race Un-Known students (2.7%). Niche (2021) stated that 3% of the Mid-Atlantic university's undergraduate students are varsity athletes.

The participant sample of emerging adult college students was recruited from all available 100-level Oral Communications courses at this Mid-Atlantic, diverse, four-year university. The minimum sample size of 159 emerging adult college students was calculated using G*Power, with an effect size of 0.15 (SPSS Tutorials, 2022). The researcher contacted all available 100-level Oral Communications instructors at the Mid-Atlantic university by email (Appendix C). The researcher incentivized each instructor that participated in administering the survey with a chance to win a $100 Amazon gift card, and the runner-up with the second most students complete the survey in its entirety would win a $50 Amazon gift card.

Instrument(s)

Runco Ideational Behavior Scale (RIBS)

Runco et al. (2001) developed the Runco Ideational Behavior Scale (RIBS) to capture the essence of ideational behavior through a self-report measurement of an individual's perceived ability to be original, fluent, and flexible with ideas, all three of which are facets of divergent thinking (Betey et al., 2010). The RIBS was created to measure how often an individual has thoughts of a certain type as a measure of creative ideation (Paek et al., 2016). This is consistent

with Puryear (2015) who's previous research has shown the Cronbach's alpha of the RIBS to be 0.90, which is a measure of its internal consistency. Paek et al. (2016) noted that there is evidence the RIBS has adequate validity. The validity of the RIBS was examined by correlating each of its forms with two criterion measures, the Creativity Assessment Package and the Creative Activity and Achievement Checklist (Runco et al., 2013). Sen (2016) noted that the validity ($\alpha = .30$ to .72) and reliability ($\alpha = .92$) of the RIBS indicated that it effectively measures ideational behavior. Runco et al. (2001) stated that the construct validity of the RIBS showed evidence of being ambiguous. Other studies provided evidence of construct validity, with statistically significant correlations between scores on other creativity tests (the Torrance Tests of Creative Thinking and the Scales for Rating the Behavioral Characteristics of Superior Students) and scores on the RIBS (Rojas & Tyler, 2018). Statistically, two factors exist within the RIBS (original ideation and divergent thinking), although it is undetermined what the theoretical distinction between the two factors is (Runco et al., 2001). Runco et al. (2001) noted that the two factors are highly correlated, but the lack of theory suggests that the one-factor structure should guide interpretation of the RIBS results. Runco et al. (2013) stated that the RIBS was correlated highly with a checklist of creative activities, backing its concurrent validity. Although a more thorough investigation of its construct validity may be required, the RIBS has been accepted as an instrument due to good internal consistency, exploratory factor analysis, and basic psychometrics such as scale reliability and item characteristics (Runco et al., 2001). Tep et al. (2021) noted that further studies would need to be conducted to fully evaluate the properties of the RIBS and substantiate its validity and reliability.

While further studies may be needed to fully evaluate the RIBS for its reliability and validity, the RIBS (Runco et al., 2001) psychometric assessment has been adopted in different

languages outside of the U.S.A where the RIBS was created. The RIBS has undergone several studies for validity and reliability in languages such as Spanish (Lopez-Fernandez et al., 2019), Chinese (Tsai, 2015), Latvian (Kalias & Roke, 2011), and Thai (Tep et al., 2021). Each of these studies, except the Spanish language RIBS (procrustes analysis), has conducted an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) to substantiate its adoption of the original American RIBS instrument to fit the language of the country that gave the study. In each case, the results verified the validity and reliability of each of the four alternate language psychometric assessments related to the RIBS. In addition, Kalis and Roke (2011) noted that while some researchers call out the weaknesses of the RIBS (such as its self-report nature and its inability to be applied to all age groups, especially children under 18 years of age who need consent to treatments or procedures involved in research), it is considered to be useful to adapt and serves as a measure of ideational behavior, which is one of the creativity aspects.

RIBS Short Form (RIBS-S)

The RIBS short form (RIBS-S) is the abbreviated version of the RIBS and was initially developed as a criterion measure (Runco et al., 2013). The 19 item RIBS-S measures the frequency with which those who take it generate new ideas in their daily lives (Mareque et al., 2019). The 19 items of the RIBS-S were selected theoretically from the original RIBS, as they are unambiguously and explicitly tied to ideational behavior (Runco et al., 2013). Puryear (2015) stated that the RIBS-S is highly correlated with the long-form version of the RIBS, which is part of the Runco Creativity Assessment Battery. Most decisions made based on RIBS-S results are entirely compatible with decisions that would have been reached using the long form (Runco et al., 2013). Runco et al. (2013) noted that the RIBS-S did not induce another incremental validity check, but it was a new and more logical format for the response options. Hao et al. (2016) stated

that the sum of the 19 items is the creativity ideation score. Runco et al. (2001) noted that the RIBS-S appeared to be a sufficiently reliable instrument to use with individuals and groups. Mareque et al. (2019) stated that the RIBS-S is easier to administer while maintaining the same validity as the original RIBS.

The American version of the RIBS utilizes the language needed to conduct this study, as its sample is primarily American speaking. Given this fact, the researcher used the American RIBS-S (Runco et al., 2001) for this study.

Occupational Identity Scale (OIS)

Ahn et al. (2015) defined the Occupational Identity Scale as a 28-item scale (annexed English version) that offers an individual measure of identity status of occupational development and consists of four subscales: Achievement, Moratorium, Foreclosure, and Diffusion. Ahn et al. noted that the OIS uses a 5-point Likert scale of agreement, ranging from strongly disagree (1) to strongly agree (5). Each of the OIS subscales measures the degree of resemblance to each vocational status based on the varying degrees of occupational exploration and commitment (Taber & Blankemeyer, 2014). Melgosa (1985) stated that OIS items were created using criteria established by previous research and its content validated by a group of experts. Melgosa noted expert analysis of the OIS responses and measures of concurrent and construct validity were obtained and estimates of item discrimination and indexes of internal consistency were achieved. The concurrent validity coefficients were Achievement (α =.79), Moratorium (α =.68), Foreclosure (α = .38), and Diffusion (α =.43) for the scales (Melgosa, 1985). Melgosa utilized a factor analysis to determine construct validity.

Regarding reliability, the OIS researcher identified four factors for the four statuses of occupational identity, and they attributed to 49 percent of the total variance (Melgosa, 1985).

Melgosa performed an item analysis on the OIS to obtain a reliability coefficient alpha for each scale, which is a measure of internal consistency (Melgosa, 1985). Melgosa noted that the reliability coefficients were Achievement (α =.87), Moratorium (α =.84), Foreclosure (α =.72), and Diffusion (α =.70). Ahn et al. (2015) stated that Cronbach's alpha coefficients were Achievement (α =.87), Moratorium (α =.84), Foreclosure (α =.72), and Diffusion (α =.70) for all statuses.

In the original study (Melgosa, 1987), the OIS had 28 items sorted into four vocational identity statutes: Diffusion, Foreclosure, Moratorium, and Achievement. Melgosa (1985) stated that the development of an objective measure to yield occupational identity statuses was needed because no one had created an instrument of its kind. Hartung (2005) noted that an instrument concerning adolescents' vocational identity might be helpful to teachers, psychologists, and other educational professionals to understand their students better. Veiga and Moura (2005) stated that the OIS's validity has significant ramifications because it allows for better counseling of students regarding their vocational calling, as it helps adolescents regarding their options.

The OIS is an essential research instrument because it helps to understand people who show features that are not explicitly prescribed for one status as the scale gives different results for each status for each individual (Veiga & Moura, 2005). Melgosa (1985) noted that creating the OIS would provide a tool to assess occupational identity inside the ego identity theory framework while employing Marcia's (1966) four identity statuses. Melgosa also noted that the data received would allow researchers to compare previous studies based on the identity statuses, as the instrument would offer an individual measure of identity status of occupational development.

Occupational Identity Achievement subscale (OIA)

Melgosa (1987) noted that the Occupational Identity Scale (OIS) was developed to validate an ego-identity status measure for the occupational area by itself and that this occupational identity scale would be able to yield a quantitative score on each of the statuses. During its validation study, the OIS obtained concurrent validity with the Objective Measure of Ego Identity Status (OM-EIS) structured interview by calculating the total score obtained by the participants on each status, analyzed what was measured by the OIS with the equivalent total score measure by the occupational items from the OM-EIS, and correlation was expected (Melgosa, 1987). Melgosa stated that all items labeled as achievement (items 3, 5, 20, 22, 23, 25, and 27) loaded above 0.6 on factor 2, which is the highest among all four factors (achievement, moratorium, foreclosure, diffusion). Melgosa noted that the result is due to the advanced ego identity dwelling in achievement individuals, which is the opposite in moratorium and diffusion people. And as hypothesized, achievement scores had a negative correlation with moratorium scores and diffusion scores (Melgosa, 1987).

Demographics

The researcher segmented all majors in the demographics section of the survey to separate three major categories: STEM majors, Non-STEM majors, and Undecided or Undeclared emerging adult college students, ages 18-25. Xue and Larson (2015) noted that "STEM" refers to the science, information technology, engineering, and mathematics domain detailed by the Standard Occupation Classification Policy Committee but excludes sales and managerial occupations. It is important to survey STEM emerging adult college students because some of the emerging adults in this study represent the future workforce in STEM fields, which are becoming increasingly important in the 4IR (Ilori & Ajagunna, 2020). Gilbert and White

(2018) noted that K12 schools and post-secondary colleges and universities would be expected to graduate STEM students with the skills needed for the 4IR workforce, including creativity and innovative problem-solving. Creativity is an essential skill for success in STEM careers, as today's economy requires the technical expertise promoted by STEM programs and the spirit of innovation (Ilori & Ajagunna, 2020). STEM fields offer opportunities for emerging adults to utilize their creativity in careers such as computer science, graphic design, architecture, and video game development (U.S. Bureau of Labor Statistics, 2015). Wong and Kemp (2017) stated that creative-oriented computing careers appeared popular for boys and girls, which seem to attract few gender stereotypes. Wong and Kemp also noted that digitally skilled youths, especially girls, identified with computer and information technology careers more oriented towards creativity, as these careers seemed to prioritize creative minds as much as technical skills.

Additionally, Li et al. (2019) noted that many STEM majors use a variety of creative design processes to develop innovative solutions to complex problems, such as brainstorming, prototyping, and design thinking. Brainstorming involves generating as many ideas as possible, regardless of how feasible or practical they may seem, which links well with ideational behavior, as both encourage flexibility and fluency, enhancing students' originality (Conradty & Bogner, 2019). Smyrnaiou et al. (2020) noted that prototyping is key, as STEM majors often create physical or digital prototypes of their ideas to test and refine their designs. Lastly, design thinking provides a space for creative thinking and emphasizes iteration, empathy, and experimentation to develop creative solutions to complex problems (Balakrishnan et al., 2021). Won et al. (2015) noted that design-based learning is a highly collaborative experience that offers many opportunities and outlets for innovation.

Research Variables

To address RQ1, the participants took the Runco Ideational Behavior Scale short scale (RIBS-S; see Appendix A) portion of the survey to receive a total score that reflected their perceived ideational behavior (IB). To address RQ2, the participants took the Occupational Identity Achievement subscale (OIA; see Appendix B) portion of the survey, which is derived from the original Occupational Identity Scale (OIS), to receive a total score which reflected their perceived occupational identity achievement (OIA). To address RQ3, the dependent variable was the perceived occupational identity as indicated by the OIA subscale achievement score. The independent variable was the perceived ideational behavior, as indicated by the RIBS-S score. The researcher used linear regression analysis to see if emerging adult college students' perceived ideational behaviors predicted the scores of their perceived occupational identity achievement.

Strategy

The researcher sought to access participants for this study through his connection with university instructors at the Mid-Atlantic, diverse, four-year university. The researcher focused on the 100-level Oral Communication courses because all undergraduate students completing baccalaureate degree programs are required to demonstrate oral communication skills through successfully completing the Public Speaking (COMM 101R) course or a designated course in their major, which would likely result in a diverse sample representative of the university's student body (ODU, 2022). Once the researcher made contact, he asked each instructor if they would administer the survey assembled for this study to all students within their 100-level undergraduate Oral Communication courses. The researcher also explained the incentives to the

instructors. The instructors administered the survey to their students by sending them the survey link and directions articulating the task to students.

Survey

Each of the participants were asked to self-report their answers to the 32-question survey assembled for this study (see Appendix D). The four-section survey consisted of five demographic questions, 19 Runco Ideational Behavior Scale-short form (RIBS-S) questions, seven Occupational Identity Achievement (OIA) subscale questions derived from the original Occupational Identity Scale (OIS), and a final question asking which instructor administered the survey to them. The researcher used Google Forms to construct the survey, which created a link for participants to take it. The survey environment may have been different for all participants, with the one commonality being that all survey attempts must be taken, completed, and submitted online through a desktop or mobile experience.

Statistical Analysis

To address RQ1, the total ideational behavior (RIBS-S) scores were calculated by summing the individual scores. Individual responses on the RIBS-S provided a score of 1 for "never," 2 for "yearly" (approximately once a year), 3 for "monthly" (once or twice each month, approximately), 4 for "weekly" (once or twice each week, approximately), and 5 for "daily" (just about every day, sometimes more than once each day) on each of the 19 items. Possible scores range from 19 to 95.

To address RQ2, the total occupational identity achievement (OIA) scores were calculated by summing the individual scores. Individual responses on the 7 item OIA subscale provided a score of 1 for "strongly disagree," 2 for "disagree," 3 for "neutral," 4 for "agree," and 5 for "strongly agree" on each of the 7 items. Possible scores range from 7 to 35.

To address RQ3, the researcher aimed to determine if the ideational behavior total scores (independent variable) predicted the occupational identity achievement total scores (dependent variable). The researcher analyzed the data for RQ3 using linear regression analysis. Simple linear regression is a statistical method that allows an individual to study and summarize the relationships between two continuous quantitative variables (Statistics Solutions, 2021).

The researcher used the ideational behavior total scores reported from the RIBS-S scale to see if it would predict the occupational identity achievement total scores (dependent variable) reported from the OIA subscale during the linear regression analysis. Spatz (2011) noted that linear regression is a technique that uses the data given to produce an equation for a straight line that is then used to make predictions. Once you have assumed the relationship is linear, you can draw the line that tells the story of the relationship between any two points (Spatz, 2011). The researcher will use the regression line obtained from the study to predict the values of Y given the values of X (Brannick, n.d.). In RQ3, the researcher aimed to find out if emerging adult college students' ideational behavior total scores (independent variable) predict their occupational identity achievement total scores (dependent variable).

Lastly, the researcher investigated the relationship between the dependent variable of occupational identity achievement (OIA total scores) and the six independent variables of age, gender, college year, major (STEM, Non-STEM, and Undecided), and ideational behavior (IB total scores), including ethnicity, a categorical variable in which the researcher created dummy variables for from seven levels into three binary variables for use during the multiple regression analysis. The dependent variable (OIA total scores) and the independent variables used in this portion of the study are all continuous variables.

First, the researcher dummy-coded ethnicity from seven levels into three binary variables: ethnicity = White, ethnicity = Other (Asian, Hispanic or Latino, Mixed with Black and White, Arab, and Native American), and ethnicity = Black, which served as the reference category. Next, the researcher checked for multicollinearity. Alin (2010) noted that multicollinearity happens when two or more independent variables are highly correlated, which can cause problems in a regression analysis, as it can be difficult to determine the individual effects of each variable. The researcher used a correlation matrix to identify any variables that may be highly correlated. Lastly, a multiple linear regression analysis was conducted to examine the contribution of each independent variable to the model. Multiple linear regression is a statistical technique that uses several independent variables to predict the outcome of a dependent variable (Hayes, 2022).

Summary and Overview

Chapter III addressed the methods and procedures used to conduct this study. The 19 items in the RIBS-S describe observable behaviors and depend on ideation (Runco et al., 2013), created by Runco. Runco et al. (2013) noted that individuals who score highly on the RIBS-S frequently appreciate and generate ideas and think about alternate ways of getting things done and solving problems. According to Runco et al., the ideation captured by the RIBS is general, fair, and characteristic of every individual and for all domains of performance.

The 28 item Occupational Identity Scale (OIS) offers an individual measure of identity status of occupational development (Ahn et al., 2015), as the researcher will just be employing the 7 item Occupational Identity Achievement subscale (OIA) located within the OIS. Melgosa (1985) stated that occupational identity is considered the essential one among other identity areas such as ideological and sexual identity, and it seemed necessary to develop an instrument to

assess it since no measure was available. Melgosa chose the area of occupational identity and their selected variables because they are critically important during the stage of adolescence and because of their societal implications today.

Chapter IV will present the findings of this study. Chapter V will summarize the research results, draw conclusions on the research findings, and list recommendations based on the conclusions.

CHAPTER 4

RESULTS

Findings

The problem of this study was to determine the degree to which emerging adult college students' perceptions of their ideational behavior predict their occupational identity achievement preceding entry into the 4th Industrial Revolution (4IR) workforce. Three research questions were developed to guide this study. They were:

- **RQ1:** How do emerging adult college students perceive their degree of ideational behavior?

- **RQ2:** How do emerging adult college students perceive their occupational identity achievement?

- **RQ3:** How will emerging adult college students' perceived ideational behavior predict their occupational identity achievement?

A four-section, 32-question survey containing five demographic questions, 19 Runco Ideational Behavior Scale-short form (RIBS-S) questions, seven Occupational Identity Achievement (OIA) subscale questions derived from the original Occupational Identity Scale (OIS), and a final question asking which instructor administered the survey to them, was used to collect the necessary data. This chapter provided the outcomes of that survey, as well as the statistical analyses applied in response to these research questions.

Response Rate

There were 166 suitable and valid responses, as 170 emerging adult college students answered the survey ($n = 170$). The student sample comes from several colleges within a Mid-Atlantic, diverse, four-year university. Of the 170 emerging adult college student responses, four

were removed due to being older than 18-25, leaving 166 cases for analysis after data screening ($n = 166$). The data were examined for any missing anomalies and missing values. No values were missing, as all 166 respondents completed the entire survey. Of the 166 cases up for analysis, none were removed.

Demographics

All respondents included in the dataset were between the ages of 18 – 25: 18 ($n = 57$), 19 ($n = 45$), 20 ($n = 24$), 21 ($n = 19$), 22 ($n = 11$), 23 ($n = 5$), 24 ($n = 4$), and 25 ($n = 1$), and were the mean (*M*) age of 19.5 years old, along with the *Mdn* ($n = 19$), *Mo* ($n = 18$), and *SD* ($n = 1.61$). The gender totals of the respondents were: male ($n = 74$), female ($n = 92$). The ethnicity breakdown of the respondents was: Black or African American ($n = 71$), White ($n = 53$), Asian ($n = 18$), Hispanic or Latino ($n = 13$), Mixed with Black and White ($n = 8$), Arab ($n = 2$), and Native American ($n = 1$). The number of students in each college year were: first year ($n = 63$), second year ($n = 49$), third year ($n = 27$), fourth year ($n = 20$), and fifth year ($n = 7$). Lastly, each available major at the Mid-Atlantic college used in this study ($n = 136$), was classified as STEM ($n = 57$), or non-STEM ($n = 79$; see Appendix F). Then, each emerging adult respondent ($n = 166$) was categorized according to their choice of major into STEM ($n = 68$), non-STEM ($n = 91$), and Undecided ($n = 7$) segments.

Statistical Analyses

The researcher utilized a five-bucket data housing system consisting of low, low-medium, medium, medium-high, and high buckets for the emerging adults in this study's ideational behavior and occupational identity individual total scores to house inside. The researcher took all possible ideational behavior (IB) total scores and all possible occupational identity achievement (OIA) total scores and divided all total scores into five co-equal buckets for

both IB and OIA. Initially, a low, medium, and high bucket format was employed when the researcher first analyzed the survey data; only the medium bucket was markedly larger than the low and high buckets. This situation led the researcher to provide low-medium, medium, and medium-high buckets to delineate the differences within the markedly large original medium data bucket.

To address the first research question regarding how emerging adult college students perceived their degree of ideational behavior, the procedure was used to add up each of the 166 respondent's total score of the 19 questions from the RIBS-S. The mean of the ideational behavior (IB) total scores for all 166 respondents was $M = 59.8675$. Regarding how many emerging adult college student participants ($n = 166$) fell into the low (19 - 44), low-medium (45-52), medium (53 – 60), medium-high (61 - 69), and high (70 – 95) individual total IB score categories, the researcher first analyzed the individual total IB score of each participant. The lowest summed individual total IB score the participants could have totaled was 19, the median is 57, and the highest is 95. There were 11 total participants who scored in the low individual total IB score category (6.6%, Never has thoughts of creative ideation), 28 who scored in the low-medium individual total IB score category (16.9%, Yearly has thoughts of creative ideation), 45 total participants who scored in the medium individual total IB score category (27.1%, Monthly has thoughts of creative ideation), 49 who scored in the medium-high individual total IB score category (29.5%, Weekly has thoughts of creative ideation), and 33 total participants who scored in the high individual total IB score category (19.9%, Daily has thoughts of creative ideation; see Figure 1).

Additionally, regarding the emerging adult college student participants ($n = 166$), the low individual total IB scores averaged a score of 40.73, and had a minimum score of 36 and a

maximum score of 44. The low-medium individual total IB scores averaged a score of 48.46, and had a minimum score of 45 and a maximum score of 52. The medium individual total IB scores averaged a score of 56.2, and had a minimum score of 53 and a maximum score of 60. The medium-high individual total IB scores averaged a score of 64.08, and had a minimum score of 61 and a maximum score of 69. The high individual total IB scores averaged a score of 74.67, and had a minimum score of 70 and a maximum score of 91.

Figure 1

Low to High Individual Total IB scores Participant Pie Chart with Percentages
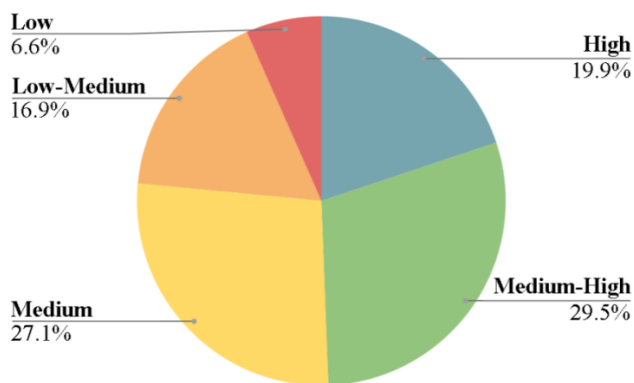
Note: (see Appendix E)

To address the second research question regarding how emerging adult college students perceived their occupational identity achievement, the procedure was used to add up each of the 166 respondent's total score of the 7 questions from the OIA subscale. The mean of the occupational identity achievement (OIA) total scores for all 166 respondents was $M = 23.6566$. Regarding how many emerging adult college student participants ($n = 166$) fell into the low (7 - 12), low-medium (13 - 18), medium (19 - 24), medium-high (25 - 29), and high (30 - 35) individual total OIA score categories, the researcher analyzed the individual total OIA score of each participant. There were seven total participants who scored in the low individual total OIA scores category (4.2%, Diffusion, Noncommitted and Nonexplored), 21 who scored in the low-

medium individual total OIA scores category (12.7%, Foreclosure, Nonexplored and Committed), and 63 total participants who scored in the medium individual total OIA scores category (38.0%, Indeterminate, Nonexplored/Explored and Noncommitted/Committed). Continuing, 53 total participants scored in the medium-high total OIA scores category (31.9%, Moratorium, Explored and Noncommitted), and 22 total participants who scored in the high individual total OIA scores category (13.3%, Achievement, Explored and Committed; see Figure 2).

In addition, regarding the emerging adult college student participants (*n* = 166), the low individual total OIA scores averaged a score of 8.71 and had a minimum score of 7 and a maximum score of 12. The low-medium individual total OIA scores averaged a score of 16.1, and had a minimum score of 13 and a maximum score of 18. The medium individual total OIA scores averaged a score of 21.7, and had a minimum score of 19 and a maximum score of 24. The medium-high individual total OIA scores averaged a score of 27.19, and had a minimum score of 25 and a maximum score of 29. The high individual total OIA scores averaged a score of 32.73 and had a minimum score of 30 and a maximum score of 35.

Figure 2

Low to High Individual Total OIA scores Participant Pie Chart with Percentages
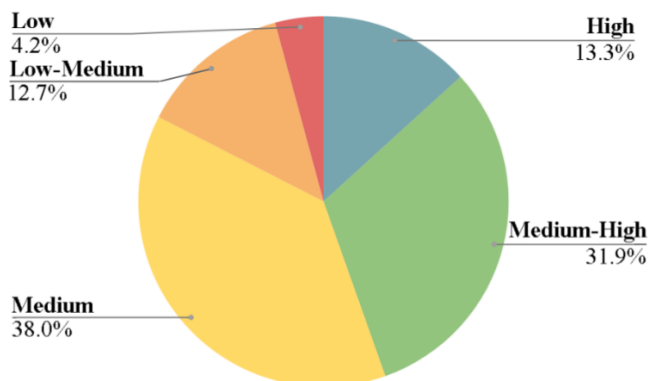

Note. (see Appendix E)

To address the third research question regarding if emerging adult college students' perceived ideational behaviors will predict their occupational identity achievement, a simple linear regression was conducted. The predictor was the total IB scores and the outcome total OIA scores. The predictor variable was found to be statistically significant, $\beta = .187$, $t(165) = 2.439$, $p = .016$, $R^2 = .035$ (see Tables 1 and 2), indicating that for every one-unit increase in total IB scores the total OIA scores changed by .108 units (slope), as the intercept was 17.209.

In the analysis, the p-value of .016 is less than 0.05 ($p < .016$), concluding that the total IB scores have a significant effect on the total OIA scores. Ideational behavior was a significant predictor of occupational identity achievement, $\beta = .187$, $t(165) = 2.439$, $p = .016$, $R2 = .0035$ (see Tables 1 and 2). In this study, a 3.5% variation in total OIA scores are explained by the total IB scores ($R^2 = .035$; see Figure 3).

Lastly, a correlation analysis showed the correlations between the independent variables and the dependent variable, such as Total OIA scores and college year ($p < .011$), ethnicity = Black and gender ($p < .033$), and ethnicity = White and major ($p < .011$) were statistically significant (see Table 3). Next, a multiple regression analysis was conducted to investigate the relationship between the independent variables and the dependent variable. The model included six independent variables, all continuous, except for the seven-level categorical variable of ethnicity, which was dummy coded into three variables: two binary variables (ethnicity = White, and ethnicity = Other) and a reference category (ethnicity = Black). The dependent variable was occupational identity achievement (OIA total scores). The non-significant results of the demographic covariates in the multiple linear regression analysis were as follows: age ($p < .252$), gender ($p < .565$), college year ($p < .519$), major ($p < .660$), ethnicity = White ($p < .959$),

ethnicity = Other ($p < .526$). Total IB scores ($p < .015$) were statistically significant (see Table 4).

The results from the Model Summary table showed that $\beta = .235$, $t(151) = 5.933$, $p = .246$, $R^2 = .055$. In addition, the adjusted R-squared value was $R^2 = .055$, indicating that the independent variables used in the multiple regression analysis explained 5.5% of the variance of the Total OIA scores. The F-statistic was non-significant ($F[7, 158] = 1.32$, $p < .246$), indicating that the model does not account for a significant portion of the variance in Total OIA scores (see Table 5). Despite this, and consistent with the linear regression, Total IB scores ($p < .015$) were statistically significant.

Table 1

Simple Regression Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.187	.035	.029	5.88475

Note. Predictors: (Constant), Total IB scores

Table 2

Simple Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	17.209	2.682		6.416	< .001
	Total IB scores	.108	.044	.187	2.439	.016

Note. Dependent Variable: Total OIA scores

Figure 3

IB Predicts OIA: Simple Regression and Effect Scatterplot
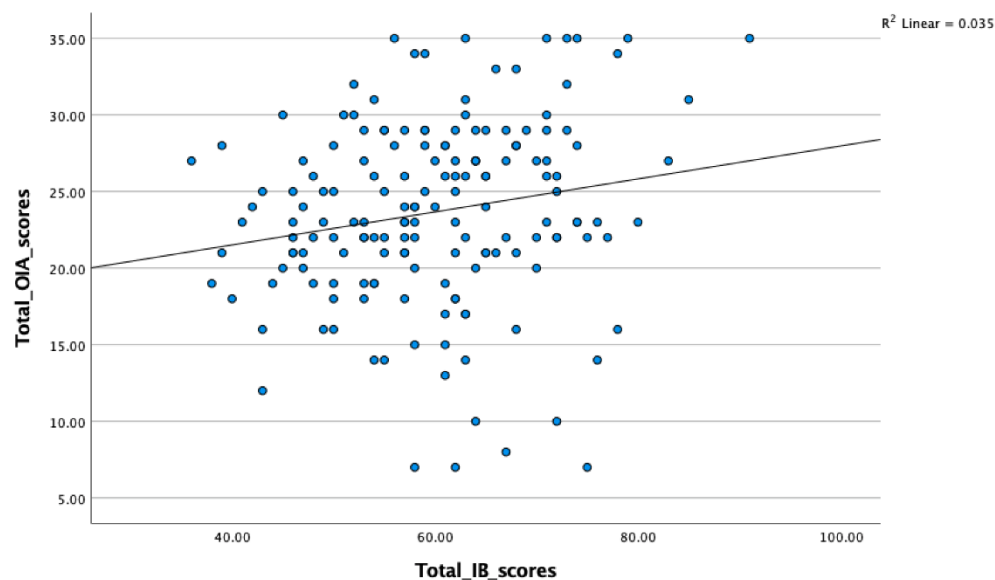
Multiple Regression Correlations Matrix

Table 3

	Total OIA scores	Total IB scores	age	gender	college year	major	ethnicity = Black	ethnicity = White	ethnicity = Other
Total OIA scores	1								
Total IB scores	.187	1							
age	.072	-.092	1						
gender	.042	-.061	-.041	1					
college year	.011	-.050	.772	-.197	1				
major	-.070	-.078	-.081	-.060	-.026	1			
ethnicity = Black	-.052	-.017	-.219	.033	-.132	.110	1		
ethnicity = White	-.026	-.040	.130	.062	.154	.011	-.592	1	
ethnicity= Other	.087	.062	.110	-.104	-.016	-.137	-.503	-.399	1

Multiple Regression Coefficients

Table 4

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Zero-order	Correlations Partial	Part
(Constant)	6.904	8.958		.771	.442			
Total IB Scores	.111	.045	.193	2.464	.015	.187	.192	.191
age	.544	.474	.147	1.149	.252	.072	.091	.089
gender	.562	.976	.047	.576	.565	.042	.046	.045
college year	-.421	.652	-.083	-.646	.519	.011	-.051	-.050
major	-.367	.834	-.035	-.441	.660	-.070	-.035	-.034
ethnicity = White	-.057	1.099	-.004	-.051	.959	-.026	-.004	-.004
ethnicity = Other	.766	1.206	.056	.635	.526	.187	.192	.191

Note. Dependent Variable: Total OIA scores, Excluded Variable: ethnicity = Black

Multiple Regression Model Summary

Table 5

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics F Change	df1	df2	Sig. F Change
1	.235	.055	.013	5.93270	.055	1.316	7	158	.246

a.   Predictors: (Constant, ethnicity = Other, collge year, Total IB scores, major, gender, ethnicity = White, age

  b. Dependent Variable: Total OIA scores, Excluded Variable: ethnicity = Black

Summary and Overview

Chapter I established research goals, the background, and significance of the study, its limitations and assumptions, the procedures used, and a list of contextual definitions that will be useful during this study and a future workforce. Chapter II reviewed the literature. Chapter III addressed the methods and procedures used to conduct this study. Chapter IV presented the

findings of this study. Chapter V will summarize the results of the research, draw conclusions on

the research findings, and list recommendations based on the conclusions.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The problem of this study was to determine the degree to which emerging adult college students' ideational behavior predicts their occupational identity achievement preceding entry into the 4th Industrial Revolution (4IR) workforce. This chapter summarizes the study, presents conclusions based on the findings, and makes recommendations for future studies related to this topic.

Summary

To guide this research, the following research questions were established:

- **RQ1:** How do emerging adult college students perceive their degree of ideational behavior?

- **RQ2:** How do emerging adult college students perceive their occupational identity achievement?

- **RQ3:** How will emerging adult college students' ideational behavior predict their occupational identity achievement?

In this study, the researcher first computed the total ideational behavior (IB) score (RQ1) and then the total occupational identity achievement (OIA) score (RQ2) by aggregating the individual scores before initiating a linear regression analysis in SPSS (RQ3) to determine if the sample of emerging adult college students' total IB scores will predict their total OIA scores preceding entry into the 4IR workforce. The emerging adult college student sample comes from several colleges within a Mid-Atlantic, diverse, four-year university. The instruments used to compile the survey for this study were twofold. First, the Runco Ideational Behavior Scale

(RIBS-S) is a 19-item Likert-type rating scale that asks respondents to rate themselves by reflecting on their use of, appreciation of, and skill with ideas (Runco et al., 2001). Paek et al. (2016) noted that the RIBS-S measures how often a participant has thoughts of a certain type as a measure of creative ideation. The second instrument used for this study was the measure of occupational identity achievement. Occupational identity achievement was measured using the Occupational Identity Scale (OIS), which is a 28-item Likert scale that offers an individual measure of identity status of occupational development. The OIS comprises four separate scales: achievement, moratorium, foreclosure, and diffusion. For this study, the researcher only used the occupational identity achievement sub-scale (OIA), which employs seven of the 28 total OIS questions. The OIS narrows down the level and nature of adolescents' optional compromise regarding their occupational calling based on the varying degrees of occupational commitment and exploration (Veiga & Moura, 2005).

This study was a descriptive cross-sectional study that used a correlational design to determine the degree to which emerging adult college students' ideational behavior predicts their occupational identity achievement preceding entry into the 4th Industrial Revolution (4IR) workforce. The researcher computed the total ideational behavior (IB) score and the total occupational identity achievement (OIA) score by aggregating the individual scores before utilizing a linear regression analysis in SPSS to determine if the sample of emerging adult college students' total IB scores will predict their total OIA scores.

After conducting the study, the data were examined for any missing anomalies and missing values, and no values were missing. All 166 respondents completed the entire survey. Of the 166 cases up for analysis, none were removed. To report the findings for RQ1, which focused on how emerging adult college students perceived their degree of ideational behavior preceding their

entry into the 4IR workforce. 11 total participants scored in the low individual total IB score category (Never has thoughts of creative ideation), 28 who scored in the low-medium individual total IB score category (Yearly has thoughts of creative ideation), 45 total participants who scored in the medium individual total IB score category (Monthly has thoughts of creative ideation), 49 who scored in the medium-high individual total IB score category (Weekly has thoughts of creative ideation), and 33 total participants who scored in the high individual total IB score category (Daily has thoughts of creative ideation).

To report the findings for RQ2, the researcher focused on how emerging adult college students perceived their degree of occupational identity achievement preceding entry into the 4IR workforce. 7 total participants scored in the low individual total OIA scores category (Diffusion, Noncommitted, and Nonexplored), 22 scored in the low-medium individual total OIA scores category (Foreclosure, Nonexplored and Committed), 63 total participants scored in the medium individual total OIA scores category (Indeterminate, Partially Explored and Partially Committed to their occupational identity). Also, 52 total participants scored in the medium-high total OIA scores category (Moratorium, Explored and Noncommitted), and 22 total participants scored in the high individual total OIA scores category (Achievement, Explored and Committed to their occupational identity).

To address RQ3, the research question regarding if emerging adult college students' perceived ideational behavior will predict their occupational identity achievement, a simple linear regression was conducted. The outcome variable was total OIA scores, and the predictor variable was the total IB scores. According to a Beta-value of $\beta = .187$, with a significance of $p = .016$, it can be said that the model did have a good fit for the data. The predictor variable was found to be statistically significant, $\beta = .187$, $t(165) = 2.439$, $p = .016$, $R^2 = .0035$, indicating that

for every one-unit increase in IB scores, the OIA scores changed by .108 units (slope), as the intercept of this study was 17.209. The researcher concluded that the total IB scores do have a significant effect on the total OIA scores. In this study, a 3.5% variation in total OIA scores is explained by the total IB scores ($R = .0035$).

Lastly, for RQ3, the researcher conducted a multiple linear regression analysis to examine if the six independent variables of age, gender, college year, major (STEM, Non-STEM, and Undecided), and ideational behavior (IB total scores), including ethnicity, a seven-level categorical variable which was dummy coded into two binary variables (ethnicity = White, and ethnicity = Other), with ethnicity = Black serving as the reference category, had a non-significant effect on the dependent variable (Total OIA scores). The findings show that the correlations between the independent variables and the dependent variable, such as Total OIA scores and college year ($p < .011$), ethnicity = Black and gender ($p < .033$), and ethnicity=White and major ($p < .011$), were statistically significant the non-significant results of the demographic covariates in the multiple linear regression analysis were as follows: age ($p < .252$), gender ($p < .565$), college year ($p < .519$), major ($p < .660$), ethnicity = White ($p < .959$), ethnicity = Other ($p < .526$). Total IB scores ($p < .015$) were statistically significant. The results from the Model Summary table showed that $\beta = .235$, $t(151) = 5.933$, $p = .246$, $R^2 = .055$. In addition, the adjusted R-squared value was $R^2 = .055$, indicating that the independent variables used in the multiple regression analysis explained 5.5% of the variance of the Total OIA scores. The F-statistic was non-significant ($F[7, 158] = 1.32$, p $< .246$), indicating that the model does not account for a significant portion of the variance in Total OIA scores.

Conclusions

The purpose of this study was to determine the degree to which ideational behavior predicts occupational identity achievement in emerging adult college students preceding entry into the Fourth Industrial Revolution (4IR) workforce. This study is critical because of the occupational identity crisis emerging adults will likely face in the 4IR workforce. After conducting the study, the data were examined for any missing anomalies and missing values, and no values were missing. All 166 respondents completed the entire survey. Of the 166 cases up for analysis, none were removed.

Based on the significant results of this study to address RQ3 ($p < .016$; $R^2 < .035$), the researcher found that ideational behavior had a significant effect on the occupational identity achievement of emerging adult college students preceding entry into the 4IR workforce. In this study, it was uncovered that emerging adults' degree of ideational behavior explains 3.5% of the variance of their occupational identity achievement. This conclusion supports the literature from Sica et al. (2017), who stated that creativity and identity could proceed as intertwined dimensions that support emerging adults in exploring, elaborating, reconsidering, and again elaborating individual answers, all while transitioning to adulthood developmental tasks, in a creative and adaptive way, or as a creative life design. The emerging adults in this study's mean occupational identity achievement ($M = 23.6566$) shows that they are "middling." The term "middling," regarding the emerging adults in this study's occupational identity achievement, is defined as moderate or average in size, amount, or rank (Merriam-Webster, 2022). If these emerging adults increase their ideational behavior ($M = 59.8675$), they are likely to increase their occupational identity achievement ($R^2 < .035$). The opposite is also noteworthy, as Sica et al. (2017) noted

that when creativity is lacking, the commitments do not follow the exploration or reconsideration processes, but deaden self-discovery work.

It is important to note that divergent thinking tests such as the RIBS are reliable and reasonably valid predictors of creative potential and future creative performance; however, the potential for creative thinking is not the same as creative achievement, and an individual may have the potential for creative thinking without actually performing creatively. O'Neal et al. (2015) stated that by definition, potential denotes talents and skills that are latent, not yet used, or perhaps immature, as performances can be observed, but potential must be inferred. That being said, there is still 96.5% of the variance of total OIA scores that is unknown and cannot be explained by the total IB scores from this study. While the results are significant, there are factors other than ideational behavior that predict emerging adults' occupational identity achievement proceeding entry into the 4IR workforce.

For RQ1, the researcher concluded that the emerging adults in this study are said to have 'medium' mean ideational behavior ($M = 59.8675$), as their mean ideational behavior is reasonably above average. The majority of the emerging adults who participated in this study (56.6%) fell in the Medium (27.1%; 45 total) or the Medium-High (29.5%; 49 total) ideational behavior range, where they either have monthly or weekly thoughts of creative ideation. The emerging adult participants with daily thoughts of ideational behavior were just 19.9% (33 total). The results of RQ1 suggest that having daily thoughts of ideational behavior is the optimal state for emerging adult college students preceding entry into the 4IR workforce and is supported in the literature by Runco et al. (2001) who stated that ideas are produced by everyone and may be especially useful for understanding "everyday creativity" because ideas are everyday products.

For RQ2, the researcher concluded that emerging adults with a 'medium' mean occupational identity achievement ($M = 23.6566$) are "middling," as their mean ideational behavior is reasonably above average. The majority of the emerging adults who participated in this study (69.9%) fell in the Medium (38.0%; 63 total) or the Medium-High (31.9%; 53 total) occupational identity achievement range, where they either have Indeterminate (Nonexplored/Explored and Noncommited/Committed) or Moratorium (Explored and Noncommitted) occupational identity. The emerging adult college student participants with high occupational identity achievement (Explored and Committed) were just 13.3% (22 total). The results of RQ2 suggest that the emerging adult college students in this study are likely to have a clearer vision of their career path and are mostly working towards it, as achievement status is attained only when students perceive themselves as confident and decided on their career choices (Berrios-Allison, 2005).

In order to achieve an occupational identity in the 4IR, we need to be able to recreate ourselves multiple times throughout our work lives. This is supported in the literature by Bogaerts et al. (2019) who stated that an individual's occupational identity structure is revised continually through ongoing processes of occupational identity exploration and commitment. Charland (2010) also noted that individuals alternate or shift between different statuses, from foreclosure to the diffusion identity status, from foreclosure to moratorium status, and from diffusion to foreclosure identity status. It is interesting to think to what degree ideational behavior may predict the occupational identity statuses of foreclosure, moratorium, and diffusion. Ultimately, it is all about how humans use our creative potential to create ourselves in the 4IR workforce by collaborating with technology, augmenting our occupational identities through technology, and using the best of humans and the best of technology simultaneously. To

do this, emerging adults must develop the soft skill of increasing their ideational behavior, which is their creative potential, to achieve their occupational identities in the 4IR workforce.

The emerging adult college students' perceptions of themselves as creative individuals predicted their occupational identity achievement, which is consistent with Plucker et al. (2004), who noted that the creative individual's perception of self is not domain specific but that it generalizes across domains. Caution does need to be exercised here, because the model was non-significant (F[7, 158] = 1.32, p < .246), indicating that the amount of variance accounted for was minimal, as power may have played an issue. Further research on creative individuals' personality characteristics stated that one consistent characteristic was seeing oneself as creative in the general sense (Barron & Harrington, 1981). This was supported by Runco et al. (2013) who noted that the ideation captured by the RIBS is a general and fair characteristic of everyone and in all domains of performance. It is interesting to think about all the occupations where daily ideational behavior will predict these emerging adults' occupational identity achievement in the 4IR workforce. Davenport and Kirby (2015) stated that in the 4IR, some knowledge workers will step up to higher levels of cognition; others will step aside and draw on aspects of intelligence that machines lack. While some will not meet the changing market demands, some will step in to adjust and monitor computers' decision-making; others will step narrowly into highly specialized realms of expertise, while inevitably, some will step forward to create next-generation machines and find new ways for them to augment human strengths (Davenport & Kirby, 2015).

The demographic covariates in the multiple regression model were not significant (p = .246), but the ideational behavior (IB) was statistically significant (p < .015), suggesting that the main independent variable (IB) has a unique relationship with occupational identity achievement (OIA) that is not accounted for by the demographic covariates. This result indicates that the

demographic variables in the model do not explain the effect of ideational behavior. The model explained a substantial proportion of the variance in the OIA total scores ($R^2 = .055$), indicating that the independent variables used in the multiple regression analysis explained 5.5% of the variance of the OIA total scores.

There will be occupational identity crises in the 4IR workforce as a result of automation. Fraher and Gabriel (2014) noted that job loss leads to severe challenges to our occupational identity, and occupational groups usually resort to creating and developing new identity narratives to account for the deep changes that affect them. The possibility here is what Davenport and Kirby (2015) stated in that we could reframe the threat of automation as an opportunity for augmentation in the 4IR workforce. By focusing on occupational identity augmentation during the 4IR workforce, emerging adults can increase their ideational behavior and achieve their occupational identity in collaboration with machines and AI. Davenport and Kirby stated that augmentation, in contrast with automation, means starting with what humans do today and figuring out how that work can be deepened rather than diminished by the greater use of machines.

K-12 and higher education educators can teach creativity. Caroff and Lubart (2012) stated that the capacity to be creative is considered a latent ability or potential which can be taught. Educators can teach concepts and frameworks around ideational behavior and occupational identity achievement to emerging adults during high school, during their transition to college, and while at university. Symonds et al. (2011) noted that one of the most fundamental obligations of any society is to prepare its adolescents and young adults to lead productive and prosperous lives as adults. In our current K-12 education system, as well as higher education, career and technical education (CTE) is the optimal content area for ideational behavior and

occupational identity achievement to be taught in the classroom. Cho-Baker et al. (2021) noted that CTE participation in high school can assist youth in attaining better occupational and educational outcomes after graduation. K-12 and higher education educators need to be preparing students for the 4IR workforce by focusing on career readiness. Symonds et al. stated that a focus on college readiness alone does not equip young people with all the skills and abilities they will need in the workplace or to complete the transition from adolescence to adulthood successfully.

Recommendations

Based on the findings of this study, the following are recommendations for researchers and practitioners.

Future Research

A future study could focus on building ideational behavior and occupational identity achievement education and training standards into K-12 and higher education curricula. Also, in future studies, this same methodology could be used with any generation, as it would give researchers more insight into how occupational identity develops broadly, not specifically to this new generation of emerging adults facing the Fourth Industrial Revolution (4IR) workforce. When conducting these future studies, this same methodology can be used at universities and colleges in the United States of America, as well as internationally. Baby Boomers may have different results than Millennials, Generation Z, and so on. Within the family unit, an interesting look at occupational identity could also be to focus on adolescents who had experienced early separation from one of their parents tended to be less achieved (Berríos-Allison, 2005). Berríos-Allison (2005) noted that this is consistent with attachment theory, which proposes that closeness between parents and children provides a secure base for adolescents to explore options. This

finding suggests that students not close to their parents may lack the confidence needed to define their identities.

Another future direction is exploring narrativization in relation to occupational identity achievement, as it would be interesting to study how our narratives help to create, or dismantle, our occupational identities in the 4IR. Brown and Coupland (2015) noted from the literature that identities are encoded in multiple and dynamic self-narratives, which are complex representations of self that evolve through soliloquy and in interactions with others. While this dissertation surveyed humans, future studies could even survey machines with artificial intelligence. The questions to AI powered machines could focus on their perceptions of humans in the workforce and if they feel they are being automated by or held back by humans. In terms of creating an occupational identity, we need to be looking at not only competing with humans, but also robots. Consequently, future studies can investigate the occupational identity of machines or robots.

A recommended future longitudinal study would be to see if ideational behavior predicts occupational identity diffusion, moratorium, and foreclosure independently. It was noted in the literature that individuals shift or alternate between different statuses, from foreclosure to the diffusion identity status, from foreclosure to moratorium status, and from diffusion to foreclosure identity status (Charland, 2010). A future study could also analyze the degree to which ideational behavior predicts occupational identity as a whole.

Future research studies could also focus on convergent thinking instead of divergent thinking, as the researcher used only divergent thinking and ideational behavior for this study. Guilford (1957) defined convergent thinking as the opposite and the compliment of divergent thinking, where a diverse set of material generated from divergent thinking can form the basis for

deriving a single best solution through convergent thinking, which would be an achieved occupational identity.

A future study could investigate how emerging adults utilize workforce training during the 4IR to prepare for their next employment opportunity in hopes of achieving their occupational identity. Duerden et al. (2014) noted a clear gap between the skills emerging adults need to successfully enter the workforce and the skills they possess upon graduation from high school and college. Some emerging adults are already working while at university, while others have dropped out of school before graduating to enter the workforce. No matter their situation, emerging adults will need training, skilling, educational courses, and tools to create themselves while in the 4IR workforce.

Researchers could also examine if certain majors, such as STEM majors, have a significant result when determining if ideational behavior predicts occupational identity achievement in their specific domain. Berríos-Allison (2005) noted findings which suggested that students who had decided on a major were more likely to be achieved. Researchers could determine if participants in each college year (1st Year, 2nd Year, 3rd Year, 4th Year, or 5th Year) had a significant result. Along with these demographics, there could also be a future study focusing on ethnicity. Berríos-Allison (2005) noted that Latinx and Caucasians tended to achieve their occupational identities more so than Asian, Native, and African Americans. Berríos-Allison also noted that Latinx tended to achieve their occupational identities because of Latinx's healthy relations and ties to their family.

Lastly, future research should examine where the remaining 94.5% of the variance of Total OIA scores is. Also, the researcher recommends adding a field for the disabled or non-disabled to the demographics section in a future study to see if disability affects perceptions of

their ideational behavior or their occupational identity achievement. Given the results of this study, it would seem as though, no matter disability, diverse humanity would play a key role in ideational behavior predicting occupational identity achievement preceding entry into the 4IR workforce because creative potential is such a human trait.

Implications for Practitioners

Because there was a significance ($p < .016$; $R^2 < .035$) in RQ3, it is important that K-12 educators help their students increase their ideational behavior (IB) before entering college and the workforce, as IB contributes minimally to increasing their occupational identity achievement. The future of education is whatever the future workforce becomes, and that future workforce is what we should be preparing our students for. It is what our curricula should be based on. K-12 education is a preparatory landscape for future participants in the 4IR workforce. Lubart et al. (2013) stated that the capacity to be creative is considered a latent ability or potential which can be taught. Specifically, occupational identity achievement could, in some way, be added to the career technical education curricula or workplace readiness standards to develop adolescents' occupational identities before they enter college, job-related training, or the workforce. Windels and Stuhlfaut (2007) stated that the most important skills for educators to teach in both entry-level and advanced courses are conceptual and strategic thinking. Educators must teach the skill of divergent thinking, which spurs exploratory thinking and embodies middle adolescence (Sica et al., 2017). The more we teach the need for using our ideational behavior daily in the K-12 classroom, the more effect it will have on students' occupational identity achievement proceeding into the 4IR workforce and beyond.

In conclusion, emerging adults in this study are "middling" in their occupational identity achievment. It could be better, it could be worse, but there needs to be a concerted effort to teach

creativity for creative potential's sake in K-12 and higher education to ensure emerging adults are reaching towards their occupational identity achievement and becoming fully prepared for the 4IR workforce. Increasing the perceptions of their ideational behavior can help to propel their occupational identity achievement higher. Educators can teach ideational behavior's relationship with occupational identity achievement in several ways. The first is exploration, where emerging adult college students can use their ideational behavior to identify potential paths that align with their skills and interests and explore different career options. Symonds et al. (2011) noted that while career planning, previous work experience, decision-making, listening skills, integrity, and creativity are all considered vital in the workplace, they hardly figure in college readiness but are closely related to career readiness. Educators must key into what World Economic Forum (2018) noted in the literature, that two investment decisions would be crucial to shaping the future of jobs: investing in workforce reskilling and prioritizing automation or augmentation. In order to keep up, emerging adult college students should be taught to embrace creativity and innovation. Kraus (2016) noted that creative leaders encourage others to drop outdated approaches, invite disruptive innovation, and take balanced risks. Risk is a key attribute needed for entrepreneurship, which is another occupational identity achievement route emerging adults can take during the 4IR. Grant (2017) noted that the word entrepreneur, as it was coined by economist Richard Cantillon, literally means "bearer of risk." Educators should teach entrepreneurship in K-12 districts and higher education institutions to develop the knowledge and skills of emerging adults to identify business opportunities they need to start their own businesses.

In terms of how educators can get their students to engage in their occupational identity achievement, they can do this through narrativization and meaning making. Lengelle et al.

(2016) stated that individuals must reflexively construct their identities through meaning-making, where identity is co-constructed in a narrative story that provides both meaning and direction. As machines and robots can perform many tasks, creativity, and innovation can set humans apart and drive improvement and progress in their workplaces. Vlad (2018) noted that innovation is seen as the engine of progress for individuals, organizations, and societies around the world. As the collaboration between humans and machines increases, educators can teach emerging adults how to best utilize human-machine collaboration, as emerging adults with strong ideational behavior are more likely to be able to take advantage of opportunities for human-machine collaboration as they identify them. Anderson (2018) stated that we will not need to prepare our workforce just once, with a few changes to the curriculum, because as AI matures, we will need a responsive workforce capable of adapting to new processes, systems, and tools every few years. Responsive emerging adult college students can use their ideational behavior to take action toward achieving their occupational identity by networking and actively seeking out opportunities. Walsh and Gordon (2008) noted that identities are defined and redefined as individuals associate and interact with others and are therefore always subject to development and change. By taking these steps, educators can teach emerging adults how they can create their occupational selves to stay competitive in the 4IR job market.

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APPENDICES

Appendix A: Runco Ideational Behavior Scale: Short Form

RUNCO IDEATIONAL BEHAVIOR SCALE: SHORT FORM (RIBS-S)
Part of the *Runco Creativity Assessment Battery* (rCAB)
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Directions: Use the 1-5 scale (given below) to indicate how often each of the phrases describes your thinking. Note the focus on your thinking, which might be different from your actual behavior. Also, you may need to approximate. Please indicate how you really think, not how you believe you should act. Remember--no names are used. Your responses are confidential.

Again, you may need to approximate. For each item, **circle** the response option that is THE CLOSEST to being accurate. Here are the options:

1 = Never
2 = **approximately** once a year
3 = once or twice each month (**approximately**)
4 = once or twice each week (**approximately**)
5 = Just about every day, and sometimes more than once each day.

1. I have ideas for arranging or rearranging the furniture at home.

1	2	3	4	5
never	yearly	monthly	weekly	daily

2. I have ideas for making my work easier.

1	2	3	4	5
never	yearly	monthly	weekly	daily

3. I read something (written by someone else) and realize there are alternative perspectives.

1	2	3	4	5
never	yearly	monthly	weekly	daily

4. I have ideas about what I will be doing in the future.

1	2	3	4	5
never	yearly	monthly	weekly	daily

5. I consider alternative careers (or career changes).

1	2	3	4	5
never	yearly	monthly	weekly	daily

6. I have trouble sleeping at night, so many ideas keep showing themselves keep me awake.

1	2	3	4	5
never	yearly	monthly	weekly	daily

7. I make plans (e.g., going to a particular restaurant or movie), but something messes it up–yet it is easy for me to find something to do instead.

1	2	3	4	5
never	yearly	monthly	weekly	daily

8. I have ideas about a good plot for a movie or TV show.

1	2	3	4	5
never	yearly	monthly	weekly	daily

Remember: The focus is on your thinking, which might be different from your actual behavior.   Please indicate how you really think, not how you believe you should act.

9.   I have ideas about a new invention.

1	2	3	4	5
never	yearly	monthly	weekly	daily

10.   I have ideas for stories or poems.

1	2	3	4	5
never	yearly	monthly	weekly	daily

11.   I have an idea about a new route between home and school (or work).

1	2	3	4	5
never	yearly	monthly	weekly	daily

12.   I have ideas for a new business or product.

1	2	3	4	5
never	yearly	monthly	weekly	daily

13.   I see a cloud, shadow, or similar ambiguous figure and have SEVERAL ideas about what the shape or figure could be.

1	2	3	4	5
never	yearly	monthly	weekly	daily

14.   I have ideas about what I will be doing 10 years from now.

1	2	3	4	5
never	yearly	monthly	weekly	daily

15.   I have trouble staying with one topic when writing letters because I think of so many things to say.

1	2	3	4	5
never	yearly	monthly	weekly	daily

16.   I often see people and think about alternative interpretations of their behavior.

1	2	3	4	5
never	yearly	monthly	weekly	daily

17.   When reading books or stories I have ideas of better endings.

1	2	3	4	5
never	yearly	monthly	weekly	daily

18.   When reading the newspaper or a letter that someone wrote, I often have ideas for better wording.

1	2	3	4	5
never	yearly	monthly	weekly	daily

19.   I hear songs and think of different or better lyrics.

1	2	3	4	5
never	yearly	monthly	weekly	daily

Appendix B: Occupational Identity Scale

OCCUPATIONAL IDENTITY SCALE

	Strongly Disagree				Strongly Agree
1. At the present moment, I don't know exactly what I want as a career, but I am examining several occupational perspectives	1	2	3	4	5
2. I am being bombarded with many suggestions about what I should choose as an occupation, and I am trying to decide which one is best for me	1	2	3	4	5
3. After many doubts and considerations, I have it clearly in my mind what my occupation will be	1	2	3	4	5
4. The occupation I have chosen is a tradition in my family and I feel I would like to follow the family tradition	1	2	3	4	5
5. After analyzing many possible occupational options, I believe I have decided on a specific career	1	2	3	4	5
6. The fact of not being certain about my occupational future bothers me	1	2	3	4	5
7. At this point, I am not worried about what type of job I will do most successfully; I'll think about it in the future	1	2	3	4	5
8. When I was a child I decided on my career and I have never seriously considered other alternatives	1	2	3	4	5
9. I am struggling with several ideas in mind for my future occupation and I feel I have to choose something specific very soon	1	2	3	4	5
10. Althogh I am in a certain line of studies, I'll still actively looking into other things for my studies and future work	1	2	3	4	5
11. It is too early for me to be concerned about my professional future	1	2	3	4	5
12. I am presently trying to decide about my future occupation. But nothing is resolved yet	1	2	3	4	5
13. My parents' recommendations for my future occupation have helped me in deciding what my profession will be	1	2	3	4	5
14. If there are no clear openings in my field of studies, I'll change my career without much concern	1	2	3	4	5
15. I haven't had any problem in choosing my future occupation, since my parents gave to me a good orientation long ago	1	2	3	4	5
16. I don't have it clear in my mind what my professional place in society is, but I am not concerned about it	1	2	3	4	5
17. I wish I could soon decide on my ultimate career goal out of the options I am considering, so that I could choose the more appropriate program of study	1	2	3	4	5
18. My folk's suggestions have helped me avoid a lot of problems in picking out a career	1	2	3	4	5

				Strongly Disagree				Strongly Agree

19. Nowadays the occupational world is so complex that I cannot commit
myself to any type of occupation. I'll see what happens in the future . . 1   2   3   4   5

20. After asking a lot of people and finding information, I am sure of
what I want and I will not be comfortable until I reach that
occupation 1   2   3   4   5

21. I am thinking seriously about my professional future, since I
have many doubts about it 1   2   3   4   5

22. I am committed to my vocation and I wouldn't easily change
it, since it took me so much effort to make up my mind 1   2   3   4   5

23. It was hard for me to decide on a career, but now, when I look
at myself I thnk that I will fit the profession I've chosen 1   2   3   4   5

24. In choosing a career, I didn't go through a struggle because my
folks gave the right direction to me 1   2   3   4   5

25. Some time ago I went through a cresis of decision, but now I can
say that I have a clear goal regarding my future occupation 1   2   3   4   5

26. My father/mother seem to enjoy so much in their occupation that
I am going into his/her type of job 1   2   3   4   5

27. I have gone through a lot of struggle to decide what my career
will be, but that is not a problem anymore 1   2   3   4   5

28. Although I don't have a clear idea of what my occupation will be,
I don't care at this point 1   2   3   4   5

A	M	F	D
	Item 1 –		
Item 3 –	Item 2 –	Item 4 –	
Item 5 –	Item 6 –	Item 8 –	Item 7 –
Item 20 –	Item 9 –	Item 13 –	Item 11 –
Item 22 –	Item 10 –	Item 15 –	Item 14 –
Item 23 –	Item 12 –	Item 18 –	Item 16 –
Item 25 –	Item 17 –	Item 24 –	Item 19 –
Item 27 –	Item 21 –	Item 26 –	Item 28 –
Total	Total	Total	Total ....

Appendix C: Instructor Solicitation Email

SUBJECT: Please Help! …an ODU Doc Student Collect Data, and Win!

Dear "Instructor Name,"

My name is Carrington Faulk, an Occupational & Technical Studies Ph.D. Candidate in the Department of STEM Education and Professional Studies at ODU. My research interests are creativity, occupational identity, emerging adulthood, and the Fourth Industrial Revolution. I am writing to offer you the chance to participate in administering the survey for my dissertation study for the opportunity to win a $100 Amazon gift card for having the most students complete my short 32-question, 5-minute survey for my dissertation study. Even if you do not "win" by having the most students participate, I am also awarding a $50 Amazon gift card to the runner-up. I humbly request that you administer the survey to all your students in your classes at the beginning of the Fall 2022 semester. I am specifically targeting the courses you teach because all undergraduate students, who are completing baccalaureate degree programs at ODU, complete a Public Speaking course such as COMM 101R, 103R, and 112R, which will likely result in a diverse sample for my study.

I am currently beginning the IRB process and will be able to send my IRB acceptance letter with the survey link if you agree to participate. Please email me back this week or the next to let me know your interest in administering my survey in your classroom. Thank you in advance for your consideration.

Best,

Carrington M. Faulk, Ed.S.
Ph.D. Candidate
Occupational & Technical Studies
Department of STEM Education & Professional Studies

Appendix D: Survey

Dissertation Survey // All

The objective of this dissertation survey is to determine the degree to which emerging adult college students' ideational behavior will predict their occupational identity achievement preceding their employment into the 4th Industrial Revolution (4IR) workforce. The Fourth Industrial Revolution (4IR) is characterized by the fusion of the digital, biological, and physical worlds, as well as the growing utilization of new technologies such as artificial intelligence, cloud computing, robotics, 3D printing, the Internet of Things, and advanced wireless technologies, among others.

This survey is comprised of three sections. There is a demographic section to start with five demographic questions, followed by a measure focusing on ideational behavior (19 questions), and next an instrument aimed at measuring occupational identity achievement (7 questions). Lastly there is a question of which instructor administered the survey to you.

Most respondents take no more than 5 minutes to complete the survey.

* Required

1. What is your age? *

    Mark only one oval.

    ◯ 18
    ◯ 19
    ◯ 20
    ◯ 21
    ◯ 22
    ◯ 23
    ◯ 24
    ◯ 25
    ◯ 26
    ◯ 27
    ◯ 28+

2. **What is your gender?** *

Mark only one oval.

( ) Female

( ) Male

( ) Transgender Female

( ) Transgender Male

( ) Gender Variant/Non-Conforming

( ) Prefer Not to Answer

( ) Other: _____

3. **What is your ethnicity?** *

Mark only one oval.

( ) White

( ) Black or African American

( ) Asian / Pacific Islander

( ) Hispanic or Latino

( ) Native American or American Indian

( ) Other: _____

4. **What is your current undergraduate enrollment status?** *

Mark only one oval.

( ) 1st Year

( ) 2nd Year

( ) 3rd Year

( ) 4th Year

( ) 5th Year

( ) Other: _____

5. What is your major? *

Mark only one oval.

- ⬭ UNDECIDED / UNDECLARED
- ⬭ Accounting
- ⬭ Actuarial Mathematics
- ⬭ African American & African Studies
- ⬭ Applied Language Studies (English)
- ⬭ Applied Mathematics
- ⬭ Art Education
- ⬭ Art History
- ⬭ Asian Studies
- ⬭ Biochemistry
- ⬭ Biological Oceanography (Ocean & Earth Science)
- ⬭ Biology
- ⬭ Biology, Secondary Education
- ⬭ Business Analytics
- ⬭ Chemical Oceanography (Ocean & Earth Science)
- ⬭ Chemistry
- ⬭ Chemistry, Teaching Licensure
- ⬭ Civil Engineering
- ⬭ Civil Engineering Technology
- ⬭ Communication
- ⬭ Computer Engineering
- ⬭ Computer Science
- ⬭ Computer Science, Teaching Licensure
- ⬭ Creative Writing (English)
- ⬭ Criminal Justice
- ⬭ Cyber Operations
- ⬭ Cybercrime (Interdisciplinary Studies)
- ⬭ Cybersecurity
- ⬭ Cytotechnology (Health Sciences)
- ⬭ Dance (Theatre & Dance)
- ⬭ Dance Education (Theatre & Dance)

- Database Administration (Information Systems & Technology)
- Dental Hygiene
- Dental Hygiene, Post-Licensure
- Digital Marketing (Marketing)
- E-Business & E-Commerce (Information Systems & Technology)
- Early Childhood Education
- Earth Science Education (Ocean & Earth Science)
- Economics
- Electrical Engineering
- Electrical Engineering Technology
- Elementary Education
- English
- English with Teaching Licensure
- Enterprise Cybersecurity (Information Systems & Technology)
- Environmental Health
- Environmental Science (Ocean & Earth Science)
- Exercise Science (Physical Education)
- Fashion Merchandising (Occupational & Technical Studies)
- Finance
- Fine Arts
- French (World Languages & Cultures)
- French with Teaching Licensure (World Languages & Cultures)
- Game Studies & Design
- Geographic Information Systems (Geography)
- Geography
- Geology (Ocean & Earth Science)
- German (World Languages & Cultures)
- German with Teaching Licensure (World Languages & Cultures)
- Graphic Design (Fine Arts)
- Health Services Administration
- History
- History with Licensure in History/Social Sciences
- Human Services

- Individualized Integrative Studies (Interdisciplinary Studies)
- Industrial Technology (Occupational & Technical Studies)
- Information Systems & Technology
- International Business, East Asia
- International Business, Europe
- International Business, Latin America
- International Studies
- Journalism (English)
- Leadership (Interdisciplinary Studies)
- Literature (English)
- Management
- Marine Biology (Biology)
- Marine Science Technology (Ocean & Earth Science)
- Maritime & Supply Chain Management
- Marketing
- Marketing Analytics & Research (Marketing)
- Marketing Education (Career & Technical Education)
- Mathematics, Big Data Analytics
- Mathematics, Statistics/Biostatistics
- Mechanical Engineering
- Mechanical Engineering Technology
- Medical Laboratory Science
- Medical Laboratory Science, Post-Certification
- Modeling & Simulation Engineering
- Music
- Music-Emphasis in Sound Recording Technology
- Music Composition
- Music Education
- Music Performance
- Network Engineering (Information Systems & Technology)
- Nuclear Medicine Technology
- Nursing, Concurrent Program
- Nursing, Post-licensure

- ( ) Nursing, Pre-licensure
- ( ) Painting & Drawing (Fine Arts)
- ( ) Park & Recreation Management (Park, Recreation & Tourism Studies)
- ( ) Personal Financial Planning (Finance)
- ( ) Philosophy
- ( ) Photography & Print Media (Fine Arts)
- ( ) Physical Education, Teaching Licensure
- ( ) Physical Oceanography (Ocean & Earth Science)
- ( ) Physics, Dual Degree in Physics & Electrical Engineering
- ( ) Physics, Professional
- ( ) Physics, Research
- ( ) Physics, Teaching Licensure
- ( ) Political & Legal Studies (Philosophy)
- ( ) Political Science
- ( ) Professional Communication (Communication)
- ( ) Professional Sales (Marketing)
- ( ) Professional Writing (Interdisciplinary Studies)
- ( ) Psychology
- ( ) Public Health
- ( ) Real Estate
- ( ) Recreational Therapy (Park, Recreation & Tourism Studies)
- ( ) Religious Studies (Philosophy)
- ( ) Risk Management & Insurance (Finance)
- ( ) Sociology
- ( ) Spanish (World Languages & Cultures)
- ( ) Spanish with Teaching Licensure (World Languages & Cultures)
- ( ) Special Education, Adapted Curriculum K-12
- ( ) Special Education, General Curriculum K-12
- ( ) Speech-Language Pathology & Audiology
- ( ) Sport Management
- ( ) Strategic Communication (Communication)
- ( ) Studio Art
- ( ) Technical Writing (English)
- ( ) Technology Education (Career & Technical Education)
- ( ) Theatre (Theatre & Dance)
- ( ) Three-Dimensional Media & Material Studies (Fine Arts)
- ( ) Tourism & Hospitality Management (Park, Recreation & Tourism Studies)
- ( ) Training Specialist (Occupational & Technical Studies)
- ( ) Women's Studies
- ( ) World Cultural Studies
- ( ) Other: _____

Ideational Behavior

19 Questions.

5. Directions: Use the 1-5 scale (given below) to indicate how often each of the phrases describes your thinking. Note the focus on your thinking, which might be different from your actual behavior. Also, you may need to approximate. Please indicate how you really think, not how you believe you should act. Remember--no names are used. Your responses are confidential. *

Mark only one oval per row.

	1 - never	2 - yearly	3 - monthly	4 - weekly	5 - daily
1. I have ideas for arranging or rearranging the furniture at home.	◯	◯	◯	◯	◯
2. I have ideas for making my work easier.	◯	◯	◯	◯	◯
3. I read something (written by someone else) and realize there are alternative perspectives.	◯	◯	◯	◯	◯
4. I have ideas about what I will be doing in the future.	◯	◯	◯	◯	◯
5. I consider alternative careers (or career changes).	◯	◯	◯	◯	◯
6. I have trouble sleeping at night, so many ideas keep showing themselves and keep me awake	◯	◯	◯	◯	◯
7. I make plans (e.., going to a particular restaurant or move), but something messes it up--yet it is easy for me to find something to do instead.	◯	◯	◯	◯	◯
8. I have ideas about a good plot for a movie or TV show.	◯	◯	◯	◯	◯
9. I have ideas about a new invention.	◯	◯	◯	◯	◯
10. I have ideas for stories or poems.	◯	◯	◯	◯	◯

6. **Remember: The focus is on your thinking, which might be different from your actual behavior. Please indicate how you really think, not how you believe you should act.** *

Mark only one oval per row.

	1 - never	2 - yearly	3 - monthly	4 - weekly	5 - daily
11. I have an idea about a new route between home and school (or work).	◯	◯	◯	◯	◯
12. I have ideas for a new business or product.	◯	◯	◯	◯	◯
13. I see a cloud, shadow, or similar ambiguous figure and have SEVERAL ideas about what the shape or figure could be.	◯	◯	◯	◯	◯
14. I have ideas about what I will be doing 10 years from now.	◯	◯	◯	◯	◯
15. I have trouble staying with one topic when writing letters because I think of so many things to say.	◯	◯	◯	◯	◯
16. I often see people and think about alternative interpretations of their behavior.	◯	◯	◯	◯	◯
17. When reading books or stories I have ideas of better endings.	◯	◯	◯	◯	◯
18. When reading the newspaper or a letter that someone wrote, I often have ideas for better wording.	◯	◯	◯	◯	◯
19. I hear songs and think of different or better lyrics.	◯	◯	◯	◯	◯

Occupational Identity Achievement

7 Questions.

Mark only one oval per row.

	1 - strongly disagree	2 - disagree	3 - neutral	4 - agree	5 - strongly agree
1. After many doubts and considerations, I have it clearly in my mind what my occupation will be	◯	◯	◯	◯	◯
2. After analyzing many possible occupational options, I believe I have decided on a specific career	◯	◯	◯	◯	◯
3. After asking a lot of people and finding information, I am sure of what I want and I will not be comfortable until I reach that occupation	◯	◯	◯	◯	◯
4. I am committed to my vocation and I wouldn't easily change it, since it took me so much effort to make up my mind	◯	◯	◯	◯	◯
5. It was hard for me to decide on a career, but now, when I look at myself I think that I will fit the profession I've chosen	◯	◯	◯	◯	◯
6. Some time ago I went through a crisis of decision, but now I can say that I have a clear goal regarding my future occupation	◯	◯	◯	◯	◯
7. I have gone through a lot of struggle to decide what my career will be, but that is not a problem anymore	◯	◯	◯	◯	◯

Instructor Name	If you do not see your instructor's name below, please write their Last Name in the "Other" option.

9. Which instructor administered this survey to you?

Mark only one oval.

○ Ayee, Alberta A.

○ Beukelman, Matea K.

○ Bromley, Jodi M.

○ Caldwell, Alma V.

○ Ciampoli, Lauren E.

○ Clarkson, Everett C.

○ Cox, Mark S.

○ Fotinos, Anthony C.

○ Francis, Joy L.

○ Gaston, Robert

○ Happer, Michelle L.

○ Haskell, Stephanie L.

○ Hurst, Keisha D.

○ Jackson, Danielle C.

○ Jennings, Victoria

○ Madia, Sherrie A.

○ Matzke-Fawcett, Amy E.

○ Mcgee, Sandra E.

○ Merrill, Julia A.

○ Nolen, Crystal M.

○ Payne, Kimberly J.

○ Pierceall, Clarissa A.

○ Pruden, Bernard F.

○ Pyecha, Adam J.

○ Robotham, Thomas J.

○ Rowe, Jane B.

○ Smith, Takedra S.

○ Velasco, Meredith T.

○ Watts, Kristi A.

○ White, Claudette M.

○ Wilson, Sara

○ Wrotten, Amanda D.

○ Other: _____

Appendix E: Low to High Individual Total IB and OIA Scores & Statistics

Low Total Indiv. IB Scores (19-44)	Low-Medium Total Indiv. IB Scores (45-52)	Medium Total Indiv. IB Scores (53-60)	Medium-High Total Indiv. IB Scores (61-69)	High Total Indiv. IB Scores (70-95)	Low Total Indiv. OIA Scores (7-12)	Low-Medium Total Indiv. OIA Scores (13-18)	Medium Total Indiv. OIA Scores (19-24)	Medium-High Total Indiv. OIA Scores (25-29)	High Total Indiv. OIA Scores (30-35)
40	45	59	62	70	10	18	21	26	34
38	50	58	65	85	7	16	24	28	31
43	46	60	65	71	7	18	24	28	30
43	49	57	63	71	10	17	20	25	35
36	48	59	61	74	7	14	23	29	30
44	49	58	63	72	12	17	19	26	35
39	47	53	68	83	8	14	19	26	33
42	48	53	63	78		16	20	27	35
39	46	54	63	74	7	16	23	25	34
43	51	55	66	70	12	18	24	25	35
41	50	54	62	77	61	16	21	29	35
	50	55	68	79	8.714285714	14	22	27	35
36	52	53	63	73	7 Total	18	23	27	30
44	45	58	64	72		18	19	26	34
448	52	57	65	72		14	22	27	30
40.72727273	49	57	64	71		13	23	26	35
11 Total	50	59	62	91		17	21	25	33
	48	60	62	76		18	22	25	32
	51	58	64	72		15	21	27	32
	50	54	65	73		15	22	27	31
	46	54	66	78		16	23	29	31
	46	58	64	74			20	26	30
	52	53	68	75		13	21	28	
	46	55	63	75		18	20	26	30
	47	59	62	71		338	22	28	35
	47	57	61	73		16.0952381	22	27	720
	50	57	67	72		21 Total	22	22	32.72727273
	47	59	64	74			23	27	22 Total
		56	68	76			22	29	
	45	55	62	70			23	28	
	52	58	61	71			22	29	
	1357	58	67	80			22	28	
	48.46428571	53	61	71			19	25	
	28 Total	55	64				21	29	
		57	68	70			22	29	
		54	61	91			23	26	
		57	67	2464			21	28	
		55	68	74.66666667			22	27	
		53	67	33 Total			19	29	
		54	65				22	28	
		56	61				22	29	
		58	65				24	28	
		57	63				21	26	
		53	62				19	26	
		57	61				23	25	
			62				23	29	
		53	69				20	28	
		60	62				19	29	
		2529	63				21	27	
		56.2					21	27	
		45 Total	61				22	29	
			69				23	29	
			3140				24	25	
			64.08163265				22		
			49 Total				19	25	
							24	29	
							24	1441	
							21	27.18867925	
							21	53 Total	
							23		
							23		
							23		
							21		
							19		
							24		
							1367		
							21.6984127		
				n = 166			63 Total		n = 166

Appendix F: STEM & non-STEM Majors

STEM & non-STEM Majors

Major	STEM (x)	non-STEM (x)	*n* = 136
Accounting		x	STEM = 57
Actuarial Mathematics	x		non-STEM = 79
African American & African Studies		x	
Applied Language Studies (English)		x	
Applied Mathematics	x		
Art Education		x	
Art History		x	
Asian Studies		x	
Biochemistry	x		
Biological Oceanography (Ocean & Earth Science)	x		
Biology	x		
Biology, Secondary Education	x		
Business Analytics	x		
Chemical Oceanography (Ocean & Earth Science)	x		
Chemistry	x		
Chemistry, Teaching Licensure	x		
Civil Engineering	x		
Civil Engineering Technology	x		
Communication		x	
Computer Engineering	x		
Computer Science	x		
Computer Science, Teaching Licensure	x		
Creative Writing (English)		x	
Criminal Justice		x	
Cyber Operations	x		
Cybercrime (Interdisciplinary Studies)	x		
Cybersecurity	x		
Cytotechnology (Health Sciences)	x		
Dance (Theatre & Dance)		x	
Dance Education (Theatre & Dance)		x	
Database Administration (Information Systems & Technology)	x		
Dental Hygiene	x		
Dental Hygiene, Post-Licensure	x		
Digital Marketing (Marketing)	x		
E-Business & E-Commerce (Information Systems & Technology)	x		
Early Childhood Education		x	
Earth Science Education (Ocean & Earth Science)	x		
Economics	x		
Electrical Engineering	x		
Electrical Engineering Technology	x		
Elementary Education		x	

STEM & non-STEM Majors

	STEM	non-STEM	
Mechanical Engineering	x		
Mechanical Engineering Technology	x		
Medical Laboratory Science	x		
Medical Laboratory Science, Post-Certification	x		
Modeling & Simulation Engineering	x		
Music		x	
Music-Emphasis in Sound Recording Technology		x	
Music Composition		x	
Music Education		x	
Music Performance		x	
Network Engineering (Information Systems & Technology)	x		
Nuclear Medicine Technology	x		
Nursing, Concurrent Program	x		
Nursing, Post-licensure	x		
Nursing, Pre-licensure	x		
Painting & Drawing (Fine Arts)		x	
Park & Recreation Management (Park, Recreation & Tourism Studies)		x	
Personal Financial Planning (Finance)		x	
Philosophy		x	
Photography & Print Media (Fine Arts)		x	
Physical Education, Teaching Licensure		x	
Physical Oceanography (Ocean & Earth Science)	x		
Physics, Dual Degree in Physics & Electrical Engineering	x		
Physics, Professional	x		
Physics, Research	x		
Physics, Teaching Licensure	x		
Political & Legal Studies (Philosophy)		x	
Political Science		x	
Professional Communication (Communication)		x	
Professional Sales (Marketing)		x	
Professional Writing (Interdisciplinary Studies)		x	
Psychology		x	
Public Health	x		
Real Estate		x	
Recreational Therapy (Park, Recreation & Tourism Studies)		x	
Religious Studies (Philosophy)		x	
Risk Management & Insurance (Finance)		x	
Sociology		x	
Spanish (World Languages & Cultures)		x	
Spanish with Teaching Licensure (World Languages & Cultures)		x	
Special Education, Adapted Curriculum K-12		x	

STEM & non-STEM Majors

Major			
English		x	
English with Teaching Licensure		x	
Enterprise Cybersecurity (Information Systems & Technology)	x		
Environmental Health	x		
Environmental Science (Ocean & Earth Science)	x		
Exercise Science (Physical Education)		x	
Fashion Merchandising (Occupational & Technical Studies)		x	
Finance		x	
Fine Arts		x	
French (World Languages & Cultures)		x	
French with Teaching Licensure (World Languages & Cultures)		x	
Game Studies & Design	x		
Geographic Information Systems (Geography)	x		
Geography	x		
Geology (Ocean & Earth Science)	x		
German (World Languages & Cultures)		x	
German with Teaching Licensure (World Languages & Cultures)		x	
Graphic Design (Fine Arts)		x	
Health Services Administration		x	
History		x	
History with Licensure in History/Social Sciences		x	
Human Services		x	
Individualized Integrative Studies (Interdisciplinary Studies)		x	
Industrial Technology (Occupational & Technical Studies)	x		
Information Systems & Technology	x		
International Business, East Asia		x	
International Business, Europe		x	
International Business, Latin America		x	
International Studies		x	
Journalism (English)		x	
Leadership (Interdisciplinary Studies)		x	
Literature (English)		x	
Management		x	
Marine Biology (Biology)	x		
Marine Science Technology (Ocean & Earth Science)	x		
Maritime & Supply Chain Management		x	
Marketing		x	
Marketing Analytics & Research (Marketing)		x	
Marketing Education (Career & Technical Education)		x	
Mathematics, Big Data Analytics	x		
Mathematics, Statistics/Biostatistics	x		

Special Education, General Curriculum K-12		x	
Speech-Language Pathology & Audiology		x	
Sport Management		x	
Strategic Communication (Communication)		x	
Studio Art		x	
Technical Writing (English)		x	
Technology Education (Career & Technical Education)		x	
Theatre (Theatre & Dance)		x	
Three-Dimensional Media & Material Studies (Fine Arts)		x	
Tourism & Hospitality Management (Park, Recreation & Tourism Studies)		x	
Training Specialist (Occupational & Technical Studies)		x	
Women's Studies		x	
World Cultural Studies		x	
		(U.S. Bureau of Labor Statistics, 2019)	

Appendix G: IRB Approval

DATE: September 23, 2022

TO: Michael Kosloski, PhD
FROM: Old Dominion University Education Human Subjects Review Committee

PROJECT TITLE: [1956665-1] DETERMINING THE DEGREE TO WHICH IDEATIONAL
                     BEHAVIOR PREDICTS OCCUPATIONAL IDENTITY ACHIEVEMENT IN
                     EMERGING ADULT COLLEGE STUDENTS PRECEDING ENTRY INTO IN
                     THE FOURTH INDUSTRIAL REVOLUTION

REFERENCE #:
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE:

REVIEW CATEGORY: Exemption category #2

Thank you for your submission of New Project materials for this project. The Old Dominion University Education Human Subjects Review Committee has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact John Baaki at (757) 683-5491 or jbaaki@odu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Old Dominion University Education Human Subjects Review Committee's records.

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VITA

Carrington M. Faulk, Ed.S.
ASCD Emerging Leader, 2020

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Experience:

Marketing Teacher
Heritage High School
Newport News, VA
December 2015-present

DECA Advisor - Lead
Heritage High School
Newport News, VA
December 2016-present

Marketing Department Lead
Heritage High School
Newport News, VA
September 2016 - present

Google for Education Certified Trainer
Google for Education
June 2017-present

Courses Taught:

- Marketing
- Sports & Entertainment Marketing
- Fashion Marketing
- Entrepreneurship
- Economics & Personal Finance
- Digital Applications
- Principles of Business & Marketing

Licensure:

- VA Postgraduate Professional Licence, (effective 2020 - 2030)
  - Admin & Supervision: Pre K-12
  - Business & Information Technology Education
  - Marketing Education
- DC Administrative Services Credential, 2021

Certifications:

- Adobe Creative Educator - Level 1-3, 2020 - present
- Google for Education Certified Trainer, 2017 - present
- Google for Education Certified Educator - Level 1 & 2, 2016 - present
- W!SE (Working in Support of Education) Financial Literacy, 2016
- Praxis II - Marketing Education, Business & Information Technology, 2015
- Praxis, 2014
- Virginia Communication and Literacy Assessment (VCLA), 2014
- Microsoft Office Specialist, Word, 2013

Education:

Old Dominion University
Ph.D., Education - Occupational & Technical Studies, 2023 (anticipated)

Old Dominion University
Ed.S., Educational Leadership, 2019

Virginia Commonwealth University - VCU Brandcenter
M.S., Mass Communications - Strategy, 2011

James Madison University
B.S., Studio Art, 2007

Organizations:

- ASCD - Association for Supervision and Curriculum Development
  - ASCD Emerging Leader, 2020
- ACTE - Association for Career and Technical Education
  - IAED (Inclusion, Access, Equity, & Diversity) Mentorship Program, 2020-2021
- ACTER - Association for Career and Technical Education Research
  - ACTER Virtual Conference, Session Host, 2020
- Alpha Phi Alpha Fraternity, Inc.
  - Historian, Zeta Lambda Chapter, 2019-2021
  - Recording Secretary, Zeta Lambda Chapter, 2017-2019

Professional Development Leadership:

- Presenter: "From Problem to Possibility: 10 Questions for Creative Educational Leaders" (Blended Learning Conference, Virtual Virginia), 2023
- Presenter: "From Problem to Possibility: 10 Questions for Creative Educational Leaders" (ASCD Leadership Summit), 2022
- Presenter: "Increasing Student Engagement: 10 Questions for Creative Educators & Leaders" (iNNovate, NNPS), 2022
- Presenter: "From Problem to Possibility: 10 Questions for Creative Educational Leaders" (ACTE CareerTech VISION), 2021
- Presenter: "Google Meet: Pre-Masterclass" (National ACTE - Educators In Action), 2020
- Presenter: "Mobile Meeting Masterclass" - Google Meet & Calendar (iNNovate, NNPS), 2018
- Presenter: "Google Permissions & Automated Grading with Flubaroo" (Heritage HS), 2017

Curriculum & Instruction Leadership:

- Marketing & Advanced Marketing Curriculum Writing Committee memeber (NNPS-CTE), 2022
- Advanced Entrepreneurship Curriculum Writing Committee member (NNPS-CTE), 2019
- Entrepreneurship Curriculum Writing Committee member (NNPS-CTE), 2018
- Sports & Entertainment Marketing Curriculum Writing Committee member (NNPS-CTE), 2016

Honors:

- Virginia DECA - State Leadership Conference, Annual Report Fortune 500 Award, 2023
- Adobe for Education - "Teacher Feature" (Instagram), 2022
- Virginia DECA, Outstanding DECA Advisor, 2021
- Virginia DECA - State Leadership Conference, Annual Report Fortune 500 Award, 2021
- ASCD Emerging Leader, 2020
- ACTE - IAED (Inclusion, Access, Equity, & Diversity) Mentorship Program, 2020-2021
- ACTE Region II Leadership Conference - First Time Attendee Award, 2019 - 2021

Skills:

- Adobe Creative Suite - graphic design
- AVID Pro-Tools - sound design
- Coding - website design
- Final Cut Pro X - video editing
- Public Speaking - professional development
- Curriculum Writing & Development