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An Investigation into the Relationship Between an Engineering Manager's Purpose-Seeking Beliefs and Behaviors and the Engineering Manager's Perception of Employee Creativity, Initiative and Purpose-Seeking Behavior

Charles Burton Daniels
Old Dominion University

AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN AN ENGINEERING MANAGER'S PURPOSE-SEEKING BELIEFS AND BEHAVIORS AND THE ENGINEERING MANAGER'S PERCEPTION OF EMPLOYEE CREATIVITY, INITIATIVE AND PURPOSE-SEEKING BEHAVIOR

by

Charles Burton Daniels
B.S. January 1994, University of the State of New York
M.E.M. August 2003, George Washington University

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Approved by:

Rafael Landaeta (Director)

Adrian Gheorghe (Member)

Pilar Pazos-Lago (Member)

Ipek Bozkurt (Member)

ABSTRACT

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Charles B. Daniels
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Director: Rafael Landaeta

Organizations have placed an overwhelming emphasis on extrinsic motivation of its workforce, normally in the form of financial incentives, in an attempt to assure individual and organizational high performance. While a significant level of financial resources is expended in this attempt to predict and influence employee behavior, no objective evidence exists of a favorable return of investment. In fact, the primary impact of most extrinsic motivation might actually be *demotivation* – the opposite of the intended use.

In this research the prevailing literature was examined and a conclusion about the power of both extrinsic and intrinsic motivation was synthesized to explore the nature of either purpose or meaning as an effective intrinsic motivator. In addition, a diverse group of over 100 Engineering Managers was surveyed to determine their beliefs about seeking meaning and purpose to determine to what extent they engage in purpose-seeking behavior. The relationship between those beliefs and behaviors and their perceptions of the behaviors of their direct reports was surveyed as well.

The results show strong correlations between engineering managers' purpose-seeking behaviors and their positive perceptions about their subordinates' strengths in initiative and creativity. In addition, no significant correlations were found for those engineering managers who are still seeking purpose. The results of this research are important because it exposes the engineering management community to new paradigms of subordinate motivation that may lead to more predictable and positive organizational performance.

This dissertation is dedicated to my wife and best friend, Cindy. Your support,

encouragement and faith in me were an inspiration during a long, arduous and rewarding

process.

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I am indebted to Dr. Michael Steger who was gracious in granting permission to use the Meaning of Life Questionnaire for my research. The survey was a perfect complement to my research goals.

I have worked for many supervisors in my career and I have been fortunate to work for two exceptional people: Dr. Resit Unal and Mr. John B. (Jack) Munson.

Dr. Unal accepted me into the community of scholars and has always been available for advice and feedback. As the Chair of the Engineering Management and Systems Engineering (EMSE) department, Dr. Unal is recognized as one of the world's leading experts on Engineering Management, and he is also an expert at motivation. I have enjoyed my time under his thoughtful leadership.

I also want to mention my mentor and long-term friend, Mr. John B. (Jack) Munson. Jack somehow saw some potential in me and took me on as a project. His keen grasp of human nature and motivation increased my desire to learn more about what makes people "tick". Jack was an exceptional leader and instilled in me many of the principles that have led to my successes. Thanks Jack. I miss our talks!

Dr. Andres Sousa-Poza was the person responsible for my arrival at the Old Dominion University. In our first meeting we found many things in common and we continue our stimulating dialogue to this day. His enthusiasm and acumen were evident from our first meeting and his strong advocacy for ODU influenced in my decision to come to ODU. I learned so much from him during formal classes and informal chats and I can never repay his benevolence.

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LIST OF ACRONYMS AND ABBREVIATIONS

ASEM American Society of Engineering Management

CEO   Chief Executive Officer

FA   Factor Analysis

DNA   Deoxyribonucleic acid

EI   Emotional Intelligence

EM   Engineering Manager

EMP   Engineering Manager Perceptions

JSC   Johnson Space Center

MLQ   Meaning of Life Questionnaire

PIL   Purpose in Life

POB   Positive Organizational Behavior

SPSS Statistical Package for the Social Sciences

USAF United States Air Force

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

BACKGROUND

The United States (U.S.) held a preeminent position in marketing, manufacturing, production and sales for two and one-half decades after World War II ended. Businesses in the U.S. could generally sell as many products as they could produce. American workers and industrial enterprises were the most productive in the world (Nelson & Wright, 1992). Employee motivation was rarely a significant issue, since war weary Americans seemed happy to have a job, a house, a family and a car. A very large number of people living in the U.S. had achieved the "American Dream." A sense of invulnerability must have pervaded the boardrooms of many stateside industrial enterprises.

During this time and subsequently, American businesses became deeply invested in the theories of work and motivation postulated by Fredrick W. Taylor and motivational theories such as those posited by B. F. Skinner. Taylor essentially believed that "scientific management" could be applied to industrial production and workers could be analogized as "machines" (Pink, 2009, p. 11). Skinner's experiments with animals and, occasionally with people, led to a belief in the power of operant conditioning as a human motivational force. American businesses have adopted this philosophy by using benefits, including base pay, bonuses, stock awards and stock options to create incentives that are designed to encourage behavior that is conducive to positive organizational performance.

This style is based on the Publication Manual of the APA, 6th edition

Although the economy of the United States still commands global respect as a powerful engine of production, the country has experienced determined and aggressive competition from a host of nations. China and India are but the latest nations to create new factories and promote industrial expansion. With increased competition and higher customer expectations, the U.S. can no longer afford expensive and ultimately damaging paradigms and illusions about the connection between rewards and performance.

THE PROBLEM: EXTRINSIC REWARDS AS A PRIMARY MOTIVATOR

In 2008, the U.S. financial sector collapsed, due in large measure to the extraordinary risks routinely employed by firms on Wall Street (McLean, 2010). In spite of this gross mismanagement, which caused the demise of some firms and severely damaged the reputation and financial fortunes of an entire industry, executives reaped nearly $18 billion in bonuses for the year (Story, 2011)! As egregious as this seems, it was an abnormally low year bonus payout year for Wall Street (Story, 2011).

This phenomenon has been repeated annually in many industries as executives receive compensation that is not concomitant with their performance (Bebchuk & Fried, 2005). A detailed analysis by Lucian Bebchuk and Jess Fried found that not only were high corporate executive salaries ineffective in promoting the long-term interests of the firm, but, in fact, excessive compensation packages often led to management behaviors that were the opposite of those intended by the incentives (2005).

It is no secret that these sorts of reward systems often lead to expensive and counterproductive results. Researchers have consistently noted how extrinsic motivation may be driving executives, managers and employees to act in ways that extremely

damaging to the long-term viability of the enterprise. These executives often ignore the health and well-being of the enterprise and instead focus doing what it takes to get the prize! There must be better and more predictable methods for providing the motivational drivers that will encourage employees to work toward what is best for the long-term health of their organizations.

INTRINSIC REWARDS

Research to define and understand the elements of intrinsic motivation has lagged the efforts to categorize the dynamics of extrinsic motivation, but research related to intrinsic motivation is evolving as topics such as positive psychology and emotional intelligence gain significance. Internal drivers of behavior such as self-regulation theory, expectancy theory, goal setting and self-efficacy are considered "cognitive" motivators and the presence of these factors has been associated with increased individual performance (Mitchell & Daniels, 2003). While very little research has been conducted to attempt to understand the relationship between performance, well-being and purpose seeking behavior, some initial research suggests that individuals who have a purposeful approach to goal setting tend to be highly successful in meeting those goals (Barron & Harackiewicz, 2001)

The author of this dissertation believes that while no single method is guaranteed to provide the necessary positive stimulus for positive behavior, intrinsic motivators, if employed ethically and toward a worthy purpose, may be one of the drivers missing from the corporate motivational quiver.

PURPOSE AT WORK

The author was introduced to purpose seeking behavior by a gentleman who later became a close friend and mentor. In 1986, the National Aeronautics and Space Administration (NASA) center for human space flight control, the Johnson Space Center (JSC) in Houston, Texas, conducted a massive competitive contract consolidation that merged 16 contracts for human space flight support and operations into one large contract. The contract was organized into three disciplines: hardware support, software support and planning/operations. A multi-company team, led by Rockwell International, was the successful bidder. Mr. Munson was the program manager for the software company and he proceeded to assemble his team from the employee base of the incumbent contractor labor force. Munson's credentials were impeccable, having supported the United States Air Force (USAF) and other major clients, but with limited direct experience with NASA. He hired his management team and conducted an initial meeting with the senior managers. The author of this dissertation was among the invitees.

Mr. Munson introduced himself and discussed the importance of the new contract. He then asked each member at the table (there were about 15 participants) to discuss their background and tell the group about their role on the contract. Around the table one manager said "Hi, my name is Jay and I manage the training system software" another said "I am Brett and I manage the operating system software". The introduction proceeded until every member of the management team had spoken. Mr. Munson noted "I am very impressed with your credentials, but none of you seems to know what your job is"! The visages around the table were startling! Many managers later noted that

they thought Munson must really not have understood the nature of the work to make

such a comment. After a short pause, Munson noted to a suddenly enlightened audience

"Your job is not to manage software; your job is to fly Space Shuttles. What you do is

vital to the safety and success of each Shuttle mission and your work is just as valuable

and necessary as that of the people sitting in the cockpit. Let's not ever forget it! Let that

knowledge guide your behavior and actions as you lead your departments." This event

was a vivid introduction to the importance of meaning and purpose in the work we do as

engineers.

OPERATIONAL DEFINITION OF PURPOSE SEEKING BEHAVIOR

Purpose-seeking behavior is defined as behavior *regularly* and *intentionally*

exhibited by an engineering manager to seek, discover and understand meaning and

purpose in life and work activities.

OPERATIONAL DEFINITION OF ENGINEERING MANAGEMENT

For the purpose of this research, the definition of Engineering Management

provided by Morse and Babcock should suffice:

> The engineering manager is distinguished from other managers
> because he (or she) possesses both an ability to apply engineering
> principles and a skill in organizing and directing people and projects.
> He is uniquely qualified for two types of jobs: the management of
> technical functions (such as design or production) in almost any
> enterprise, or the management of broader functions (such as
> marketing or top management) in a high-technology enterprise.
> (Morse & Babcock, 2010)

THE RESEARCH QUESTION

The primary research question is: What is the relationship between an Engineering Manager's purpose-seeking beliefs and behaviors and the same Engineering Manager's perception of the initiative, creativity and purpose-seeking behavior of employees who report directly to the Engineering Manager. This question will be addressed by conducting a survey with practicing engineering managers and analyzing the data collect from that survey. The research will focus on the engineering manager's intrinsic beliefs, the behaviors that ensure from those beliefs and the intrinsic perceptions of the engineering manager with respect to direct reports.

CONTRIBUTIONS TO THE BODY OF KNOWLEDGE

Contributions to the Practice of Engineering Management

The expected findings of this research may serve as a catalyst to engineering firms to reexamine their motivation practices to make certain that their methods are delivering desired results, and to consider how new intrinsic motivation approaches might be employed to provide a more sustainable enterprise evolution.

This research focusers initially on engineering managers because of the particular nature of engineering. Engineers are trusted members of society primarily because they possess knowledge, skills and capabilities that are outside the understanding of the general public (Harris, Pritchard, & Rabins, 2009). Therefore, the engineering community accepts the responsibility to always act so as to enhance the status of the profession and to protect the credibility of the community (Harris et al., 2009). Members

of the engineering profession should have access to knowledge about practices that may serve to defeat the special confidence accorded members of the profession by the public.

Contributions to the Theoretical Foundations of Purpose Seeking Behavior

The foundational theories related to purpose seeking behavior have not been established. This research might serve as a beginning point to initiate other research to determine how purposeful behavior integrates into an overall structure of human motivation.

CHAPTER II

LITERATURE REVIEW

A wide range of literature was reviewed to assess the current state of knowledge about purpose-seeking behavior. The literature search revealed that a paucity of research exists to address the concept of purpose-seeking behavior. The research that has been published regarding this subject is often multi-topic and interdisciplinary. There appears to be no recognized branch of research with a sole focus on purpose-seeking behavior. . The literature map in Figure 1 describes the breakdown of topics studied.

Figure 1:   Literature Map
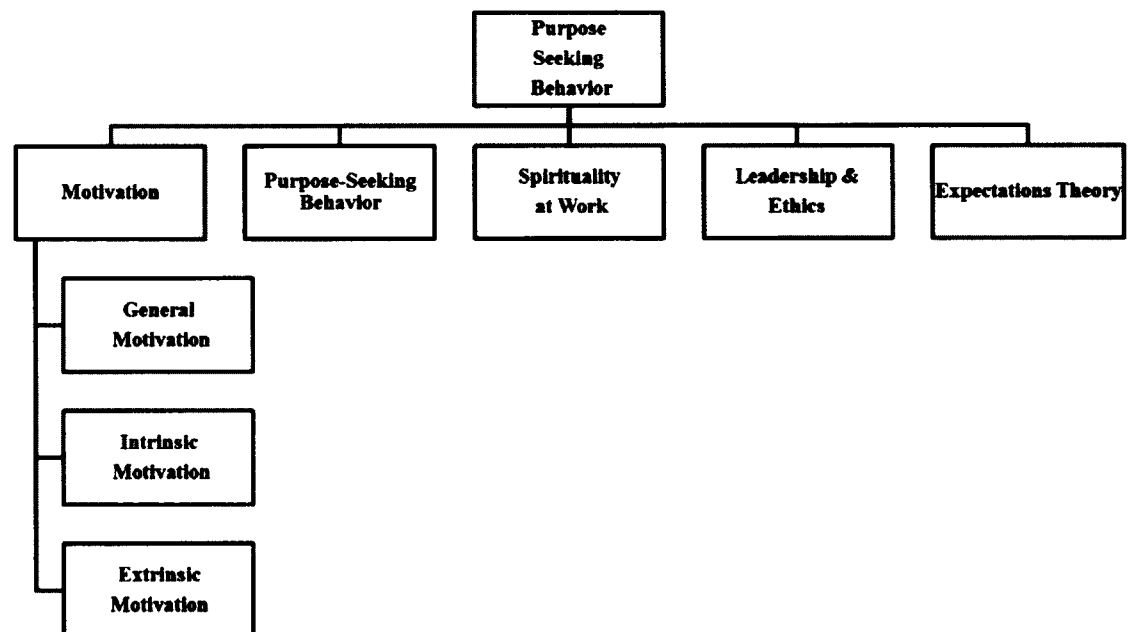
LITERATURE CATEGORIES

The initial category studied was motivation. A significant body of peer-reviewed literature exists to allow a full exploration of general, extrinsic and intrinsic motivation. Secondarily, literature on purpose-seeking behavior was reviewed and analyzed.

Extensive searches have *not* yielded extensive source material related to purpose-seeking behavior. A tangential area, spirituality, was analyzed. This area is chosen because some of the literature discussing purpose is often published under the rubric of spirituality. Much of this literature addresses work and religion – which is not a specific focus of this research. However, purpose-seeking behavior does appear as a secondary theme in some of the literature.

Expectation theory, also popularly known as the Pygmalion Effect, can provide important knowledge about how a leader's expectations about a subordinate might actually influence employee behavior and performance.

A final area of exploration was leadership and ethics. The leadership and ethics literature provided some insights into leaders that use purpose-seeking behavior ethically. Indicators are present to demonstrate the linkage between leader behavior and employee behavior. Although limited, some valuable information exists in the body of literature.

RESEARCH ON MOTIVATION

While it is clear that no single theory provides a unified approach to understanding human motivation, much of literature related to extrinsic motivation concludes that extrinsic motivators, in particular monetary incentives, tend to be poor long-term motivators (Deci, 1992). Many researchers have documented positive short-term effects that accrue from extrinsic motivation, but negative long-term effects are commonplace (Benabou & Tirole, 2003; Jensen, 2010; Lei, 2010). In fact, in experiments conducted by Edward Deci, the correlations between extrinsic motivation and task performance have

been found to be lower than the correlations between task performance and *no attempt* at motivation (Fleming, 2011).

Intrinsic motivation, however, appears to have a different motivational influence. Many social scientists are beginning to articulate the benefits of sincere attempts to use intrinsic motivation to achieve positive organizational results (Pink, 2009).

Researcher Harry Harlow began to conduct experiments with primates during the 1950's to better understand learning (Harlow, 1950). Harlow and his team devised an elaborate experiment that would reward the subjects when they successfully opened a complicated lock mechanism (Harlow, 1950). Unexpectedly, as the researchers prepared the experiment, the primates were able to manipulate the lock as a form of play (Harlow, 1950). At the time, the scientific wisdom held that primates, and humans, were motivated by their primary needs (food, water, shelter, procreation) (Pink, 2009). Harlow and his team also expected to witness primary need motivation, but instead they noted "The behavior obtained in this investigation poses some interesting questions for motivation theory, since significant learning was attained and efficient performance maintained without resort to special or extrinsic incentives" (1950, p. 231). Harlow further noted that "the performance of the task provided intrinsic reward" (1950, p. 232). An even more surprising outcome occurred when the experimenters provided food rewards to the primates as a performance motivator – primate performance degraded (Harlow, 1950)! Stated another way, the introduction of an extrinsic motivator, the food, led to a lower level of performance than when the monkeys were simply intrigued by the challenges of the lock.

Harlow's work led other researchers, including Edward Deci, to determine how intrinsic motivation might be manifested in humans. Deci's initial experiments involved solving a complex task with an object that resembled a Rubik's cube (Deci, 1971). The subjects were randomly allocated to one of two groups, a control group and an experimental group (Deci, 1971). Initially, both groups were give the tasks to perform with no stated reward (Deci, 1971). During the second trial run, the control group was informed that a small amount of money would be paid to them if they could complete the task, while the experimental group was still not offered any compensation for successfully completing the task (Deci, 1971). Up to this point, both group exhibited similar performance (Deci, 1971). On the third trial, the control was informed that no money would be provided for successfully completing the task, while no reward was offered to the experimental group (Deci, 1971). During this trial, the control group lost interest in the task and the experimental group continued to perform as well as in the other two trials (Deci, 1971). This initial experiment seemed to mirror the results found by Harlow in his research with primates. When working for the sheer joy of solving a challenge, an intrinsic motivation, instead of anticipating a reward, an extrinsic motivation, task performance tends to increase.

Deci has replicated this experiment in others settings with similar results. He has noted that a manager who is interested in motivating subordinates:

> Should not concentrate on external control systems such as monetary rewards, which are linked directly to performance, but, rather, should concentrate on structuring situations that are intrinsically interesting and then be interpersonally supportive and rewarding toward the persons in the situation. While large payments can lead to increased performance due to feelings of inequity, these payments will, however, be making the people dependent on the money, thereby decreasing their intrinsic motivation (Deci, 1972, p. 120).

Other researchers have concluded that intrinsic phenomena such as Maslow's concept of self-actualization may even be an unconscious driver of human behavior, and therefore, a more powerful stimulus than extrinsic devices (Kenrick, Griskevicius, Neuberg, & Schaller, 2010). The noted author Victor Frankl writes that his experience in a Nazi concentration camp during World War II compel him to believe in the importance of transcendence, or purpose, in human growth and development (Frankl, 1966). Frankl's experiences and research have led to his belief that "Self-transcendence is the essence of existence" (1966, p. 104). Swedish researchers have developed the Swedish Purpose in Life (PIL) survey instrument that "captures and confirms the theoretical assumptions of Frankl's theory" related to Frankl's concept of "will to meaning" or purpose (Jonsen et al., 2010, p. 41).

RESEARCH ON PURPOSE-SEEKING BEHAVIOR

A limited amount of research and literature exists to address the topic of purpose-seeking behavior. Daniel Pink, however, has concluded that the search for meaning may be one of the most powerful and relevant intrinsic motivators in modern life (Pink, 2009). This finding has been mirrored in research by other authors who aver that purpose is a primary

motivational force (Bronk, Hill, Lapsley, Talib, & Finch, 2009). Kashdan and McKnight found that the search for purpose and meaning is a foundational motivational element and the quest for finding meaning in one's life takes place through many routes (Kashdan & McKnight, 2009).

Purpose-seeking behavior may also be an important element in several modes of various multiple intelligences (Moran, 2009). In addition, those who seek purpose in life tend to exhibit "emotionally maturity" and may be more morally sensitive (Moran, 2009, p. 155).

Some evidence exists that purpose-seeking leaders are generally effective on a wide range of performance variables, however, not much research has been conducted to link this behavior to overall organizational effectiveness (Holloman, Rouse, & Farrington, 2007). When the organizational members clearly understand the organization's long-term purpose, strategies are improved (DeVilbiss & Gilbert, 2005). In additional, it appears that organizations with a clearly defined and widely understood purpose have a significant competitive advantage in their sphere of influence (Ellsworth, 2002).

A link between purpose-seeking behavior and ethical conduct may also be emerging. The most successful organizations have an ethical purpose that pervades the culture of the organization (Nikos Mourkogiannis, 2006). It seem clear that organizational purpose clearly establishes the organization's core beliefs and a clearly defined purpose leads to more effective strategies (Nikos Mourkogiannis, 2006). On a personal level, finding the purpose in one's profession may be one of the most important elements of job satisfaction and career progression (Nikos Mourkogiannis, 2007).

Finally, scholars have found a wide range of positive benefits that accrue from purpose-seeking behavior (Byron & Miller-Perrin, 2009). Purpose-seeking behavior may also become a key future element in the study of Positive Organizational Behavior (POB).

RESEARCH ON SPIRITUALITY AT WORK

Spirituality is closely related to purpose. Although spirituality may be only one element of religion, many observers equate the two phenomena (Brooke & Parker, 2009). However, meaning and purpose can be separated from specific religious practices or beliefs (Pavlovich & Doyle Corner, 2009). Spirituality in the workplace is poorly understood and rarely addressed by leaders (Gross-Schaefer, 2009). The few organizations that have focused on spirituality appear to be more productive than those that do not (Badrinarayanan & Madhavaram, 2008; Jurkiewicz & Giacalone, 2004; Poole, 2009) .

The "transcendence perspective" of workplace spirituality allows an individual to perceive the holistic nature of life and to grasp the meaningful nature of work (Carter, 2009, p. 88). Exposure to "context providing meanings and values" can enhance an "individual's commitment to these meanings" (Fave, 2009, p. 296). The results of one study show a strong positive correlation "among aspects of spirituality and organizational commitment" (Usman & Danish, 2010, p. 188). Workers' commitment to the organizations goals has shown to have a highly positive correlation to organizational performance and cannot be overstated (Mehmud, Ali, Baloch, & Khan, 2010).

A meta study conducted by Karakas establishes a link between workplaces that accommodate spirituality and employee well-being (Karakas, 2010) , while other studies

show that many benefits result when workplaces accommodate spirituality (Jurkiewicz & Giacalone, 2004).

Researchers have also addressed spirituality by analyzing three aspects of the phenomenon: "meaningful work, sense of community and alignment with values" (Milliman, Czaplewski, & Ferguson, 2003, p. 440). This research found that purpose and finding meaning in work were closely related concepts and that meaningful work is an intrinsic motivator. The authors of the report propose that "work is not just meant to be interesting or challenging, but that it is about things such as searching for deeper meaning and purpose, living one's dream, expressing one's inner life needs by seeking meaningful work, and contributing to other" (Milliman et al., 2003, p. 429). This research is a valuable complement to the extant research, but its focus is on how work (an external construct) affects attitude (an internal construct).

Although the scholarship related to workplace spirituality is in an embryonic stage, more attention to spiritual needs in the workplace might help mitigate some of various ill of modern organizations (Sheep, 2006).

RESEARCH ON EXPECTATION THEORY

Expectation theory, also known as the "Pygmalion Effect" or "Self-fulfilling prophecy", may be of importance to the study of leadership (Inamori & Analoui, 2010, p. 306). A significant body of research has been conducted to determine the relationship between "a perceiver's expectation and the target's performance" (Inamori & Analoui, 2010, p. 306). If a leader has high expectations about the ability and performance of an individual, the individual tends to live up to those expectations (Inamori & Analoui, 2010). Similarly, low leader expectations are correlated with poor subordinate

performance (Inamori & Analoui, 2010). A recent study illustrated this phenomenon in a multi-cultural study by further stating that "maintaining positive perception is imperative for successful management of people and operations" (Inamori & Analoui, 2010, p. 317)

. Additional research reinforces the Pygmalion Effect. One study of over 900 managers indicated one significant relationship that is worthy of mention. The study found "that leader expectations were related to employee engagement in learning activities" (Bezuijen, van den Berg, van Dam, & Thierry, 2009, p. 1248). This may be significant when compared to a Gallup study that revealed that employee commitment and employee engagement were key indicators of positive organizational performance (Wagner, 2006).

A meta study to analyze the implications of the Pygmalion Effect in industry and the military sought to add additional insight into this phenomenon (Kierein & Gold, 2000). This study indicated that, although the effect was more pronounced in military organizations, it is also present in industry (Kierein & Gold, 2000).

Other studies have reinforced the concept that leader expectations can significantly influence subordinate performance. These studies and their impact on organizational prosperity are summarized by J. Sterling Livingston:

> For top executives in industry who are concerned with the
> productivity of their organizations and the careers of young
> employees, the challenge is clear: it is to speed the development of
> managers who will treat their subordinates in ways that lead to
> high performance and career satisfaction. The manager not only
> shapes the expectations and productivity of his subordinates, but
> also influences their attitudes toward their jobs and themselves. If
> he is unskilled, he leaves scars on the careers of the young men,
> cuts deeply into their self-esteem, and distorts their image of
> themselves as human beings. But if he is skillful and has high
> expectations of his subordinates, their self-confidence will grow,
> their capabilities will develop, and their productivity will be high.

More often than he realizes, the manager is Pygmalion (1969, p. 89).

RESEARCH ON LEADERSHIP AND ETHICS

The research and literature on leadership and ethics is reasonably robust. Ethics has a wide range of definitions and one definition elaborates on the *characteristics* of ethics: "that branch of philosophy dealing with values relating to human conduct, with respect to the rightness and wrongness of certain actions and to the goodness and badness of the motives and ends of such actions" (Flexner, 1987). This definition describes a generalized set of personal characteristics that would appear to apply to everyone. In the context of an organization where good and evil, right and wrong human actions and virtuous and nonvirtuous behavior are clearly defined, this definition might serve us as a guide to understanding ethical leadership.

A second definition implies a governance construct, specifically; it addresses the proscriptions and allowances that are characteristic of a member of a group who is functioning within the constraints defined by the group. Ethics is defined as "the rules of conduct recognized in respect to a particular class of human actions or a particular group, culture, etc.: *medical ethics; Christian ethics.*" (Flexner, 1987). In addition, the second definition leads us to a conclusion that the profession, or a particular organization, can establish those rules and standards and can imbue the organizational culture with an imperative to always follow those rules and structures. In other words, the codified guidance becomes embedded in the cultural DNA as mores, norms and customs.

When fraud, deceit or manipulation occur, norms, mores and customs are violated, in particular the "norms of honesty and transparency" (Gigch, 2008, p. 153).

Although some researchers believe that ethical lapses or direct violations occur when norms are shattered (Gigch, 2008), this view does not address the issue of corrupt mores, norms and customs, which are exemplified by corrupt cultures with nonvirtuous leaders.

Organizational culture is a phenomenon that has been identified, categorized and analyzed beginning approximately two decades ago. Although organization culture has always been present, its emergence in the early 1990's has provided valuable insights into organizational behavior. Edgar Schein is one of the earliest and most learned observers of organizational culture. He takes the position that culture drives not only behavior in an organization, but also attitudes and ways of thinking (Schein, 1990). Schein defines organizational culture as (emphasis by the author of this paper):

> Culture is what a group *learns* over a period of time as that group *solves* its *problems* of *survival* in an *external environment* and its problems of *internal integration*. Such learning is simultaneously a behavioral, cognitive, and an emotional process. Extrapolating further from a functionalist anthropological view, the deepest level of culture will be the cognitive in that the *perceptions*, *language*, and *thought processes* that a group comes to share will be the ultimate *causal determinant* of feelings, *attitudes*, *espoused values*, and *overt behavior (1990, p. 111)*.

Leadership is a key variable in understanding the culture, ethics and performance of any organization or enterprise. A wide range of studies have been conducted to clarify the role of leaders in guiding, overseeing and correcting the behaviors of a collective and a clear link between organizational effectiveness and ethical leadership is evident (Hood, 2003). Hood notes that her studies demonstrate "the ethical orientation of the CEO is a critical issue to consider in understanding ethical practices in the organization" and "it has been noted that the basis for effective leadership, and, more particularly, ethically based leadership, are the traits of honesty and integrity" (Hood, 2003, p. 269). These finding

has also been validated by 25 years of research by James Kouzes and Barry Posner. Kouzes and Posner have been conducting research to determine the characteristics of admired leaders, and in four separate large scale surveys over the 25-year period, honesty has always been cited by survey participants as the most important characteristic of an admired leader (Kouzes & Posner, 2007). Researchers Richard Boyatzis and Annie McKee have also found that leaders tend to attract followers who share the same values and moral characteristics as the leaders (Boyatzis & McKee, 2005).

Leadership style also appears to be an indicator of effectiveness in governance. Hood's research also showed that "transactional leaders" were more focused on only following the letter of the law when ethical issues are involved and "transformational leaders would go beyond simple legal prescription and implement more socially responsible and ethical practices within the organization" (Hood, 2003, p. 271).

Leaders are role models in an organization and they set both good and bad examples. Effective leaders are driven by core values and principles, which they frequently articulate and strive to live by (Kouzes & Posner, 2007). In their extensive research, Kouzes and Pozner have found a common set of traits that exemplify effective leaders who serve as positive role models:

> The list is populated by people with strong beliefs about *matters of principle*. They all have, or had, unwavering commitment to a clear set of values. They all are, or were, passionate about their causes. The lesson from this simple exercise is unmistakable. People admire most those who believe strongly in something, and who are willing to stand up for their beliefs (2007, p. 46).

Leadership can also be described as the personal characteristics and persuasive power that exist in those individuals who enforce the mores, norms and customs of the enterprise through their words, behavior and methods of guidance and correction.

Many of the current leadership theories concentrate on the "lowest common denominator" instead of on higher-order values, and this approach often yields lower-order results (Kalpana, 2009, p. 32). High performance leaders tend to focus on higher-order drivers, such as purpose and meaning and are willing to share information, power and purpose with team members (Carson, Tesluk, & Marrone, 2007).

The actions of the leaders of an organization matter – followers tend to seek behavioral cues from their leaders (Brown & Treviño, 2006). Leaders create and mold the ethical environment of an organization through their behavior and actions (Neubert, Carlson, Kacmar, Roberts, & Chonko, 2009). Therefore, it is important for leaders to have a set of values and principle upon which their actions are based. Articulating purpose is one of the five practices of exemplary, high performance leadership and the one practice in which leaders engage less frequently than the other four (Kouzes & Posner, 2007).

The concept of being a part of something larger than oneself can create a sense of purpose and meaning in an individual (Cacioppe, 2000). Organizations can better prepare their leaders to face the challenges of the future by concentrating on gaining "wisdom" instead of focusing on matters of "style" (Sosik & Dworakivsky, 1998, p. 17).

SUMMARY OF LITERATURE REVIEW FINDINGS

Table 1 below illustrates what is known about purpose-seeking behavior and what is unknown. This research is designed to address the unknown factors.

Table 1:   **Literature Review Summary**

What is Known	What is Unknown
• Extrinsic motivation provides only short-term benefit, if any. • Extrinsic motivation is the primary means used by organizational leaders to achieve goals. • Intrinsic motivation provides more lasting motivational drive. • Purpose-seeking behavior is an intrinsic motivator. • Seeking purpose appears to be a significant, if under used, motivator. • Very little research has been documented to understand the impacts of purpose-seeking behavior.	• The relationship between an Engineering Manager's purpose-seeking beliefs and behaviors and that Engineering Manager's perception of the initiative of his or her direct reports is unknown. • The relationship between an Engineering Manager's purpose-seeking beliefs and behaviors and that Engineering Manager's perception of the creativity of his or her direct reports is unknown. • The relationship between an Engineering Manager's purpose-seeking beliefs and behaviors and that Engineering Manager's perception of the purpose-seeking behavior of his or her direct reports is unknown.

THE CONCEPTUAL MODEL AND EXPECTATION THEORY

An additional component of intrinsic motivation is expectation theory. Research has demonstrated a strong relationship between a manager's perception of employee performance and the actual behavior exhibited by the employee (Inamori & Analoui, 2010). If a manager has beliefs about seeking purpose in work related activities and has positive expectation about his or her subordinates, then the employee's initiative, creativity and purpose seeking behavior might be influenced. Similarly, a feedback loop might be established to further reinforce the manager's beliefs, behaviors and perceptions. The theory is illustrated in Figure 1.

Figure 2:   The Purpose Seeking Model

Engineering Manager's Beliefs and Behaviors About Purpose and Meaning

Engineering Manager's Perception of Employee Initiative, Creativity and Purpose Seeking Behavior
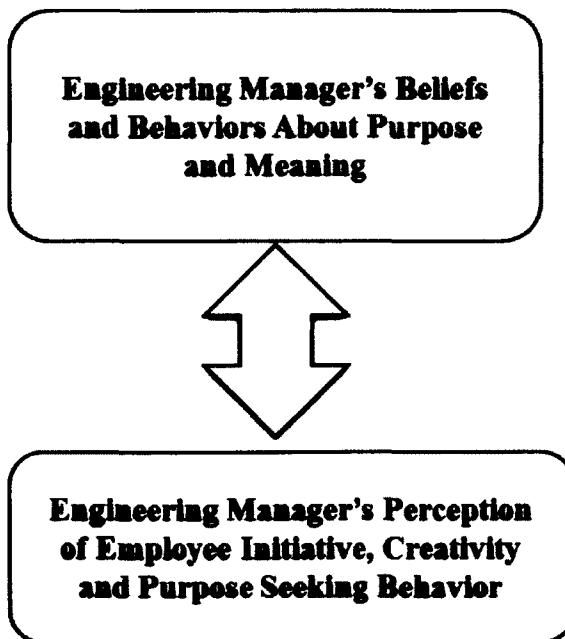
THE RESEARCH HYPOTHESES

The specific null hypotheses for this research are:

H_{0a}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, at a construct level, and the engineering manager's perception of the subordinate initiative, creativity and purpose seeking behavior, at the construct level.

H_{0b}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of initiative in meeting work goals exhibited by subordinates under the leadership of the engineering manager.

H_{0c}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of initiative in solving problems exhibited by subordinates under the leadership of the engineering manager.

H_{0d}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of creativity exhibited by subordinates under the leadership of the engineering manager.

H_{0e}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of creativity of problem solving approaches exhibited by subordinates under the leadership of the engineering manager.

H_{0f}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of understanding of the importance and purpose of the group's work exhibited by subordinates under the leadership of the engineering manager.

H_{0g}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of understanding of the purpose of the organization exhibited by subordinates under the leadership of the engineering manager.

CHAPTER III

METHODOLOGY

THE RESEARCH PROCESS

This research is designed to examine the existing literature to determine paradigms related to extrinsic and intrinsic motivation and will concentrate on the potential impact of purpose-seeking behavior as an intrinsic motivator. In addition, a wide-ranging and diverse group of engineering managers will be surveyed to determine their perceptions of their own purpose-seeking behaviors and beliefs, and their perceptions about the creativity, initiative and purpose-seeking behavior of their subordinates. An insignificant amount of research has been conducted to determine the relationship between an Engineering Manager's purpose-seeking beliefs and behaviors and the Engineering Manager's perception of employee initiative, creativity and purpose-seeking behavior. Purpose-seeking behavior might prove to a powerful method of achieving organizational goals.

A deductive approach was used in this research project. In the initial stage of the research, a theory was developed to articulate the expected outcomes of the research (Trochim & Donnelly, 2008). After the thesis was formed, research goals were established and defined by a series of hypotheses (Trochim & Donnelly, 2008). In addition, a conceptual model is created to illustrate the theoretical foundations of the research. A literature search was subsequently conducted to determine the extent of knowledge already documented and a gap analysis ensued.

The tools and methods required to investigate the research question were then defined. The researcher sought and gained permission to use the Meaning of Life Questionnaire (MLQ) and the MLQ was paired with researcher-defined questions to investigate the theory. The surveys were administered and data were collected to test the hypotheses (Trochim & Donnelly, 2008). Finally, analysis of the data was used to confirm or invalidate the hypotheses (Trochim & Donnelly, 2008). In the final stage, after approval from the dissertation committee, the findings will be published. The unit of analysis for this research will be the individual engineering manager who participated in the survey. The engineering manager's beliefs (an intrinsic phenomenon) and perceptions about subordinate behaviors (also an intrinsic phenomenon) are the key elements of quantitative research.

The specific steps that were taken to conduct the research are listed in Figure 2 below. As each step in the process progressed, new information often required iterations back to previous steps to incorporate the new findings or knowledge.

Figure 3:   **The Research Methodology**
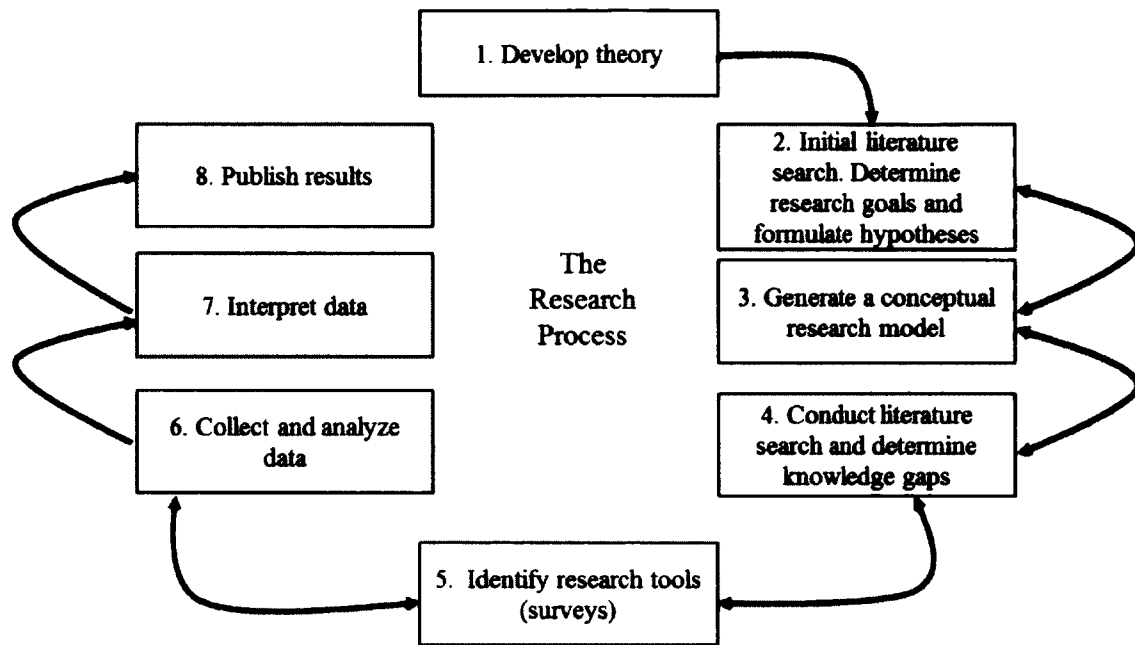
THE MEANING OF LIFE QUESTIONNAIRE

The Meaning of Life Questionnaire (MLQ) was developed by Dr. Michael Steger to provide a "a clean, direct, face valid, and psychometrically robust measure of the presence of and search for meaning in life" (M. F. Steger & Shin, 2010). The MLQ was used in an electronic survey in combination with six researcher-designed questions (EMP), to first determine the Engineering Manager's beliefs and behaviors about meaning and purpose in life and then to determine the Engineering Manager's perceptions about direct report initiative, creativity and purpose-seeking behavior.

The MLQ instrument measures both the "Presence of Meaning" and the "Search for Meaning" and, therefore, provides a valid and reliable method that is suitable to determine an individual's beliefs and behaviors related to meaning (M. F. Steger, Frazier, Oishi, & Kaler, 2006, p. 80). Three studies were performed to demonstrate "internal consistency, temporal stability, factor presence of, and the search for, meaning of life" (M. F. Steger et al., 2006, p. 80). The author of the instrument, Michael Steger, makes an important distinction about interpreting the use and meaning of the survey. The MLQ addresses a duality: Those who have found purpose in their lives typically experience a positive psychological state, and those who are still seeking purpose in their lives typically will not experience an optimal psychological state until purpose is understood and achieved (M. F. Steger, Kashdan, T.B, Sullivan, B.A, & Lorentz, D., 2008). This instrument is an ideal method to determine an Engineering Manager's beliefs and behaviors related to seeking purpose. The MLQ questions are shown in Table 1.

The EMP includes six questions designed by the researcher to obtain the engineering manager's perceptions about subordinates in three areas (subclasses): initiative, creativity and purpose-seeking behavior. Each area represents a subclass, and is addressed by two questions. The EMP question set is described in Table 3.

Table 1: **Meaning of Life Questionnaire**

MLQ Question		Category
MLQ-1.	I am looking for something that makes my life feel meaningful.	Searching
MLQ-2.	I am always looking to find my life's purpose.	Searching
MLQ-3.	My life has a clear sense of purpose.	Presence
MLQ-4.	I have a good sense of what makes my life meaningful.	Presence
MLQ-5.	I have discovered a satisfying life purpose.	Presence
MLQ-6.	I am always searching for something that makes my life feel significant	Searching
MLQ-7.	I am seeking a purpose or mission for my life.	Searching
MLQ-8.	My life has no clear purpose.	Presence
MLQ-9.	I am searching for meaning in my life.	Searching
MLQ-10.	I understand my life's meaning.	Presence

A seven-point scale, shown in Table 2, was used to document the responses from survey participants for both the MLQ and the EMP questions.

Table 2: **MLQ Response Scale**

1	2	3	4	5	6	7
Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True

RESEARCHER DEFINED QUESTIONS

The additional questions, developed by the researcher, were included in the

survey, and were designed to evaluate the engineering manager's perception of worker

motivation in three areas: initiative, creativity and purpose. The same seven-point

measurement scale used with the MLQ questions was used.

Table 3   Engineering Manager's Perception of Employee Effectiveness (EMP)

Question	Intended Purpose
EMP-1: My direct reports appear to be highly motivated to meet the goals important to our team.	**Subclass: Initiative.** Demonstrates the Engineering Manager's perception of direct reports' initiative in meeting work goals.
EMP-2: My direct reports often take initiative to solve problems.	**Subclass: Initiative.** Demonstrates the Engineering Manager's perception of direct reports' initiative in solving problems.
EMP-3: My direct reports often come up with creative ways to improve the way we do our work.	**Subclass: Creativity.** Demonstrates the Engineering Manager's perception of direct reports' creativity.
EMP-4: My direct reports find creative ways to solve problems.	**Subclass: Creativity.** Demonstrates the Engineering Manager's perception of the creativity of direct reports' problem solving approaches.
EMP-5: My direct reports understand the importance of the work we are assigned.	**Subclass: Purpose.** Demonstrates the Engineering Manager's perception of direct reports' understanding of the importance and purpose of the group's work.
EMP-6: My direct reports understand the overall purpose of the organization in which we work.	**Subclass: Purpose.** Demonstrates the Engineering Manager's perception of direct reports' understanding of the purpose of the organization.

DEMOGRAPHIC QUESTIONS

The following demographic questions and response choices were included in the

survey:

1) How many years of total work experience do you have?
   a) 1-3 years
   b) More than 3 years and less than 5 years
   c) More than 5 years and less than 10 years
   d) More than 10 years
2) How many years have you been an Engineering Manager?
   a) 1-3 years
   b) More than 3 years and less than 5 years
   c) More than 5 years and less than 10 years
   d) More than 10 years
3) If you are or have been an engineering manager, please select your total number of direct reports.
   a) 3 or less
   b) 4-7
   c) 8-10
   d) More than 10
4) What is the highest level of education you have completed?
   a) High School or Less
   b) Trade or Vocational School
   c) Attended Some College
   d) Undergraduate College Degree
   e) Master's Degree
   f) Doctoral Degree
   g) Prefer not to answer
5) Are you male or female?
   a) Male
   b) Female

SOURCES OF EMPIRICAL DATA

The primary source of survey information was the membership of the

American Society of Engineering Managers (ASEM). The survey was sent via email to

the approximately 600 members on the ASEM distribution list. The survey collected

demographic information, as well as the MLQ and EMP information and an open-ended

block, but no personal identification information. The message was constructed by the

researcher and administered by the Office Manager of ASEM. This process is depicted

in Figure 4.

Figure 4:   The Survey Administration Process
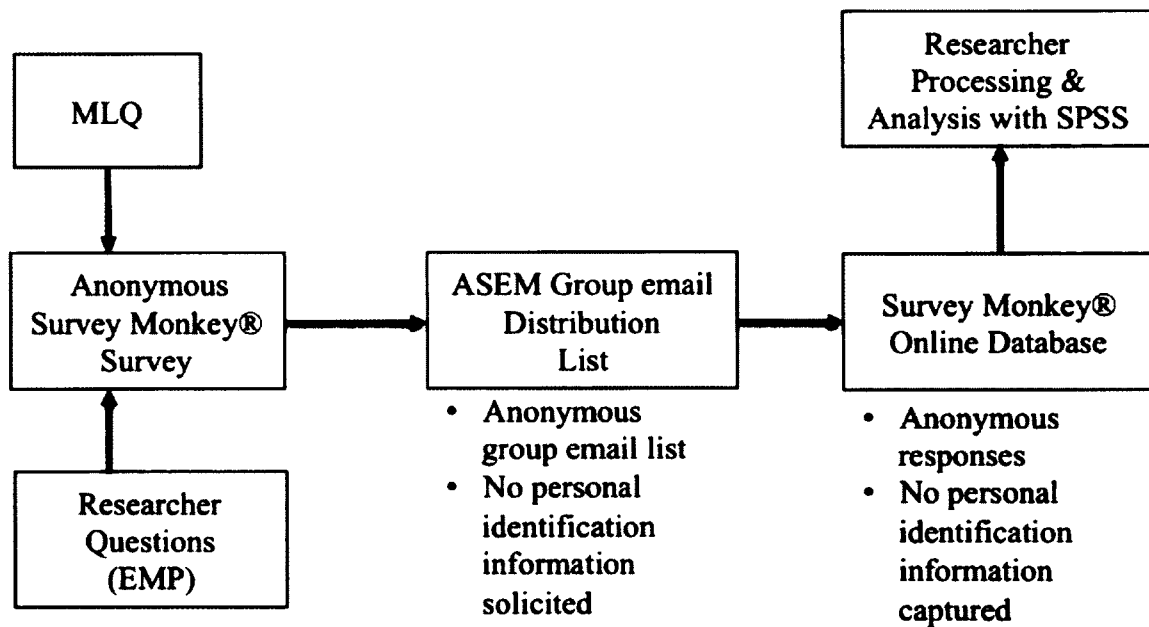
The survey response yielded 120 responses. At least 50 responses would have

been adequate and any number greater than 50 should have created a comfortable margin

for analysis.

The survey was initially administered to a small pilot group to establish the

adequacy of the survey to meet its intended purposes, the length of the survey and to

establish the expertise of the research in this domain (Iarossi, 2006). The survey

construct is depicted in Figure 5.

Figure 5:   The Survey Construct

Meaning of Life Questionnaire (MLQ): Self Report

Researcher Questions: Perceptions About Direct Reports
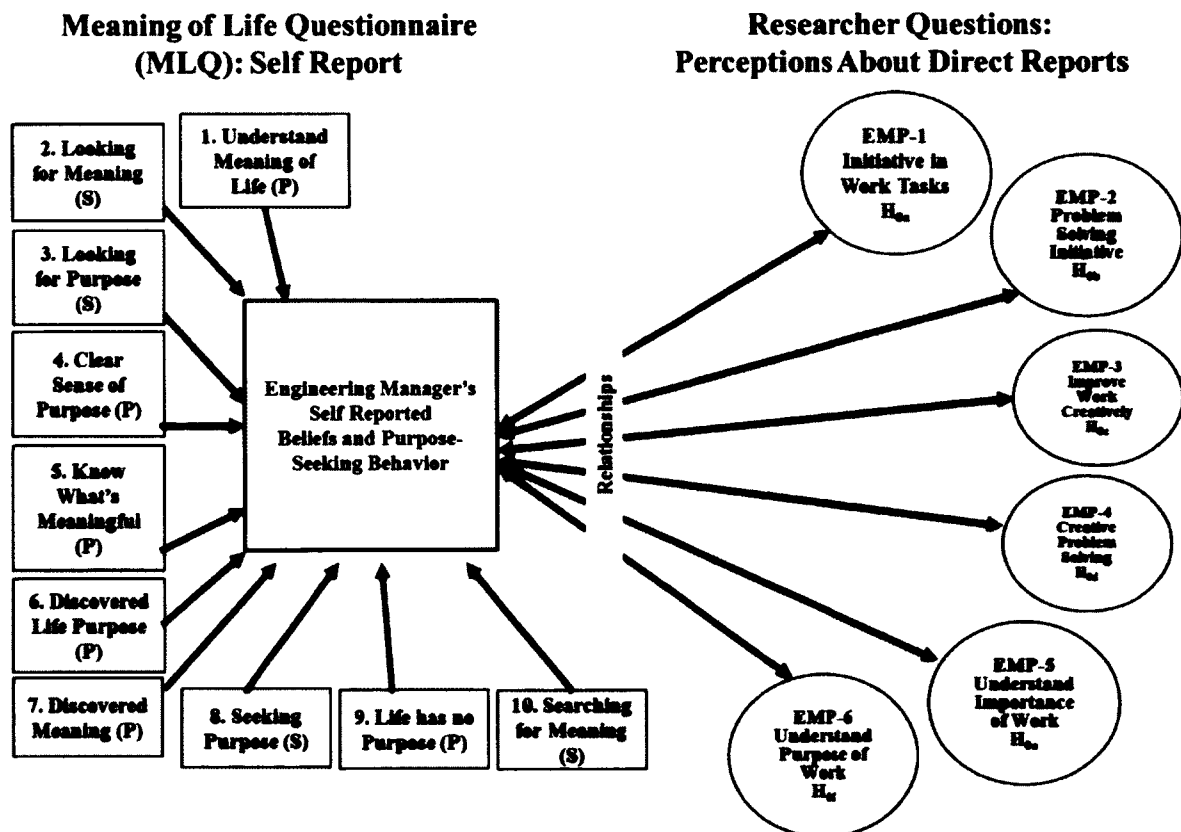
Figure 6:   **Data Analysis Process**

Retrieve data from
Survey Monkey®
Online Database

Evaluate Dataset

- Sample size
- Code variations
- Open-ended questions

Determine root cause of
inadequacy and adjust if necessary.

Is dataset
adequate?

No

Yes

Perform correlation
analysis using
Spearman's Rho

Analyze results and
determine
hypotheses
validation

Update dissertation
and publish results
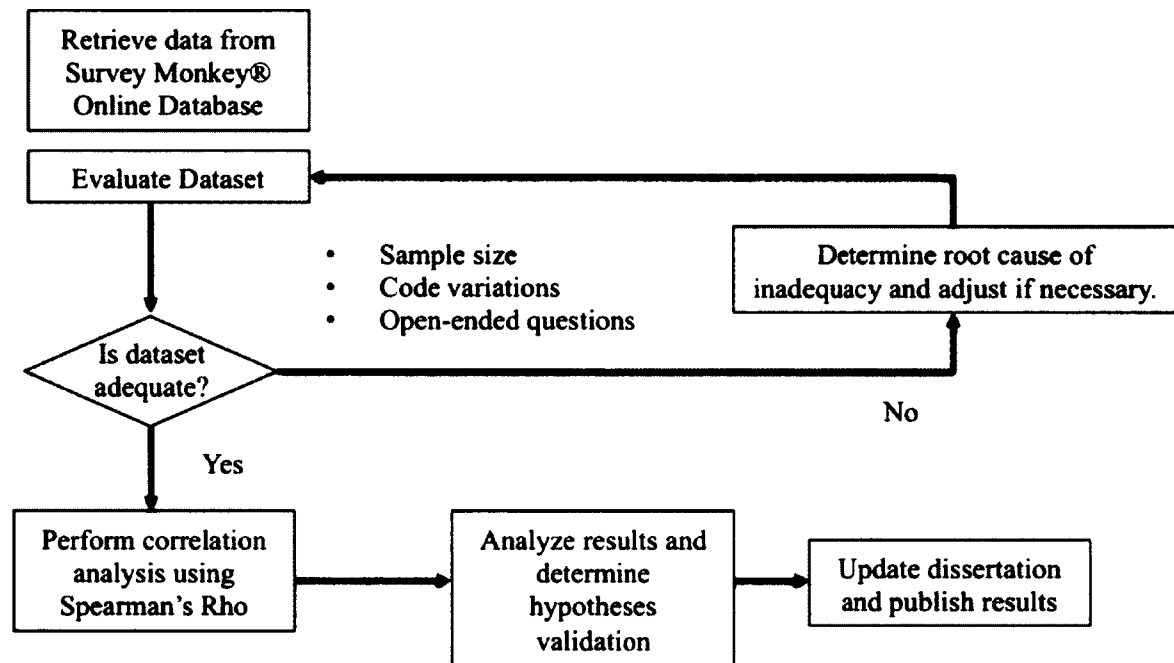
ANALYSIS OF THE DATA

Both the MLQ and the EMP questions require a ranked response to indicate the respondent's preference. Since the numbers are ordinal numbers, the best method to determine correlation among the responses may be Spearman's Rho. "The Spearman correlation measures the degree to which the relationship between two variables is generally one-directional or monotonic" – this is a suitable definition for the technique and fits the needs of this research (Gravetter & Wallnau, 1985, p. 540). Another attraction of this method is that it does not require a specific data distribution to create correlations (Gravetter & Wallnau, 1985). Finally, Spearman works well with large and small samples (Gravetter & Wallnau, 1985).

Several analysis approaches were employed. Initially, all of the MLQ questions were correlated, using Spearman's' Rho in a two-tailed analysis, to understand the individual question to question relationships. Next, the entire MLQ set, using the FA result, was correlated separately with each of the EMP questions. This analysis was the analysis used to test the hypotheses. Finally, the entire MLQ question set was analyzed against the entire EMP question set using the FA results for each construct.

STATISTICAL SIGNIFICANCE

William Buchanan defines statistical significance as an indicator that expresses the likelihood that "a tendency we find in a sample is sufficiently strong for us to conclude that it also occurs in the population from which the sample is drawn" (Buchanan, 1988, p. 97). He notes further that a statistical significance of 0.05 indicates that the results are probably not a consequence of randomness and should suffice as a threshold measurement of significance (Buchanan, 1988, p. 97).

CHAPTER IV

RESULTS

This chapter provides a detailed analysis of the results of the information

collected during the month long survey period.

ENGINEERING MANAGER RESPONSES

The survey collected 120 responses, of which 101 participants completed all of the

survey questions. The 101 complete responses were analyzed. This is a number sufficient

to allow useful analysis. The 120 responses are summarized in Table 4.

Table 4:   Survey Response Rates

Category	N	%
Response rate of ASEM addressees (600 ASEM members)	120	20.0%
Response rate of complete data sets of ASEM members	101	16.8%
Total number of EM attempting the survey.	120	100.0%
Number of respondents with no EM experience.	15	11.7%
Number of respondents who exited early.	4	0.8%
Number evaluated by SPSS Software.	101	84.2%

The descriptive statistics for the MLQ elements are shown in Table 5 and the

descriptive statistics for the EMP elements are shown in Table 6.

Table 5: **Descriptive Statistics for MLQ Elements**

Question	N	Mean	Standard Deviation	Variance
MLQ-1	101	6.0198	1.41407	2.000
MLQ-2	101	5.1188	1.48517	2.206
MLQ-3	101	5.8911	.91543	.838
MLQ-4	101	6.1980	.66362	.440
MLQ-5	101	5.8911	1.03828	1.078
MLQ-6	101	4.9406	1.69010	2.856
MLQ-7	101	4.7426	1.73582	3.013
MLQ-8	101	1.6040	1.04956	1.102
MLQ-9	101	3.8614	2.04954	4.201
MLQ-10	101	5.5743	1.15192	1.327

Table 6: **Descriptive Statistics for EMP Elements**

Question	N	Mean	Standard Deviation	Variance
EMP-1	103	5.7129	1.07086	1.147
EMP-2	103	5.8119	1.13765	1.294
EMP-3	102	5.5545	1.07215	1.150
EMP-4	102	5.6139	1.12223	1.259
EMP-5	101	5.9901	.93268	.870
EMP-6	101	5.9307	1.09779	1.205

DEMOGRAPHIC INFORMATION

Demographic information for the survey sample is depicted in Table 7. Males were more strongly represented in the survey than females, a statistic in harmony with the general population of engineering managers. Respondents were reasonably distributed by years of experience, with a skew toward 20 or more years. In addition, the number of years as an engineering manager was also skewed toward 20 or more years. This seems reasonable, since an individual rarely enters the workforce as an engineering manager and must often gain experience as an engineer prior to receiving a management position. A significant number of the respondents had a graduate degree. A large number of respondents reported direct reports in excess of 20. This amounted to slightly more than 42 percent of the total value. The remaining classifications of direct reports were distributed as illustrated in Table 7.

Table 7:   Demographic Information

Demographic	Classification	Frequency (n=98)	Percentage
Gender	Male	78	79.59%
	Female	20	20.41%
Total Work Experience	0-5 years	5	5.10%
	6-10 years	9	9.18%
	11-15 years	6	6.12%
	16-20 years	8	8.16%
	20 or more years	70	71.43%
EM Experience	0-5 years	20	20.41%
	6-10 years	19	19.39%
	11-15 years	10	10.20%
	16-20 years	15	15.31%
	20 or more years	34	34.69%
Education	Bachelor's degree	9	9.18%
	Graduate degree	89	90.82%
Number of Direct Reports	0-5	16	16.33%
	6-10	20	20.41%
	11-15	16	16.33%
	16-20	7	7.14%
	20 or more	42	42.86%

SCALE DEVELOPMENT AND TESTING

Reliability testing was conducted using Chronbach's Alpha. Factor Analysis (FA) was used to determine construct validity.

Reliability of the Survey Instruments

Reliability describes the ability of an instrument to replicate responses over repeated trials using the same instrument (Bordens, 2008). In research related to human dynamics, survey instruments are often employed, as they were in this research project. Chronbach's Alpha is a statistical methodology primarily used to determine the "internal consistency" of a survey instrument (Cortina, 1993, p. 100). Alpha scores greater than 0.5 are considered acceptable for this research (Ahire & Devaraj, 2001). The technique was applied to both the MLQ and EMP question sets. The results for the ten questions of MLQ, an established instrument, are shown in Table 8. A Chronbach's Alpha value of 0.729 meets the threshold test.

Table 8:   Chronbach's Alpha for MLQ

Chronbach's Alpha	N
0.738	10

When Chronbach's Alpha was applied to the EMP question set, a value of 0.912 was calculated, as illustrated in Table 12. The value demonstrates strong internal reliability (Ahire & Devaraj, 2001). As the value of alpha approaches one, the strength of the internal reliability increases (Gliem, 2003).

Table 9:   Chronbach's Alpha for EMP

Chronbach's Alpha	N
0.912	6

Face Validity

Face validity is defined as a test to determine whether an instrument "appears to be appropriate" for its intended use (Gliner & Morgan, 2000, p. 320). As a standalone measure, face validity is insufficient, however, in combination with other measures it can reinforce overall validity of the instrument (Gliner & Morgan, 2000, p. 320). Careful analysis by the author, another experienced engineering manager and the pilot study group confirms the face validity of the EMP instrument.

A pilot group of eight experienced engineering managers voluntarily reviewed the survey to determine ease of use and clarity of the EMP questions, which were included in the pilot study. Participants were asked to review the questions, comment on the comprehension and clarity of the questions and to suggest recommendations to improve the survey. All pilot participants indicated that the questions were clear and understandable and they offered no recommendations to improve the questions. One participant noted that scales can be subjective, and determining the extent to which a group of employees exhibits behavior must be normalized. No changes were made to the questions based on the pilot group exercise. The pilot group did not evaluate the MLQ contents since the author of the survey has already validated this instrument.

.Construct Validity of the Instruments

A construct is defined as a "hypothetical concept that cannot be measured directly" (Gliner & Morgan, 2000, p. 322). Construct validity measures the extent to which a tool, for example a survey, is actually measuring the underlying concept (Gliner & Morgan, 2000).

Factor Analysis (FA) is a method that can serve several purposes, including assessing the "psychometric properties of new and existing measures", as well as examining "construct validation" (Harrington, 2009, p. 2).

FA was conducted with both the MLQ set of questions and responses and the EMP questions and responses. Factor loading values of at least 0.4 are considered adequate for this research and may be used to measure construct validity (MacCallum, Widaman, Zhang, & Hong, 1999). MLQ factor loading values, shown in Table 10, are all greater than 0.4 for each element of the MLQ, except for question nine, which establishes a negative presence position. The low factor loading score for MLQ-8 is also reflected in the subsequent correlation analysis for each MLQ-EMP correlation report as demonstrated in Tables 12 through 17. MLQ-8 states "My life has no clear purpose" (M. F. Steger, 2006). This illustrates the phenomenon known as "discriminant evidence" (Gliner & Morgan, 2000, p. 323). "Discriminate evidence" occurs when a value reflects expected variations between questions that correlate with one construct (in this case presence or seeking) and a question that represents an construct that is in opposition to the original construct, such as the denial of presence (Gliner & Morgan, 2000, p. 323).

Table 10:   **Factor Loading Values for the MLQ**

Questions	Factor Loading
MLQ-1. I am looking for something that makes my life feel meaningful (S).	.700
MLQ-2. I am always looking to find my life's purpose (S).	.696
MLQ-3. My life has a clear sense of purpose (P).	.532
MLQ-4. I have a good sense of what makes my life meaningful (P).	.434
MLQ-5. I have discovered a satisfying life purpose (P).	.571
MLQ-6. I am always searching for something that makes my life feel significant (S).	.696
MLQ-7. I am seeking a purpose or mission for my life (S).	.670
MLQ-8. My life has no clear purpose (P).	-.469
MLQ-9. I am searching for meaning in my life (S).	.549
MLQ-10. I understand my life's meaning (P).	.568

FA for the EMP questions shows a unitary underlying component in the survey, as illustrated in Table 12. The values for each question were greater than 0.4, a confirmation of construct validity (MacCallum et al., 1999).

Table 11: **Factor Loading for the EMP**

Question	Factor Loading
EMP-1: My direct reports appear to be highly motivated to meet the goals important to our team.	.839
EMP-2: My direct reports often take initiative to solve problems.	.895
EMP-3: My direct reports often come up with creative ways to improve the way we do our work.	.887
EMP-4: My direct reports find creative ways to solve problems.	.889
EMP-5: My direct reports understand the importance of the work we are assigned.	.610
EMP-6: My direct reports understand the overall purpose of the organization in which we work.	.677

HYPOTHESIS TESTING

The specific null hypotheses and the survey results for this research are discussed

below. The values originated from a correlation analysis among the responses to the

MLQ and the responses to the EMP. A two-tailed Spearman correlation analysis was

conducted for each of the elements of the MLQ separately with each of individual

elements of the EMP.

A correlation analysis of the MLQ question set with respect to each EMP element

is shown below in Table 12. In addition, the MLQ question set was correlated to the

entire EMP question set as construct to construct. The results are shown in Table 13. A

strong correlation is evident between the MLQ and EMP in their entirety. A detailed

analysis of the results of each EMP question follows Table 12.

Table 12:   MLQ to EMP Correlations

		MLQ
EMP-1	Spearman's Rho	.276[**]
	Sig. (2-tailed)	.005
	N	101
EMP-2	Spearman's Rho	.223[*]
	Sig. (2-tailed)	.025
	N	101
EMP-3	Spearman's Rho	.354[**]
	Sig. (2-tailed)	.000
	N	101
EMP-4	Spearman's Rho	.341[**]
	Sig. (2-tailed)	.000
	N	101
EMP-5	Spearman's Rho	.194
	Sig. (2-tailed)	.052
	N	101
EMP-6	Spearman's Rho	.165
	Sig. (2-tailed)	.100
	N	101

H_{0a}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, at a construct level, and the engineering manager's perception of their subordinates' initiative, creativity and purpose seeking behavior, at the construct level.

This hypothesis is rejected. A relationship between the MLQ question set, at the construct level, and the EMP question set, at the construct level, shows a correlation (rho = .354, p = .000) at the .01 level, as shown in Table 13 below.

Table 13:   MLQ to EMP Correlations

	EMP
MLQ	
Correlation Coefficient	.354**
Sig. (2-tailed)	.000
N	101

Hypothesis H_{0b}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey

questions, and the engineering manager's perception of the degree of *initiative* in meeting work goals exhibited by team members under the leadership of the engineering manager.

This hypothesis is rejected. A relationship between the MLQ question set and EMP-1 shows a correlation (rho = .276, p = .005) at the .01 level. The results the MLQ (FA) to EMP-1, MLQ to EMP and all MLQ to EMP-1 are shown in Table below.

Table 14: **EMP-1 Correlations**

EMP-1: My direct reports appear to be highly motivated to meet the goals important to our team.				MLQ to EMP-1	MLQ to EMP
		EMP-1	MLQ Element		
MLQ1	Spearman Correlation Coefficient	.195	I am looking for something that makes my life feel meaningful. (S)	rho = .276** p = .005 N = 101	rho = .354** p = .000 N = 1010
	Sig. (2-tailed)	.051			
	N	101			
MLQ2	Spearman Correlation Coefficient	.092	I am always looking to find my life's purpose. (S)		
	Sig. (2-tailed)	.361			
	N	101			
MLQ3	Spearman Correlation Coefficient	.205*	My life has a clear sense of purpose. (P)		
	Sig. (2-tailed)	.040			
	N	101			
MLQ4	Spearman Correlation Coefficient	.214*	I have a good sense of what makes my life meaningful. (P)		
	Sig. (2-tailed)	.032			
	N	101			
MLQ5	Spearman Correlation Coefficient	.312**	I have discovered a satisfying life purpose. (P)		
	Sig. (2-tailed)	.002			
	N	101			
MLQ6	Spearman Correlation Coefficient	.054	I am always searching for something that makes my life feel significant. (S)		
	Sig. (2-tailed)	.591			
	N	101			
MLQ7	Spearman Correlation Coefficient	.008	I am seeking a purpose or mission for my life. (S)		
	Sig. (2-tailed)	.938			
	N	101			
MLQ8	Spearman Correlation Coefficient	-.311**	My life has no clear purpose. (P)		
	Sig. (2-tailed)	.002			
	N	101			
MLQ9	Spearman Correlation Coefficient	.006	I am searching for meaning in my life. (S)		
	Sig. (2-tailed)	.954			
	N	101			
MLQ10	Spearman Correlation Coefficient	.230*	I understand life's meaning. (P)		
	Sig. (2-tailed)	.021			
	N	101			

Hypothesis H_{0c}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of *initiative* in solving problems exhibited by team members under the leadership of the engineering manager.

This hypothesis is rejected. A correlation between the MLQ question set and EMP-2 shows a correlation (rho = .228, p = .021) at the .05 level. The results the MLQ (FA) to EMP-2, MLQ to EMP and all MLQ to EMP-1 are shown in Table 15 below.

Table 15: **EMP-2 Correlations**

EMP-2: My direct reports often take initiative to solve problems.				MLQ to EMP-1	MLQ to EMP
		EMP-2	MLQ Element		
MLQ1	Spearman Correlation Coefficient	0.147	I am looking for something that makes my life feel meaningful. (S)		
	Sig. (2-tailed)	0.137			
	N	101			
MLQ2	Spearman Correlation Coefficient	0.111	I am always looking to find my life's purpose. (S)		
	Sig. (2-tailed)	0.264			
	N	101			
MLQ3	Spearman Correlation Coefficient	0.189	My life has a clear sense of purpose. (P)		
	Sig. (2-tailed)	0.056			
	N	101			
MLQ4	Spearman Correlation Coefficient	.293**	I have a good sense of what makes my life meaningful. (P)		
	Sig. (2-tailed)	0.003			
	N	101			
MLQ5	Spearman Correlation Coefficient	.311**	I have discovered a satisfying life purpose. (P)	$rho = .228**$ $p = .021$ $N = 101$	$rho = .354**$ $p = .000$ $N = 1010$
	Sig. (2-tailed)	0.001			
	N	101			
MLQ6	Spearman Correlation Coefficient	-0.020	I am always searching for something that makes my life feel significant. (S)		
	Sig. (2-tailed)	0.842			
	N	101			
MLQ7	Spearman Correlation Coefficient	0.042	I am seeking a purpose or mission for my life. (S)		
	Sig. (2-tailed)	0.674			
	N	101			
MLQ8	Spearman Correlation Coefficient	-.292**	My life has no clear purpose. (P)		
	Sig. (2-tailed)	0.003			
	N	101			
MLQ9	Spearman Correlation Coefficient	-0.013	I am searching for meaning in my life. (S)		
	Sig. (2-tailed)	0.895			
	N	101			
MLQ10	Spearman Correlation Coefficient	0.152	I understand life's meaning. (P)		
	Sig. (2-tailed)	0.126			
	N	101			

Hypothesis H_{0d}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of *creativity* exhibited by team members under the leadership of the engineering manager.

This hypothesis is rejected. A strong correlation between the MLQ

question set and EMP-3 exists (rho = .356, p = 0) at the .01 level. The results the MLQ

(FA) to EMP-3, MLQ to EMP and all MLQ to EMP-1 are shown in Table 15 below.

Table 16:   **EMP-3 Correlations**

EMP-3: My direct reports often come up with creative ways to improve the way we do our work.				MLQ to EMP-1	MLQ to EMP
		EMP-3	MLQ Element		
MLQ1	Spearman Correlation Coefficent	.254**	I am looking for something that makes my life feel meaningful. (S)		
	Sig. (2-tailed)	0.137			
	N	103			
MLQ2	Spearman Correlation Coefficent	0.111	I am always looking to find my life's purpose. (S)		
	Sig. (2-tailed)	0.264			
	N	103			
MLQ3	Spearman Correlation Coefficent	0.189	My life has a clear sense of purpose. (P)		
	Sig. (2-tailed)	0.056			
	N	103			
MLQ4	Spearman Correlation Coefficent	.293**	I have a good sense of what makes my life meaningful. (P)		
	Sig. (2-tailed)	0.003			
	N	103			
MLQ5	Spearman Correlation Coefficent	.311**	I have discovered a satisfying life purpose. (P)	$rho = .354**$ $p = .000$ $N = 101$	$rho = .354**$ $p = .000$ $N = 101$
	Sig. (2-tailed)	0.001			
	N	103			
MLQ6	Spearman Correlation Coefficent	-0.020	I am always searching for something that makes my life feel significant. (S)		
	Sig. (2-tailed)	0.842			
	N	103			
MLQ7	Spearman Correlation Coefficent	0.042	I am seeking a purpose or mission for my life. (S)		
	Sig. (2-tailed)	0.674			
	N	103			
MLQ8	Spearman Correlation Coefficent	-.292**	My life has no clear purpose. (P)		
	Sig. (2-tailed)	0.003			
	N	103			
MLQ9	Spearman Correlation Coefficent	-0.013	I am searching for meaning in my life. (S)		
	Sig. (2-tailed)	0.895			
	N	103			
MLQ10	Spearman Correlation Coefficent	0.152	I understand life's meaning. (P)		
	Sig. (2-tailed)	0.126			
	N	103			

Hypothesis H$_{0e}$: No significant relationship exists between an engineering

manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey

questions, and the engineering manager's perception of the degree of *creativity* of

problems solving approaches exhibited by team members under the leadership of the

engineering manager.

This hypothesis is rejected. A strong correlation between the MLQ

question set and EMP-4 exists (rho = .327, p = 0) at the .01 level. The results the MLQ

(FA) to EMP-4, MLQ to EMP and all MLQ to EMP-1 are shown in Table 15 below.

Table 17:   EMP-4 Correlations

EMP-4: My direct reports find creative ways to solve problems.				MLQ to EMP-1	MLQ to EMP
		EMP-4	MLQ Element		
MLQ1	Spearman Correlation Coefficient	.286**	I am looking for something that makes my life feel meaningful. (S)		
	Sig. (2-tailed)	0.004			
	N	101			
MLQ2	Spearman Correlation Coefficient	0.117	I am always looking to find my life's purpose. (S)		
	Sig. (2-tailed)	0.240			
	N	101			
MLQ3	Spearman Correlation Coefficient	.286**	My life has a clear sense of purpose. (P)		
	Sig. (2-tailed)	0.004			
	N	101			
MLQ4	Spearman Correlation Coefficient	.365**	I have a good sense of what makes my life meaningful. (P)		
	Sig. (2-tailed)	0.000			
	N	101			
MLQ5	Spearman Correlation Coefficient	.403**	I have discovered a satisfying life purpose. (P)		
	Sig. (2-tailed)	0.000		*rho = .341** p = .000 N = 101*	*rho = .354** p = .000 N = 101*
	N	101			
MLQ6	Spearman Correlation Coefficient	0.067	I am always searching for something that makes my life feel significant. (S)		
	Sig. (2-tailed)	0.502			
	N	101			
MLQ7	Spearman Correlation Coefficient	0.111	I am seeking a purpose or mission for my life. (S)		
	Sig. (2-tailed)	0.268			
	N	101			
MLQ8	Spearman Correlation Coefficient	-.334**	My life has no clear purpose. (P)		
	Sig. (2-tailed)	0.001			
	N	101			
MLQ9	Spearman Correlation Coefficient	-0.029	I am searching for meaning in my life. (S)		
	Sig. (2-tailed)	0.772			
	N	101			
MLQ10	Spearman Correlation Coefficient	.326**	I understand life's meaning. (P)		
	Sig. (2-tailed)	0.001			
	N	101			

Hypothesis $H0_e$: No significant relationship exists between an engineering

manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey

questions, and the engineering manager's perception of the degree of understanding of

the *importance* and *purpose* of the group's work exhibited by team members under the leadership of the engineering manager.

This hypothesis is accepted. No significant correlation exists between the MLQ question set and EMP-4. The results the MLQ (FA) to EMP-5, MLQ to EMP and all MLQ to EMP-1 are shown in Table 15 below.

Table 18:   EMP-5 Correlations

EMP-5: My direct reports understand the importance of the work we are assigned				MLQ to EMP-1	MLQ to EMP
		EMP-5	**MLQ Element**		
MLQ1	Spearman Correlation Coefficient	0.072	I am looking for something that makes my life feel meaningful. (S)		
	Sig. (2-tailed)	0.474			
	N	101			
MLQ2	Spearman Correlation Coefficient	0.078	I am always looking to find my life's purpose. (S)		
	Sig. (2-tailed)	0.437			
	N	101			
MLQ3	Spearman Correlation Coefficient	.222*	My life has a clear sense of purpose. (P)		
	Sig. (2-tailed)	0.026			
	N	101			
MLQ4	Spearman Correlation Coefficient	0.154	I have a good sense of what makes my life meaningful. (P)		
	Sig. (2-tailed)	0.125			
	N	101			
MLQ5	Spearman Correlation Coefficient	.274**	I have discovered a satisfying life purpose. (P)	$rho = .194$ $p = .052$ $N = 101$	$rho = .354**$ $p = .000$ $N = 101$
	Sig. (2-tailed)	0.006			
	N	101			
MLQ6	Spearman Correlation Coefficient	0.085	I am always searching for something that makes my life feel significant. (S)		
	Sig. (2-tailed)	0.399			
	N	101			
MLQ7	Spearman Correlation Coefficient	0.029	I am seeking a purpose or mission for my life. (S)		
	Sig. (2-tailed)	0.775			
	N	101			
MLQ8	Spearman Correlation Coefficient	-.371**	My life has no clear purpose. (P)		
	Sig. (2-tailed)	0.000			
	N	101			
MLQ9	Spearman Correlation Coefficient	-0.105	I am searching for meaning in my life. (S)		
	Sig. (2-tailed)	0.294			
	N	101			
MLQ10	Spearman Correlation Coefficient	.215*	I understand life's meaning. (P)		
	Sig. (2-tailed)	0.031			
	N	101			

Hypothesis H_{0f}: No significant relationship exists between an engineering

manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey

questions, and the engineering manager's perception of the degree of *understanding* of

the *purpose* of the *organization* exhibited by team members under the leadership of the engineering manager.

This hypothesis is accepted. No significant correlation exists between the MLQ question set and EMP-6. The results the MLQ (FA) to EMP-6, MLQ to EMP and all MLQ to EMP-1 are shown in Table 15 below.

Table 19:   EMP-6 Correlations

EMP-6: My direct reports understand the overall purpose of the organization in which we work.		EMP-6	MLQ Element	MLQ to EMP-1	MLQ to EMP
MLQ1	Spearman Correlation Coeffiicent	0.113	I am looking for something that makes my life feel meaningful. (S)		
	Sig. (2-tailed)	0.260			
	N	101			
MLQ2	Spearman Correlation Coeffiicent	0.096	I am always looking to find my life's purpose. (S)		
	Sig. (2-tailed)	0.341			
	N	101			
MLQ3	Spearman Correlation Coeffiicent	0.184	My life has a clear sense of purpose. (P)		
	Sig. (2-tailed)	0.065			
	N	101			
MLQ4	Spearman Correlation Coeffiicent	0.060	I have a good sense of what makes my life meaningful. (P)		
	Sig. (2-tailed)	0.554			
	N	101			
MLQ5	Spearman Correlation Coeffiicent	.204*	I have discovered a satisfying life purpose. (P)	$rho = .165$ $p = .100$ $N = 101$	$rho = .354**$ $p = .000$ $N = 101$
	Sig. (2-tailed)	0.040			
	N	101			
MLQ6	Spearman Correlation Coeffiicent	0.001	I am always searching for something that makes my life feel significant. (S)		
	Sig. (2-tailed)	0.991			
	N	101			
MLQ7	Spearman Correlation Coeffiicent	0.062	I am seeking a purpose or mission for my life. (S)		
	Sig. (2-tailed)	0.538			
	N	101			
MLQ8	Spearman Correlation Coeffiicent	-.330**	My life has no clear purpose. (P)		
	Sig. (2-tailed)	0.001			
	N	101			
MLQ9	Spearman Correlation Coeffiicent	-0.025	I am searching for meaning in my life. (S)		
	Sig. (2-tailed)	0.804			
	N	101			
MLQ10	Spearman Correlation Coeffiicent	0.081	I understand life's meaning. (P)		
	Sig. (2-tailed)	0.422			
	N	101			

HYPOTHESIS SUMMARY

The MLQ instrument addresses two dichotomous indicators of purposeful behavior: is the engineering manager still seeking purpose (S) or has the engineering manager found a purpose and understands the meaning and purpose of his or life (P).

The EMP measures an engineering manager's perceptions about the degree of creativity, initiative and purpose seeking behavior in direct reports.

Both the MLQ and EMP instruments demonstrated reliability through a high internal reliability score calculated by the Chronbach's Alpha method. In addition, face validity for both instruments was established. Finally, construct validity calculations indicated that both instruments measure what was intended and expected.

The results of the MLQ to EMP elements, at the construct level, showed a strong correlation between the two constructs.

The results of correlation analysis between the MLQ and EMP question sets demonstrated a high degree of correlation between the MLQ and the EMP elements related to initiative and creativity but no significant relationship between the MLQ and the EMP elements of purposeful behavior.

This research confirms the relationship between an engineering manager's purpose seeking beliefs and behaviors and the same engineering manager's perceptions of direct report creativity and initiative.

Table 20:   Summary of Hypothesis Testing Results

Hypotheses	Fail to Reject/Reject for this Sample Data
H_{0a}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, at a construct level, and the engineering manager's perception of the subordinate characteristics of initiative, creativity and purpose seeking behavior, at the construct level.	This hypothesis is rejected.
H_{0b}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of initiative in meeting work goals exhibited by team members under the leadership of the engineering manager.	This hypothesis is rejected.
H_{0c}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of initiative in solving problems exhibited by team members under the leadership of the engineering manager.	This hypothesis is rejected.
H_{0d}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of creativity exhibited by team members under the leadership of the engineering manager.	This hypothesis is rejected.
H_{0e}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of creativity of problems solving approaches exhibited by team members under the leadership of the engineering manager.	This hypothesis is rejected.
H_{0f}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of understanding of the importance and purpose of the group's work exhibited by team members under the leadership of the engineering manager.	This hypothesis is accepted.
H_{0g}: No significant relationship exists between an engineering manager's purpose-seeking beliefs and behaviors, as measured by the MLQ survey questions, and the engineering manager's perception of the degree of understanding of the purpose of the organization exhibited by team members under the leadership of the engineering manager.	This hypothesis is accepted.

CHAPTER V

RECOMMENDATIONS AND CONCLUSIONS

Human motivation is a topic that has stimulated significant research and

controversy. Early research focused on the extrinsic drivers that many researchers

believed were descriptive and predictive of human behavior (Pink, 2009). Subsequent

research indicates that intrinsic motivation may have more powerful and long lasting

effects and may drive behavior that leads to more positive organizational performance

(Mitchell & Daniels, 2003). It seems clear that neither extrinsic nor intrinsic

motivational drivers can be expected, in isolation, to serve as the single method with

which organizations attempt to incentivize performance and influence organizational

outcomes. It does appear that a uniform reliance on extrinsic motivation may be

hazardous and may lead to many undesirable consequences.

The literature review in Chapter 2 summarizes the extensive level of research

conducted to understand extrinsic motivation. However, a lesser level but more recent

research has been conducted to examine intrinsic motivation. The research related to

purpose and meaning as a motivator is scarce and a significant gap exists in the field.

Research discussions related to spirituality at work have tended to connect

spirituality and religion together as a construct. While this line of inquiry is instructive,

it does not address purpose and meaning in a secular context. Several recent studies have

shown significant research potential in the area of spirituality and work; however, it is not

a focus area for this research.

The research related to leadership, ethics and purpose tends to reinforce the idea

that leaders have a significant impact on organizational culture and mores.

Organizations tend to follow the patterns established by the leader, and if the leader is

purposeful and leads ethically, purposeful and ethical individuals will be attracted to the

organization. The converse is also certain.

Expectation theory simply indicates that people tend to rise to meet the

expectation of leaders. Low expectations appear to engender low performance.

Finally, very little research has been conducted in the engineering management

field and it is unclear whether the technical nature of engineering management provides

any differentiation in the research.

Chapter 3 identifies the methods used in this research and explains the survey

instruments employed. Over 100 engineering managers were surveyed to elicit their

beliefs about purpose.

Chapter 4 explains the results the accrued from testing both the MLQ and EMP,

and both instruments were found adequate to the task at hand.

This research has demonstrated the need to create a better understanding of the

role of purpose and meaning at work, as well as in our private lives. The Hebrew prophet

Isaiah stated, "Without a vision the people will perish". This sentiment has been

reinforced by the extensive research in leadership conducted by researchers Jim Kouzes

and Barry Pozner. In their seminal work on leadership, *The Leadership Challenge*,

Kouzes and Pozner note that after 25 years eliciting information from leaders, one

phenomenon is clear: the most important elements of leadership, which are creating,

articulating and modeling vision and purpose are the practices employed *least often* by

leaders (Kouzes & Posner, 2007).

The use of the MLQ questionnaire, which relies on the dichotomy of seeking

purpose and the presence of purpose, shows a positive relationship between engineering

managers who believe they have found meaning in their lives and their perceptions of

positive employee behavior. This may be a critically important motivational factor when

one considers expectation theory.

The implications of this research could be far reaching for engineering managers.

If a leader has found a life purpose and extends that purpose to the work setting, then the

leader may perceive a high degree of initiative, creativity and purposeful behavior in his

or her direct reports. According to expectation theory, the leader's belief in these

subordinate characteristics may actually reinforce those characteristics in the

subordinates, and may lead to performance that is beneficial to the organization and not

simply self-aggrandizing.

The engineering domain has become highly complex and the ability to create

magnificent technology and innovations seems limited only by human imagination. As

the work of engineers becomes more complex, more decisions must be made the

individual engineer, whose judgment and motivation becomes an increasing important

constituent in the ability of an enterprise to ethically deploy new technologies and

effectively manage existing technologies.

DISCUSSION OF THE HYPOTHESIS TESTING

The importance of the first hypothesis is to determine whether the MLQ and EMP

constructs show a relationship. Since the correlation between the two instruments is very

strong, the instruments do demonstrate that the engineering managers self-reported beliefs and his or her perceptions of subordinate initiative, creativity and purpose-seeking behavior are linked.

If an engineering manager makes the effort to personify and articulate individual and organizational purpose, subordinates will more likely have better internal guidance with which to complete complex tasks, initiate new ideas and methods and solve problems. Additionally, if subordinates are finding creative ways to solve problems, new opportunities and increased organizational efficiencies may arise.

If expectation theory means that an engineer manager who has found purpose in his or her life and work has expectations that subordinates will take initiative in meeting work challenges, and the expectations are actualized by subordinates, then the engineering manager can devote more time to surveying the future and understanding the environment.

The implications of the second and third hypothesis are: if, as a result of the engineering manager's purpose-seeking behavior, subordinates show initiative in solving problems, the engineering manager is only faced with the unique and unstructured problems that are appropriately elevated to the engineering manager.

The implications of the fourth and fifth hypotheses relate to subordinate creativity. If subordinates exhibit more creativity as a result of the engineering manager's confidence in purpose, new ideas may flow more easily, more ideas may be implemented and the subordinates may be more willing to take measured risks.

The final two hypotheses were not rejected; therefore, we may conclude that the engineering manager's perceptions about employee purpose-seeking behavior are not

related to the same engineering manager's self-reported beliefs about purpose-seeking behavior. This may mean that the engineering manager is not specifically noticing the behaviors or they may not be present. The area of research could be enhanced to understand this phenomenon better. The significance of this set of findings may also be that engineers are not accustomed to thinking about overall purpose or possibly engineering managers are not articulating purpose in a fashion that would lead subordinates to bring to the topic to consciousness. This is an area that may provide interesting future research opportunities.

If some or all of these propositions are realized, the field of engineering manager could make substantial strides in a positive, forward direction.

LIMITATIONS OF THE RESEARCH

This research was limited to a specific body of subjects: self-identified engineering managers and biases based on the knowledge, training and experience in the engineer community may be present. While this research provides insight into the phenomenon of purpose and meaning as a motivator, extending the research to other management fields might illustrate more generalizable patterns. In addition, this research elicited responses related to an engineering manager's perceptions about direct report creativity, initiative and purpose-seeking behavior, however, the issue of job performance was not addressed. Establishing a relationship between MLQ and the engineering manager's perception of job performance may prove to be insightful.

While the variables used to capture engineer manager perceptions were useful, additional variables might be added to determine other significant motivational relationships.

This research was also designed to elicit responses from an individual about his or her beliefs and behaviors as well as about his or her perceptions of subordinates. An inclusive 1360-degree evaluation that includes subordinate input may provide additional comprehension of motivation. Finally, more research is needed in other fields to validate the findings of this study and extend the research to other fields and a variety of industries.

These findings do provide value to the Engineering Management field.

FUTURE RESEARCH OPPORTUNITIES

Additional research involving positive psychology and positive organizational behavior and the specific relationship between Emotional Intelligence (EI) and the presence of purpose and meaning may lead to integration of some of the concepts inherent in both EI and purpose. Another, more complex approach, would involve the development of a longitudinal study to determine the long-term influence of purpose, meaning and overall happiness.

Research to understand the specific relationship between purposeful behavior and other intrinsic motivational drivers, including self-efficacy, goal setting and curiosity might also provide enlightenment.

This research did not establish cause and effect. The correlations cited demonstrated a relationship. Further research may develop a more robust understanding of the role of purpose and may lead to much greater understanding of this phenomenon.

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APPENDICES

A. SURVEY INSTRUMENT

Purpose Seeking Behavior

Introduction

Thank you for participating in our survey. This survey is part of an effort by a PhD student at Old Dominion University to determine the beliefs, behaviors and perceptions of Engineering Managers related to meaning and purpose. Your input is anonymous and strictly confidential and will not be used for any purpose other than research conducted by Old Dominion University.

The survey should take no more that 10 minutes to complete.

Your participation will allow the researcher to gain a better understanding of engineering management practices.

Thank you again for your candid answers.

Purpose Seeking Behavior

NOTIFICATION

PROJECT TITLE:
An Investigation into the Relationship Between an Engineering Manager's Purpose-Seeking Beliefs and Behaviors and the Engineering Managers' Perception of Employee Creativity, Initiative and Purpose-Seeking Behavior

INTRODUCTION:
The purposes of this form are to give you information that may affect your decision whether to say YES or NO to participation in this research, and to record the consent of those who say YES. This survey is conducted using the SurveyMonkey® software application, and at no time will you be asked to provide any information that would identify you.

RESEARCHERS:
Responsible Project Investigator: Dr. Rafael Landeta, Associate Professor Engineering Management and Systems Engineering Department, Batten College of Engineering and Technology, Old Dominion University Researcher: and Charles B. Daniels, Lecturer, Master of Engineering Management, Engineering Management and Systems Engineering Department, Batten College of Engineering and Technology, Old Dominion University.

DESCRIPTION OF RESEARCH STUDY:
This research project is designed to survey a diverse group of Engineering Managers to determine to what extent they engage in purpose seeking behavior and the relationship between those behaviors and their perceptions of the behaviors of their direct reports.

If you decide to participate, then you will join a study involving answering 16 questions on a survey and providing demographic information about your engineering management experience.

If you click on the YES button at the end of this consent form, you will be taken to the survey that should take between 10 and 15 minutes to complete. Approximately 100 people will be participating in this survey.

EXCLUSIONARY CRITERIA:
You should now be or have been a practicing engineering manager to participate in this survey.

RISKS AND BENEFITS:
RISKS: No risks accrue to any individual who participates in the survey, since no personal identification information is collected or stored.

BENEFITS: There are no direct benefits.

COSTS AND PAYMENTS:
The researcher wants your decision about participating in this study to be absolutely voluntary. Therefore, no monetary compensation will be provided for participation in this survey.

CONFIDENTIALITY:
This survey does not collect any personal identification information, however, the researcher will take reasonable care to keep any private information, including the raw survey data, confidential. The results of this study may be used in reports, presentations, and publications; but the researcher will not identify you. Of course, your records may be subpoenaed by court order or inspected by government bodies with oversight authority.

WITHDRAWAL PRIVILEGE:
It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study at any time. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled.

COMPENSATION FOR ILLNESS AND INJURY:
If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of any harm, injury, or illness

Purpose Seeking Behavior

arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Charles Daniels at cbdaniel@odu.edu or Dr. George Maihafer the current IRB chair at 757.683.4520 at Old Dominion University, who will be glad to review the matter with you.

Purpose Seeking Behavior

INFORMED CONSENT - 2

*1. VOLUNTARY CONSENT:

By clicking on the YES button, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that YOU understand this form, the research study, and its risks and benefits and that you understand how to contact the researcher should you have any questions about the research. If you have any questions later on, then the researcher should be able to answer them. Please contact Charles Daniels at cbdaniel@odu.edu or 757.683.4083.

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Dr. George Maihafer, the current IRB chair, at 757.683.4520, or the Old Dominion University Office of Research, at 757.683.3460.

And importantly, by clicking on the YES button below, you are telling the researcher YES, that you agree to participate in this study. You may print a copy of this form for your records if you desire.

◯ YES   ◯ NO

Purpose Seeking Behavior

What is an Engineering Manager?

An engineering manager possesses both an ability to apply engineering principles and a skill in organizing and directing people and projects. An engineering manager is uniquely qualified for two types of jobs: the management of technical functions (such as design or production) in almost any enterprise, or the management of broader functions (such as marketing or top management) in a high-technology enterprise. (adapted from Morse & Babcock, 2010)

*2. I am now or have been an Engineering Manager.

○ Yes

○ No

Purpose Seeking Behavior

MLQ Introduction

Before we begin, please take a moment to think about what makes your life and existence feel important
and significant to you. Please respond to the following statements as truthfully and accurately as
you can, and also please remember that these are very subjective questions and that there are no
right or wrong answers. Please answer according to the scale indicated in the question.

Purpose Seeking Behavior

MLQ-1

✱3. I am looking for something that makes my life feel meaningful.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

MLQ-2

✱4. I am always looking to find my life's purpose.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

MLQ-3

✻5. My life has a clear sense of purpose.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

MLQ-4

*6. I have a good sense of what makes my life meaningful.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

MLQ-5

*7. I have discovered a satisfying life purpose.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

MLQ-6

✱8. I am always searching for something that makes my life feel significant.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	◯	◯	◯	◯	◯	◯	◯

Purpose Seeking Behavior

MLQ-7

*9. I am seeking a purpose or mission for my life.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	O	O	O	O	O	O	O

Purpose Seeking Behavior

MLQ-8

✱10. My life has no clear purpose.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

MLQ-9

＊11. I am searching for meaning in my life.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

MLQ-10

✱12. I understand my life's meaning.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

EMP Introduction

For the next six questions, please think about how you feel about your current direct reports or your most recent direct reports.

Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers.

Please answer according to the scale indicated in the question.

Purpose Seeking Behavior

EMP-1

✱13. My direct reports appear to be highly motivated to meet the goals important to our team.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

EMP-2

*14. My direct reports often take initiative to solve problems.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

EMP-3

✱15. My direct reports often come up with creative ways to improve the way we do our work.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

EMP-4

✱16. My direct reports find creative ways to solve problems.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

EMP-5

*17. My direct reports understand the importance of the work we are assigned.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	O	O	O	O	O	O	O

Purpose Seeking Behavior

EMP-6

✳18. My direct reports understand the overall purpose of the organization in which we work.

	Absolutely Untrue	Mostly Untrue	Somewhat Untrue	Can't Say True or False	Somewhat True	Mostly True	Absolutely True
1	○	○	○	○	○	○	○

Purpose Seeking Behavior

Conclusion

Thank you for participating in this survey. The author plans to present his findings at a future ASEM Conference.

Purpose Seeking Behavior

Comments

19. Please share any comments you have about purpose-seeking behavior.

The following demographic information will be useful in categorizing survey responses.

Purpose Seeking Behavior

Demographic Information

✱20. How many years have you been an Engineering Manager?

Years as an Engineering Manager

Years as an Engineering
Manager
[   ]

✱21. How many years of total work experience do you have?

Years of Experience

Years of Experience
[   ]

✱22. What is the largest number of direct reports you have had at any one time as an engineering manager?

Number of Direct Reports

Number of Direct Reports
[   ]

23. Are you male or female?

◯ Male

◯ Female

24. What is the highest level of school you have completed or the highest degree you have received?

◯ Less than high school degree

◯ High school degree or equivalent (e.g., GED)

◯ Some college but no degree

◯ Associate degree

◯ Bachelor degree

◯ Graduate degree

TO: Rafael Landaeta, PhD
              Responsible Project Investigator

FROM: George Maihafer, PT, PhD
              Chairperson, IRB

RE: Addendum Request to "An Investigation into PSB", **(ODU IRB # 12-021).**

DATE: March 12, 2012

After review of the amended revision to "An Investigation into PSB", **(ODU IRB # 12-021),** .I approve the change in an expedited review manner. The amendment to the methodology of the study is as follows:

- Change the title of the study from "An Investigation into PSB" to "An Investigation into the Relationship between an Engineering Manager's Purpose-seeking Beliefs and Behaviors and the Engineering Manager's Perception of Employee Creativity, Initiative, and Purpose Seeking Behavior".

A Progress report or Close out Report will be required one year from the original approval date of the study application to the Old Dominion University Institutional Review Board (February, 2012) . Please let me know if I can be of any further assistance.

B. INSTITUTIONAL REVIEW BOARD APPROVAL

No.: 12-021

OLD DOMINION UNIVERSITY
HUMAN SUBJECTS INSTITUTIONAL REVIEW BOARD
RESEARCH PROPOSAL REVIEW NOTIFICATION FORM

TO: Rafael Landaeta   DATE: February 16, 2012
      Responsible Project Investigator   *IRB Decision Date*

An Investigation into PSB
Name of Project

Please be informed that your research protocol has received approval by the Institutional
Review Board. Your research protocol is:

     __ Approved (Progress Report)
     __ Tabled/Disapproved
     _X_ Approved, (Exempt) contingent on making the changes below*

_____*Nora Mashah*_____   February 16, 2012
       IRB Chairperson's Signature   *date*

Contact the IRB for clarification of the terms of your research, or if you wish to make
ANY change to your research protocol.

The approval of the study is exempt and therefore does not require the submission of a
Progress Report or Close out Report. You must report adverse events experienced by
subjects to the IRB chair in a timely manner (see university policy).

---

*   Approval of your research is CONTINGENT upon the satisfactory completion of
     the following changes and attestation to those changes by the chairperson of the
     Institutional Review Board. Research may not begin until after this attestation.

*In the Application and the Informed Consent- Write out the acronym in the title
initially; placing the acronym only in parenthesis.
    In the Application
          • Under 3a Start date should be changed to 2-16-2012.
          • Under 3b End date should be listed as 2-16-2013.
          • 4a and 4b should be left blank.
    In the Informed Consent:
          • Change this format into a Notification Statement rather than informed
            consent. Remove signature at end and replace the signature with a
            notification statement that then goes directly to the survey after they
            check the box. "If you click here you agree to participate in the study'.
            Remove new information section.

- Include the 'Responsible Project Investigator, Dr. Rafael Landaeta, Responsible Project Investigator, at the top with other researchers.
- Remove the sentence fragment above the Exclusionary Criteria section - found at the end of the Description of Research section.
- Under Benefits- State that there are no direct benefits.

Attestation

As directed by the Institutional Review Board, the Responsible Project Investigator made the above changes. Research may begin.

_____ March 12, 2012
     IRB Chairperson's Signature   *date*

C.   MLQ PERMISSION

Mail
Calendar
Contacts
....
Deleted Items (32)
Drafts
Inbox (5)
Junk E-Mail
Sent Items

Click to view all folders

(Custom Expiration\Manag...
Advising (1)
Advising (1)
Advising
ENMA 301
ENMA 805
Pending
PhD
Projects
Publications (2)

Manage Folders...

Reply | Reply to All | Forward | Move | Delete | Junk | Close

Re: MLQ Questionnaire

Michael Steger [michael_f_steger@yahoo.com]

You replied on 10/27/2011 4:57 PM.

Sent: Thursday, October 27, 2011 3:56 PM
To: Daniels, Charlie
Attachments: MLQ description, scoring, ~1.pdf (139 KB) [Open as Web Page]; MLQ.pdf (56 KB) [Open as Web Page]

Hi Charles, you already took the only steps necessary. Here is the scoring guide in case that helps. You have permission to use the MLQ (also attached)

Mike

Michael F. Steger, Ph D
Counseling Psychology & Applied Social Psychology
Director, Laboratory for the Study of Meaning and Quality of Life
Colorado State University
Department of Psychology
1876 Campus Delivery
Fort Collins, CO 80523-1876
Fax (970) 491-1032

michael_f_steger@yahoo.com
Website http://michaelfsteger.com
Check out our new book, Designing Positive Psychology, from Oxford University Press!

From: "Daniels, Charlie" <CBDaniel@odu.edu>
To: "michael_f_steger@yahoo.com" <michael_f_steger@yahoo.com>
Sent: Thursday, October 27, 2011 12:51 PM
Subject: MLQ Questionnaire

Dr Steger
I am member of the faculty at Old Dominion University in Norfolk, Virginia and I am conducting research on Engineering Managers and Purpose Seeking Behavior. The Meaning of Life Questionnaire seems an ideal instrument to use in my research. Can you tell me what steps I need to take to gain access to the instrument for my research?
Warm Regards,
Charles B Daniels

Charles B Daniels
Lecturer
Engineering Management and Systems Engineering
Batten College of Engineering and Technology
Old Dominion University
2408 Kaufman Hall
Norfolk, Virginia 23529
757 683 4083
cbdaniel@odu edu

Spam
Not spam
Forget previous vote

D. CORRELATION MATRIX

Correlations

			EMP-1	EMP-2	EMP-3	EMP-3	EMP-4	EMP-5
Spearman's rho	MLQ1 1	Spearman's Rho	.195	.131	.238*	.270**	.072	.113
		Sig. (2-tailed)	.051	.192	.017	.006	.474	.260
		N	101	101	101	101	101	101
	MLQ2 1	Spearman's Rho	.092	.109	.132	.113	.078	.096
		Sig. (2-tailed)	.361	.277	.189	.262	.437	.341
		N	101	101	101	101	101	101
	MLQ3 1	Spearman's Rho	.205*	.173	.256**	.270**	.222*	.184
		Sig. (2-tailed)	.040	.084	.010	.006	.026	.065
		N	101	101	101	101	101	101
	MLQ4 1	Spearman's Rho	.214*	.293**	.258**	.364**	.154	.060
		Sig. (2-tailed)	.032	.003	.009	.000	.125	.554
		N	101	101	101	101	101	101
	MLQ5 1	Spearman's Rho	.312**	.297**	.427**	.389**	.274**	.204*
		Sig. (2-tailed)	.002	.003	.000	.000	.006	.040
		N	101	101	101	101	101	101
	MLQ6 1	Spearman's Rho	.054	-.024	.172	.064	.085	.001
		Sig. (2-tailed)	.591	.814	.086	.526	.399	.991
		N	101	101	101	101	101	101
	MLQ7 1	Spearman's Rho	.008	.042	.134	.111	.029	.062
		Sig. (2-tailed)	.938	.677	.180	.269	.775	.538
		N	101	101	101	101	101	101
	MLQ8 1	Spearman's Rho	-.311**	-.309**	-.381**	-.350**	-.371**	-.330**
		Sig. (2-tailed)	.002	.002	.000	.000	.000	.001
		N	101	101	101	101	101	101
	MLQ9 1	Spearman's Rho	.006	-.008	.015	-.023	-.105	-.025
		Sig. (2-tailed)	.954	.938	.882	.816	.294	.804
		N	101	101	101	101	101	101
	MLQ10 1	Spearman's Rho	.230*	.138	.240*	.315**	.215*	.081
		Sig. (2-tailed)	.021	.169	.015	.001	.031	.422
		N	101	101	101	101	101	101

**. Correlation is significant at the 0.01 level (2-tailed). □ Correlation is significant at the 0.05 level (2-tailed). □

E.   ELECTRONIC MAIL MESSAGE TO SURVEY PARTICIPANTS

Research Assistance

Daniels, Charlie

Sent: Sunday, February 19, 2012 3:02 PM
To: asem-hq@mst.edu
Bcc: Daniels, Charlie

| This message is high priority.

Kelli:

I hope this email finds you well. As you may recall, we discussed my research project last fall. I have now gotten approval from my dissertation committee and from the college IRB to begin my survey. I would like to take you up on your offer to help.

I would like to set up the survey with one message on Tuesdays and send the survey message and link on Wednesday. The first message, to be sent Tuesday, follows below the line. If you could cut and paste the message in an email to the ASEM distribution list, I would be deeply grateful. I will follow-up tomorrow with the email to be sent out Wednesday.

Thanks again for your help!

Charlie Daniels
Lecturer, EMSE
Old Dominion University
757.218.6356
cbdaniel@odu.edu

Subject: Research Assistance

Greetings:

My name is Charles Daniels and I am a PhD student in Engineering Management at the Old Dominion University in Norfolk, Virginia. I am conducting research to try to understand the role of motivation in the perceptions of Engineering Managers.

You have been selected to participate in this survey because of your association with the American Society of Engineering Managers (ASEM). Your candid feedback to the survey will be a vital component of the research project and all responses will be confidential. No personal identification data will be collected during the survey process. The survey should take about 10 minutes to complete

Please check your spam filter to make sure you receive the survey when it arrives. Thank you for taking the time to support this research project.

Yours truly,

Charles B. Daniels

Charles B. Daniels
Instructor
Engineering Management and Systems Engineering
2400 Kaufman Hall
Old Dominion University
Norfolk, Virginia 23529
757.218.6356
cbdaniel@odu.edu

VITA

Charles Burton Daniels

Engineering Management and Systems Engineering Department

Batten College of Engineering and Technology

Old Dominion University

Kaufman Hall, Room 240B

Norfolk, Virginia 23529

757.683.4083

Education:

PhD, Engineering Management, Old Dominion University. Estimated completion, May 2012.

Master of Engineering Management, George Washington University, Washington, D.C. 2003.

Bachelor of Science, University of the State of New York, Computer Science, Albany, New York, January 1994.

Work Experience:

Mr. Daniels is currently a Lecturer in the Engineering Management and Systems Engineering Department of the Batten College of Engineering and Technology of the Old Dominion University. He has over 40 years of experience in organizational management and leadership, communications systems, information systems, management consulting, change management, employee and leadership development and quality improvement in both government and commercial enterprises. He has over 25 years of experience in program management for large scale, mission-critical systems; system development lifecycle analysis; planning and implementation; systems engineering; line management and engineering; culture change and management consulting. He has served as a senior executive and Vice President for Engineering for a Fortune 500 commercial enterprise.

Publications:

ASEM Conference Paper (co-author) - *Teaching Interactively Using Web-Conferencing: The Student Perspective*. Presented at the 32nd Annual Association of Engineering Management International Conference.

"Improving Leadership in a Technical Environment: A Case Example of the ConITS Leadership Institute," *Engineering Management Journal*, Vol. 21, no.1, March 2009.

Southwest Systems Solutions Case Study, Case Study for Training Malcolm

Baldrige National Quality Award Examiners, NIST, 1996, co-author.