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Multicase Historic Studies of Innovative Work Behavior Among Intellectually Gifted Adults

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Walden University

2019

Abstract

Multicase Historic Studies of Innovative Behavior amongst Intellectually Gifted Adults

by

Karen D. Gaskins

MS, Walden University, 2009

BS, University of Maryland University College, 2000

ASN, Prince George's Community College, 1978

Proposal Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Organizational Psychology

Walden University

August 2019

Abstract

This qualitative research study was conducted to examine whether investing in innovation and gifted adults would improve America's economic well-being. The investment puzzle became a problem because prior educational researchers researched innovation as creativity rather than productive behavior. Moreover, adult giftedness was researched as negative development rather than alternate normative behavior. The purpose of this research study was to generate new knowledge about innovation and intellectually gifted adults. Wics (wisdom, intelligence, creativity, synthesized) theory of intelligence provided the theoretical framework because intelligence was a measure of human productivity potential. The neuropsychological conceptual framework facilitated a cognitive map of the innovation process. While the multicase historic research design provided answers to the research questions. Four real life historic events embedded with innovation activity utilized comparative methodology to mark patterns. Raw data gleaned from archival/historic research was analyzed using content analysis of primary resources. The key results were as follows: (a) the innovation process is a psychological tool which transcends creativity; (b) empathy, intellectual complexity, and moral intelligence was linked to wisdom; and (c) transcendent experiences were intrinsic motivators to go beyond expected production levels. Results from this study was useful for I/O psychologists because high intellectual ability talent can increase organizational productivity and develop employment opportunities. The positive social change implications were business administration will change by redirecting business strategies to organizational relationships, and training and development.

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Dedication

This complete dissertation study is dedicated to the Gaskins and Hill families, my son, Eddie R. Williams Jr. (he has learning disabilities), and his attendant, Dot. As I developed this research study, I realized it was a rare opportunity to be able to give back to society. I used to wonder why so many individuals were so critical of what I was doing. I know now, why they were critical. They didn't believe in the betterment of society. They thought pursuing advance education was a 'prize' or winning the lottery rather than hard work and continuous illumination. Pursuing advance education was for myself a means of getting closer to God.

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Table of Contents

List of Tables

Chapter 1: Introduction to the Study

Introduction

Productive systems within a business organization exist to provide for consumer needs and demands in the form of products and services. The products and services often come in many forms. For example, new ideas, cures for diseases, useful devices or tools. In addition, the development of services and new products can create employment opportunities for workers (Chrysikou, 2012; Rotman, 2013). Inside business organizations, there are many types and forms of productive systems. Productive systems can be machine based, human based or a combination of both. This research study's emphasis was on human factors involved in innovation activities such as human productive systems, human productive behavior known as innovative behavior (IB) and innovation technology resulting from innovation activities. Productive systems and productive behavior are important because workers earn income with their productive behavior and with what they are able to produce. Consequently, organizational productivity is how organizations accumulate wealth and profits to stay competitive in the global marketplace.

Innovation was the topic of this study and is being operationally defined as human productive behavior in organizational context (Friedman, 2012). Unfortunately, innovation is productive behavior society knows little about. However, innovation activities and work are often carried out in social interaction within organizations (Hulin, 2014). The commercialization of innovations are often the cause of social progress and

rapid, radical change. Take for example, Edison's invention of the light bulb and the commercialization of electricity. The light bulb not only replaced gas-lighting and the gas-lighter's job but radically changed the way society perceived time. Human beings gained more time by controlling light.

Need for the Study

The purpose of this research study was to develop a comprehensive scientific description of innovation activities and IB. For the 21st century workplace, innovation has become a preferred skill but no one actually understands what innovation is. Innovation remains a mystery because innovation is rarely researched, and theoretically limited (Drucker, 2010; Harrington & Voilleque, 2011). Some confusion about the term originates from educational research, the social media, and the performing arts (Williams, Runco & Berlow, 2016). In these fields, innovation and creativity are used interchangeably, which was contrary to what psychological scientists have done in the past. Moreover, psychological scientists view innovation and creativity as independent processes (Williams, et al, 2016).

To complicate the matter further, the skill is strongly linked to profound giftedness (Shavinina, 2003). Hence, adult giftedness was another rarely researched topic in the literature. Unfortunately, teachers and society tend to correlate childhood giftedness with adult intelligence and label profoundly intelligent adults 'crazy' (Streznewski, 2013).What was known about innovation was in the context of the environment, business organizations, and management objectives (Smith, Courvisanos,

Tuck & McEachern, 2011).What was needed to understand innovation was more information and facts about the individual worker and other human factors involved in innovation activities.

Potential Social Implications

The positive social change implications of this study was for the professional practice of I/O psychology. The social change agenda will refocus I/O psychology to social relations in the workplace, and training and development of employees, especially high intellectual ability talent. This means advocating for giftedness and giving the intellectually gifted adult a 'voice' in organizations and organizational politics. Rather than viewing high ability talent as socially 'flawed' or 'crazy', organizational leaders will value high ability talent for their productive abilities and their potential for endless possibilities. Innovation is the direct result of the gifted adult's subjective capability to imagine an alternate reality. Finally, I/O psychologists will lead human development initiatives by designing and installing evidence based transformational learning systems in business organizations to stimulate and to sustain innovation activities.

Chapter Preview

Chapter one, defined the perimeters and goals of this dissertation research study which was to find answers to the investment puzzle about innovation. The chapter opened with a brief but informative introduction of the topic of interest: innovation. The next section, the background, provided the basis for conducting the research study. Next, the problem statement, and the purpose of the study. Next, the conceptual framework in

reference to the theoretical model (Sternberg, 2003) wics theory of intelligence (see details in chapter two). The chapter ended with a summary of the chapter and transitions to chapter two, the synthesized literature review.

Background of the Study

Introduction

Innovation matters because innovation is a preferred 21st century skill but no one really knows what the skill is and what innovation entails. It is a growing concern among economists, business leadership and politicians because of global effects and global economics (Chrysikou, 2012). New ideas and approaches are needed to resolve economic, workplace, and social problems. Globalization is about how people communicate to impact the world and economic development (Merriam-Webster, 2007). Since the internet has made the world a smaller place especially concerning the global marketplace, supply and demand has become more complex. While wars, violent conflict and environmental disasters continue to fuel inflation and drive currencies towards worthlessness (Goldstein, 2003). Three critical aspects of globalization was central to problem-solving and adaptation: (a) business administration; (b) management; and (c) international trade. Although it may go unnoticed by world leadership, international trade is an opportunity for commerce to become a vehicle for peace and economic homeostasis (Anderson, 2013; Austin, 1966, Damasio & Damasio, 2011; Gaskins, 2016, Reber-Rider, 2008).

It is important to the potential applications of any findings about innovation to remember this: innovation and creativity are not synonymous terms or processes. In the past, psychological scientists have viewed creativity as a small aspect of the cognitive innovation process (Fan, et al, 2016; Williams, Runco & Berlow, 2016). Therefore, the researchers and research studies having the greatest impact on the foundational concepts and design of this research study were as follows:

- Fortunato and Furey (2009) research work regarding thinking and mental time travel.

- Krone (2012) research work with mental rotation.

- Kirton (2006) research work with decision-making and conflict resolution.

- Pinker (1997) research work with human nature and evolutionary principles and concepts such as adaptation and problem-solving.

- Shavinina (2003) research studies on giftedness, gifted adults, and innovation.

- Sternberg (2003; 2009) research work about intelligence, productivity, innovation, and cognitive neuroscience.

- Vandervert's theory (2003) of the psychological innovation process.

- Weisberg (2006) research work comparing creativity and innovation in all forms.

This research study differs from previous research in focus: the human being at work and other human factors such as behavior, attitudes and motivations. Therefore,

another research objective was to explore the mediating role of psychological empowerment and psychological contracts involved in innovation activity in organizational context (Afsar, Badir & Saeed, 2014).

Innovation Research Literature

The literature about innovation research was sparse, multifaceted and interdisciplinary. Research approaches were diverse and varied. The greater part of the literature was qualitative in nature and grossly outdated. This was the primary rationale for conducting a meta-synthesis of the literature rather than conducting a traditional literature review. The research on innovation and gifted intelligence was most likely dropped during the behavioral revolution (1950 to 1990) in psychology. The behavioral revolution focused on behavior rather than the contents of mind and is a possible explanation for the scarcity of the literature on innovation, a mental process. Some studies utilized archival research, MRI studies, interviews, observation studies and surveys with assessment tests.

Human factors research was limited in scope to cognitive neuroscience, social psychology, personality studies and developmental psychology. When innovation was conceptualized as purely creative behavior, the conception 'creativity' presented many problems with applications and transferability to the workplace and ultimately business organizations unless the organization was a theater. Further, an individual cannot sing or dance new products or services into existence, increase productivity, or create employment opportunities. Although the research on gifted adults was sparse, the

majority of the material linked the capabilities and skills of the gifted adult to innovation and innovation technology (Shavinina, 2003). For example, the light bulb, the airplane, cures for diseases, battle strategies, etc. Renzulli (2003); Shavinina & Seeratan, (2003); Shavinina, (2003, 2004, 2013) linked gifted intelligence and general intelligence with innovation and IB.

Intelligence was the featured variable of Sternberg (2003) wics theory of intelligence which became the matrix variable of this study. This is because intelligence was a measure for job performance, understanding individual differences, and measuring human productivity potential (Anatasi & Urbina, 1997; Santrock, 2009). Sternberg & Hedlung (2002), linked increased productivity with job tenure and experience. Job tenure can be translated as expert knowledge and linked to the variable, wisdom. Evolutionary research approaches and theories linked innovation to problem-solving and adaptive behavior. Additionally, most of the literature made the point, IB was the outcome of STEM (science, technology, engineering and mathematics) based knowledge and gradual, deliberate intellectual development.

Some of the research literature examined thinking style and linked innovation with divergent thinking (DT). For example, Kirton (2006) utilized the concepts of DT to develop his adaptation-innovation (A-1) theory to reduce conflicts and build teams in an organizational context. As a matter of fact, Kirton (2006) used an unusual research approach to study innovation. He used quasi-experimental methods by analyzing battles and battle strategies to explain the impact of DT on decision making. In management

school, perspective managers study battle strategies to understand how to develop and plan business strategies. In OB literature, innovation was researched as voluntary prosocial behavior (Jex & Britt, 2008). However, innovation as voluntary behavior was not conducive to the purpose and goals of this research study. Finally, the distinguishing feature of innovation was a 'definitive purpose' (Weisberg, 2006). Therefore, more than creativity, innovation and IB had a definitive purpose or goal.

The literature on wisdom was sparse but broad. In general, wisdom was linked to sound decision making, to finding right answers to life's questions, and to the ability to give good advice (VandenBos, 2007). In a series of experiments using vignettes, intelligence and wisdom were linked and viewed as expert knowledge (Smith & Baltes, n.d.; Smith, et al.; Staudinger, 1988) (cited in Sternberg, 1995). When wisdom was linked to transcendence and mystical experiences, wisdom was the result of the remaking of the character which shaped a new form of consciousness (Underwood, 2001). Further, Baltes (n.d.) emphasized the role of knowledge and life experience in achieving wisdom. While Sternberg (2003) balance theory of wisdom emphasized the importance of intelligence in balancing conflicting interests and working towards a common good.

On the other hand, Hall (2010) posited there were several pillars or foundations to wisdom. Among these 'pillars' were such variables as humility, compassion, emotional intelligence, moral reasoning and dealing with ambiguity. In the literature, these variables were linked to adult gifted intelligence as well. In Hebrew, the word for wisdom was 'chokhmah' which means heart and mind. Therefore, wisdom was

perceived as expert knowledge influenced by the heart and mind. The philosophers, Bacon, Locke, and Hume perceived wisdom as the authority of personal experience. From a Christian point of view, the fear of God was considered the beginning of wisdom. Therefore, wisdom has a spiritual and religious component. Socrates (n.d.) thought of wisdom as coupled with the cardinal virtues which transcended the cognitive. Aristotle (n.d.) believed wisdom revealed the character of a person. A comprehensive summary of wisdom literature was wisdom was perceived as a different kind of intelligence which is linked to learning, lived experiences, job tenure or experience gleaned from work. Wisdom was positively associated with aging but it was not necessary to possess a high IQ to be wise. Some perceptions of wisdom, implied the variable was linked to profound gifted adult intelligence (IQ of 170 upwards).

From a technical and psychological perspective creativity was a general term referring to the several mental neural networks dealing with the ability to produce or develop original work or thoughts (VandenBos, 2007; Reber, Allen, Reber, 2009). In the literature, creativity was linked to the creative imagination, creative thinking, DT style, and creative intelligence. DT style was linked to the association of ideas and the lower executive functions (Williams, et al., 2016). The former terms were descriptive of the mental processes involved in the creative process but does not explain or describe human productive behavior or innovation. For example, innovation is not the creative imagination and physical labor is not creativity.

The creative imagination is a mental module in which blue prints for new ideas are 'written' (VandenBos). Furthermore, the neural networks of the creative imagination are sometimes explained as the unconscious and conscious coming together (VandenBos). Therefore, creativity is only part of the innovation process but not innovation. Additionally, perceiving creativity as the same as innovation does not explain human productive behavior in the workplace, or the essence of innovation activity.

Innovation Literature Gap

The literature gap was addressed by conducting a meta-synthesis literature review because it facilitated understanding what was known about innovation and what remains to be known about innovation. Further, prior training in cognitive neuroscience concepts were utilized to provide stronger arguments for human factors research in innovation. In addition, neuroscientific concepts and principles linked innovation to the mind/body process. This made it possible to place the human being in a work or organizational situation or circumstance. In conclusion, the largely unconscious innovation process needs to be explained to be able to tap into the productive potential of high intellectual ability talent and ultimately, the intellectually gifted adult.

Statement of the Research Problem

Currently, the economy is in an information age which is supported by a knowledge economy. For the 21st century workplace, employers seek prospective employees with three preferred skills: (a) innovation capabilities; (b) knowledge of how to gather and organize pertinent information; and (c) understand how knowledge and

ideas can be applied to develop new products and services that add value and increase organizational productivity. As a result, globalization, the internet, global economics, and electronic technology has changed the management of international and the way business is administered. Consequently, businesses are experiencing high national productivity outputs but decreasing employment opportunities (Rotman, 2013). There is a problem in industry and business administration because despite the increased productivity, employment opportunities are decreasing. Furthermore, there is a growing validated concern about robotics replacing human labor in many industries. The problem has negatively impacted the individual organizational worker because employers believe robotics and electronics are cost-effective and safe. However, as a result innovation is reduced or disappears because robotics nor electronics can develop employment opportunities.

A possible cause of the problem has to do with determining whether America's economic well-being means investing in robotics and equipment or innovation and human development. Currently, economists and politicians are divided in finding a solution to the investment problem. For example, some economists believe investing in robotics, machinery to enhance the proficiencies of organizational productivity is the answer (Leubsdorf, 2016). However, the problem with the previous solution is this: (a) national productivity outputs are measured by organizational outputs. Individual or team productivity or innovation activities are not included in the measurements; (b) the unspoken and underlying implication is that all labor is physical and this is not truth; (c)

employment opportunities are decreased and so is knowledge; and (d) depending on what worked in the past to replicate the conditions of the industrial revolution. On the other hand, other economists believe innovation will decrease unemployment and increase industrial growth (Leubsdorf). However, business industries do not encourage innovation because no one really knows what innovation looks like in an organizational situation. Perhaps, the biggest obstacle is how to make the change over to an innovation orientated organization and to convince top management the change is profitable to sustainability and organizational growth.

Unfortunately, there was little evidence in the literature to support either solution to the investment problem. The problem was complex because productivity, innovation and technological change is interrelated (Field, 2008). Besides the former insight, knowledge creation is possible without technology (Field). Similarly, change is imminent because economists and politicians are demanding more multifaceted and interdisciplinary approaches to globalization effects. However, no one knows the long term effects of innovation activities on global economics because of theoretically limited ideas about innovation and innovation is vastly misunderstood as a human productive system (Drucker, 2010; Kirton, 2006; Omidi & Khoshtinat, 2006; Zhang & Zhou, 2016). VanGundy (1968; 2006), an organizational researcher asserted, "An understanding of innovation is needed to clarify its use in the literature (in Kirton, 2006). Additionally, Smith, et al. (2011), asserted after conducting an investigation into innovation, "There exists a need for understanding the human factors connected with innovation activities".

Perhaps a study which builds on previous literature which investigates innovative behavior (IB) in various organizational situations by qualitative multicase historic research study utilizing comparative methodology could provide insights to resolve the investment issue, answer the research questions, and provide a means of developing a thick rich description of innovation, IB, and the innovation process.

Purpose of the Study

The purpose of this multicase historic research study was to describe innovation and IB for gifted adults in various organizational settings. The goal was accomplished by making constant and consistent comparisons between four real-life historical events featuring different types of IB. Using replication logic, a historic-comparative (H/C) analysis facilitated the discovery of several behavioral patterns linking to the cognitive innovation process. This research study facilitated the developmental foundation of evidence based knowledge of innovation by answering the research questions. IB is referred to as the introduction and applications of new ideas, processes, and procedures to work roles and tasks, work units and organizations.

Research Questions

RQ1: How is the cognitive innovation process initiated in the mind of innovation technologists to influence IB?

RQ2: What does IB look like on a typical day in a typical workplace situation?

RQ3: How do gifted adults feel about their innovative capabilities?

(a) Are they consciously aware of the process and the skills?

(b) Is the process unconscious?

RQ4: How do transformational leaders recognize and inspire the use of IB in organizational settings?

(a) Is transformational leadership a form of innovation technology?

RQ5: What kinds of innovative behaviors do transformational leaders use to instill trust and loyalty in their followers?

(a) What is the nature of their psychological contracts with their followers?

Conceptual Framework

The key phenomenon of this research study was innovation, IB and the innovation process. Conversely, there were three critical psychological concepts underlying the basic framework of this study: (a) theories of the mind; (b) consciousness; and (c) the mind/body relationship and resulting underlying processes. This is because the primary analysis was based on the conceptual framework: the mind, the mind/body process, and planned movement. Innovation is a general term for productive behavior in organizational context. While IB, planned movement, is overt and can be assessed, observed, measured, and predicted (Baucum, 2006; Santock, 2009). The mind is where the totality of mental processes resides. For this study, the mind is an explanatory tool for psychological data (Reber, Allen & Reber, 2009). Mind is where the conscious and unconscious mental experiences of the human being resides. Consciousness is a state of awareness where the components and the elements of the mind are made available through introspection techniques and other research tools (Reber, et al., 2009).

Consciousness contains the sensations, perceptions, and memories of the human being (Loring, 1999; Sternberg, 2009). The mind/body process is a classic metaphysical problem concerning the relationship between the mental and the physical aspects of the human being. As of this writing, neuroscientists are still trying to explain consciousness.

The primary theories that justified the conceptual framework were: (a) transcendent mind which was linked to the variable wisdom; (b) phenomenology which is a means of exploring the subjective thoughts of others; (c) psychophysics and psychophysiology were approaches to the mind/body process; (d) behaviorist assumptions; (e) evolutionary theories which explored human nature; (g) quantum mind explored the possibilities of human thought; and (h) social constructionism is a philosophical approach to work and labor from a social interaction perspective.

Transcendent mind is a theory of mind about the property of the mind. Instead of assuming mind and consciousness is bounded to the body, mind is perceived as extended and not bound to the body (Clark & Chalmers, 1989). The extended mind concept was useful for linking social interactions, circumstances, and the environment to IB. Psychophysics was a theory emphasizing the relationship between concisely controlled stimuli and prearranged behavioral responses (Baruss & Mossbridge, 2017). For example, the smell of food cooking makes an individual hungry. Psychophysiological approaches facilitated the link of physiological measures and data to human subjective experiences (Baruss & Mossbridge). In addition, psychophysiological approaches examined the close relationship between the brain and the mind utilizing cognitive based

theories such as Sternberg (2003) wics theory of intelligence. The approach also linked

the survival instincts to problem solving and adaptive behavior (Kirton, 2006; Pinker,

1997). Quantum mind theory is the perception consciousness creates mind and matter

(Baruss & Mossbridge). The hypothetical concept may sound unusual but it an updated

theoretical argument for the existence of God and intelligent design. It is an extension of

Aristotle's logical basis for intelligence: human intelligence replicates a master mind of

intelligence. Therefore, the theory of quantum mind has a faith and spiritual basis. Gifted

adults may take the capability to innovate beyond survival impulses as self-expression of

their giftedness (Gaskins, 2016; Streznewski, 2013).

In conclusion, spirituality and faith has deep roots in society and their collective

unconscious beliefs. Faith and spirituality is not always bad and faith and spirituality is

not religion. Even atheists have faith and spirituality. What truly matters is how

individuals are treated and that their natural rights are respected. From this perspective,

spirituality and faith can become part of the workplace as a motivator and as a means to

preserve unity.

Nature of the Study

The nature of this research study was multi-faceted, complex, and clinical. It was

multi-faceted because scientific facts from several social science disciplines were used to

develop a broad but comprehensive picture of IB. It was complex because of the

integrative use of cognitive neuroscience, developmental psychology, I/O psychology,

OB, and Sternberg (2003) cognitive based theoretical framework. The study was clinical

because the phenomena of interest, innovation was linked to the mind and body, human behavior, and ultimately the human being. Therefore, it was unethical and immoral to manipulate, deceive, dominate, or influence human behavior, choice, or obscure their free-will (American Psychological Association [APA], 2010). The research scientist and psychologists are to do no harm.

Theories of mind in regards to this study were grossly simplified. The processes of the mind and body are extremely complex and varied than described in the literature review (see chapter two). For example, confounding variables such as behavioral variation, and human differences were not explored. There were some loss of vital facts through the translation of technical vocabulary across several hard science (e.g., physics and physiology) and several social science domains (e.g. social psychology and clinical psychology). It is a personal belief that human participants are not always necessary to conduct a robust research study. In this circumstance, multicase historical study design was chosen to elucidate IB because: (a) facts about innovation was sparse and invalidated. Therefore, it was extremely risky to design a safe research project; and (b) it was useful for using the past to demonstrate an alternate future (Wyche, Sengers & Grinter, 2006). General principles and concepts from the past can be modified to design interventions for the present. In summing it up, multicase studies are useful for exploring events, processes, and behavior within real life settings by eliminating psychological and physical risks entirely (Creswell, 2013).

Definitions

Adult gifted intelligence: An alternate lifespan development for adult gifted individuals (Streznewski, 2013).

Brotherhood: An ethic of care, mercy, and justice that allows for professional autonomy, independence of thought, and difference (Kotleras, 2007).

Creative intelligence: Cognitive component linked with creativity, especially the ability to invent, to explore, expand, imagine and uncover (Reber, Allen & Reber, 2009).

Creative imagination: The cognitive process of re-combining past experiences and previously formed images into novel physical realities (Reber, Allen & Reber, 2009).

Divergent Thinking (DT): Cognitive process that is characterized by a multitude and range of ideas (Reber, Allen & Reber, 2009).

Giftedness: An IQ of two standard deviations above the mean or higher (statistically tested 130 or higher) obtained on individual intelligence tests (VandenBos, 2007).

Impression management: Behaviors that are designed to control how others perceive the self, especially by guiding them to attribute desirable traits to the self (VandenBos, 2007).

Innovation: A change or improvement in procedures or production introduced by an independent thinker (Friedman, 2012).

Innovative work behavior (IWB): Productive and IB which is useful for industry and economic purposes. It is also used interchangeably with productive innovative behavior (PIB) and innovative behavior (IB) [Jex & Britt, 2008].

Key expert informant or respondent: An ethnographic technique to collect data by interview about group behavior, beliefs, experiences, and related matters when participants are not accessible (Schensul, LeCompte, Trotter, Cromley & Singer, 1999).

Productive behavior: Behavior in an organizational context that facilitates organizational goals (Jex & Britt, 2008).

Assumptions of the Study

There were three critical conceptual assumptions regarding this research study. The assumptions were as follows: (a) the mind; (b) the imagination; and (c) consciousness. The three concepts were assumed to exist, although no one has seen or touched the mind, the imagination or can explain consciousness. The three concepts were critical because they influence human behavior and ultimately the study phenomena: innovation. Therefore, it was useful to view mind as containing the experiences of human beings, as a collection of processes, and characteristic of innovation technologists (Reber, Allen & Reber, 2009).

Scope of the Study

The scope of this research study was limited to discussions and topics on innovation, human productive behavior in the workplace, and the cognitive innovation process. Conversely, innovative behavior (IB) is not always recognized by management

and organizational coworkers. The specific aspects of innovation addressed in this study were: (a) the mind/body process of innovation; (b) the neural networks throughout the brain and body involved in the cognitive process; and (c) the physical behavior of innovation activities. The specific focus was chosen because innovation is human behavior processed in the brain and then realized as planned behavior. One important component of I/O psychology was learning ways of facilitating and improving behavior that is beneficial to organizations, communities, and society (Ford, Hollenbeck & Ryan, 2014). The legal and ethical practice of I/O psychology understands work from a psychological perspective and focuses on the individual worker in their organizations where they work.

Delimitations

The target population of this research study was the gifted adult who thinks to earn income and innovates in innovation orientated organizational settings as knowledge workers or innovation technologists. This study, unlike the educational and industry literature, did not perceive gifted adult workers as overgrown children with complex responsibilities. This study perceived giftedness in adults as alternate normative development. Therefore, gifted adult development, and children and adolescent development were not similar. Common sense would dictate the developmental tasks or benchmarks of children and adolescents do not transfer to the workplace or to adult skills or life tasks. For example, IB is correlated to gifted adults rather than to children or

adolescents with high IQs because it takes 30 years for the intellect to mature (Shavinina, 2003, 2004; Shavinina & Seeratan, 2003).

Observing performers and artistic presentations was not useful for this study because: (a) innovation was not being perceived as creativity; and (b) artists and performers are not known as knowledge workers or innovation technologists. It is personally believed some researchers were trying to broaden the criteria for accessing giftedness but using artistic talent as a measure for giftedness is illogical. Since creativity has nothing to do with the IQ. Every human being is creative. Further, very few human beings have high IQs. Therefore, watching artistic performances would not answer the research questions or give insight into the innovation process. Surveys or questionnaires were not useful for this study because of the general lack of knowledge about what innovation actually is.

Limitations

The limitations of this study were time and not having the finances to travel to collect data in the field. However, this dissertation was a small scale study with a large sample to demonstrate personal mastery of designing research to receive a doctoral degree in psychology. A research dissertation is generally designed to make a modest but original contribution to the literature in the researcher's discipline. In this case, I/O psychology; and to enter a community of highly trained research scientists and scholars.

Positive Social Change Agenda

The potential positive social change effects of this research study was the possibility of impacting five key areas of need. These areas of need were as follows: (a) education; (b) industry; (c) international politics; (d) local and global economics; and (e) the professional practice of I/O psychology. Additionally, the research study may likely stimulate scientific investigations into innovation, IB and the innovation process.

Chapter Summary

Chapter one introduced the topic of this research dissertation; innovation, which was referred to as human productive behavior in workplace settings. For the purpose of this study, the operational definition of innovative behavior was productive behavior that adds economic value to business organizational systems in innovation orientated organizations (Friedman, 2012). Chapter one then transitioned to chapter two, the meta-synthesis literature review.

Chapter 2: Literature Review

Introduction

The purpose of metasynthesis literature review was to define and clarify the research problem being investigated (Galvan, 2006). Other purposes of the literature review were: (a) to summarize previous investigations; (b) to identify relationships and gaps; and (c) to identify the next steps in solving the research problem (APA, 2010).

Restatement of the Research Problem

Organizational productivity is increasing but employment opportunities are decreasing. Moreover, economists and politicians are divided on a course of action to resolve the problem. Some economists believe investing in equipment will solve the problem. While other economists believe investing in innovation will resolve the problem. However, there is no evidence in the literature to support either solution to the problem or to make an effective decision about the problem.

Restatement of the Purpose of the Study

The purpose of the multicase historic research study was to describe the innovation process and IB. As of this writing, organizational researchers view IB as voluntary citizenship behavior. This may likely be the reason IB goes unrecognized by managers, stakeholders, and co-workers. This is because they do not always see the value in voluntary behavior (Jex & Britt, 2008). Besides going unrecognized, IB was not encouraged in workplace situations because it is believed to be 'creative' behavior rather than genuine work behavior (Baumgartner, 2015). However, organizational researchers

view IB as more complex than mere creative behavior (Williams, Runco & Berlow, 2016).

Literature Search Strategy

During the month of June in the year, 2013, I began to survey various databases and libraries for scholarly, peer-reviewed literature and journal articles to define and clarify the research problem. The first few searches were conducted at the University of Maryland campus in McKeldin library. Unfortunately, most of the surveyed material was grossly outdated or did not comply with cognitive approaches. The next few searches were conducted at the public libraries in the towns of Bowie and Crofton. These searches proved to be unprofitable as well. The next search was conducted on the internet and proved to be unproductive.

However, Walden University's library contained plenty of peer-reviewed journal articles on innovation, innovation technology, intelligence, gifted intelligence, economics, workplace issues, and a few journal articles on the Battle at Agincourt, Queen Elizabeth I, Marie Curie, and the Apollo 13 incident. I collected more than three thousand journal articles and about thirty books. Only one thousand articles were useful for the cognitive approach research study. All the articles were not used for the metasynthesis literature review. The majority of the articles were located in the ScienceDirect and Thoreau databases. The research studies were predominately qualitative tradition with a handful of quantitative studies. However, there was enough reference materials to write the preliminary prospective. About a year later, in the spring of 2014, the journal articles

began to duplicate but I was able to write the three chapter proposal and receive approval

to write the three chapter proposal on innovation.

Table 1

Databases Assessed at Various Sites

Walden University	Business, management, philosophy, psychology, medicine, theology, neuroscience, social science, economics, sociology.
McKeldin (University of Maryland)	Philosophy, psychology, sociology, social science, medicine.
Bowie Library	Biographies, psychology, philosophy, theology.
Crofton Library	Biographies, psychology, philosophy.
Internet	All subjects and continuous search.

Search Engines Assessed at Walden University.

Academic Search Complete, Academic Search Premier, dissertations (case

studies), dissertations & thesis (innovation, case studies and archival research), Emerald

Management Journal, ERIC, Google Scholar, Harvard Business Review, ProQuest

Central, PsycArticles, Socindex, Thoreau, ScienceDirect, Internet, and Scientific

American Mind

Key Terms Used in Search Engines.

The key terms that were used in this literature review were innovation,

productivity, creativity, wisdom, intelligence. Key terms were used in combination with

other words. For example, creative intelligence.

Current Literature Analysis

There were three critical ideas about intelligence, innovation, and IB that provided stronger support for the relevance of the research problem. The ideas were: (a) gifted intelligence contributes to economic growth; (b) innovation has a problem-solving focus; and (c) innovation activities was the cause of positive but rapid change. Several studies made the point that investing in human development and high ability intellectual talent most likely leads to innovation, increased productivity, and economic growth. A third idea was innovation activities were the cause of radical change. Moreover, rapid change was perceived as the force behind discovering new ways of adapting and discovering alternate means of employment.

Restatement of the Conceptual Framework

The conceptual framework foundational basis was cognitive neuroscience and psychophysiological concepts and theories. The psychological and physiological basis provided strong support for describing the brain-mind-body processes involved in innovation activities. Wics theory (Sternberg, 2003) provided the means to collect, gather and organize data to describe how the neural networks in the body interacted to link to overt planned movement of IB.

Chapter Preview

Chapter two was divided into two main sections: (a) the literature search strategy and (b) the metasynthesis literature review. Sternberg's (2003), wics theory of intelligence and/or adult giftedness was the theoretical framework that grounded this

study in cognitive and psychological concepts. Next, the metasynthesis literature review consisted of analyzing five variables: (a) wisdom; (b) intelligence; (c) creativity; (d) innovation; and (e) behavior. Chapter two concluded with a summary and emerging themes from the literature review. The chapter transitioned to chapter three, research design and methods.

Theoretical Foundation

The theoretical framework for this study was Sternberg (2003) cognitive based, wics theory of intelligence and gifted adult intelligence. In I/O psychology and OB literature, intelligence is a measurement of human productivity. Adult gifted intelligence was strongly correlated to IB and innovation activities (Santrock, 2009; Shavinina, 2012). Sternberg (2003) wics theory was appropriate for this study for four reasons: (a) the theory facilitated the collection of cognitive based data; (b) intelligence was a primary measure of human productive behavior; (c) adult giftedness was correlated with IB; and (d) the variables of the theory were interrelated and were useful for mapping the inner innovation process.

Sternberg, an experimental psychologist and cognitive research scientist developed wics theory (2003) to express alternate but broader conceptions and measures of intelligence. The idea of broader intellectual measures worked for this study because IB may likely be a gifted adult's expression of problem-solving and discovery (Gaskins, 2017; Streznewski, 2013). The theory facilitated access to several cognitive critical skills

of the imagination, such as mental rotation and the information-processing neural network systems involved in intelligence and information processing.

To understand the effects of creative thought, Sternberg collaborated with other researchers from a variety of disciplines and cultures. For example, using human subjects and computer simulations of creative thought, it was posited 'creative thought had two processing phases: generative and exploratory' (Sternberg, 2009). The insight was significant because the generative stage of creative thought constructs mental images in the imagination. Furthermore, the imagination collaborates with the brain's neural networks to move logic and reasoning across the mind and the nervous system (Loring, 1999).

In 2002, Sternberg collaborated with several organizational researchers to study the components of effective leadership. Dai (2003) used the theory to study adult giftedness and to explore broader concepts of giftedness. Lastly, Sternberg collaborated with Hedlung to discover a link between intelligence, age, and wisdom in regards to human performance and productivity (Sternberg & Hedlung, 2002). The finding was that 'job tenure had the greatest impact on productivity' (Sternberg & Hedlung). The five propositions of the theory (see table below) allowed the associative properties of the variables to be compared with the shared experiences of the gifted adults in the four historical events.

Table 2

The Five Propositions of Sternberg (2003) wics theory

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1. Industry and the American educational system has narrow concepts of intelligence.
2. Intelligence is a conceptual trait beyond statistics and quantitative measures.

3. Intelligence includes applications of information processing and higher cognitive functions.
4. Intelligence is linked with effective decision-making.

5. Intelligence is associated with problem-solving skills.

Four Primary Theorists

Wics theory of intelligence (Sternberg, 2003) provided the primary theoretical foundation for this research study. However, three primary theorists, Kirton, Pinker, and Shavinina contributed vital material for the conceptual framework of the study. Much like Sternberg, their theoretical approaches encouraged viewing the study phenomena in holistic and alternate ways. Second, their theoretical propositions and findings confirm, validate, and broaden the correlational links to Sternberg's (2003) wics theory, to the matrix variable, intelligence, and the participants of the study: intellectually gifted adults.

First, Kirton (2006), an operational researcher, linked DT style and problem-solving capabilities to innovation. This action provided a link to the innovation process. While Pinker, (1997) an evolutionary experimental psychologist, linked innovation with survival and adaptive behavior using the logic of evolution. Lastly, Shavinina, (2003, 2004, 2012), a developmental psychologist, linked adult gifted intelligence with

innovation technology. All of the primary theorists' correlations facilitated linking innovation with gifted adults and high ability intelligence to human productive systems, high ability intellectual capital, and other human factors related to innovation activities.

Metasynthesis Literature Review

Introduction

Psychologists are not historians but they study the past to understand what forces shape the present (Schultz & Schultz, 2004). For this research study, four historical events from the past were chosen to analyze. This was because: (a) the research on innovation or IB was scarce; (b) the clinical aspect of the featured variables; (c) following an instinctive hunch; and (d) historical events are stable because they have already occurred. Therefore, innovation activities and IB could be repeatedly observed and thoroughly analyzed utilizing comparative methodology.

The behavior is most prevalent and encouraged in life-threatening situations, especially during war and violent conflicts. This was the rationale for choosing two surreal situations to contrast with two 'ordinary' situations. I wanted to compare behavior to understand if IB was sustainable, normative behavior that could be used in daily workplace situations. Besides, it is common knowledge the survival instincts and behavior are stronger than human sexual instincts and impulses. European historical events were chosen over American historical events because European history is uncommon knowledge to myself. This choice lowered the probability of coincidence in the outcomes of research findings. The choice also eliminated the possibility of

manipulating the data for personal reasons. I was encouraged to deeply reflect and to creative discovery.

The underlying criterion of unfamiliarity assured random choice of historical events, high significance of results, high reliability, and validation of any collected data and resulting findings. In retrospect, Britons and Europeans live in a profoundly different world from Americans (Paxton, 1997). Europeans are more aware of their history, and are eager to learn from the past (Paxton). Additionally, Europe's past is readily available as descriptions in letters, diaries, paintings, photographs, and other official and authentic accounts (Schultz & Schultz, 2004).

Study Phenomena: Innovation

Introduction

The operational definition of innovation was defined as employee productive behavior that adds value to organizational productive systems. The value is in the form of products and services and improving inventions (inventions are not innovations) for commercial use (Friedman, 2012; Gaskins, 2019; Jex & Britt, 2008; Robbins & Judge, 2007). The origin of the term innovation derives from the Latin word, novare, which means to 'make new'. The products and services of innovation activity was linked to the intellectual capital of intellectually gifted adults. In the current knowledge economy and the information age, intellectual development and knowledge of how to use information is the capital asset of any business enterprise (Drucker, 2010; Gallos, 2016). Markets and

information are inseparable because community markets creates the demand for products

and services through word of mouth, and is cost-effective (Madrick, 2002).

Innovation

The heart and soul of innovation is about the individual's intellectual capital and

work is about employee relationships. This is because work defines an individual,

personally and socially (Ford, Hollenbeck & Ryan, 2014; Hulin, 2014). To lack work is

an assault on human dignity. According to OB literature, there were three forms of IB

that is suited to workplace situations: (a) replication; (b) forward incrementation; and (c)

advance forward incrementation. Therefore, innovation can be explained in the context of

domain specific skills (e.g. the surgeon and his/her operating skills); creative intelligence,

and task motivation (Jex & Britt, 2008).

Replication is duplicating existing products with improvements. Forward

incrementation is reconstructing new products from an original model or blue print and

advance forward incrementation is innovating products and services that are ahead of

their time (Sternberg, Pretz & Kaufman, 2003). Products and services that are innovated

from advance forward incrementation are the cause of rapid change and positive social

progress. Innovation is a sociotechnological phenomenon that shapes the personality and

intrinsic motivations of employees (Carayonnis, Gonzalez & Wetter, 2003; Goldsmith &

Foxall, 2003). For managers to be able to tap into the gifted adult's high potential,

organizational policies and politics must change from the top down (Senge, 2006).

Teachable Innovation

Early Educational Intervention

Innovation can be taught. Teaching innovation should be started as early as possible (Clapham, 2003). Critical thinking, reflective thinking skills and medicinal nutrition are the foundational prerequisites for teaching innovation. Critical thinking is the objective analysis and evaluation of information (Merriam-Webster, 2007). The development of this skill leads to independent thinking. Something teachers resist in the American educational system. Two key components of critical thinking are: (a) the development of cognitive information processing skills, and (b) intellectual commitment to life-long learning (VandenBos, 2007). Reflective thinking is thinking in a way that develops higher order thinking skills. Medicinal nutrition is serving nutritious food and meals that facilitates development of the brain. For example, serving beef liver (good for building blood), baked fish with fins (builds brain cells) or steamed vegetables in a broth base (loaded with minerals and vitamins). To develop critical and reflective thinking skills requires psychological security and freedom of thought. Something a child may not experience at home or in school.

American society puts a premium on behavioral and cognitive conformity which is erroneously referred to as 'discipline' (Gaskins, 2016). Sternberg (2003) believed the problem with teaching critical thinking had much to do with the misfit between teaching techniques and the student's learning style. American school teachers teach for rote learning and then evaluates student progress through cooperative behavior. Teachers,

parents or society are not ready for individuals who want to learn deeper such as gifted children and the gifted adult.

Sternberg (2003) recommended a four point strategic approach to improve teaching techniques to teach specific required skills to children in grade school. He posited the system would require minimal deviation from the teaching strategies teachers learned in their college training. The four recommended strategies were: (a) teaching for memory; (b) teaching for analysis; (c) learning through exploration; and (d) teaching for pragmatics of reality (Sternberg, 2003). The four strategies would require coordination with an educational curriculum based primarily in STEM medium and the humanities (Sternberg, 2003).

Age Appropriate Workshops

For six consecutive years, the Leumi Robotics Center at Technion in Israel, sponsors a Robo Traffic competition for young learners (Technion-Israel Institute of technology, 2015). The young competitors come from elementary, middle and high schools from Israel, America, Argentina, Russia and the Ukraine to learn from mechanical engineers with doctorates and work-related experience. The 'learn by doing' workshop was designed by the mechanical engineers who guide the students in learning the innovation process, and the value of team work by programing robotic cars to drive through a complex labyrinth. The workshop is coed and girls who believe they are not scientifically or mechanically incline have won the competition several times. The

workshop is reminiscent of the middle age guild system where expert knowledge was passed down to the youth through apprenticeships by master teachers.

Training and Development: Education and Industry

As of this writing, there were four highly recommended approaches to teaching the innovation process: (a) three types of workshops, and (b) transformational learning systems. The workshop approach involves work in a room or building. Therefore, workshops are learning to design or enrich your job or work. The learning takes place in a social situation where there is an exchange of ideas and information. This is part of the transformational learning process. Transformational learning systems are workshops but utilize technology to teach principles and concepts about work within an organization for the individual or in a group situation.

Transformational learning systems are evidence based workshops or training systems. The systems can only be installed by expert I/O psychologists and the workshops on transformational learning can only be presented by the I/O psychologist who wrote this dissertation. The goal was to understand how to build an innovation orientated organization with an innovative organizational culture committed to life-long learning. Tapping into the potential of people especially gifted adults requires five core disciplines: (a) personal mastery; (b) shared vision; (c) mental models; (d) team learning; and (e) commitment to life-long learning (Senge, 2006). The workshop approach consists of: (a) the literature based approach; (b) the workshop approach; and (c) the hybrid approach (Kostoff, 2003). Examples of the literature approach were:

- The Young Indiana Jones Series (1992) produced by George Lucas was suitable for adolescents who are interested in history, technology and biographies of famous individuals. Lucas utilizes a fictional character, Indiana, to 'teach' how science, technology, and war makes rapid radical changes in the environment and society by following Indiana by utilizing story-telling techniques.

- Star Trek (1965-1969), Family viewing because of the exploration of moral intelligence. It is a science fiction television series created and produced by Gene Roddenberry. Star Trek was a weekly excursion into the future where science and technology was utilized to wage peace. Human development was important to achieve balance in the 23rd century.

- Lord of the Rings (1954). Written by J.R.R. Tolkien. Tolkien teaches social psychology and morality by creating a parallel universe. The peoples of middle earth have to forget their divisions and unite to overcome the forces of evil. Tolkien's female characters are different from the average women. Tolkien's women are more like the Old Testament matriarchs and the Blessed Virgin: beautiful, intelligent, holy, and humble.

- Apollo 13 (1995). Docudrama directed by Ron Howard. Apollo 13 is a real life historical event. Apollo 13 demonstrates the importance of science and technology in supporting a moral society. I was in high school when the incident happened and the rescue helped me realize a moral

humanity will triumph over technology in every situation and circumstance.

Furthermore, the workshop at Technion in Israel is an example of an age appropriate workshop for children and teenagers because the learning was guided by adults with expert knowledge (see description above). Examples of the hybrid method are professional trade conferences for psychologists, attorneys, and physicians sponsored by the trade associations to facilitate closing learning gaps, keeping skills updated and learning about current issues and new techniques in their respective fields of study. Trade associations are not social clubs or meetings to talk, socialize, and network. Conferences and workshops are designed to continue learning. All doctors are committed to life-long learning to improve their skills and to expand the scope of their respective practice.

Two Neuroscientific Theories of Innovation

Introduction

Neuroscience is a complex discipline because it deals with the study of the brain, the spinal cord, the nervous system, and other processes of the body influencing the brain-mind-body process. In this study, the nervous system was used as a reference to collect, to organize and to explain psychophysiological data that links to innovation activities. Kalbfleish (2008), a neuroscientist, posited insights from brain science could provide explanations for human performance and productivity, after he analyzed MRIs in a research study. Additionally, Kalbfleish (2008) asserted IB is the result of a complicated coordination of knowledge, creative capabilities, and physical labor. Again

raw data is being linked to the variable of intelligence. Consequently, Sternberg (2003) made a similar assertion when he developed the wics theoretical model. Therefore, IB is a psychological response to some stimuli that manifests itself as planned physical movement directed towards solving problems in the environment (Gaskins, 2016). Which links innovation activities to evolutionary theories and concepts.

A Psychophysiological Theory of Innovation: Vandervert (2003)

Vandervert (2003) asserted any type of innovative behavior was the result of a collaborative relationship between the working memory and patterns being generated in the cerebellum. The cerebellum is located where the spinal cord meets the brain in the back of the head (Loring, 1999). The cerebellum receives information from the sensory systems to coordinate movement and procedural learning (Loring). There were three propositions to Vandervert's (2003) theory of innovation: (a) innovation is the byproduct of evolutionary adaptation and is linked to the survival instincts and adaptive behavior; (b) innovation is the result of efficiencies and relationships of specific human cognitive networks; and (c) innovation is the result of a collaborative relationship between the memory-cerebellum cognitive processing systems.

Sternberg and Pinker made similar assertions about intelligence in their research work. Sternberg (2003) pointed out intelligence, creativity, and wisdom have an interrelated relationship. While Pinker (1997) asserted the mind is organized into modules with specialized designs based on individual genetic programing (pg. 21). Pinker referred to innovation as 'forward' engineering and useful for industry (pg. 21).

Therefore, the specialized and interrelationships between certain variables and brain networks was confirmed in Pinker (1997); Sternberg (2003; 2009) and Vandervert (2003) research work.

In conclusion, Vandervert (2003) perceives the working memory as an ongoing stream of ideas, images, and personal schemas of values and memories. DT style or creative thinking consists of ideas, images, and personal ideas which are transformed by personal preferences, opinions, ideas, prior experiences, and images (Kirton, 2006; Runco, 2008). Vandervert's model, perceptions, and propositions of innovation links innovation to the imagination and the autobiographical memory.

An Operational Theory of Innovation: Kirton (2006)

In 2006, Kirton, an operational researcher, developed the adaptation-innovation (A-I) theory as a model for team building, for problem-solving, and decreasing conflict in organizational settings. Kirton (2006) conceptualized IB as a means to solve problems by increasing productivity utilizing DT style and adaptive behavior. DT style was associated with higher order cognitive processes such as idea generation and intelligence. Kirton (2006) used thought experiments and logic to link problem-solving capabilities and adaptive behavior to decision-making capabilities. Furthermore, in his studies, he tried to understand how different types of decisions impacted IB by analyzing battle strategies and battle outcomes. What Kirton (2006) discovered was there was a complex relationship between cognitive style in thinking, circumstances and change effects. This research finding influenced the criterion and choice of historical events used in this study.

Impression Management

In this study, the definition of impression management (IM) originates from social psychology concepts and principles. For this study, IM was defined as a goal directed process in which individuals attempt to influence the perceptions of others about a person, object, or event (VandenBos, 2007). The person could be the self and is not connected with fashion, seduction or manipulation. IM is a form of IB that extends beyond work tasks. IM is role modeling behavior that is used to shape information in social interaction situations. IM is recommended for and utilized by women and minorities to transcend sexual and racial stereo-types. This is because it is critical to the success of minorities and women in positions of power (Singh, 2013). Moreover, IM is especially preferred for the success of professional service providers and female C.E.O.s. IM is being explored in this study because it is a pattern with transformational leaders in all four historic case studies. For example, King Henry V dressed as a monk rather than a warrior. Historically, IM was used by women to highlight intellectual competence by wearing suits, high quality clothing and structured hairstyles. Additionally, a lean, healthy, slimness and long dark straight hair are indicators of intellectual competence and self-confidence. Therefore, IM is a very skillful and subtle form of persuasion.

In case two, Queen Elizabeth I used the virtue purity and the image of the Virgin Mary to unite the Protestants and Catholics in her country. Her vestments were of high quality and edged in silver, gold, pearls and diamonds. She cut her hair to highlight the shape of her face and highlight the extreme whiteness of her skin. She always had a halo

of some sort surrounding her head. She walked to church weekly and prayed as an example to her subjects. Marie Curie utilized IM to minimize her social roles of wife, and mother by emphasizing her professional role of the physicist and research scientist.

First, she took her role as a scientist, seriously. She never let the fact she was a woman get in the way of learning or discovery. She pursued her doctorate while she was a wife and pregnant. During the Victorian era when women wore elaborate hairstyles and dressed colorfully, Dr. Curie wore a plain hairstyle, apron, and black dress. She only allowed the press to photograph her pouring chemicals into beacons or peering through a microscope. Therefore, the public had nothing to compare her against except the photographs of the research scientist.

In case study four, Kranz wore a handmade vest his wife sewed before the beginning of each manned space flight mission he directed. For his team, the action did not begin or mean anything until Kranz received his vest or the okay from his wife. Impression management is IB because it is a matter of strategic planning and precise timing rather than receiving a title or becoming a fashion model (Singh, 2013). In general, wise individuals create social images of the 'self' in the mind of others to gain employment, investment (e.g. a house), and social rewards or professional respect. Therefore, it was no coincidence in all four historical events, appearance and behavior were the key determinants of impressions that were being used to shape the perceptions of followers and other individuals (Singh).

Section Summary

The variable innovation was varied which included two theories about innovation. Kirton (2006) was designed to be an organizational intervention against conflict and chaos. While Vandervert (2003) theory of innovation was a model for the cognitive innovation process. Although there were eight types of IB it was posited there were three that were useful for organizational innovation and increasing productivity. IB was intrinsically motivated and most likely was the means human beings improve their situations and circumstances through work. In this study IM was being perceived as a form of IB because IM utilized such techniques as symbolic interaction, authencity, meticulous etiquette to elicit positive reactions from leaders and other powerful individuals. Innovation is teachable and should begin at an early age. Passive activities such as watching performances are not conducive to innovation training because children learn through play and story-telling.

Creativity

Introduction

Creativity has a very wide scope which consists of a broad range of domain tasks (Sternberg, Pretz & Kaufman, 2003). Creativity, is a complicated process which involves a wide range of neural networks. The networks work to coordinate brain activity across several brain regions (Schlegel, 2013). Creativity is a whole brain activity that underlies the survival impulses and adaptive capabilities of human beings (Anstead, 2014). Creativity is a normative capability every human being inherits to enhance their chance

of survival (Darwin, 1930; Pinker, 1997). Unfortunately, society tends to blur the lines between creative capabilities and applied creative activities.

In this research study, creativity is being conceptualized in the context of organizational productivity, work related behavior, and products as the byproduct of applied creative activity. Innovative work behavior much more than creative self-expression is linked to economics, the dignity of the human worker, the creation of employment opportunities, and task constraints of business enterprises and economic growth (Sternberg, Pretz & Kaufman, 2003).

Neuroscience of the Creative Imagination

As thought develops, so does the imagination (Gajdamaschko, 2015). The imagination is what the brain and the mind does (Gaskins, 2016). The imagination is the image-making power of the mind and one component of IB (Baumgartner, 2015). The creative imagination is both emotional and intellectual (Linqvist, 2010). Moreover, both traits are closely associated (Linqvist). The neuroscientific concept of the imagination is a mental workspace (Mintz, 2013). The mental workspace is similar to Vygotsky's (1978) zone of proximal development [ZPD] (Crain, 2000). The ZPD is a measure of cognitive development with an expert guide (Crain). This is a similar concept which was described in the Technion workshop for children and adolescents to learn innovation.

For this study, the emphasis was on two aspects of the creative imagination: (a) the productive imagination; and (b) the reproductive imagination. The productive imagination is associated with the cognitive functions supporting the capability to invent

by creating new images (Hunter, 2015). Moreover, the ability to mentally rotate visual images is associated with the productive imagination (Krone, 2012; Sternberg, 2009). Consequently, the reproductive imagination is closely linked to the memory systems (Vygotsky, 1978; Sternberg).

The memory systems collects and store many different types of images, ideas, and memories (Hunter, 2015). Memory is a manifestation of the imagination which facilitates the construction of future scenarios (Fortunato & Furey, 2014; Hunter). Further, it is believed individuals with active imaginations have strong associative abilities (Ho, Wang & Cheng, 2013). Associate abilities were linked to DT style in the literature. In other words, strong imaginations are more efficient at generating a range of ideas. The innovation process is initiated with the generation of ideas or DT style (Clapham, 2003).

Creativity, the Creative Imagination and Personality Factors

IB was determined by personality factors and strongly correlated with giftedness and extreme intelligence (Shavinina, 2012). Genetics and enriched life experiences contribute to exceptional intelligence (Ho, Wang & Cheng, 2014). Personality and creative potential have a direct impact on the creative imagination (Liang, Chang & Hsu, 2013). Creative capabilities depend on the ability to consciously direct mental activities with a highly structured imagination (Goldsmith & Foxall, 2003). Radical discoveries requires a radical shift in thinking (Chi & Hausmann, 2003). The use of the higher cognitive functions is determined by working memory systems (Ropovik, 2014). Additionally, the episodic memory stores personal lived experiences and is an important

factor in a broad range of cognitive tasks (Madore, Addis & Schacter, 2015). Major

inventions and innovations are attributed to creative geniuses (Simonton, 2012; 2014;

Weisberg, 2006). For the exceptionally intelligent, IB may likely be a creative outlet

(Streznewski, 2013).

Creativity Training

Green, Cohen, Kim & Gray (2012) conducted a meta-analysis of the literature on

creativity training to evaluate the effectiveness of the training. The study was based on

the premise, creative performance can be improved through educational training and

should start early (Clapham, 2003). Green, et al, (2012) were using the research study to

challenge the rationale for using creative activities (plays and artistic performances) to

teach innovation. This is because educators and educational researchers posit creative

training enhances the cognitive function of DT (Clapham, 2003). However, the findings

of the study were mixed and predictable which means creativity training is not the means

to teach innovation.

What was confirmed in the research study, was that there was a positive impact

on ideation as the educators believed (Green, et al, 2012). However, what this means is

creativity training improved the ability to generate ideas or DT style. Unfortunately, the

enhancement did not transfer to real world situations (Green, et al.). Furthermore,

creativity training made a marked impact in business settings on productivity and job

performance. However, the enhancement enhanced previous knowledge and training in

STEM based employment. For example, job experience and expertise and familiarity with job tasks such as a surgeon, a lawyer, or psychotherapist (Green, et al).

Alternate Research Approaches to Understanding Creativity Training (CT)

Finally, two separate experiments were conducted to understand how to teach innovation and the innovation process. One study (Wang, Ho, Wu & Cheng, 2014) used ethnographic methods while another researcher (White, 2014) used an experimental approach. What the researchers (Wang, et al, 2014; White, 2014) discovered was that a different type of training is needed to be useful to businesses and economic applications. Wang, et al. (2014) asserted the development of the scientific imagination is the precursor of creativity. This implies early training should emphasize reading, writing, mathematics and science, and later integrate creative activities into school curriculums. Furthermore, White (2014) asserted good science fiction facilitates IB by stimulating the imagination. This means exposure to 'what if' situations that the writer or viewer resolves through critical and reflective thinking skills supports the development of the cognitive innovation process. Both findings indicate STEM based knowledge is an essential foundational component in IB (Gaskins, 2016). Innovation is essentially, thinking to improve things (Smith, 2003). In addition, training and development for innovative behavior begins with promoting discovery to facilitate cross-discipline transfer (Kostoff, 2003).

Table 3

Basic Differences between Innovative behavior and Creative Behavior

Innovative Behavior	Creative Behavior
Definitive purpose	Normative potential
Workplace behavior	Enhances the chances of survival
STEM knowledge base	Moves logic across neural networks
Divergent thinking style	Produces art and artifacts
Gifted intelligence	Self-expressive
Intrinsic motivation	Right brain processing
Problem-solving	Supports the development of the imagination.
Adaptive behavior	

Section Summary

The analysis of creativity revealed it was a small element of innovation activity. Furthermore, the evidence based literature clarified that creativity and innovation are not synonymous terms. Therefore, creativity was not utilized to analyze innovation, IB or the cognitive innovation process. This was directly concerning the workplace, organizational and individual productivity or economic situations or circumstances. However, creativity and DT style were linked and had a collaborative relationship with the generation of ideas and facilitates generating ideas of how to solve a problem. This was a helpful tool in group or team situations involving brain storming activities. What was found to be useful

in the analysis of creativity was the collaborative and interrelationship between the imagination and IB.

Matrix Variable: Intelligence

The psychological construct of intelligence was multi-faceted with many diverse functions (Sternberg, 2009). It is the primary information-processing module in the brain and the nervous system (Loring, 1999; Sternberg). The primary components of intelligence was similar to the cognitive processes of thinking and memory because an individual would have to think deeply to bring images to the conscious (Sternberg). Intelligence was involved in interpreting, storing, and retrieving information to transform images, and ideas into more meaningful forms such as products and services (Nicholson, 1995). According to OB literature, cognitive analysis and mental models are used to understand how information, skills, and memories are transformed for use in business and industry (Nicholson, 1995).

Organizational researchers use cognitive maps to explain business strategies and decision-making in an organizational context (Nicholson). Intelligence has been used as a valid measure of workplace job performance and predicts productive behavior in employees (Robbins & Judge, 2007). Vygotsky (1930) believed history and technological development changed human capabilities because of adapting to new environments and the development of new psychological tools (Crain, 2000). Formal and advance educational training has a significant positive impact on the IQ (Santrock, 2009). Much like the psychological construct of wisdom, intelligence is associated with slow and

gradual systematic change. This function makes the psychological traits of wisdom and intelligence similar in outcome but different in function.

Sternberg (2003) defines intelligence as the ability to achieve success in terms of one's personal standards and, within one's cultural context. Sternberg also believed information processing components underlie the successful use of intelligence (2003). In conclusion, cognitive neuroscience links the information-processing networks to computation theories and facilitated the linkage of Sternberg's (2003) wics model of intelligence variables to the inner innovation process. This facilitated developing a map of innovation from the mind to planned body movement.

Neuroscience of Intelligence

The neuroscientific analysis of intelligence will be limited to the information processing systems in the brain and the nervous system. However, because of simplifying the intellectual process, emphasis was put on three components: (a) attention and/or consciousness; (b) memory, encoding and storage; and (c) thinking or the manipulation and transfer of information. This is because these components directly impact physical behavior. Furthermore, Sternberg (2009) developed a simple four point strategy of the information processing system which consists of:

- First, introducing a stimulus or variable.

- Second, encoding the information about the variable in the memory module.

- Third, thinking.

- Fourth, responding to thought.

Sternberg's (2009) four point strategy was utilized to understand how the cognitive innovation process was initiated in the mind of the gifted adult. The above very simplified neuroscientific strategy underlies the construction of all new procedural knowledge. Each trait of the information-processing module has a different function. For instance, the primary purpose of the attention network is to monitor human interactions with the environment. The monitoring system facilitates adaptive behavior, and links past memories with present and planned future scenarios (Fortunato & Furey, 2014; Sternberg, 2009).

Future planning was linked with mental rotation, consciousness, and DT style (Fortunato & Furey, 2014). The central executive frontal lobes coordinates consciousness and governs responses in decision-making capabilities. It was important to point out here that domain specialists (physicians, lawyers and psychologists) process information differently from novices, teenagers, and less educated peers. The memory networks function to encode, store, and retrieve information, while the working memory encodes and processes organized information into meaningful chunks and is linked to new information (Sternberg, 2009).

The new information is then linked to the autobiographical memory which consists of learned and lived personal experiences. The more an individual learns, the greater is the potential of associative thinking and DT style. Vandervert's (2003) theory of innovation posited the innovation process passes through the visuospatial sketchpad

and the phonological loop is activated by the frontal and parietal lobes where logic and reasoning takes place. Therefore, IB is the result of logic and disciplined behavior.

Creative Intelligence

The conclusion innovation and creativity are not interchangeable terms is solidly based in the findings of the research studies of Csikszentmihalyi, VanGundy, Sternberg, and Weisberg who believed creativity was different from innovation. Innovation was not practiced in business to support the self-expression of its employees. Innovations are commercialized to accumulate wealth and profits to pay productive employees income. Innovation is the result of logic, science, and Stem based knowledge combined with creative intelligence. Creative intelligence was defined as going beyond what is given to generate novel and interesting ideas (Merriam-Webster, 2007). Creative intelligence is linked with DT and learning style.

Thinking Style, Intelligence and Innovative Behavior

Polymaths are individuals of wide range knowledge and learning (Merriam-Webster, 2007). Their expertise usually spans a significant number of subjects to draw on and a number of complex bodies of knowledge to solve problems (Wikipedia contributors, 2016). Polymaths are individuals who incorporate different styles of thinking and are most likely to engage in IB (Root-Bernstein, 2003). Polymaths are strongly linked to DT style, the predictor of original thought and the profoundly gifted adult (Williams, Runco & Berlow, 2016).

The imagination is the root of innovation, but the imagination is not used much in business, and most likely discouraged (Baumgartner, 2015). The imagination has a capacity for modification, change, and adaptation (Angell, 1906; Feuerstein, 1979). Further, the ability to change and adapt was linked to DT style (Kirton, 2006/2016). The development of speech and language parallels with the development of the imagination (Vygotsky, 1930). Internal speech is responsible for consciousness, self-control, the creative imagination, and thinking in concepts (Smolucha & Smolucha, 1986). Therefore the unconscious stream of thought in polymaths (gifted adults) is different from the average individual. Polymath thinking requires more self-control, discipline, commitment to life-long learning, and thinking in structured concepts such as abstractions, pieces of logic, and images (Gaskins, 2016).

Religion, Moral Intelligence and Innovative Behavior

Innovation is strongly correlated to gifted intelligence and personality factors (Shavinina, 2003, 2004, 2012; Shavinina & Seeratan, 2003; Simonton, 2012). The gifted comprises about one percent of the world's population (Baucum, 2006). The population is small but diverse (Baucum).Giftedness is not entirely understood by society and early education teachers but it is a plasticity of the brain and nervous system that is not entirely understood by neuroscientists (Kalbfleisch, 2008). To be gifted or a genius is to be different, hidden, misunderstood and silenced by society (Gaskins, 2016). Giftedness is an alternate adult 'normative' lifespan (Fiedler, 2015; Streznewski, 2013). Gifted

intelligence is part of this study because gifted adults possess the highest potential for initiating innovation activities (Shavinina, 2012).

The lack of high levels of intellectual stimulation can actually cause psychological and physical damage in the gifted and extremely intelligent people (Fiedler, 2015; Streznewski, 2013). The gifted are known to have high moral standards, the need for clarity, and radical holistic development (Fiedler). Structured religions (e.g. Judaism, Roman Catholic, and Islam) provides the foundation for clarity, the development of high moral schemas and self-transcendence. The gifted are usually honest, humble and criticized mercilessly by their peers. The gifted adult embraces an ethic of care at a very early age in their cognitive development (Kohlberg, 1972; Piaget, 1953).

High moral standards was one of the first indicators of a high IQ and correlates with a desire to change social situations through problem-solving. At a relatively early age, gifted individuals are focused on the desire to help others, solve social issues or develop a direct and personal relationship with God (Tosey & Gregory, 2002; Underhill, 2001). Much like IB, self-transcendence is linked to intrinsic motivation and the development of wisdom (Gaskins, 2016). Self-transcendence is the final level of psychological development when all metaneeds are met (Maslow, 1954). Lastly, Maslow (1954) asserted, "We need to learn to transcend the foolish tendency of letting our compassion for the weak generate hatred for the strong".

Section Summary

Intelligence was a multi-faceted psychological construct. This was the rationale for making intelligence the matrix variable. This is because intelligence pivots arounds so many human capabilities and functions. It was the primary component in survival, adaptation, higher order thinking, and decision-making. In I/O psychology, intelligence is a measure of individual differences, human productivity, and job performance. In the literature, innovation is strongly linked to adult gifted intelligence.

Moderating Variable: Adult Gifted Intelligence

Introduction

A detailed analysis of adult giftedness was conducted because gifted intelligence links to the target population, and the population of interest: intellectually gifted adults of either gender. Unfortunately, adult giftedness was another subject in the literature that was sparsely researched. In this research study, adult giftedness was explored from diverse approaches in the literature because the participants in the historic events were deceased and other measures had to be utilized to assure compliance to the gifted adult construct. Sternberg (2003) wics theory of intelligence and my personal expertise in accessing intelligence was utilized as a guide to select the primary participants for this study. Unfortunately, the literature could not be utilized because what was known about adult gifted intelligence was largely based in child and adolescent developmental literature. Consequently, the public school system expects children to outgrow giftedness (Fiedler, 2015; Sternberg, 2003). Besides that, an adult is not a child or teenager.

Workplace studies of giftedness was not useful because it was explored from a negative point of view (Kotleras, 2007; Scott, 2012). In society, the average adult treats the gifted adult like a child because of their 'child-like wonder' and the passionate need to master material (Powell & Haden, 1984). For example, Fokker, a scientist in WWI, discovered a means of attaching machine guns to airplanes, was treated like a child. He was heavily guarded while his choices were limited out of a distorted sense of the glory of war and power. In this way, complex weapons not only changed warfare but the psychology of society and their social institutions (Grant, 2014).

Adult giftedness was worth exploring for two good reasons: (a) because individuals with high levels of intelligence show measureable biological and behavioral differences; and (b) because giftedness was strongly correlated to innovation (Shavinina, 2012; Streznewski, 1999). In conclusion, there are definitely measureable differences between average and gifted individuals. This should be scientifically explored and analyzed. Definitions of giftedness usually focus on individual performance such as artistic talent and sports achievement, and this injustice should be addressed as well (Fiedler, 2015).

Table 4

Normative Distribution of Intelligence used by Psychologists & Psychiatrists

Average IQ: 90 to 115
General giftedness: 130 to 175
The profoundly gifted: 175 upwards

The table is a general standard in conjunction with other standards, i.e. biological and psychological differences. There are important behavioral differences among the gifted and profoundly gifted adult, i.e. it is normal for a profoundly gifted adult to exhibit 'peculiar' behavior. 'Peculiar' is often in the eye of the beholder.

Neuroscience of Adult Gifted Intelligence

Introduction

There is no universal definition or agreement of what gifted intelligence is, therefore Sternberg was attempting to broaden the definition of giftedness to include more inclusive measures. For this study, the operational psychological definition was the state of possessing a great amount of natural ability, talent, and intelligence (VandenBos, 2007). Further, giftedness has been defined as the interaction of above ability, task commitment, and creativity (Renzulli, 1978). Giftedness has been perceived as the ability to produce thoughts, tangibles, artistry, or human services that are creative and proficient (Tannenbaum, 1986). What all the definitions in common is the underlying implication of uniqueness, originality, difference, and the unusual. Thus, the gifted are separate from the ordinary and the status quo.

In the literature it became quite obvious the average person was threatened by their intelligence and capabilities. Often the gifted are misunderstood in relationships, education and the workplace. Gifted intelligence is measured by psychologists and psychiatrists who administer validated IQ tests (i.e., Wechsler and the Standford-Binet tests) to obtain a statistic measure of intellectual potential. It is unfortunate that gifted individuals are given less attention in services, resources, information, and basic needs than the disabled. The gifted have special needs as well. Lawrence, et al., (2008) conducted several quantitative studies to discover the relationships between intelligence, creative achievement, and innovation. What they discovered was innovation was a crucial resource for employment opportunities and economic growth (Lawrence, et al.). Can we as a society afford to continually isolate and oppress our best human resource for survival and improvement?

The Gifted Adult

Giftedness is a neural plasticity neuroscientists know little about (Kalbfleish, 2008). However, Vygotsky and Feuerstein conducted many research studies to confirm the plasticity of intelligence (Sternberg, 2003). Intellectually gifted adults think differently from the average individual and is actually intellectually stimulated by difference and challenge (Corten, Nauta & Ronner, 2008; Silverman, 1998). Healthy gifted minds are encouraged by the pleasure of problem-solving and improving things (Streznewski; 2013). Creative activities are necessary for the gifted adult but distinctions must be made between intellectual giftedness and 'raw' talent (Gagne, 2003 in

Furtuengler, et al., 2013). For the intellectually gifted individual, enhanced right brain

development may likely be an indication of natural talent rather than an indication of

cognitive potential for innovation.

What is an 'accomplishment' for the average individual (i.e. singing, dancing &

acting) will likely be a 'natural talent' for the gifted person. Therefore, a gifted individual

with a natural talent for singing would not become self-centered about their vocal talent

but would seek to develop their natural talent further. This would include taking voice

lessons to the level of mastery. The need to master material is linked to innovation

potential and profoundly gifted intelligence. Innovation originates in the imagination

because of the accumulation of uncommon knowledge (Fivush, et al., 2011). The right

brain, where the fine arts are processed is part of the brain process, involving the right

prefrontal cortex and the inferior frontal cortex, where complex and conscious behavior is

mediated (Kolb & Whishaw, 1998).

Further, it has been posited gifted intelligence has its roots in a mutation in favor

of left brain development (Mrazik & Dombrowski, 2010; Lovden, et al., 2010). The left

brain is where speech, language, logical analysis, and mathematical computation are

processed by the brain (Sternberg, 2009). It is generally believed the development of

gifted intelligence is driven by a 'mismatch' in cognitive processing (Lovden, et al.,

2010). The mismatched character of giftedness may likely leave the intellect

psychologically 'hungry' for intellectual stimulation or a need for information or an

exchange of new ideas (Silverman, 1998). Consequently, the lack of high levels of

intellectual stimulation and meaningful interaction will cause physical and psychological damage in intellectually gifted individuals (Fiedler, 2015; Streznewski, 2013).

In conclusion, gifted adults have atypical brain organization coupled with enhanced right brain development (Silverman, 1998; Sternberg, 2009). The atypical brain organization sets the gifted individual apart from the average individual psychologically and physically (Fiedler, 2015; Streznewski, 2013). For example, being oversensitive to weather changes or being acutely aware of the environment. Moreover, being acutely aware of the environment is a marker of profound giftedness, and how the innovative process was initiated. The gifted adult is a deep and independent thinker whose provocative thoughts are often ahead of its time (Gaskins, 2016).

Self-Identity and Intellectual Giftedness

Society defines the gifted individual by their giftedness in negative or positive ways. For example, I have been called 'crazy', 'a man', or 'young man' with no regards to my feelings or dignity as a woman (K. Gaskins, personal communication, 2013). These labels stem from the fact society socializes people to believe: (a) intelligence is a masculine trait; and (b) people who are different are 'crazy'. Actually, intelligence is a neutral trait and is inherited by both males and females. Intellectually gifted adults do not identify with their giftedness or form their personal identity in conformity with or compared to the 'normative' majority. Their identity is their 'sense of self' defined by the individual, his or herself. This personal identification of self does not include physical and psychological characteristics that are shared by racial groups, color, culture or ideals

(Streznewski, 2013). This is because the very small group of intellectually gifted adults

do not practice racism, sexism, or discrimination. There is only one race: the human race.

The gifted are acutely aware of their difference and do not want to be assimilated into the

status quo or other racial groups. The gifted individual, and this is a metaphor,

subjectively views the status quo as the mechanic-like Borgs seen in Star Trek. Often, the

gifted defy crowds to form an alternate, more personal identity. This is not to be confused

with the clinical diagnosis of dissociative personality. The personal formation of a

personal identity compares more to the theory of a community of selves (Mead, 1984).

For the gifted adult, their giftedness is a psychological tool to: (a) accumulate and

process information; (b) for intellectual stimulation; or (c) for extending the mind into the

environment searching for challenges (Gaskins, 2019; Streznewski, 2013). Processing

and accumulating information was linked to the variable wisdom and intelligence while

extending the mind into the environment was linked to the theory of extended mind

(Clark & Chalmers, 1978). The innovation process shapes the behavior and psychology

of the gifted adult (King, 2003). As a matter of fact, the gifted adult prefers the company

of other gifted adults or solitude (Perrone-McGovern, Boo & Vanatter, 2012). The

preference for solitude serves the purpose for developing ideas without unsolicited

criticism or misplaced judgement (Gaskins, 2016).

Intellectual giftedness in adults is an alternate normative development life span

which deviates from the status quo (Streznewski, 1999; 2013). The characteristics of

profound intellectual giftedness was utilized as a 'marker' to access profound giftedness

in potential participants in the four historic case studies. Take for example, the British officer, an English gentleman, and an archeologist, Sir Lawrence of Arabia. Although he was a highly decorated war hero and leader, his methods were 'questionable" because he used his knowledge of archelogy to get to know the Arabs, intimately. He shocked the British militia with their 'colonial attitudes' by defying what the British considered 'proper behavior' for an English officer by forming an alternate identity as an Arab.

Sir Lawrence considered himself as neither English nor Arab but both and neither. In other words, he considered his-self a human man with different roles. This personality formation is referred to as forming a community of selves which is united in the self (Mead, 1984). In this sense, he was truly, a 'world citizen'. In conclusion, front-line supervisors have problems identifying innovation activity but also intellectually gifted adults because of the lack of predictive validation about IB and the innovation process (Furtuengler, et al., 2013).

Table 5

Skills of the Gifted Adult that Transfers to the Workplace

Makes keen observations	Enjoys problem-solving
Connects unrelated ideas	Learns quickly
Enjoys discussing & exchanging ideas	Independent thinker (ahead of their time)
Quirky sense of humor (peculiar behavior).	High moral values (moral intelligence).
Life-long learning (sense of wonder).	Seeks excellence in everything
Feels different from those around them.	Humble (in a way that is not understood by co-workers or the public.

Personality Theories of Adult Giftedness

Personality traits are the organizing factors of the human psycho-physiological system (Allport, 1961). Certain personality traits determines the characteristic behavior and thought patterns of an individual (Allport). The personality provides the building blocks for giftedness which is determined by genetic disposition (Darwin, 1930; Pinker, 1997; Sternberg, 2003). The total network of human physiological systems including the brain must be in top working condition before difficult and complex processes can be useful to the individual. Therefore, mental health as well as physical health is critical to gifted cognitive development (Gaskins, 2016).

The nuclear family and early experiences within the nuclear family shapes giftedness and develops gifted potential (Ho, Wang & Cheng, 2010). The functional family unit achieves optimum cognitive development of offspring by facilitating meaning through ritual, structure, and continuity (Ho, Wang & Cheng). Additionally, genetics is

responsible for how the imagination develops (Ho, Wang & Cheng). Gifted adults

experience careful, early intellectual training and guidance for personal development.

This gives gifted individuals common personality traits (emotional and moral

intelligence) and similar challenges to overcome. Such as being misunderstood by the

status quo, or envied because of perceived advantages (Killoran, 2015).

In 2012, Shavinina, a developmental psychologist, conducted a biographical study

of Nobel laureates to discover innovative behavior is determined by a certain set of

personality traits. Parents of gifted children do not dictate but 'illustrate' and

'demonstrate' desired behavior they want their children to imitate. This is because (a)

their children are independent thinkers and (b) they want to 'imprint' the behavior they

want their children to become (Bowlby, 1954; Gaskins, 2016). Factors such as personal

experiences, educational training and lived experiences are encoded and stored in the

autobiographical memory for later use (Sternberg, 2009). Role modeling is a stronger and

more sustainable teacher for growing children and adolescents.

There were three personality theories that linked to adult giftedness and

innovative behavior. These theories were: (a) the three ring theory of giftedness

(Renzulli, 1978); (b) the star model of giftedness (Tannenbaum (1983); and (c) the

triarchic model of intelligence (Sternberg, 2000). Renzulli (1978) asserted giftedness

results from the interaction between three human traits:

- Above intelligence
- High levels of tasks commitment

- High levels of creativity

Renzulli (1978) theorized individuals who are capable of giftedness would require a wide variety of educational opportunities and services that are not provided through regular instructional programs. Parents of gifted children do not rely solely on public or private education to develop their children's potential. Next, Tannenbaum (1983) developed the star model of giftedness as a tool to identify giftedness in children and adolescents. It is a holistic model which includes assessing for personality attributes and environment interactions. Sternberg (2000) triarchic theory of successful intelligence uses the cognitive approach to explain successful intelligence. Lastly, Kim (2005) discovered from a study that there is only a small correlation between IQ and creativity.

Table 6

Family Factors Impacting the Development of Gifted Intelligence

Genetic inheritance	Social Status: middle to upper middle class	Intact nuclear family & extended blood kin relationships
Emphasis on education and pursuit of advance education.	Wide range of hobbies and interests.	Moral intelligence
Regular church attendance (structured religions)	Respect for life & the dignity of others.	Street smarts
Independent thinkers	Honest & humble	Ability to learn from past mistakes.
Open to new experiences.	Orientated towards science Philosophy & technology.	Emotional intelligence.

The Intellectually Gifted Woman

The intellectually gifted woman was analyzed in this research study because: (a) intellectually gifted women are psychologically different from the average woman and man, and gifted men; and (b) their intellectual development follows a different path than the gifted man or the average woman (Lovecky, 1993). Unfortunately, there was less scholarly material on the intellectually gifted women than on gifted adults in general. This is because society follows male norms. The existence of the gifted woman is not a 'male norm'. The gifted woman is an example of what a woman could be if she focused on her full development as an individual. Myths were created about the intellectual capabilities and the intellectually gift woman because educators and the average individual actually believes only men are intelligent. Therefore, this cognitive habit is hardwired and hard to break.

The gene for high intelligence is inherited and neutral. Either male or female can be intelligent or profoundly intelligent. Among the intelligent and profoundly intelligent male and female there are differences in character, behavior, thinking style, and focus (Streznewski, 2013). For example, the profoundly gifted intelligent individual tends to be extremely morally intelligent. In a sense, it is ironic the average woman insists on being equal with men but bash intelligent woman and criticize their accomplishments as 'masculine'. This may likely be the reason, women's work and accomplishments are not taken seriously by society. Women have innovated but their accomplishments go

unrecognized. For example, women innovated windshield wipers, car heaters, and the cell phone but does anyone know their names?

Some of the reasons stem from unequal opportunities, sex role stereotyping, and lowered aspirations for women (Lovecky). Girls are encouraged, especially the scientifically inclined, if they have artistic talent to make a career in the performing arts rather than a career in science. Emphasis is put on caretaking, having babies, and extreme self-sacrifice. Girls are socialized to excuse whatever wrong a man does and isolate women who use their minds. Most of the literature on the intellectually gifted women made the point; female intelligence is generally disregarded. However, women who do not fail utilize their intellectual gifts in connection with others (Lovecky, 1993).

Society views intelligence as a male trait, as individual, hierarchical, and unrelated to other aspects of human experience (Lovecky, 1993). Both Elizabeth and Marie realized their visions, goals and abilities through their connection with intellectually gifted men. Intellectually gifted women connect with their fathers at an early age, and later with intellectually gifted men who do not adhere to ridgid sex or gender roles, and are not angered or threatened by ambitious, intellectually gifted women. Gifted women can develop their skills and abilities by building on cognitive skills and their personal experiences as women. Intellectually gifted women go through a different set of developmental stages in which growth in emotional and rational abilities compliment their intellectual and creative abilities (Belenky et al., (1986) as cited in Lovecky).

The intellectually gifted women integrates rational and emotive thinking while linking the objective with subjective knowing (intuition) [Belenky et al., as cited in Lovecky]. In the research literature, rational and emotive thinking is correlated with the cognitive traits of wisdom and empathy. In ancient Greece, wisdom was called 'Sophia', a woman, and the 'prophetess' was the maturing women who shared her wisdom rather than personal opinions of the future. In the Old Testament of the Bible, intellectually gifted women (matriarchs) were preferred by the patriarchs. The matriarchs, Sarah, Rebecca, Leah, Rachel and Esther were described as beautiful, intelligent, holy, and humble. The interconnectedness of thinking and feeling should be honored (Gaskins, 2019).

Female gifted intelligence and wisdom is characterized by deep empathy. In this research study, the cognitive innovation process was initiated by the emotion empathy. Empathy is cognitive and emotional and requires a high level of conscious awareness and emotional integration (Lovecky, 1993). In the scholarly literature, this skill is referred to as emotional intelligence. Marie Curie is an excellent example of emotional intelligence because she loved her husband unconditionally and studied for her doctorate while she was pregnant. Since Marie made sacrifices to realize her full potential, she has contributed much to medicine, technology, and the scientific method. She discovered a treatment for cancer, and although she hated war, she designed the x-ray machine that improved surgical techniques on the battlefield. In conclusion, despite the obstacles and

stereotypes, many intellectually gifted women lead personally satisfying lives while contributing to the welfare of others.

Importance of Nuclear Families

The mother may be the first teacher of the children but there is overwhelming evidence in the literature, the father has the greatest impact on the development of gifted intelligence in both sexes (Gaskins, 2016; Nock, 1998). The assertion originates from a universal assumption about adult masculinity: men will provide for and protect their families (Nock, 1998). Gifted adults usually come from upper middle and middle classes because of access to resources (Burham, et al., 2014, 2015; Rindermann & Thompson, 2011) The character of a family makes a huge statement about a man's independence and maturity (Nock). His work defines a man personally and socially, and confirms his dignity because work supports adult responsibilities (Hulin, 2014). Furthermore, men change as a result of being married (Nock). When a man becomes a father, he can fully feel and express his humanness to a family, therefore, his wife and children benefit from this (Pittman, 1993). The father of upper middle and middle class families usually provides the resources for a stable environment and healthy growth of his children.

Gifted intelligence thrives in an environment of cooperative parenting and the division of responsibilities and tasks (Nock, 1998). In other words, traditional families with 'old-fashioned' values are best for the development of gifted intelligence. Their family environment provides constant and consistent intellectual stimulation, i.e. a home library, radio, board games, and lots of play time (Nock). Gifted adults grow up with

meaningful experiences which involve social interaction with siblings and both parents (Nock). Moreover, benevolent fatherhood is concerned with freedom, social justice, and mercy (Willock, 1999). If a man is going to raise a strong, secure woman, he must both like and respect females (Pittman, 1993). He must model respect for woman on his wife to his children (Pittman). The more quality time a girl spends with her father, the more secure, independent, and feminine the woman (Pittman). This is because her father has overcome the need to control, protect, or dominate her choices (Pittman). The assessable father provides the foundational basis for strong convictions to do what is right, to defy crowds, and for women to reject extreme self-sacrificial attitudes (Meszler, 2008).

In conclusion, although current standards for manhood and fatherhood exclude old-fashion ideas of providing, protecting, and love, these qualities of fatherhood have the greatest impact on the development of gifted intelligence in both sexes. Father craft develops the adaptive and problem-solving abilities of innovation activities (Pruett, 2000). These abilities are correlated to the survival instincts and IB. A father's Socratic questioning strengthens cognitive capabilities and social intelligence (Pruett). These abilities were correlated to cognitive development (critical and reflective thinking) and leadership skills. The father facilitates the capacity for attachment, emotional intelligence, the absence of gender role stereotyping, self-control, moral intelligence, physical development and other effects (Pruett). These skills were correlated to innovation, social intelligence, and the preferred skills of the 21st century leader. Every household should have an assessable father (Gaskins, 2019).

Positive Workplace Cohesion

The 'brotherhood' and 'sisterhood' ideology was included in this study because the 'Hoods' are an extension of functional family relationships into the community and the workplace. The concept of brotherhood originates from the organizational culture of priests, the military, and professional service providers (i.e., doctors, physicians, lawyers). Workplace innovation and especially intellectual giftedness is supported by a small network of like-minded individuals. For example, for the psychologist, the 'Hood' exists as the American Psychological Association, and other psychologically trained psychologists.

Furthermore, the 'Hoods' do not exist as a physical entity, as a substitute for family, or a social outlet (Gaskins, 2016). The 'Hoods' are symbolic abstractions and compatible moral sentiments that extends family values, emotional and career support into the workplace, the community, private practice, or the battlefield. The hoods underscores the moral value, "Love your neighbor as you love yourself". Loving your neighbor has nothing to do with 'like' or personal preference or based on superficial characteristics such as race, color, culture, or artistic talents. The hoods are spiritual representations of familial support and protection especially concerning dangerous work, incubating new ideas, and finding resources for innovation activities such as scientific research. The hoods facilitate the freedom to develop inherent gifts to the fullest potential, provides access to key resources, and supports life-long learning. In the absence of competition and hostility, intellectually gifted adults who are members of

hoods, can take calculated risks, obtain career advice, work with a mentor, and maintain professional autonomy (Daddis, 2010).

Section Summary

This section was an excursion into the character, personality, and background of the intellectually gifted adult and general intelligence which is strongly correlated to innovation. Besides that, the intellectually gifted adult was the target population of this research study. What the average individual misinterprets about Sternberg's attempt to broaden the scope of what constitutes intelligence does not mean he meant to invalidate intelligence testing. Sternberg's goal was to question the 'exclusive' use of numbers and artistic talent as the means of establishing the cognitive potential of an individual. He wanted to eliminate 'group-think' about intelligence. Sternberg (2003) wics theory of intelligence was an appropriate guide to explore other measures, to locate participants for the study in historical events, and to organize the research findings.

Third Variable: Wisdom

Introduction

For this research study, the operational definition of wisdom was defined as the ability to make sound judgements (VandenBos, 2007). However, wisdom is another topic that was rarely researched. Wisdom was linked to innovation through effective decision-making. Wisdom was also linked to moral reasoning, and faith, and faith is linked to transcendent experiences (Hall, 2010). Knowledge and the acquisition of knowledge is a critical component of wisdom, intelligence, and learning. Wisdom creates knowledge by

transforming educational training, and by challenging the perceptions of what an individual learns from personal experiences (Baltes & Staudinger, 2000; Yang, 2014). Wisdom is similar to intelligence but is a parallel process (Pascual-Leone, 1995).

Intelligence is a critical component in the development of expert knowledge. Expertise is an ongoing process of consolidating skills needed for high level mastery in the workplace (Sternberg, 2009). Wisdom is how expert knowledge is utilized to perform well under different kinds of circumstances (Sternberg, 2003; 2009). Therefore, wisdom is a component of life-long learning. For example, intellectually gifted adults become wise from coping with loss and suffering (Hall, 2010; Kotleras, 2007; Scott, 2012). Consequently, pain and suffering is prevalent in the biographs of Queen Elizabeth I and Marie Curie. Wisdom forms when slow and painful learning has ended and the transcended 'self' has emerged (Pascual-Leone, 2000).

It is the accumulation of diverse and uncommon knowledge, and learning from experience that stimulates and shapes intellectual growth, and why learning from experience is the cause of psychological metaphorphosis (Pascual-Leone). Therefore, intellectual growth and personality integration are important elements in the development of wisdom (Pascual-Leone). Thus, learned experience and the duration of learned experiences are important components in achieving wisdom. For example, it takes on the average ten years upwards to develop expertise in a STEM based profession such as medicine, psychology, and the law. This is why professional service providers have long training requirements, and then are regulated by the government to assure public safety.

Swartz (2011), proposed a definition of wisdom that included the subcomponents of adaptive attributes. Adaptive attributes are linked to the survival instincts (Darwin, 1930). Innovation was linked to adaptive and problem-solving behavior (Kirton, 2006; Pinker, 1997). Thus, wisdom underscores adaptive behavior that assures the survival of the individual (Csikszentmihalyi & Rathunde, 1995). In conclusion, adaptive behavior has been linked to DT style, intelligence, and other order functions in the literature (Fortunato & Furey, 2014; Kirton, 2006). Adaptive capabilities matures when the reorganization of the ego occurs in the late 30's to 40's (Pascual-Leone, 2000). Therefore, when the development of intelligence has peaked in the 30's, during the early 40's and upward, the reorganization of the ego makes it possible for the gifted adult to use their creative imagination in pragmatic and productive ways (Pascual-Leone).

Neuroscience of Wisdom

Introduction

An analysis was conducted to understand the interconnections between wisdom, adult gifted intelligence, and other human factors involved in innovation activities. Emphasis was put on brain specialization, cognitive development, and brain plasticity. This is because wisdom shapes learning, and expert knowledge is acquired through learning from experience. Therefore, innovation activities most likely broadens the intellectual capabilities while shaping the thoughts and behavior of innovation technologists. The analysis below is speculative because as of this writing no cognitive map of wisdom exists.

The Wisdom Neural networks

The prefrontal cortex and several neuro-subcomponents figure prominently in achieving wisdom (Meeks & Jeste, 2009). The subcomponents are: (a) the limbic system; (b) the striatal brain regions; and (c) the 'mirror' neural networks (Meeks & Jeste). The limbic system is associated with motivation, emotion and memory (Loring, 1999). Which is linked to intelligence, cognitive development, and thinking style. The innovative process is intrinsically motivated and linked to the memory systems. While the striatal regions are associated with the visual, sensory regions, and the midbrain. Vandervert (2003) theorized the innovation process passed through the visual-spatial sketchpad and the speech loop. The visual spatial sketchpad is where images are rotated in the imagination (Gaskins, 2019; Krone, 2012). The neural 'mirror' system is associated with empathy and most likely images in the reproductive imagination (Loring; Gaskins, 2016). The frontal cortex acts as the conductor and has deep connection with the prefrontal cortex, the striatal regional centers, the long term memory networks including the autobiographical memory, and motor cortex (Sternberg, 2009). The neo-cortex regions of the brain and the genetic memory become increasingly left brain processing with frequently utilized knowledge (Sternberg). As the brain is used frequently for problem-solving, it makes the genetic memory more resistant to aging and decline (Meeks & Jeste). This is most likely why when the development of intelligence peaks at the age of 30, the development of wisdom is in a very, very, slow decline (Gaskins, 2019).

Wisdom as a Measure of Innovation Potential

Introduction

In this section, wisdom was analyzed and explored as a possible multilevel model to assess for innovation potential. The hypothetical trait of intelligence has measures, and wisdom was considered because: (a) wisdom is similar to the construct of intelligence, and (b) intelligence stabilizes at thirty years. Additionally, research scientists have discovered IB starts at 40 years of age but peaks at 60 with a very slow decline. For example, 'Whistler's Mother' was painted by a 90 year old. I recently met a doctor who stated his mother studied for a doctorate late in her life and began writing her dissertation in her 70's, and Di Vinci was a very productive senior citizen. What was examined in this analysis was the links between the macro and micro-levels of the ecological system to understand the impacts and effects of change involving innovation activity.

The Wisdom Multilevel Model

Depending on the stem based domain, innovation technologists innovate on the average between 40 to 70 years of age and beyond. Therefore, innovation activity is not for children or teenagers. Di Vinci was a senior citizen when he became highly productive. Therefore, ageism most likely is another obstacle to innovation activities. Additionally, wisdom is highly correlated with age and maturity. Further, what Sternberg & Hedlung (2002) discovered in a research study about productivity was IQ was not so much a factor for increased productivity but learning from experience, and knowing how to use knowledge.

Below are three examples of evidence based theoretical models of wisdom. The models can be utilized in conjunction with validated IQ tests, measures of personality and moral development tests, and other types of tests such as organizational fit to create a profile of a potential innovation technologist. The model can be used as a guide to develop curriculum and effective training systems but primarily to assess and predict IB. The models are as follows:

1. Ardelt (2004), the Ardelt model of wisdom.

2. Brown & Green (2004/2009), The Brown model of wisdom.

3. Fortunato & Furey (2009/2014), theory of mind/time.

Section Summary

In conclusion, the theory of mind/time, an organizational model, can be utilized to trace the development of intelligence over time. While the other two models can be utilized in conjunction with other tests such as intelligence, wisdom, attitudes and motivations.

Outcome Variable: Innovative Behavior (IB)

A simple explanation of innovation is employee productive behavior or the commercialization of a pragmatic idea (Hamilton, 2007). Usually a radical idea changes the collective unconscious and impacts the workforce and social progress. Innovation is not creativity but applied creativity with the use of creative intelligence, and the creative imagination. In other words, creativity plays a small part in innovation. Therefore, more than creativity, IB has a definitive purpose and is initiated by the technologist to carry out

a specific purpose such as solving a problem. This is what is currently known about innovation but much more research is needed.

The highly developed mind is a critical financial resource for industry growth, increased productivity, and the homeostasis of global economics (Runco, 2016; Shavinina, 2012). The creation of new knowledge and its applications to the workplace would mean the workplace and business administration would have to change to support organizational innovation activities. In addition, more research has to be conducted on adult giftedness, how to manage high ability talent, intellectually gifted women and their development, individual differences and other human factors topics to be able to predict the impacts and effects of IB, to control the GDP, organizational productivity, and to stabilize global economics.

Qualitative Study: Innovative Behavior

Two research scientists, Heinzen & Vail (2003) conducted an observational study about IB to test the hypothesis IB and impression formation were linked. They designed the study to observe IB in a nursing home. What the research scientists were looking for were two types of behavior: (a) situational driven behavior manifesting as IB and (b) personality driven behavioral innovations. What they discovered was that observing innovation events was linked to the interaction between the stressors of the environment and perceived threats to the individuals in the nursing home lives. In other words, the research scientists discovered the high probability of observing IB correlated with the

infliction of psychological trauma or perceived threats connected with psychological trauma.

The finding clearly indicates IB is linked to the survival instincts and adaptive behavior. What Heinzen & Vail (2003) discovered was the fight or flight system stimulated IB. What I learned from this research study was to proceed with caution when selecting a research design for this study because attempting to stimulate innovation activity on human subjects could traumatize the participants. Therefore, more research is needed to design safe research. I also learned it was easier to observe IB in surreal situations rather ordinary situations. Therefore, case study design and historic research design were chosen to investigate innovation in a safe but timely fashion.

Summary of Metasynthesis Literature Review

The sectional analysis of the qualitative research study marked the end of the critical evaluation of peer-reviewed journal articles and scholarly literature on innovation. The literature review utilized the variables of Sternberg (2003) wics theory of intelligence. Intelligence became the matrix variable in which to revolve the research strategies around. This is because intelligence is a measure of human productivity potential. The targeted population was the intellectually gifted adult, although deceased were part of the four historic events embedded with IB and innovation activities. Four historic events were chosen to indicate a robust investigation of the study variable and to utilize comparative methodology. As previously asserted, the literature review confirmed

innovation and creativity were not synonymous terms. Creativity supports innovation

activity but rarely leads to innovation or the commercialization of products and services.

Table 7

Emergent Hypothesis and Propositions from Literature Review

A high IQ may likely not be necessary to innovate.	The cognitive innovation process is teachable. Start early with play & developing the imagination.
Workplace training systems should be designed to stimulate the imagination.	The use of the imagination should be encouraged in the workplace.
I/O practitioners should understand organizational culture & social networks.	There is a difference between creative self-expression and innovative behavior.

Please note that the above themes are not meant to be an exhaustive list of what was found in the literature review. The list refers to the cognitive approach framework of this study. The literature review elucidated many things about innovation but there is still no description of the behavior or a cognitive map of the innovative process. This why more research needs to be conducted.

Chapter 2 Summary

Chapter 2 was divided into two main sections: (a) the literature search strategy

and (b) the metasynthesis literature review. Chapter 1 was a detailed explanation of the

conceptual framework and background of the study. The conceptual framework

supported the theoretical framework, Sternberg (2003) wics theory of intelligence. The

variables of the theory provided the means to utilize cognitive approaches to facilitate a

cognitive map of the innovation process. The metasynthesis literature review provided

the means to investigate, synthesize and update the literature. Chapter two, transitioned to

chapter three, research method.

Chapter 3: Research Method

Introduction

Research psychologists conduct research studies to find simple explanations for physical realities, and to explain human behavior. Chapter 3 consisted of detailed explanations of research strategies and methodology to replicate this study, and to find answers to the research questions. This research project was designed to establish the worth of IB in the workplace through avocation of individual differences, and putting emphasis on the dignity of intellectually gifted adults.

Restatement of the Purpose of the Study

The purpose of this multicase historic research study was to describe and explain innovation activity in STEM based organizations. This goal was accomplished through the development of human factors knowledge to add a modest but significant contribution to innovation science and OB. The lesser underlying purpose was to elucidate the worth of adult gifted intelligence in the workplace. This goal was accomplished through clarification of what innovation was and by giving intellectually gifted adults 'voice'.

Chapter Preview

Chapter 3 consisted of detailed explanations of research strategies, methodology and the rationale for selecting the research design. Included in this chapter was an overview of how this study was conducted to find answers for the research questions. Explanations were kept as simple as possible to make it possible to replicate the study.

The Central Phenomena

The central phenomenon of this research study was innovation. The operational definition of innovation was simply employee productive behavior in organizations. The I/O definition of innovation was employee productive behavior that adds value to organizations in the form of products and services (Friedman, 2012). Further, the products and services were practical and can improve daily living and mundane tasks. Additionally, the products of innovation can be commercialized to sell on the open global marketplace to create employment opportunities which will decrease poverty. Work is where human beings interact to work, confirm their dignity, and support their families (Ford, Hollenbeck & Ryan, 2014, Pope John Paul II, 1981; Sacks, 2011). However, there are disadvantages connected with innovation activities. Some of the disadvantages are rapid and radical change, and negotiating and predicting business cycles. Yet, the phenomena is worth investigating because sustaining innovation activities may likely decrease poverty and balance global economics.

Research Design and Rationale

Research Tradition of the Study

This research project investigated innovation utilizing qualitative research tradition. Qualitative research tradition was preferred because innovation literature was sparse and misunderstood. The research goal was to provide clarification of the term and to describe innovation from the subjective view of the gifted adult who innovates for a living. Qualitative research tradition facilitated the collection of nonnumeric data which

focused on the human factors involved in innovation activities. Additionally, qualitative research tradition facilitated flexibility in the choice of the research design and methodology. Demographics such as race, culture, gender, and other confounding variables were not explored because of the lack of normative data to make fair and ethical comparisons.

Research Design

The research design chosen to facilitate the study was multicase historic studies design, filtered through a social constructionist lens. The research design is actually a fusion of two qualitative research traditional designs: (a) multicase study design and (b) historic research design. Each research design functioned to balance out inherent weaknesses in each research design. Fusing the two research designs eliminated most ethical issues, especially concerning the use of human subjects, and strengthened reliability and validation issues. For example, multicase study design facilitated the inquiry of a trendy issue within a real life setting such as a battlefield, and a nation. While the historic research design facilitated a contextual approach to IB through the use of archival and historic research. Both designs facilitated the use of archival/historic research, and comparative methodology.

Philosophical Framework

The qualitative, multicase historic research design was filtered through a social constructionist lens. Social constructionism takes the philosophical position any knowledge of reality is a construct of language, culture, and society (VandenBos, 2007).

Social constructionism, as was this research study, is built on the concept, work happens in social interaction. The study was viewed from the subjective view of the gifted adult about innovation in natural settings.

Researcher's Epoche

My primary role in this research project was data collection instrument in multifaceted roles, such as data analyst, interpreter, modified participant observer, and informant. Each role held a different responsibility, insight, and approach. The roles were for the most part, self-explanatory but the role of informant was complex. It was complex because I am a member of the intellectually gifted population, and my IQ places me in the profoundly gifted adult population. I was the informant to gain access to a 'hidden', often loathed population. At times, it was difficult to remain unbiased. As an I/O psychologist, I am an expert in high intelligence because understanding intelligence was part of my training as an I/O psychologist. As a psychologist and 'insider', I know the characteristics of giftedness in all populations. I also knew the literature on high intelligence was very sparse. I knew the literature was sparse because the average individual is not interested in researching high intelligence. First, they have no point of reference, and second, the average individual envies their broad based knowledge and expertise. The gifted individual finds this remarkable because they have to work hard to acquire this broad base of knowledge. While the average individual gets their information from the social media, and association with a narrow group of like-minded peers. The gifted individual indulges their curiosity about the world, read books, and reflect on their

experiences. I am interested in adult gifted intelligence and will continue to be because human development and giftedness is a vital resource for humanity and positive social progress. Therefore, in this study, I felt the need to give the intellectually gifted adult a 'voice' because knowledge and how knowledge is utilized is critical to the survival of humanity and future generations to come.

Methodology

Plan of Inquiry

The general methods that were utilized in this study were: (a) constant comparative methods; (b) archival/historic research methods; (c) clinical methods; (d) comparison historic (H/C) methods; (e) phenomenological methods; and (f) diversified methods. The methods were limited by the research model, the goals of this study, and the field of study: I/O psychology. The methodologies provided data links to the research model, and to the theoretical, and conceptual frameworks. The methods were utilized to generate theories to explain IB, innovation, and the innovation process. The primary function was to link the investment issue (the research problem), with methodology strategies to collect raw data to answer the research questions.

Nontraditional Methodology

This research study was complex and required a depth of uncommon knowledge from several social science fields, and the hard sciences, such as physics and chemistry to find answers to the research questions. The methods described above were utilized because the research subjects were deceased or inaccessible, and the variables of the

study could not be manipulated (see chapter 2, meta-synthesis literature review). Data was generated by exploring patterns and by comparing a common set of historic events known as cases which were rich with innovation activities and behavior. The methods were prescriptive, descriptive and facilitated the link of the findings to the legal professional practice of I/O psychology, and business administration. Some of the nontraditional methods utilized in this study were: (a) archaeology methods; (b) economic methods; (c) art history methods; (d) ergonomics; (e) quantum mind; (f) quantum physics; (g) engineering methods; (h) psychological methods; (I) psychophysiological methods; and (j) neuroscientific methods.

Participant Selection Logic

Target Population

The target population was the 'hidden' subculture of intellectually gifted adults. Gifted adults think for a living, innovate and commercialize new products, services, and ideas to serve the common good. Gifted adults were the targeted population of interest because IB is strongly correlated to giftedness in the literature (Shavinina, 2003, 2004, 2012). The population is rare and comprises only 1 to 2 percent of the world's population (Baucum, 2006/2018). Moreover, extreme intelligence is difficult to assess and to recognize because profound giftedness is apparent in only 0.5 percent of the world's population. Regarding this study, intellectual giftedness was assumed in each historic case. However, there was strong evidence to support the truth of the assumption.

Participant Criterion

There were three basic criteria for selection of participants for this research project. The three criterion were: (a) participation in or had eye witnessed one or more of the historic events; (b) possess expert knowledge of British, European, and American history; and (c) written scholarly material on one or more of the historic cases. The four cases were dated roughly from 1415 to 1970. Since the cases took place in the remote past, it was assumed potential participants for the study were deceased or inaccessible. When I contacted the history department head at a major university, I found out I was trail blazing. No one had conducted a research study utilizing gifted intelligence to understand innovation in the workplace, and no historian was prepared to answer my questions about innovation.

Sampling Strategy

Purposeful stratified sampling strategy was the main sampling strategy. However, other sampling strategies were utilized as well. The sampling strategies were: (a) deviant case; (b) criterion sampling; and (c) maximum variation sampling. Overall, stratified sampling strategy was utilized to assure adherence to the target population, and to identify the four historic cases with innovation activities and IB. Utilizing several types of sampling strategies assured the high quality of this research project.

Historical Case Studies

Case Study 1: Battle at Agincourt (1415)

This real life historic event happened in France on October of 1415. What essentially happened in the historic case study was a small force of British foot soldiers armed with the English longbow defeated a French mounted force of twenty thousand soldiers. What was of interest in this case study was: (a) motivations; (b) radical change effects; (c) human-tool interaction; and (d) how the intellect was utilized to win the battle.

Case Study 2: Elizabethan England (1558-1603)

This real life British historic case study encompasses the forty year reign of Queen Elizabeth I. The Elizabethan era was the subject of study because under Queen Elizabeth I's reign there was a large amount of innovation activity in politics and government, radical changes in social customs and fashion, the beginning of the British industrial revolution and the Enlightenment era. The goal was to analyze radical change effects and how the changes lead to industry growth and economic prosperity. What was of primary interest in this study was the British industrial revolution, radical change effects, and the philosophies of the Enlightenment era and its impact on innovation and business administration.

Case Study 3: Transcendence in a Home Laboratory (1898)

This real life European historic case study happened just 3.3 miles from Paris. What was of primary interest in this case study was understanding the process of

discovery, Marie's management of her laboratory and her career, her work life balance and her relationship with herself. She is the first person and the only woman to win a Nobel Prize in two separate categories: chemistry and physics. She managed to achieve many firsts as a woman when women were fighting for the vote. Her husband, a doctor and physicist, viewed her as his equal. The unit of analysis for this case study were self-management of a career, self-transcendence, work-life balance, understanding the procedures and processes of discovery, fund-raising activities to support original ideas and research, and what was life like for the highly intelligent woman.

Case Study 4: NASA: Apollo 13 Incident (1970)

The real life American historic case study happened in two locations: on earth and in space. Three astronauts were trapped in the hostile environment of space. While engineers on earth worked around the clock to get the men safely back to earth through process innovation, procedures and modification of flight strategies. I was in high school when the event occurred. I remembered how the lives of three 'unimportant men' became prominent in the world's life cycle. For six days there was world-wide peace because of a common concern: to get the men safely back to earth. I remembered the focus was on respect for human life rather than technology or machinery. The unit of analysis for this case study was innovation, the importance of human life and the intellect for survival, the motivations of the engineers and the astronauts, NASA's organizational philosophies and policies, and the emerging co-operative and transformative leadership style of Lovell and Kranz.

Case Studies Summary

The primary goal in all the historic case studies was to understand how knowledge workers think, how knowledge was utilized to innovate, and what the motivations for innovating were. The historic case studies were selected because of being enriched with innovation activities and IB. Two surreal deviant case studies were chosen to contrast against relatively normative situations and circumstances. The case studies were all compatible to archival/historic research methods, and comparison methodology.

Data Collection Instruments

Data Collection Tools

- Researcher: Doctoral student and expert knowledge worker

- Artifacts

- Archived data

- Authenticated historic documents

- Peer-reviewed journal articles

- Archived audiovisual interviews

- Battle simulations (battle at Agincourt)

- Archived University history lectures

- Virtual tour of the Curie's home laboratory

- The Curie's lab books

Researcher Developed Tools

- Field notebook

- Reflective journal

Data Analysis Plan

The types of analysis that were utilized in this study were:

- Art history analysis: paintings, clothing, jewelry, pictures, photographs

- Content analysis: documents, lab books, books, biographies, letters

- Artifact analysis: English long bow, weapons

- H/C analysis: context and pattern matching

- Deviant case analysis: how cases were alike and different

- Phenomenological analysis: subjective and objective view of the gifted adult

- Constant comparison analysis: theory development

- Replication logic analysis: how often does IB activities happens in the cases

- Cross-case analysis: similarities and differences

- Clinical analysis: brain-mind-body processes involved in innovation activities

- Time series analysis: traces change

- Pattern matching analysis: establishes internal validity

Data Protocols

1. From where was the data collected? Data collection was collected from various locations in the United States, Britain, Europe, and in the state of

Maryland. Data collection occurred online or in person at a scholarly

libraries.

2. Who collected the data? The doctoral student collected all of the data.

3. Frequency of data collection events? Data was collected on an as needed

    basis, usually 8 to 10 hours a day. Data collection was completed in six

    months.

4. How was data recorded? Data was recorded by hand using the pencil and

    paper method in a field journal.

5. What was the follow up plan if recruitment had resulted in too few

    participants? Participants or respondents were not involved. I was

    approved to conduct archival/historical research only.

6. How did participants exit the study? N/A.

Recruitment Protocols

1. Waited patiently to obtained IRB approval prior to collecting data.

2. IRB approval was obtained on March 21st, 2018 to collect archival/historic

    data only.

3. The approval number was 01-24-18-0037771. Approval expired on

    January 19th, 2019.

4. Contacted universities, museums and scholarly libraries to collect primary

    resources of authentic historic documents and validated archived data.

5. Librarian scientists from the U.K. were responsive and cooperative.

6. Conducted archival/historic research for 6 months.

7. Analyzed authentic and validated archival/historic documents, books and journals. All resources were primary.

8. Synthesized and organized all collected data during field engagement.

9. Utilized synthesized and analyzed data to write chapters 4 & 5 of the doctoral dissertation.

Issues of Trustworthiness

Credibility (Internal validity)

Internal validity was established by triangulation of data collection methods. The data collection methodology utilized were: (a) constant and consistent comparison methodology; (b) H/C methodology; and (c) archival/historic research methodology. Data analysis consisted of synthesizing the data to match cognitive states to IB and innovation activities. Utilization of lesser known British, European, and American historic events served to increase probability, randomness, decrease research threats, reduce biasness, and to assure the absence of manipulation.

Transferability (external validity)

External validity was established through utilization of Sternberg's (2003) wics theory of intelligence and propositions. The theory grounded the study to facilitate theory building in the context of innovation and IB. The psychophysiological framework facilitated a cognitive map of the innovation process to explain IB. The transferability of

the data depended on OB and workplace behavior and intelligence as a measure of intelligence.

Dependability (reliability)

Reliability was established through the utilization of case study and historic research protocols. A case study database was developed which consisted of art, paintings, artifacts, historic documents, archived documents, information about the English longbow, etc. Analysis of the items in the database were used to build explanations to explain IB in the context of organizational psychology principles and concepts. In addition, the reflective thoughts of the doctoral student researcher as insider confirmed the subjective view and experiences of the intellectually gifted adult in the workplace.

Confirmability (Objectivity)

Objectivity was established though the researcher's epoche. The researcher identified herself as a member of the profoundly gifted community. The researcher became the informant to gain access to the small community of intellectually gifted adults. The construct validity of intelligence, wisdom, creativity and innovation was established through multiple sources of evidence, and the establishment of a chain of events, such as the Enlightenment era and the British industrial revolution.

Ethics and Compliance to Research Protocols

This qualitative research paradigm had its roots in archaeology, anthropology, developmental and clinical psychology. It is an innovative and experimental model which

encouraged the use of other types of scientific training. The qualitative multicase historic

research design encouraged complete compliance to the APA's ethic code for

psychologists (APA, 2010). This was accomplished by eliminating all potential ethical

issues and research threats. The fusion of the two research designs eliminated threats to

internal validity such as history, maturation, selection of participants and other significant

research threats. Nonexperimental methods were utilized to collect nonnumerical data.

This research study did not utilize human participants nor was the clinical aspects of the

variables manipulated. The study utilized real life historic events as cases. The historic

events were stable because they had already happened and could be repeatedly analyzed

for data.

Chapter Summary

Chapter 3 was an overview of the research design and methodology for collecting

and analyzing raw data for this study. The research strategies for the study utilized three

methods: (a) constant comparison methods; (b) H/C methodology; and (c)

archival/historic research methodology. The population sample consisted of individuals

who were either deceased or inaccessible because of the periodical time line of the

historic events. The four historic events were chosen because they were enriched with

innovation activities, IB, and intellectually gifted adults of both genders. Chapter 3

transitioned to chapter 4, results of data collection.

Chapter 4: Results

Introduction

Evidence from the synthesized literature review confirmed the outcomes from conducting the research study. The study facilitated the means to answer the research problem and the research questions. Data collection for this study was triangulated utilizing archival and historic research methodology and two types of comparison methodology. Data collection goals focused on the respondents, and gifted adults in the context of their respective organizations in regards to their innovative productive behavior. Undoubtedly, the key respondents were either deceased or inaccessible. Therefore Sternberg (2003) wics theory and the conceptual framework made it possible to utilize other measures to assume and assess the value of intelligence of the key participants featured in the historic events. The findings from this study were psychological and of a psychophysiological nature because the dissertation study was a psychological study.

Re-statement of the Purpose of the Study

The purpose of the qualitative multicase historic research study was to explain the worth of adult gifted intelligence, and the ability to innovate. The study was conducted because of the importance of globalization and utilizing evidence based solutions to social and economic problems. For example, it may likely become possible for international trade to become a vehicle of peace. While sustaining and increasing organizational productivity may likely decrease worldwide poverty and violent conflict.

Re-statement of the Research Questions

RQ1: How is the innovation process initiated by the innovator to facilitate IB?

RQ2: What does IB look like in a STEM workplace in an organizational context?

RQ3: What does the gifted adult feel about their innovative capabilities?

RQ4: How much of the innovation process is unconscious?

RQ5: How was IB recognized in the organizational settings?

RQ6: How do innovators behave in professional and socio-technical workplaces?

RQ7: How do managers instill loyalty in followers?

RQ8: What is the nature of psychological contracts between the key players?

Chapter Preview

In chapter 4, an overview of the findings were presented. In addition, there were detailed descriptions of data analysis and research strategies. The chapter ends with a summary of the findings and their implications. Chapter 4 then transitions to chapter 5, the interpretations of the findings.

Research Setting

The setting for this research study was the remote past, spanning five hundred, and fifty five years along an infinite time line. Four lesser known, real-life historic events from Britain, Europe and America's past were studied in their natural settings. The research study was designed to mimic experiments and a longitudinal study. The historic events were purposely selected to observe the time periods, before, during, and after, the British Industrial Revolution. Many risks and the possibility of adverse events were

managed because the events had already occurred, were stable, and could be repeatedly analyzed for data. The time periods were as follows: (a) 15th century, medieval France; (b) 16th century, Elizabethan England; (c) 19th century, Paris, France, the enlightenment era; and (d) 20th century, United States, Florida, Cape Kennedy, and outer space, somewhere between the moon and the earth.

Precise Settings and Locations

Case Study 1: Battle at Agincourt (1415). Agincourt, France. Farmland, two miles outside the town of Calais.

Case Study 2: Elizabethan England (1558-1630). The British Isle located North by Northwest of Europe.

Case Study 3: Discovery in home-based laboratory (1898). The Curie's home based laboratory, three miles from Paris, France.

Case Study 4: The Apollo 13 incident (1970). NASA ground flight control located at Cape Kennedy, Florida, the space ship, Odyssey, located 62 miles up from earth.

Demographics of the Research Study

Table 8

Psychographic characteristics of Key Respondents

Intellectually Gifted Adults	Characteristics of Key Respondents
Problem-solver	Problem-solver
Life-long learner	Life-long learner

Humble	Humble
Regular church attendance (structured religion)	High moral standards
Honest	Honest
Street Smarts	Learns from experience
Innovative behavior	Innovative behavior

There were four nominal categories that were utilized in this study to select potential respondents for this study, and to define the perimeters of data to be collected: (a) gifted intelligence; (b) gifted adults; (c) gifted men; and (d) gifted women. The categories were general and broad because there was sparse and limited information in the literature about the gifted adult and the human factors involved in innovation activities. Therefore, a gifted adult could be male or female of any race, color, culture, religion, ethnicity, or nation. Additionally, gifted intelligence was not perceived of as a disability, a special skill, a mental health issue, a mental illness, or as a strictly masculine trait. Women are intelligent, too. High ability intelligence cannot be imitated, accessed or recognized by non-psychologists or non-psychiatrists because studying intelligence is part of the psychologist and the psychiatrist's long term training. Sternberg (2003) wics theory of intelligence provided a broader model and concept of intelligence to assess the respondents in the research study for high intelligence (see table 8). It was not possible to administer and score an IQ test as a selection tool because of the inaccessibility of the key respondents. Additionally, the highest IQ is not always measurable by standard IQ tests.

In retrospect, limiting data collection to European historic events or deviant events did not limit behaviors or thoughts to European standards of behavior or thought. Any individual, no matter what color or race would react the same way on a battlefield or in a laboratory. Mind and thoughts have no color or race. Psychology is the study of the mind, and is about explaining the physical realities of being human, and human nature. Sternberg was correct to assert there should be other means to assess for high ability intelligence. While Pinker (1997), an evolutionary psychologist posited there should be a means to tap into the potential of high ability adults. In the 21st century workplace and beyond, knowledge and knowing how to use knowledge will be useful to humanity for social progress.

Table 9

Key Respondents of this study

Deceased Respondents	Inaccessible Respondents
Six thousand English longbow archers, King Henry V, Queen Elizabeth I, Sir William Cecil, Drs. Pierre & Marie Curie, Jim Swigert, Fifty ground control engineers, Barbara Goldsmith	Gene Kranz, Jim Lovell, Fred Haise, fifty ground control engineers, Susan Quinn, Eva Curie

Data Collection

Table 10

Data Collection Table

Participants	Types of Data Collected
6,000 English Longbow archers (1415)	Battle simulations, tutorials, historic records, eye witness reports, biographical material
King Henry V	Biographical materials, artifacts, paintings, eye witness accounts.
Queen Elizabeth I	Artifacts, biographies
Sir William Cecil	Biographs, artifacts
Pierre & Marie Curie	Photographs, lab book & reports, virtual tours, artifacts, documentaries
Gene Kranz	Autobiography, audio-visual interviews
Jim Lovell	Auto-visual interviews, debriefing sessions, NASA technical reports, Televised press conferences
50 NASA ground control engineers	NASA websites all over the world
Barbara Goldsmith	Audio-visual interview, biography of Marie Curie
Susan Quinn	Biography
Eva Curie	Biography
Fred Haise	Audio-visual interviews
Jim Swigert	Audio-visual interviews

The type of data the IRB permitted to collect was archival/historic data only. It was not possible to utilize survey or questionnaires to collect data because of the different concepts of the term innovation. Second, very few creative individuals have innovated because a patent or copyright would provide the proof. Third, a dissertation is not an opinion poll, to interview individuals to give their opinions on European or other historic events they know little about. Their opinions would not facilitate answering the research problem or research questions. Therefore, archived data and historical methodology defined the perimeters of the kinds of data that was collected.

The duration of data collection was six months starting in March of 2018 and ending on August of the same year. Data was collected from a private location. The frequency of data collection was from five to ten hours a day (30 hours per week), 120 hours per month, and 720 hours or more in six months. Whenever possible, data was collected late nights or early mornings. The research sample was large and heterogeneous and yielded rich, evidence based data. N=6,064 respondents, the sum of table 9.

Data Analysis

Data analysis was processed as raw data was collected and recorded in field notebooks by hand. Data Analysis was tedious, multi-level and complex. The methods utilized were archaeological and ethnographic techniques of collecting, organizing, and recording data. Data collected was from the subjective view of the respondents in their natural settings. This was achieved by utilizing a variety and diversity of analysis.

Table 11

Data Analysis Utilizing Raw Data from Research Methodology

Data Analysis	Raw Data Collected
Content analysis	Books, reports, archived data, historic documents
Artifact analysis	Weapons (English Longbow)
Art history analysis	Paintings, buildings, photographs, clothing, jewelry
Comparative religion analysis	Compared Catholic dogma with other religions
H/C analysis	Compared social customs & other behavior
Mind-body analysis	Match cognitive states to planned movement
Organizational culture analysis	People, policies, mission, vision, leadership style
Pattern matching	Similar or differences in behavior
Sociotechnological analysis	Change effects and impact of progress

Evidence of Trustworthiness

This study was a robust research study of innovative behavior in the workplace and organizational context because of the large random sample N=6,064) and compliance to ethics and research protocols. The four historic cases were studied in their natural settings and data collection was triangulated. The study was reliable and valid because of the attention put on lessening research threats and eliminating ethical issues. Research weaknesses were balanced through the innovative use of two qualitative research designs:

(a) multiple case study design and (b) historic research design. These procedures facilitated the expansion of human factors data connected with giftedness in the workplace, employee productive behavior, and innovation science.

Preliminary Findings of Multiple Historic Case Studies

Introduction

Humanity's sense of time, space and orientation in society has been shaped by innovative technologies. For example, the development of the light bulb changed the concept of time by extending daylight hours. Additionally, the airplane changed the concept of time and travel. Innovations are not just artistic creations but new technologies that transcend the mind, changes the environment, and human concepts of time and space. This research study makes the underlying point that the human worker is critical to organizational success even against fierce marketplace competition and can literally make or break organizational goals if workers are not encouraged to use their imagination or spiritualize the workplace. Therefore, the primary concerns of the I/O psychologist should be the well-being of the human worker.

Table 12

Correlations of individual and organizational units (between & within case studies)

Similarities	Psychophysiological data (e.g. behavior, motivated, cognitive intent, etc.)
Differences	Environmental (e.g. location, culture, time periods, etc.)
Outliers & anomalies	War, home-based laboratory, space, space ship, etc.

Case studies 1 & 4 correlate (surreal situations), case studies 2 & 3 correlate (collaborative & partnership, feminine wisdom), case studies 3 & 4 correlate (observable IB & products) and case studies 1 & 4 correlate (transformational learning)

Research Questions Answered

RQ1: What is the innovation process and how is the process initiated?

The innovation process is a psychological tool utilized by the profoundly gifted adult to solve problems in the environment, to discover, explore, or to improve things. The imagination develops the cognitive image of what needs to be replicated in the physical world by IB. The process is largely unconscious but gifted adults are fully aware of the process. This is most likely the rationale for the average individual to believe innovation and creativity are the same processes: lack of awareness of thoughts and ideas that transcend creative thinking. Usually innovations cause rapid and radical change and the changes are not always easy to adapt to. The process is long and gradual but is linked to planned movement. If an innovation is physical product or a widget, it can be commercialized and sold on the open marketplace for income. The innovation process is

evolutionary and more practical than creativity for enhancing survival, adaptation, and change.

RQ2: What does IB look like on a typical day in the workplace?

What IB would like in the workplace would depend on the type of organizational culture, corporate policies, the mission statement and context of the organization, and how management is trained to recognize and encourage IB. This is possible even in a fast food restaurant situation. However, a manager might likely observe a worker intensely engaged in their work task.

RQ3: What feelings do gifted adults have about their innovative abilities?

First, the individual would have to be acutely aware of self (not others) and their own abilities. I became aware of my own innovation capabilities by pursuing advance education. Like most gifted women, I became aware of my capabilities in relationships (e.g. classroom situations) and with a mentor. For example, a college professor coached me twice into a 4.0 for two quarters. I generally do not care about grades. Another example is my dissertation chair who guided and coached this dissertation and research study. When I learned I could innovate, I was thrilled to discover I could solve problems, design tools, and devices that could improve situations for others. Innovation is linked to my high moral values and my impulse to give. Innovation is a way of giving to others without being manipulated or ridiculed. Being able to innovate I feel useful in a different and practical way. There is little or no ego attached to the outcome or ability. Just pure satisfaction and gratitude.

RQ4: Do managers recognize IB in organizational context?

Usually the transformational and democratic leader does because he/she gets to know their followers as individuals. They do not conceive of fairness as treating everyone the same. They do not focus on color or race but the skills of the people they are responsible for. They understand they are responsible and not their followers because corporate asks the leader and not the worker when something is not working.

RQ5: How does the transformational manager instills loyalty in their followers?

First, the nature of the psychological contracts between the leader and the follower is mutual respect and trust. Above all, a transformational leader is honest and is preferred by intelligent and extremely intelligent individuals. A transformational leader is intellectually stimulating and treats their followers as they would want to be treated (the golden rule). Second, the personal development of their followers are important. The leader knows the team as skillful and learning individuals and not as a glob of bodies to order about. Third, the transformational leader is fair and not presumptuous of justice. All followers are not treated the same because each has different interests, needs, and abilities. The transformational leader is not a psychologist but socially intelligent. Everyone is not the same. A smart transformational leader builds a team by learning about the individual's KSAO's and not by psychoanalyzing as a psychologist. The team's 'attitude' has nothing to do with productivity or success but the motivations, attitudes and competence of the leader, manager or corporate board.

Four Multiple Historic Cases

Introduction

For this multicase historic research study, nonexperimental methods were utilized to collect archival/historic data about innovation and IB. Human subjects were not utilized in this study because potential respondents were either deceased or inaccessible. The four historic events were perceived as cases or 'experiments', and four to six cases were recommended to conduct a robust qualitative research study (Creswell, 2012). This was the rationale four historic events were chosen for this dissertation research study. The historic events were: (a) rich with innovation activities and IB; and (b) were lesser known historic events from Britain, Europe, and American history. The rationale for using historic events from Britain and Europe was to increase probability, randomness, reliability, and validation. Two historic events were deviant cases while the other two cases were 'normative'. Comparative methodology was used to collect and analyze data from the four historic cases, and to answer the research questions. Finally, clinical methodology was used to develop a speculative cognitive map of the innovation process (Gaskins, 2018).

Historic Case Study 1: Battle at Agincourt (1415)

Vignette

During the 15th Century, Britain's King Henry V, declared war on France. His rationale was based on the divine rights of kings, and he honestly believed he was the rightful ruler of France. When Henry started his march on Paris, something went wrong

and he had to retreat with his fifteen thousand men, largely composed of English longbow archers. The march to safely was long and difficult. Henry lost many of his men to starvation and sickness. They were further humbled by the small kindnesses of the French villagers as they retreated to safety. They gave the soldiers food and shelter as they marched towards the safety of the English occupied French town of Calais. However, as Henry and his men approached Calais, a heavily armed French cavalry unit of twenty thousand soldiers blocked their way. What happened next has remained the subject of debate, legend, and scientific speculation for over six hundred years. King Henry and his small force of nine or six thousand English longbow archers defeated the French force with few losses.

Agincourt: Literature versus Science

Shakespeare, the playwright, used a few facts about the battle at Agincourt to elevate the battle to a legend. Although the battle and the resulting victory shaped the 'indomitable British spirit', which also shaped the American spirit, the British are sensible enough not to take Shakespeare to heart. Shakespeare wrote nonfiction and fiction to entertain and educate the pleasantry. On the other hand, science credits the environment and King Henry's battle strategies for the British victory. However, other researchers credit French arrogance and the lack of discipline as the rationale for the victory. It is not arrogant to assume victory with a larger force over a smaller force of men. It is common sense. However, scientific speculation only resolves a small part of the mystery. King Henry V, and his followers believed the victory was the result of

divine intervention. Consequently, the humble king dedicated the victory to God's justice and mercy.

The purpose for analyzing this case was not to promote religion, the Roman Catholic faith, or God. This dissertation was psychological and focuses on the subjective view of the respondents in the case study. I am a psychological scientist but I know there is a God. My relationship with God is very subjective, very personal, and empathetic. Therefore, I am able to present the battle at Agincourt and its outcomes in an objective and unbiased way. This is because this research study is psychological and not theological. I am more interested in finding meaning in the shared experiences of the longbow archers on the battlefield than debating God's existence or nonexistence. The psychological truth of King Henry V, the French, and their followers was the unconditional belief in God. I cannot discuss God in a scientific study about innovation and IB, therefore, the focus was on King Henry and his men's faith. Faith is not religion and religion is not faith. This critical insight facilitated the psychological construct of faith as intrinsic motivation, and transcendent experience. What was of interest in this study was how overwhelming stress impacted innovation activities and IB. The goal was to trace the effects of change and survival in a surreal situation.

The English Longbow Archers and the Longbow

The social standing of the archers were below the gentry and the merchant classes but higher than the peasantry. However, the archer's professional skills and wages provided the means for respect and opportunity. The yeomanry, as the archers were

called, decreased the peasant class (lower middle class) by providing a portal to upward

mobility. Therefore, part of the archer's motivation for being part of the King's armed

force had much to do with escaping a cycle of economic depression as well as their

religious faith. In 15th century Britain, the only religion of choice was Roman Catholic

and since the first converts to Christianity were Jews, the faith was essentially more

Jewish than modern Roman Catholic religion. The militia were organized according to

guilds (trade associations) and provided the income to stabilize the town's economies.

The 15th century English armies consisted of two types of soldiers: men-at-arms (knights)

and the foot soldier (infantry), the English longbow archer. To this day, the infantry

(Marine Corps) are considered the most innovative part of an armed force (Holmes,

2001). The archers were highly trained, highly skilled, highly disciplined, and competent

(Curry et al., 2015). These qualities and characteristics are what linked the archers to

adult gifted intelligence.

King Henry placed great emphasis on formal discipline and correct conduct for

practical reasons because waging war and violent conflict on neighboring towns were

how nation states accumulated wealth (Curry et al). King Henry possessed two markers

of the transformational leader: demanding and modeling discipline and correct behavior

(Yukl, 2010). These two markers are the why transformational leaders will attract

intelligent followers (Yukl). Another marker is preferring men who followed directions

(not without questioning) rather than opinionated men. This is because following orders

in a battle could make the difference between survival and death. A well-disciplined

armed force requires team work and unselfish behavior such as sacrifice and the construct

sacrifice is the link to faith and high moral standards.

The English longbow was a difficult weapon to master because it required long

years of practice and use to become proficient. In other words, you master the use of the

weapon by doing. The longbow was Scandinavian in origin and a version of the longbow

was used by the Vikings against the English (Curry et al., 2015). The longbow was well

made, cost-effective and suitable for mass production and raiding. The longbow was

renowned for volume and accuracy and a team of archers were comparable to the WWII

machine gun. Therefore, the machine gun may likely be a technological innovation of the

longbow by decreasing man power. Standards of recruitment focused on long range and

straight shooting, and team work. Team work was especially crucial because of the

English tactical system. The English tactical system was defensive while the American

tactical system is offensive. The English tactical system requires the cooperation of an

interdependent team working towards the same goal (Curry et al.) Some examples of this

type of tactical system is Star Trek. Starfleet wages peace by utilizing a defensive tactical

system. The proof is Kirk's prime directive: not to directly interfere with the natural

progression of human beings. Another example is NASA's tactical system for manned

space flights. Their tactical system is defensive so that they can handle problems together

as a team. Therefore, a defensive tactical system forces the use of innovation activities,

and IB by utilizing the natural obstacles in the environment to secure survival and to

reach planned goals. To provide an argument against the popular phrase, 'Thinking

outside of the box', innovation is more like thinking inside the box but differently. The archers learned different formations and approaches to their work by active listening, and by being exposed to diversity and difference (see case study 4).

The archers were transformational life-long learners and this is how they maintained their employment and sustained their economic value. During the 'dark ages' war and violent conflict was how nations reached economic prosperity. The military leaders and foot soldiers depended on intelligence and weapons to win wars (Curry et al., 2015). This was proof innovation was not voluntary behavior and was linked to evolutionary theories of adaptation and survival. However, psychological stress and imposing great psychological trauma may most likely limit innovation activities and behavior because intelligence is altered on the battlefield. An individual just wants to stay alive.

The Leadership Style of King Henry V

King Henry's leadership style was democratic and transformational (case study 4). This leadership model was before its time in 15th century. Henry treated his subjects with kindness while his contemporaries including church leadership were authoritarian. However, this excludes monks and parish priests who were considered virtually powerless by church officials because they worked among the 'people'. King Henry V was the only key respondent with a political agenda but he had many benevolent characteristics which link to the gifted adult. First, he was humble though he was a monarch. A marker of giftedness. He was highly educated and most likely by a priest or

monk. Another marker of giftedness. The gifted usually pursue advance education or learn by doing or learn through a system of careful reading (See case study 3, Pierre Curie). He was wise and was known by his subjects to settle disputes in satisfactory ways. He was a highly devout Catholic and respected the dogma and rituals, and traditions of the Catholic church. If he had conflicts with church dogma or the church officials, he never openly challenged the church or the church's authorities. This is another marker of the gifted adult. They utilize the traditions and rituals of organized religions to leverage and practice their high moral standards. Therefore, faith, prayer, religion, and spirituality matters to the gifted adult. A traditional systemized organized religion and church matters to the development of gifted intelligence.

Henry was highly respected as a proficient war warrior yet he managed his public image by dressing as a monk. He used his religious spirituality in part like Queen Elizabeth I (see case study 2) to invoke a psychological ideal of 'religious benevolence' through impression management. He was respected as a great leader because Catholic Britain would perceive the king as an intermediary between God and his subjects. Perhaps the use of a spiritual ideal implied and secured unity because the Catholic Church was an important institution in the lives of the medieval peoples. He shared the danger of death in battle by fighting along aside his men on the battlefield. He stayed alive because he was surrounded by voluntary body guards as he fought. Again the repeated theme of team work. Henry was an honest man and this is the mark of a great leader: the courage to be honest and humble (Yukl, 2010). For example, he did not expect

to win the battle but he did not lie to his men. Although Shakespeare credits Henry for making eloquent speeches to his men, on the eve of battle he was humble, became very vulnerable, and human for his followers. He shared his fears but encouraged his followers to transcend the need to survive and work together as a team (Curry et al., 2015).

To encourage team work despite the odds of success is another marker of the transformational leader (Yukl, 2010). In encouraging team work despite the odds instills hope and hope is linked to faith. Kranz and Lovell did the same with their respective crew members during the Apollo 13 incident (see case study 4). Further, Henry was quoted as saying to his men, "I would rather die than to be taken by the French to burden the English with my ransom", (Curry, et al.). The sentence is more of an impassioned promise to his men and his feelings about his life and his soul than an eloquent Shakespearean speech to entertain an audience. He was affirming his desire to die with his followers. In addition, considering how royalty was treated in battle, his impassioned utterance was one of great sacrifice. Another marker of a great leader.

On that day, before the battle, Henry was wise to confirm his faith and his men's faith in God and the afterlife. Therefore, their intrinsic motivation of faith and belief in divine intervention became part of the unexpected turn of events (miracle), and their determination to work as a team. They won the battle with few losses. Moreover, more than six hundred years later (see case study 4), a similar turn of events happened with the motivations being similar. Faith as the motivator to go beyond what is expected. Then

perhaps miracles, which are above scientific laws may likely not be attributed to magic but to other types and forms of law.

Faith, Hope and Charity under Pressure

Before dawn on October 25th, in the year 1415, St. Crispin's day, English and French soldiers said prayers, confessed to priests, and attended mass to ready their selves for battle (Curry et al., 2015). Shortly thereafter, six thousand English longbow archers, before taking their defensive positions, knelt, made the sign of the cross on the ground and kissed it. Pope John Paul II was known to kiss the ground after his arrivals to his destinations. Consequently, Pope John Paul II's faith was very 15th century-like and was very spiritual Jewish. To continue, the ritual gesture reminded the men of their mortality because the English were facing an uncertain future. Their faith which was an unconditional belief in a just deity and an acute awareness of their impending death were internalized in prayers and confession to priests. The rituals and the gestures connected to the rituals served to reduce their anxiety about the outcomes of the battle (Critcher & Lee, 2018). The religious rituals stimulated intrinsic motivation to transcend fear and selfishness and confirmed their unconditional belief in a superior deity. Their faith and an unconditional belief in a higher being gave plausibility to transcendence and miracles (Critcher & Lee).

Unlike modern Catholics and Christians, the medieval mind had an intimate and personal belief in a higher deity. Their faith was slightly different from the ancient Hebrews who had a covenant with God. Besides, that, the first converts to Christianity

were Jews. For Jews, death is not something to fear because death is simply a transition from life to another life (Talmud). This is the rationale for King Henry's referral to his men about justice and mercy in the afterlife. The modern Christian thinks of faith in the context of reason and an act of the will. This thinking style is supposed to transform the individual in a spiritual way. However, in the modern world, there has been a great decline in belief of God. Faith is linked to the psychological constructs of charity (love) and hope, and belief in miracles. For the truly religious, a miracle is a religious sign of God's love and redemption. Henry's men believed in God's redemptive love.

King Henry said to his men, "May God and the justice of our cause defend us" (Curry et al., 2015). Their unconditional faith in God was the basis for the men to work as a team and transcend matters of the battlefield. Henry's impassioned speech again reveals his effectiveness as a great transformational leader. He was able to stimulate their intelligence and to sustain innovation capabilities and IB during the battle because the mind contains infinite possibilities for survival, adaptation, problem-solving, discovery, and improvement. The highly educated and highly developed gifted adult can triumph over technology and the 'common sense' of the collective unconscious. Therefore, from the subjective view point of the key respondents, they were correct to attribute their victory to the miracle of divine intervention.

Summary of the Findings in Historic Case Study 1

First, the findings of case study one is the outcome of the analysis of a deviant case or an extreme example of innovation activities and IB. This is because in surreal

situations, IB is clearer and more visible. This is the rationale for utilizing historic events that have already occurred to stay in compliance with international and national standards of conducting scientific research. The critical findings in the case study were: (a) faith as a psychological construct; (b) faith as an intrinsic motivator; (c) miracles and the nature of other laws; (d) spiritual based productivity; (e) how faith is more than belief in God; and (f) transcendence of basic survival instincts. Analysis of collected raw data consisted of learning about the environment and the battle field; learning the English tactical system and of King Henry's battlefield strategies; human-tool interaction and weapons; learning how to use the English longbow and its history; comparative religion; and how rituals and ceremony were used on the battlefield to ready the men for the outcome of the battle. In other words, psychological data was collected because the case study was not selected to glorify conflict or war. An unintentional turn of events demonstrated the need for a militia even beyond the spoils of war and violent conflict.

In general, the artifact analysis of the longbow revealed the longbow was a most innovative tool for hunting and recreation. The long training required to master the tool changed the men physically and psychologically. From an art history analysis a painting of King Henry V revealed he looked like a monk. I read the Shakespearean play and watched two movies based on the play because I wanted to get a broad picture of the battle and battle strategies but I was more focused on Shakespeare's beautiful prose. He painted an ideal picture of Henry and the war and the play was useless for a scientific and psychological analysis of what it like to be in danger of death on a battlefield. In my

opinion, what happened on the battlefield was a miracle. A miracle is an event that seems to contradict scientific laws (Webster's New World Dictionary and Thesaurus, 2014). However, there are other laws besides the laws of science. Miracles are linked to the construct faith and certain types of behavior and certain types of behavior can transcend what is expected in certain situations and circumstances.

Faith has many meanings and is of many types. Faith was defined as an unquestioning belief in religion or complete trust in something (Webster's New World Dictionary and Thesaurus, 2014). The Jewish concept of faith was a person who acts within God's will and does not work outside the divine law. This was another implied reference to other types of laws in the universe. The Greek ideal and the modern Christian's understanding of faith is the disposition of the intellect but involves an act of will (Stravinskas, 1991). Therefore, in the modern Christian's mind, faith and reason is correlated, therefore is highly tempted not to believe in God or divine intervention. Consequently, psychological science has no definition of the psychological construct of faith. The 15th century Catholic Christian believed the matter of faith was connected to the will of God and the divine law, while the modern Christian believes faith is a matter of reason. The thinking is illogical because faith is irrational, an individual believes or does not believe because the existence of God is not in the realm of physical or psychological proof. First God is a deity outside of the universe which essentially means God cannot be proven or disproven. It is illogical to argue about something that cannot or can be proven.

Faith is linked to transcendence and transcendence is linked to innovation activities and IB. This is because the knowledge to innovate is created from a conglomerate of information and ideas processed by the brain and the nervous system. The information is part of the memory system but stimulates the innovation process and is external of the mind and body. The purpose of the process is for the common good and not for selfish reasons. The survival of humanity depends on social interaction or team work. What is also significant to note about the Battle at Agincourt is that the English and the French prepared for battle in the same manner but the French's intentions were different from the English. The English were humble and totally depended on their faith in God and the afterlife. The British felt they needed God but the French did not.

Table 13

Summary of Findings in Case Study 1

Faith, transcendence, miracles, hope and love are linked to innovation and IB.

Innovation is intrinsically motivated by Faith.

Faith is an act of the will.

Miracles are events beyond the laws of science.

Innovation activities and IB are transcendent experiences.

Faith and transcendence is linked to adult gifted intelligence.

Productivity increases with learned experience and tenure on the job.

Faith is linked to wisdom and wisdom is linked to knowledge, information processing and expertise.

Social , moral and emotional intelligence is linked to innovation.

Innovation is linked to proficient team work, shared transcendence and shared faith

Historic Case Study 2: Elizabethan Era; the Golden Age (1558-1630)

Vignette

Queen Elizabeth I experienced many psychological traumas before becoming queen of England. She lost her mother, Anne Boleyn, at the age of three. She lost her father, King Henry VIII, whom she adored, suddenly. Then her half-brother, Edward died. She was wrongly accused and imprisoned twice because she was perceived as an obstacle and a threat by her half-sister, Mary Tudor, called Bloody Mary. Next, her half-sister, her father's surviving wife, and her step mother's lover, all projected their overwhelming fears, ambitions, and frustrations on a very vulnerable Elizabeth Tudor. At that time, she had no ambition to be queen. It was Sir William Cecil, her life-long advisor, who removed her from the overwhelming stress of court. Imagine how it must have felt to be imprisoned in a room for three months, with a window overlooking the spot where her mother was beheaded.

The Mysteries of a Queen and a Woman

The woman, Elizabeth Tudor, who became queen of England, was very different, very vulnerable, and very intelligent. All these characteristics are markers of adult gifted

intelligence. The average individual takes advantage of gifted people in the workplace because they are vulnerable and moral. Much like Dr. Marie Curie, Elizabeth as the queen of England, was a creative dynamo but in a different way from Dr. Curie. First, though feminine intelligence was considered unusual in the 16th century, it was not considered negative or unfeminine. Like King Henry, her predecessor, she was a transformational leader and believed in the divine right to rule. Like Lovell (see case study 4), she was charismatic. This means the transformational model of leadership is neutral and not gender based. Elizabeth approached her position to rule as a vocation. She possessed excellent communication skills which she utilized to facilitate respect from the peasantry to the royal court. In case studies 1 and 4, King Henry V, Kranz, and Lovell possessed the same type of communication skills.

Though Elizabeth Tudor was labeled protestant, she was in actuality, a Catholic reformer as her mother Anne Boleyn was. She loved the Roman Catholic faith and the rituals. The Church of England is quite Catholic in many ways. It runs on the same liturgical cycle, the same liturgy, and the church hierarchy is similar. However, the dogma is slightly different. For example, priests can marry and date but not in the Catholic faith. Elizabeth reformed the church because she hated the divisions between her subjects over religion and she hated how her half-sister, Mary Tudor solved the problem of division through violent means. Mary Tudor did not read the Bible except to justify her actions. Elizabeth instinctively understood the church had the power to release the imagination and love for life and she read the Bible. Like King Henry V, she was deeply

religious. She resolved the divisions between the British people in a very peaceful and constructive way by reforming the Catholic Church so Protestants and Catholics could worship together. She believed as queen, she should provide a role model of what an ideal Christian should be and act like. She accomplished this by walking through town to church to attend mass or to pray. In addition, Elizabeth did not oppose the church being under the authority of the Pope. It was the 16th century Pope who opposed Elizabeth and her position on the throne for political reasons.

Queen Elizabeth I had a definitive vision of the British identity and as a woman managed to expedite her vision of the British identity without large scale war and a series of violent conflict. This is because she most likely had intimate knowledge of male psychology. She knew how to direct male energies where men would be at their best. For one, she was a scholar, and had a deep respect for scholarship. Scholarship provides the foundation for the free exchange of ideas. Besides, Elizabeth believed the pen was mightier than the sword. She knew men were concerned with things of the mind (scholarship), exploration, discovery and adventure (geography). In addition, she knew exploration would open the door to discovery, adventure, diplomatic relationships, and alternate means of accumulating wealth. Elizabeth was an adventuress herself. Lastly, although the average American thinks of royalty as celebrities or politicians, the British monarchy is neither to the British people or Europeans. British royalty is living history and how the British realize their immortality and continuity of the British people through

the royal line. Queen Elizabeth I was able to accomplish her goals because she had help from a gifted man named Sir William Cecil. She realized her goals through connection.

The Gentry, Merchants & Explorers

In the year 1563, the Elizabethan government issued a legal mandate that would ultimately stabilize national and local economics. The mandate stated, "All abled bodied individuals excluding gentlemen, scholars, and landowners (upper class with wealth) must choose a trade from the crafts (e.g. carpentry or smoldering brass), the sea (e.g. merchants and explorers), or agriculture". The mandate served to make sure every abled bodied individual was gainfully employed. Ultimately, merchants and explorers became part of the middle and upper middle classes. This is because the products they bought to England from other parts of the world supported the growth of entrepreneurship. Moreover, the mandate effected full employment and made an impact on how people spent their money. The merchants made sure they had knowledge of the goods they sold because the growing middle class preferred to invest their money and to buy goods that supported family needs. Notice the repeated theme of knowledge and the use of knowledge linked to supply and demand in an economic means. Therefore, a large percent of the taxes were collected without oppressive tactics.

Established wealth or Aristocrats preferred playing the 'stock market' for two reasons: (a) their financial investments provided the capital for the merchants and explorers to bring back goods; and (b) to realize a profit from their financial investments. The goods the merchants sold bought power, and near social status with aristocrats and

those who inherited wealth. The merchants were self-made, had conservation morals, a

thrifty nature, a hard work ethic, and integrity. These characteristics are characteristic of

gifted intelligence and are the foundation to upward mobility. Innovation and innovation

activities has its roots in agriculture. The grains the farmers grew provided bread and

other food supplements and was open to the design of machinery to ease harvesting and

storing grain. Another stabilizing effect on the economy was eating fish instead of beef

and pork because seafood provides nutrition for the brain. Adding fish to their diet

supported clarity and focus to the brain and decision-making. Moreover, medieval

marriage had a stabilizing effect on the local economy. This is because marriage gave

women protection and equality. Although the medieval woman was not known for their

intelligence, they were not expected to be passive and totally obedient to men or their

husbands. They usually contributed to the marital relationship as an equal partner.

Businesses were purchased and owned jointly by both husband and wife.

The Gifted Woman Queen

Elizabeth Tudor was a social institution reformer and innovator. She had the skills

of an I/O psychologist or a city planner. She knew enough about infrastructure to modify

most of the 16th century British social institutions. First, she modified the Catholic

Church to include Protestants. A concern with relationships. Besides modifying the

rituals of the Roman Catholic Church, she used impression management to provide a

living psychological model to unite the British people and to maintain their unity. She

used the Blessed Virgin as a model to effect unity among her subjects. She knew the

Virgin was honored by both Catholics and Protestants, therefore she reinvented herself into a live icon of the Virgin. First, because she did not want other women to imitate her clothes as if she were a fashion model or celebrity, a mandate was issued to not copy her fashions. Second, she used jewels, silver, gold and elaborate embroidery to symbolize holiness, purity, virginity and redemption in her clothing. Sir William Cecil was wise enough to understand what Elizabeth wanted to accomplish and provided the finances for her elaborate wardrobe. Therefore, common faith, and impressions of holiness, purity and Virginity provided the basis for unity among religious divisions. The repeated theme of faith as a motivator for increased productivity, again.

Although the British Industrial Revolution was at its climax in the 19th century, Elizabeth's policies and institutional reforms provided the foundations for invention and innovation activities. This was because of focus on scholarship and science becoming the foundation for reasoning. New ideas accelerated progress in science, law, medicine, philosophy, and theology. Therefore, scholarship, scientific knowledge, and the free exchange of ideas provided the passage to invention, innovation, and commercialization of products and services developed from innovation activities. Elizabeth's modification of the Catholic Church encouraged independent thinking and intellectual scholarship as well. The emphasis on scholarship resulted in the growth of professional and educational services. Elizabeth's vision of the British identity was aristocratic, regal, and refined and was accomplished through a collaborative partnership with her intellectually gifted advisor, Sir William Cecil.

Gifted Men: The Gifted Woman's Ally

Queen Elizabeth I was very ambitious for the sake of the British but knew she could not accomplish her vision, alone. True, she had a staff of men at her disposal but who made her provide proof for her ideas. However, there was a great man behind the great woman, Sir William Cecil, her chief advisor. He was a man she could trust. William was a statesman, a diplomat, a politician, administrator, scholar and lawyer. He was from the upper class gentry and a political moderate like Queen Elizabeth I. Sir William possessed a strong moral sense and legal propriety. He was Protestant but a humble man. Humility is a marker of giftedness in gifted adults. He was an unusually secure man because he never attempted to live his manhood through Elizabeth's royal power or try to fix Elizabeth as a woman. Sir William started his service in King Henry VIII's court. It was in the Tudor's court he realized his duty (vocation) was to serve the Tudor family. To Elizabeth's credit, historically, men did not attach their ambitions to any woman's goals or ideas but Sir Cecil was an unusual man and Elizabeth was an unusual woman. Their collaborative partnership was unusual because it was one of mutual respect and friendship rather than subject to royalty. They managed to negotiate several relationships between them but managed to transcend gender and sexual roles and to collaborate for the people of Britain as friends.

Their collaborative relationship is of critical importance to gifted women because of two insights: (a) gifted women realize their full potential in connection and relationships and (b) the gifted of any gender prefers to work with other gifted individuals

of either gender. To have a collaborative relationship between a gifted male and a gifted female is the golden means because men are the other half of human existence. Many gifted women, like Queen Elizabeth I and Dr. Marie Curie utilize their intelligence in the context of relationships to serve the common good (Lovecky, 1996). The collaboration between Elizabeth and Sir William was very productive and effected much positive social change for the British. Together, they designed people friendly social and governmental institutions, developed policies that supported entrepreneurship, innovation, and the commercialization of products and services. They were a powerful team because both individuals respected the skills, knowledge, and the difference and diversity of the other.

Summary of Findings Case Study 2

What was critically important about this study was: (a) the productive relationship of gifted adults in collaborative partnerships; (b) gifted men as the intellectually gifted woman's ally; (c) the intellectually gifted woman develops her gifted intellect in connectedness and significant relationships; and (d) the repeated theme of faith and wisdom. For this study, the operational definition for the gifted female was a woman who possessed the typical characteristics of the gifted adult and an IQ of 140 upwards. However, a definition of feminine gifted intelligence should include internal experiences as well. This is because feminine intellectual giftedness develops as an interconnection between thinking and feeling more so than gifted male counterparts (Lovecky, 1996). Therefore, the intellectually gifted woman is not a smaller version of the gifted man or the average man. The gifted woman is essentially a female adult with high intellectual

abilities and emotional intelligence. Feminine giftedness is concerned with interpersonal relationships, the interconnections between herself and the world, and the use of empathetic knowing (feminine wisdom).

Men, whether gifted or not tend to think in the form of facts, figures, and details (analytical reasoning) while gifted women are focused on process and relationships (empathetic knowing or intuition) [Aiken, 1993]. The gifted woman may utilize intuition but her intuition is linked to her higher cognitive thinking (reason). She is less opinionated and more educated than the average woman. Gifted women are not radical feminists because they do not learn to deny difference in the name of equality (e.g. men and women are the same or labeling intelligent women 'men') or deny herself in the name of morality (e.g. extreme self-sacrifice or not developing natural talents) [Lovecky, 1996). Gifted women maintain their sense of difference because difference is not perceived as inferiority (Aiken). The average woman believes the myth of inferiority because they are not self-defining of their womanhood and angry about feeling inferior. Their anger is acted out by hating and bashing other women. (Miller, 1991).

Table 14

Findings from Historic Case Study 2

Gifted adult collaborative partnerships in the workplace.
Gifted men as the gifted woman's ally.

Gifted women develop their intellectual giftedness and emotional intelligence in connection.

Feminine giftedness is concerned with process and interpersonal relationships.

The repeated theme of faith was linked to feminine wisdom.

Historic Case Study 3: Discovery in a home laboratory (1898)

Vignette

Dr. Marie Curie earned the reputation of 'superwoman' because she was different and a profoundly gifted physicist. She was productive but society does not believe women are productive unless they entertain men or disregard the accomplishments of women. She channeled her love for peace and equality through her work as a scientist. Society expects women to find emotional fulfillment in marriage, raising children and obeying men. Therefore, women like Marie Curie are considered "accidents', 'freaks of nature' or 'superwomen'. However, Marie Curie was a wife, a mother of two girls, and a research scientist who discovered radioactivity. Her discovery lead to the discovery of the atom, the basis of medical treatment for cancer, and used x-rays to change surgical techniques on the battlefield. She is also the mother of nuclear medicine. Marie was Pierre's greatest discovery but Marie's greatest discovery was radioactivity.

The Myth of the Superwoman

In this research study, it was discovered the profoundly gifted woman was perceived as either a 'goddess', 'superwoman' or a 'man'. These myths are particularly

circulated when a woman is very productive and very successful. The average male views her as competition and the average woman views her as someone to sabotage or a smaller version of a 'man' who does not care about 'women's' issues. It is interesting these individuals use their selves as models to judge what is 'normal' or 'normative' for other women. They are the status quo because they do not try to understand or honor the sacrifices the gifted woman is making to realize her full potential as a woman and as a professional. The gifted woman's efforts to produce often broadens gender and social roles for women as well as men. Moreover, the average woman believes the only means of changing anything is to 'misbehave', bash men or label successful women. Marie Curie broadened the role of women by developing her full potential as an individual. Moreover, she challenged the collective unconscious' perceptions of woman's work as not being productive through the discoveries of two natural occurring elements: radium and polonium. Radium was utilized to treat cancer.

Marie Curie managed to achieve her goals because: (a) she did not hide behind the fact she was a woman. She pursued her doctorate in physics when she was married and pregnant; (b) she was humble enough to ask for help; (c) she married Dr. Curie reluctantly but Pierre accepted his wife's plans, ambitions, and goals; and (d) she was psychologically different from the typical Victorian woman or gentlemen. Marie succeeded because she was a woman with a plan. Her accomplishments are no mystery because she followed her plan and asked for help when she noticed she would be overwhelmed. Interestingly enough, although Marie did not practice the Catholic

religion, Marie practiced her Catholic faith through her work and her love for peace.

Again the theme of faith as a motivator to serve the common good. Marie was a Catholic

like Queen Elizabeth I and King Henry V. Faith and love for science and peace spurred

her to do the seemly impossible. Marie's story is a story of a profoundly gifted woman

with a plan who carefully chose her friends and other relationships. Her adherence to a

plan and asking for help was how Marie Curie succeeded in reaching and surpassing her

goals.

The Enlightenment

The enlightenment era was the outcome of the 16th century, Elizabethan era, or

Golden age. The enlightenment or the age of reason was an intellectual and philosophical

European movement during the 18th and 19th centuries. The movement focused on the

concerns and issues of humanity and human reasoning and the Europeans became

interested in moral integrity without church dogma. There was a paradigm shift to

humanist philosophy. Humanism is a focus on morality, the integrity of individuals, and

the concern for the common good of humanity. This theme is repeated in case 4 when

Kranz favors the astronauts' lives over the mission. It is an extension of Augustine's

philosophy of 'man making heaven on earth'. The primary focus was not the afterlife but

on the realities of being human. Queen Elizabeth I's focus on scholarship and learning

continued throughout three centuries. The enlightenment or the age of reason came about

through scholarship and the growth of literacy. Knowledge and the expansion of

knowledge caused rapid and radical social change. The continuous free exchange of ideas

developed science and the scientific method. Science rather than religion began to play an important role in the collective unconscious of the British and European peoples.

Since science began the basis of solving problems and effecting social change, the free exchange of ideas became the cornerstone of organizational science which lead to advances in medicine, mathematics, and physics. The widespread use of the scientific method lead to manufacturing. Pierre Curie began his career in manufacturing as an industrial engineer. The engineers played an important role in invention, innovation, and the commercialization of products and services. In the manufacturing plants, experimentation and innovation was encouraged by management. The plants were highly organized and equipped and job offers for men came in the form of apprenticeships. The apprentices learned their craft by doing or experimentation and innovation. Their managers would become their mentors and would encourage commercializing the products the apprentices invented or innovated. For example coal mining. Coal mining improved the quality of home life because coal introduced an alternate means of heating other than the fireplace.

The Gifted Male: Pierre Curie, Ph.D.

Although Pierre Curie was a profoundly gifted man, he was not entirely aware of his giftedness. He thought of himself as 'slow minded' because of a need to focus on one thing at a time. In this time period, Pierre would have been labeled ADHD by educators, counselors and the average individual. However, the highly intelligent individual has a long attention span and intense focus. This is the reason why Marie Curie could focus on

measuring minerals for long periods of time. Pierre was an avid reader but was very careful about what he read. This is another marker of giftedness. He was deeply contemplative and spent much of his time in solitude surrounded by the beauty of nature. The profoundly gifted male or female, at times, likes to spend time in solitude to think. He had a sensuous nature but possessed the temperament of a priest. This is another marker of giftedness, self-control and emotional intelligence. The profoundly adult practices chastity and self-control to realize their planned goals.

Unlike most men, Pierre believed deep involvement in meaningful work (industrial engineering), he thought made romance impossible. As a gifted man, he did not have the need or desire to control or dominate women to prove or assert his masculinity. Pierre had the kind of personality, the modern woman would call 'non-masculine' because he was gentle, kind, and friendly. The 'sexual puzzle' is not unusual for gifted men because they have problems negotiating their personal definitions of masculinity with public opinion. Pierre wrote poetry, and immersed himself in work. He was essentially a creative genius and had established his career and status as a research scientist before he met Marie.

Pierre Curie was a doctor, a physicist, a college professor, a research scientist, an industrial engineer, an inventor and innovator. His meeting with Marie was not 'love at first sight'. Marie and Pierre were introduced because of her graduate work in physics and a need for a laboratory and resources. Pierre, the doctor and college professor had access to resources. Pierre also admired and recognized Marie's genius. He empathized

with her drive for meaningful work and her obvious financial and sexual vulnerabilities. He was emotionally intelligent and comfortable expressing his emotions. Pierre and Marie spent the evening in conversation where they found out they had much in common. Marie was the answer to his prayerful thought. He believed women geniuses were rare (he was correct) and secretly wanted to fall in love with one. This is another marker of the profoundly gifted adult, they admire intelligence in others and want to have relationships with profoundly gifted adults of the opposite sex.

Since gifted adults are highly disciplined and have self-control, they are labeled 'low sex drive', 'homosexual', 'transgendered', and 'bisexual' or 'asexual' because the average individual models their sexual identity on social media standards. What actually changed for Pierre when he married Marie was his life and work took on a different meaning. Pierre, a gifted man was able to look pass the obvious, and see a vulnerable and beautiful woman he wanted to spend his life with. More than her intellect, Pierre treasured her love and spirituality, therefore his love for Marie and his family was unconditional.

Marie Curie, Gifted Woman, Ph.D.

Marie Curie was an anomaly for three reasons: (a) she did not hide behind the fact she was a woman; (b) she was different in many ways from the average Victorian woman; and (c) she was profoundly gifted (possessed a high IQ). What created the myth of the Marie Curie superwoman was her productive and significant work, and her ability to achieve work-life balance. These two achievements are surrounded by myths, too.

First, unlike the average woman, Marie believed her pursuit in advanced education and her work in physics was emotionally fulfilling and important. The Victorian woman believed marriage, raising children, and obeying men were important and emotionally fulfilling. Second, Marie was not passive, obedient or self-sacrificing because of prior experiences she had as a child. She grew up during a revolution in Poland involving the Russians. Her family actively protested the Russian domination of the Polish culture, which was a risk of death, and she lost several members of her family to disease. Although she loved her mother, she was closer to her father who was a physician. (See chapter 2 about fatherhood and giftedness). Despite being surrounded by violent conflict and disease, she lived in a functional nuclear family. Like Queen Elizabeth I, Marie learned wisdom from her early experiences. Therefore, Marie was socially and morally different from the average man and women of her time.

Marie was an independent thinker and listened to her own voice. Another marker of giftedness. She quietly defied society and limited stereotypes by pursuing her education despite the fact it was against the law. For example, a few bold women would clean a lecture room while a physics or chemistry class was in session just to learn. The gifted woman finds quieter means of making her point or meeting needs society opposes. She takes the high road to freedom. This is referred to as moral intelligence. Marie was humble and asked for help to achieve work-life balance. For example, her father-in-law, who was a physician watched her daughter while she conducted her experiments. Despite being married and pregnant, she pursued her doctoral studies in physics. In her

experimental work, she insisted on pursuing the truth. She was also wise to keep her

work and home life separate from the scrutiny of the public. This is most likely why her

marriage to Pierre was successful because she did not use her marriage to justify her

personal choices. Much like Queen Elizabeth I, she used impression management to

manage her public image. For example, instead of being the typical 'Gibson Girl', Marie

dressed plainly and wore her hair in a simple style. She allowed the press to photograph

her peering through a microscope or pouring chemicals into a beaker. Therefore the

public had nothing to compare her to except the image of a research scientist.

For Marie, developing her intelligence in connection facilitated work-life balance

and discovery. She grew as an individual and was able to apply her intellectual gifts to

her innate feminine wisdom. If she is a model, she is a model for women who want to

reach their full potential as women in relationships because she used her intelligence and

her personal plan to reach her career goals.

Summary of Findings Case Study 3

The specific findings in this case study were: (a) the myth of the goddess-

superwoman and the myth of the 'fearsome' multitasking woman; (b) gifted women

develop their cognitive abilities in connection; (c) the emerging concept of feminine

wisdom; (d) partnership in marriage is unlike the collaborative-partnership of the

workplace; (e) the gifted woman is socially and morally intelligent which makes her

different from the average individual (male or female); (f) gifted women achieve their

objectives through strategic planning; (g) there are similarities and differences between

the gifted men and gifted women; and (h) gifted women ask for help to achieve work-life balance. Repeated themes were faith, impression management, scholarship and the exchange of ideas providing the foundation for innovation and invention.

The gifted adult female is unlike the average woman or man. For example, Einstein stated, "She (Marie Curie) is the only individual money has not corrupted'. This means Marie's work was not in pursuit of resources, fame and wealth. She actually found her work emotionally fulfilling. Therefore, money and fame followed Marie. Gifted women prefer gifted men as marital partners because a gifted man understands what issues and concerns gifted women have and will confront. The gifted man has some of the same issues for the same reasons. Gifted empathy is both cognitive and emotional, therefore, the gifted woman is able to experience the thoughts and feelings of others but also know her own thoughts and feelings (Jordan, 1984 in Lovecky, 1996). She does not merge her identity with other women, the public or men to try to understand the other. Gifted empathy requires a high level of integration of high intelligence and emotional intelligence (Lovecky, 1996).

It is unfortunate the average woman and man labels the gifted woman a 'strong' woman as if she needs no one and nothing affects her. On the contrary, her deep sensitivities and high IQ increases her vulnerabilities. She experiences a deep sense of being different from others, especially women because of her high moral standards and social concepts. For example, gifted women do not pursue relationships for money, fame or status. Like the average woman, she wants a relationship to develop and grow. She is

especially compassionate but has difficulty building mutual relationships (Lovecky,

1996). Society strongly pull women towards similarity rather than self-definition.

Intellectually gifted women acquires knowledge through meaning and applies her

knowledge through context. The information age is not so much about knowledge but

how to apply knowledge. Innovation transcends creativity because it is the application of

knowledge with a purpose. Additionally, partnership in marriage is not perceived as a

business contract or a collaborative-partner workplace relationship. Though Marie

married Pierre reluctantly, Pierre provided more than economic support to Marie. For

Marie, Pierre provided the emotional support she needed to grow and develop as a

woman and research scientist through the interdependence of a healthy relationship.

Lastly, in order for Marie to achieve work-life balance she depended on help from her

family and later laboratory assistants. Pierre was the individual who designed the

measuring instrument that helped Marie discover radioactivity. In theory, marriage

should support the growth and development of both spouses but in reality this is not the

rule. It was a fortunate choice for Marie not to be a housewife because there would not

have been a treatment for cancer or x-ray machines to change battle surgery, or nuclear

medicine or the discovery of the atom or flights into space.

Table 15

Summary of the Findings in Historic Case 3

The myths of the goddess-superwoman and the fearsome multitasking woman.

Partnership in marriage is unlike the workplace collaboration partnership.

The gifted woman is socially intelligent and morally different from the average

woman. She holds herself to higher standards.

Gifted women meet their goals through strategic planning.

Gifted women ask for help to achieve work-life balance.

Meaning and context are important to the gifted woman.

Gifted women develop their intelligence and emotional intelligence in connection.

Historic Case Study 4: The Apollo Incident (1970)

Vignette

Lovell peered out of the side window of the spacecraft, Odyssey and took a deep

breath. What he saw puzzled him. What he saw was a thick gas like cloud escaping into

the surrounding darkness of space. He knew it was an anomaly and probably oxygen. The

oxygen the astronauts needed to survive in the vacuum of space. However, he hoped he

was wrong. Calmly, he radioed to ground control on earth at NASA and said, "Something

is venting into space". After a moment of silence, Capcom radioed back, "We copy your

venting". For six days the three astronauts were trapped with little hope of returning

home. During the six days, the world seemed to stand still because of universal concern

for the astronauts. NASA's engineers worked around the clock to solve problems as they

came up, modify procedures and innovate new processes to get the men safely back to

earth. In the end, it was ingenuity and respect for human life (moral intelligence) that

bought the three astronauts safely back to earth. It was innovation and IB and the motivation of faith and hope not technology that saved the lives of the astronauts.

The Hidden Key: Moral Intelligence

In this fourth historic case study, an unforeseeable event happened during a routine manned space flight mission to the moon: an oxygen tank exploded. Much like historic case study 1, the incident was a miracle because what happened was above the laws of science. Additionally, there were problems with the electrical power. While the engineers on earth worked the problem, the astronauts had to survive on minimum oxygen, heat, food, and water. In the end, the engineers decided to work with and not against the laws of physics. They used the natural trajectories of space to maneuver the men around the moon and on a pathway back to earth. Innovation has to be STEM based because science solves problems within the content of frameworks and structure. Innovation transcended creativity, therefore, a miracle happened.

Instead of an unconditional belief in a merciful and just deity being the intrinsic motivation to go beyond what was expected, it was moral intelligence and a belief in the sanctity of life. In other words, the engineers loved their neighbor and cherished their lives, they were highly motivated to transcend selfish needs and work and learn as a team. Historic case studies 1 & 2 has much to reveal about the importance of religion and humanistic approaches to work and workplaces. However, the theme of faith and spirituality are prevailing themes in all four case studies. Faith and spirituality may likely

be important elements in team building and in motivating intelligent men and women to produce products and services beyond what is expected.

NASA: Training for Manned Flight Space Missions

NASA is an example of an innovation orientated organization because NASA's vision and mission revolves around discovery and exploration. However, NASA is not necessarily the universal model for innovation orientated organizations. Organizational innovation models should be based on the context and culture of the organization. One critical characteristic of innovation orientated organizations is learning philosophy. NASA's learning philosophy is transformational learning theory (Mezirow, 1978). NASA's training and development system is transformational and an evidence based practice. This is because NASA's training systems are designed and installed by I/O psychologists, human factors researchers and behavioral specialists (O'Keefe, 2008). Top management in innovation orientated organizations never leave their technology, key personnel or resources to chance. NASA's learning framework is based on the 'Star model' and consists of two parts: (a) technical training and (b) team training. NASA wants every employee on manned mission flights to have the same understanding about crew safety and mission success (O'Keefe). The primary purpose of their training is to build a strong, cohesive, effective team. When a problem is presented to flight control, the team stops and concentrates on the presented problem. The behavior is known as focused deep awareness.

Deep focused awareness is another marker of the profoundly gifted adult and an element of emotional intelligence. NASA's technicians train with the astronauts utilizing simulated scenarios to solve different types of problems that might be encountered in space during space flight missions. Although innovation and IB is linked to the profoundly gifted adults, it is highly unlikely NASA's organizational culture is entirely comprised of profoundly gifted adults (Gaskins, 2019). It is NASA's mission statement, vision, policies and other structural benefits that attract very intelligent and wise individuals to their organization because one team of intelligent individuals are more productive than one profoundly gifted adult. NASA's transformational learning system is a learning philosophy of deep learning that requires a major shift in conscious and unconscious thinking (Mezirow, 1978). Deep thinking requires the embrace of new behaviors and perspectives (Santalucia & Johnson, 2016). Personal information is facilitated through meaningful social interaction, active listening, and the free exchange of ideas. NASA's transformational learning system is one powerful means of developing productive work teams but requires a different kind of management style from the top down.

NASA's Astronauts: Rocket Scientists or Space Pilots?

The first astronauts were military test pilots. Military test pilots were highly educated, highly skilled, and highly disciplined. These are innate skills of the gifted adult. Kranz and Lovell were pilots becoming employed at NASA and have much in common. However, Lovell became an astronaut. Astronauts know the value of team work and

although their religious faith is not the motivation behind becoming an astronaut, their religious faith and spirituality is an important part of their work. For example, one astronaut shared Eucharist with his crew mates in space who were not Catholic. This is because beyond the boundaries of earth, difference seems to become unimportant in the shadow of the vastness of space and the universe. The sharing of Eucharist and his faith was a means of finding meaning in a shared transcendent experience with his crew mates. Much like gifted adults, astronauts actively seek out diversity and difference because the acquired knowledge pays off in solving problems and in decision-making. The accumulation of information and ideas means having more cognitive resources to draw from memory and use with the imagination. An interesting fact about the astronauts in the Mercury and Apollo mission is they all had one individual they admired in common. Tsiolkovsky, the Russian rocket scientist who made space flight possible. This was during the 'cold war' between Russia and the United States. The astronauts ignored the conflict and difference because Tsiolkovsky created their means of meaningful employment for military test pilots: space travel and discovery. Additionally, if Tsiolkovsky had gone to public school, his teacher most likely would have discouraged his idea as a fantasy and punished him for not complying with classroom 'rules'. The situation makes a strong case for considering alternate means of educating and supporting gifted intelligence.

The Collaborative-Communicative model of leadership (Gaskins, 2018)

Kranz, the flight director of the Apollo 13 mission and Lovell, the team leader of the Apollo 13 crew, had much in common. Both mean had families. Both men were military pilots. Both men had seen action in war. Both men had innovation capabilities and tried to design instruments to resolve problems encountered during flight. Both were highly educated and highly experienced. Both men were highly religious. Kranz was Catholic and Lovell was Presbyterian. Both men were closely attached to their families and possessed 'peculiar' behavior. For example, Kranz refused to start a mission without wearing a vest that was handmade by his wife. On the other hand, Lovell would court his wife as if she was his girlfriend. Both men were democratic transformational leaders (Kranz, 2000; Lovell, 1994).

During the Apollo 13 incident, where communications across boundaries and distant locations and leadership initiatives could have caused overwhelming problems, Kranz and Lovell utilized a different type of leadership style: the collaborative-communication (CCM) [Gaskins, 2018]. The CCM of leadership was useful in this situation because (a) Kranz and Lovell physically occupied two different spaces and (b) Kranz who had never flown a space mission had no point of reference. Kranz had to depend not only on Lovell for information but the crew members as well. In other words, both Kranz and Lovell had to become humble. Other presenting problems were communications between the men on earth and in space. There was a 1.5 second delay in radio contact but in a crisis there is little room for error. Every second counts in space.

What made the mission successful was Kranz and Lovell shared power and reframed from issuing orders. Rather than 'lead' the mission Kranz advocated for the space crew and presented the problems to the engineers and told them what outcome was preferred. Lovell spent the time in space comforting and encouraging his crew members.

In this deviant case study, a new leadership model emerged based on humility and the sharing of power to realize a shared goal or outcome. The engineers were not 'thinking outside the box' because of space and laws of physics. They had to learn how to 'think inside the box' to find alternate means of getting around the laws of physics because the miracle (something beyond the universe and the laws of science) came about because everyone transcended the finite mind to tap into the 'master mind' beyond the universe. This statement is not about appeasing a harsh judgmental deity. Logically, there would have to be something-a deity, a spiritual entity or master mind-outside the universe to create the universe. Therefore, innovation and IB would be possible through transcendence mind and the imagination.

Summary of Case Study 4

Historic case study 4 was the analysis of a deviant case featuring innovation activities and IB. Both cases were extremely stressful but one case involved violent conflict and the other a rescue from a hostile environment. Surprisingly, both cases have much in common. The most obvious was miracles. The operational definition of a miracle is an explainable event above the laws of science. Science nor religion can explain the event although the event happens in real life in finite space and time (Gaskins,

2019). In both cases, productivity and innovation is increased because of the release of the intrinsic motivation of faith and spiritual values. Both organizations, though different in context, culture and intent were innovation orientated organizations.

Table 16

Summary of Findings in Historic Case 4

Faith & spiritual values are intrinsic motivators for increasing productivity and stimulating innovation activities and innovative behavior.
Innovation activities and innovative behavior transcends creativity and creative behavior.
Innovation and divergent thinking is thinking 'inside the box' differently.
Innovation orientated organizations encourage the values and spirituality.

Synthesis of Findings

Introduction

The findings of this research study are significant but transferable to innovation orientated organizations and organizations that want to gradually change their systems over to become an innovation orientated organization. Currently, the only innovative orientated organizations are STEM based and service orientated organizations. For example health care. However, changing an entire business to an innovation oriented organization will require the services of the I/O practitioner, the I/O psychologist with a doctorate level education and experience, a human factors specialist or a behavioral

specialist with knowledge of systems theory. The context and content of an organization is critical. However, this is unlikely to happen in this century or the beginning of the next. Besides the former barrier, there needs to be more research in organizational behavior, innovation science and human factors before beginning to apply some of the concepts and principles presented in this dissertation study.

Table 17

Synthesis of Significant Findings

When faith and moral intelligence is linked to laws of science or types of laws (i.e., the divine law), this can be a powerful motivator to increase productivity and to stimulate innovation activities.
Gifted women develop their gifted intellect and emotional intelligence in connection with significant and freely chosen relationships. Note: marriage is not necessarily a vehicle for growth and development.
Gifted men and gifted women have different cognitive thinking styles and approaches which are often complementary to increased productivity, innovation activities, problem-solving, discovery, exploration or improvement.
Feminine wisdom is the outcome of a highly educated intellect, moral intelligence, emotional intelligence and learning from experience. Very useful in community settings.

Transformational leaders encourage and guide innovation activities through meaningful social interaction and the free exchange of ideas.

Transformational training and development systems stimulates and sustains innovative activities and behavior. The systems are designed and installed by I/O psychologists.

Gifted men (IQs 130 upwards) are the gifted woman's ally. Gifted individuals (IQs, 130 upwards) prefer working with other gifted individuals because of collaborative relationships (i.e. not being ridiculed for being different, or dominated because of being female).

Transition from chapter 4 to chapter 5

  This marks the end of chapter 4 and the explanation of the significant findings from the analysis of data and the four historic studies. Chapter 4 transitions to chapter 5, the discussion and applications of the findings.

Chapter 5: Discussions, Conclusions and Recommendations

Introduction

The findings and outcomes of the qualitative research study answered the research problem about increasing productivity to assure America's economic well-being. The answer strongly favored investing in innovation and the intellectual capital of the gifted adult. The operational definition of innovation was a human based productive system utilizing knowledge and the intellectual capital of human beings. The respondents of this study were gifted adults or the knowledge worker (i.e. physicians, engineers, etc.) who thinks to earn a living and understands how to apply STEM based knowledge to add value to organizations. Furthermore, the products and services of innovation activities are commercialized which develops sustainable income and employment opportunities. By conducting a research study investigating innovation, the research problem, and the research questions were answered. New knowledge was developed from archival/historic research and comparative methodology. For example, before conducting an analysis, it was assumed innovation would be an applied type of creative activity. However, the findings from the study strongly indicates something quite different. Innovation was a means of transcending creativity and creative activities (Gaskins, 2019).

The new knowledge will form the foundational basis of evidence based literature for OB, I/O psychology, human factors research, innovation science, and gifted adult research. This research project was designed to contribute to the disciplines of psychology and I/O psychology. The primary concern was the individual worker who produces in an organizational context. Therefore, the findings of this study were interpreted within the framework of an innovation orientated organization (Siguaw, Simpson & Enz, 2006).

The innovation orientated organization is a STEM based business that stimulates and sustains innovation activities through its learning philosophies and organizational culture (Siguaw, Simpson & Enz, 2006). The organizational culture consists of individuals who like to continuously learn to solve problems and improve products, services, processes and procedures. Although there are several competencies of an innovation orientated organization, only four competencies were discussed in the framework of the research findings. The four competencies were as follows: (a) employees (gifted adults); (b) learning philosophies (transformational learning theory [Mezirow, 1978]); (c) transfunctional beliefs (i.e. faith, spirituality, etc.) as motivators to stimulate and sustain innovation activities; and (d) human-tool interaction and technology. More research is needed before attempting to apply any of the principles and concepts presented in this academic paper. The concepts can only be transferred and installed by I/O psychologists, human factor specialists or experimental psychologists to

be effective for organizational and business purposes. Applications of this study requires the specialized knowledge of I/O psychologists who can teach others to be effective.

Purpose for Conducting Research Study

There were several reasons for conducting this research study. The purposes were to: (a) explain the worth of adult gifted intelligence; (b) explain the value of continuous development of the adult mind throughout the developmental lifespan; (c) explain how productive work and social relationships sustain organizational productivity; and (d) explain how high levels of innovation activity increases the growth of industry, and the GDP.

Nature of the Study

The nature of this traditional qualitative study was clinical, interdisciplinary, and empirical phenomenologic. The study phenomena, IB, was a clinical variable, and could not be ethically or morally manipulated. Therefore, the study was conducted without utilizing human subjects. The initial goal of this research study was to broaden the scope of I/O psychology to update the legal practice of I/O psychology.

Summary of Key Findings

Introduction

The practical implications of findings were progressive, speculative, and futuristic. Currently, there are only a few innovation orientated models. Two examples are NASA and Lockheed Martin which are STEM based workplaces. Any concepts and principles of this will need to be applied within the content and context of the

organization. This means the average business would have to make radical changes from the tops down to bottoms up to become an innovation orientated organization. Lastly, a business cannot make the change to an innovation orientated organization without the assistance of an I/O psychologist. This means this dissertation is not an instruction manual.

Table 18

Significant Findings and Patterns of the Four Historic Case Studies

- The psychological innovation process is a psychological tool. The unconscious process allows the mind to transcend creativity and creative activities. Transcendence experiences facilitates innovation activity and innovative behavior.
- The innovative process is stimulated and sustained by transformational learning and intrinsic motivations of faith, moral, and emotional intelligence coupled with intellectual complexity.
- Gifted men and women are different psychologically but complementary. Gifted women develop their intellectual complexity in connection. Feminine wisdom is the outcome of a highly educated intellect, moral intelligence, and learning from experience.
- Transformational leaders guide and encourage innovation activities through meaningful social interaction and the free exchange of ideas.
- (Gaskins, 2018), A speculative cognitive map of the unconscious innovation process (See appendix A for full explanation).
- (Gaskins, 2018), A theoretical model innovation behavior in organizational context (See appendix B detailed explanation).
- (Gaskins, 2018), A collaborative-communication model of shared leadership, (See appendix D for full explanation).

Interpretation of Findings

Findings were discussed utilizing the framework of the innovation orientated organization (Siguaw, Simpson & Enz, 2006). Based on the findings gleaned in chapter 4, the competencies discussed were (a) employees; (b) learning philosophies; (c) transfunctional beliefs; and (d) technology. The competencies were discussed from the view of human factors research and social relationships in organizational context.

Discussion

Innovation Orientated Organizations: Employees

The primary concern for the innovation orientated organization were employees and employee competency (Siguaw, Simpson & Enz, 2006). Employee competencies revolve around innate characteristics for improvement and increased productivity. Furthermore, an innovation oriented organization values learning and the ideas of their employees. Therefore, the 'ideal' employee for the innovation orientated organization was the gifted adult (Gaskins, 2019). For gifted adults, religious beliefs play an important role in career development and in finding meaningful employment (Perrone, Webb, Wright, Jackson & Ksiazak, 2006). Their spiritual beliefs and moral intelligence affect their conduct at work while personal religious beliefs influence their career choice (Perrone, et al., 2006). Their mental health and will to innovate is connected to their commitment to spirituality and the quality of life. In the 21st century and beyond, gifted adults and high intellectual ability workers will be the preferred employees for the

innovation orientated organization. This is because their advance education and

experiences makes it possible to apply information and ideas to increase organizational

production and to innovate. Innovation orientated organizations were collaborative,

encouraging, less stressful, and more conductive to the personal development of their

employees. However, much research on innovation advocates for change but little is

known about how to encourage whole systems towards innovation activities (Moussa,

McMurray & Muenjohn, 2018). Currently, most American organizations are bureaucratic

which leads to minimal growth and innovation (Moussa, McMurray & Muenjohn).

Innovation and Learning Philosophies

There is a strong link between organizational learning and innovation (Siguaw,

Simpson & Enz, 2006). First, it is widely agreed the learning climate of an innovation

orientated organization and innovation are highly correlated (Siguaw, Simpson & Enz).

Second, evidence based literature correlated innovation to the skills and intellectual

capital of the gifted adult (Gaskins, 2019). Therefore, for innovation orientated

organizations to realize productivity, innovation, and financial goals, learning is

important (Siguaw, Simpson & Enz). For this study, learning philosophies refer to the

ability of employees to gather, assimilate, and apply new knowledge to innovate and

produce (Siguaw, Simpson & Enz). Organizational learning and life-long learning is a

function of prior knowledge and experience or wisdom (Gaskins).

The best learning philosophy is the emergent transformative learning theory

(Mezirow, 1978). Transformational learning is perspective learning and consists of three

dimensions: (a) psychological; (b) revision of functional belief systems; and (c) behavioral, specifically in lifestyle (Mezirow). For example, NASA's 'STAR' model training system is a transformational learning system. The Apollo 13 incident was successful, in part, because a Capcom engineer remembered a similar situation in a simulated training scenario. The prior information was utilized to develop a realistic plan of recovery and rescue. Therefore, transformational learning systems are powerful means to learn and apply what one has learned to real life problems and issues. Transformational learning systems seem more effective because learning involves the expansion of consciousness by transforming one's worldview, specific skills, talents, and other competencies of the self. In other words, it is a holistic approach to self-development and self-actualization (Gaskins, 2019).

Effective transformational learning facilitates meaning through knowledge. What is utterly important about transformational learning is the ability to critically assess assumptions about people, things, and places. It is an effective system because the adult imagination can be incorporated as part of the innovation process (Gaskins, 2019). Therefore, the skills of critical thinking and reflection are actively cultivated and preferred in the innovation orientated organization. Transformational training systems are linked to the allocation of resources and the selection of technology and the context of the organization. For example, technology for a private practice would not be appropriate or effective for a large urban clinic. Therefore, transformational training systems should be designed and installed by the I/O psychologist.

Lastly, it is worth noting for evaluating the effectiveness of transformational learning systems, according to cognitive archeology, modern human beings have expanded parietal regions of the brain. These regions are critical to visuospatial integration and eye-hand-tool management (Bruner, et. al., 2018). This means human cognition can be targeted by evolutionary processes. Therefore, hand-tool relationships and theories of IB in organizational context can be evaluated and investigated through physical and physiological correlates or tracking emotional changes during hand-tool contact (Bruner et al.).

The Gifted Adult: Transfunctional beliefs

Innovation orientated organizations discover what is important to prospective employees and try to accommodate. Resources are directed specifically towards innovative ideas and are supportive of employees who champion new ideas. For this study, the 'ideal' employee for the innovation orientated organization was the gifted adult. Insights from the research outcomes were interpreted from the subjective view of the gifted adult and their psychology. What was discovered to be important to the gifted adult were personal spiritual beliefs, how to use moral intelligence to serve humanity, and faith (Gaskins, 2019). The intrinsic motivation to innovate revolves around moral intelligence, the desire to self-actualize, and faith in something greater, a higher power, or a benevolent entity (Gaskins).

For the gifted adult, innovation is a psychological tool in which meaning is constructed from knowledge. The gifted adult's neurological brain systems work

differently from the average individual because high ability intelligence is linked with

implicit memory systems. Gifted adults, male or female, are intrinsically motivated to

derive experiential meaning from their religion through innovative work and meaningful

social interaction (Hood, 1973). Therefore, an all-consuming passion for their job and

organization can inspire a gifted individual to perform over and above the call of duty

(Elangovan, Pinder & McLean, 2010). For example, individuals in case study 1 & 4 were

motivated by faith and the divine law to experience a miracle. A miracle is an event that

cannot be explained by science or time. The gifted adult makes personal sacrifices and

devote extra time to their jobs to serve (Elangovan, Pinder & McLean).

Spirituality was defined as one's relationship with a higher power within a system

of religion and one's sense of purpose and meaning in life (Perrone, et al., 2006). The

gifted adult pursues religion in established systemized religions such as Judaism, Roman

Catholic, and Islam because of the rituals and ceremonies instead of music and dance.

The rituals serve to internalize their faith and the divine law. Faith and spirituality is

encouraged in innovation orientated organizations because continuous learning allows the

organizational culture to adapt in a climate of radical and rapid change. According to

Kant (n.d.), faith is the key to justify transcendental reflection about the divine law,

miracles and transcendent skills such as innovation (Gaskins, 2019). Employees who are

intrinsically motivated by faith are more likely to have transcendent experiences than

extrinsically motivated employees (Hood, 1973). Transcendent means 'going beyond'

human experience and there are different kinds of transcendent experiences. Innovation

orientated organizations create a unifying comradeship, enthusiasm and devotion among employees through culture friendly policies and well trained front line managers (Siguaw, Simpson & Enz, 2006). Lastly, transfunctional beliefs encourages and facilitates knowledge transfer to retain a diversity of viewpoints (Siguaw, Simpson & Enz). Transfunctional beliefs have the potential to lead to continuous improvement and the implementation of innovations.

Technology and Human-tool Interaction

In an innovation orientated organization, technology is utilized as a tool to stimulate and sustain innovation and innovation activities (Siguaw, Simpson & Enz, 2006). High innovative organization's technology was linked with the allocation of resources and learning philosophies. The innovative organization devotes resources to the development and acquisition of new technologies because continuous innovation and commercialization is important to the survival of the business. In addition, the R & D departments are designed to facilitate and enhance adaptation to change. However, the organizational culture (employees & management) has to be ready to accept and actively pursue change (Gaskins, 2019). High innovation orientated organizations are proactive in utilizing technology to stimulate innovation and innovation activities in their employees. Consequently, technology is used to facilitate maximum use of the mind and knowledge, and to relieve stress. The context of the organization determines technical choices.

Learning philosophies facilitates organizational-wide learning and communication. The technology and learning systems facilitates intraorganizational

communications through departments and employees (Siguaw, Simpson & Enz, 2006). In the literature, it is widely agreed the learning climate of innovation orientated organizations and innovation are highly correlated (Siguaw, Simpson & Enz). Further, transformational leadership style was the most important means for developing an innovation orientated and learning organization (Zagorsek, Dimovski & Skerlavaj, 2009). Learning systems of innovation orientated organizations are deeply based in organizational learning (i.e. transformational learning philosophies and systems, and life-long learning initiatives) because these types of systems stimulate and sustain innovation activities and behavior. Consequently, the systems are designed to attract and retain high ability intellectual capital such as the gifted adult. This is because the 'ideal' employee, the gifted adult is committed to life-long learning and to mastering material. Since transformational learning systems are designed to expand consciousness through psychological and physiological change, the system must be designed and installed by I/O psychologists to be effective.

Limitations of the study

This qualitative traditional research study was among the few studies to integrate prior innovation knowledge, OB, management science and human factors involving innovation science to create new knowledge. Therefore, most of the concepts and principles presented in this study are progressive and trail-blazing. The research study made a modest but significant contribution to innovation science and I/O psychology because the emphasis was on human factors and the individual organizational worker.

There were not enough facts in the literature to design research studies utilizing human subjects. Additionally, there is still not enough human factors research to conduct controlled experiments utilizing human subjects. However, it is highly recommended if human subjects are included in other studies to utilize structured interviews, focus groups, multicase studies, and diary studies featuring individuals who have innovations (patents) or their work tasks are embedded with innovation potential (i.e. physicians, judges & research scientists). In addition, study the patents of innovationists and create computer simulations of speculative IB. Use film to record an innovator innovating to understand how to recognize and encourage the behavior. Study the biographies and autobiographies of innovators and creative geniuses. A factor analysis is needed of all variables involved in the innovation process and how they link to attitudes and motivations of human beings and human nature. The theory of IB (Gaskins, 2018) and Vandervert's theory (2003) needs to be further developed and tested in organizational situations. The gifted have isolated their selves and society has isolated the gifted because they are different. We need their intellectual capital and practical ideas to improve the environment and future generations. Next, and of upmost importance is learning more about gifted adults in the workplace. Lastly, MRI and PET studies of the innovation process is needed to understand the brain-mind-body connection of innovation activities. Further research should focus on human factors, transformational learning systems, transcendent experiences, and applications to specific industries.

Recommendations

Introduction

Alone, this research study is not the solution to the problem of global economics, social problems or wiping out competition in the global marketplace. It took over a century and a half to create the problems nations and world leaders are facing now. It will take many more years and research studies to turn the situations around. This study provides a small but significant contribution to the problem of productivity and innovation. Second, this study is multidisciplinary and there were problems translating technical language across the disciplines. The interpretations of the research study are progressive and futuristic because I/O psychology is positive psychology. I/O psychologists are trained to build on human strengths and human nature. More research is needed before addressing and applying the concepts and principles to organizational systems. Changing from a business organization to an innovation orientated organization means making radical and disruptive change to how business is administered for customers as well as stakeholders. This would require deep commitment and asking for help. Making effective positive change will require retaining the services of a qualified I/O psychologist who will utilize evidence based practices and manage planned change. The question is this: are world and business leaders humble and care enough to work with research psychologists to make the required changes?

General Recommendations

- Top management will need to decide if their organization is worth the changeover to an innovation oriented organization. If affirmative, ask for assistance.

- Select, train and retain managers who are capable of guiding and encouraging innovation activities.

- Re-design the workplace to accommodate workplace spirituality and the values of employees.

- Top management should actively value the ideas of employees.

- Organizational culture should be of total acceptance, comradeship and open-mindedness.

- Top management should acquire the professional services of I/O psychologists if organizational systems are to be effective and sustainable for innovation activities.

- Innovation orientated organizations should offer training and a chance to acquire experience through apprenticeships, internships, fellowships, and entrepreneurships.

- Preference for mature and older workers who can and desire to train younger employees should be encouraged.

- Retain the services of I/O psychologists, in house or free-lance, to facilitate adaptation to change effects and to assure effectiveness of organizational systems.

Recommendations for the Professional Practice of I/O Psychology

These are some of the recommendations proposed for I/O psychologists and their practices. The small changes will broaden the scope of practice for the I/O psychologist and improve business conditions. The first recommendation is to take courses in counseling and psychotherapy. This is because mental health issues are becoming prevalent in the workplace and surrounding communities. The I/O psychologists can become a point of prevention by designing programs, interventions, and team building activities. Take courses in community psychology because often conflicts are bought from home to work and back into the community. Community psychology can help to build skills to understand the environment and climate of an organization and communities. A community is an organization and functions under the laws of OB. Adding counseling to your skillset will assist in financing a private practice and inform your research. Present your research work whenever and wherever you can. In this way, new ideas and applied research are presented to inspire contributions from other psychologists. Take courses in neuroscience and psychobiology to understand the impact of change on human beings in organizations and the surrounding community. Try to learn about OB from the viewpoint of the individual worker rather than top management and stakeholders. Lastly, study more than just I/O psychology. Learn from other social science and hard science disciplines and their research work. This will help to develop a broader picture of I/O psychology and where your unique perspective and ideas fit in

psychology. Do not try to modify your ideas to the status quo because of politics, prejudice and ignorance.

Implications for Positive Social Change

The positive social change implications of this research study was the improvement and appreciation of the human being and meaningful work in creating in improving productivity, work conditions and developing employment opportunities in business organizations. The long range effects of change will result in the betterment of individuals, businesses, economics and society. However, to increase productivity levels in organizations through innovation activities, I/O practitioner-scholars will have to restructure existing organizations and their respective systems. Consequently, this will cause revolutionary but positive social change in global economics and how business is administered. Another critical change will be the I/O psychologist and their toolkit. The I/O psychologist will broaden the scope of their practice to include knowledge and applications of human factors and innovation science. The third radical but positive social change will happen on the individual level. The active promotion of intellectual capital and high ability talent in the workplace will result in improved training and development systems to reward and retain knowledge workers and great improvement in intellectual capital.

Conclusions

It is my hope this research project and the resulting findings will inspire other psychologists to continue the inquiry into innovation science. Especially concerning the

individual organizational worker and the impact of organizational culture on productivity and job creation. Consequently, the organizational culture and the skills of the employees shape and definite the organization's identity and competencies in the global marketplace. Work is not only important to the gifted adult but to families, and community life. A descent income, meaningful work, and an organization that values the contributions of employees, confirms the dignity of work and the continued existence of humanity.

Summary of Chapter 5

This marks the end of chapter 5 and the dissertation. The interpretations of findings were pragmatic and interpreted in the context of the innovation orientated organization construct. The chapter concluded with a statement on positive social change.

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Appendix A: Theoretical Speculation of the psychological innovation process (Gaskins, 2018)

A simple explanation: Empathy begins the innovation process because the emotion, empathy is linked to higher moral values and standards. Empathy gradually changes to sympathy and then empathy. The description would indicate the human being is being shaped and changed by the process.

Detailed explanation:

1. Acute self-awareness because the mind is extended into the surrounding environment and perhaps beyond.

2. The mind interacts with the environment and perceives distress and/or opportunity.

3. The self allows empathy to respond to the 'problem'.

4. Empathy (the intellectual grasp of distress) links to morality and moral values.

5. Empathy gradually changes to sympathy as the individual searches the memory modules for information and a solution.

6. Sympathy changes to compassion (awareness involving a desire to help) when individual learns of the impact the problem has on an individual, group, or humanity.

7. Compassion links to creative intelligence and the innovation process.

8. Compassion leads to purpose and innovative behavior.

Appendix B: A theoretical model of innovation behavior (IB) in organizational context (Gaskins, 2018)

This is a hypothetical theory of IB using the gifted adult as a model.

$$IB = (IQ{\uparrow} + D) \times EI^2$$

IB = innovative behavior or human productive behavior

IQ↑ = a validated IQ of 130 upwards

D = disciplined behavior. Psychometrians should use a behavioral questionnaire with a Likert-like rating scale.

EI = emotional intelligence (can use a standard test for emotional intelligence)

EI = highly educated intellect. This is obvious but try to look for broader indication such as life experience or tenure on the job.

The objective of the model is to obtain statistics of individual productivity and it's impact on organizational productivity using quantitative analysis. Statistics could be utilized to predict workforce needs and future impacts on industry and commerce, how certain industries are impacting global economics, predicting and controlling business cycles, and how investment in human capital impacts commerce. The stats could also be used to compare production levels with equipment and machinery productive levels to delay closing industries while discovering alternate employment opportunities.

Appendix C: A model of shared leadership: Collaborated/communicative model

(Gaskins, 2018)

The collaborative-communication leadership model (CCM) emerged from the findings in historic case study 4, the Apollo 13 incident. Kranz and Lovell used the model to share leadership duties because of barriers and borders. Kranz was on earth and Lovell was in space. Leadership had to be shared to solve problems because the solutions to the problems were coming from earth and Kranz's team. The model requires two or more leaders in different locations to share power to meet the same goal. The leaders must be humble, open-minded and honest. The CCM is useful for diplomatic relationships especially between hostile countries, to coordinate global economic efforts, to negotiate treaties, communicate about the weather or climate, and to negotiate peace treaties across borders.

Appendix D: IRB Approval and Approval Number

Multicase Historic Studies of Innovative Work Behavior among Intellectually Gifted Adults was officially approved for conducting research for the research study on March 21, 2018. Data collection was limited to archival/historical research. The approval number was 01-24-18-0037771. IRB approval expired on January 23rd, 2019.