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MGT 5950: Leadership & Ethics: Summer 06

16 August 2006

Finding Emotional Leadership in Structural Engineering Field

Abstract

This paper focuses heavily on emotional leadership in a technical field – is it possible? My interest in particular is, structural engineering, which promotes higher understanding of the laws of physics, a practical application of math and science. An overview of Leadership and Ethics, defined through the eyes of notable Scholars, and the two main styles of leadership, ‘transformational’ and ‘transactional’, will be briefly discussed. Variables of emotions, such as empathy and control of emotions, among others, that are central to the emotional intelligence of a leader play important roles in leadership processes. Engineers, by nature, are perceived as problem-solvers. Structural Engineers, specifically, need visual stimulation to understand the given problems, apply the laws of physics to propose a solution, use mathematical equations to justify alternatives, weigh consequences in terms of cost, probabilities, and risk analysis in order to make decisions, and finally, rely on understanding the human elements before presenting their conclusions on a proposed structure (project), in which the “FOR CONSTRUCTION” plans are based on understanding the intended human use or occupancy. This paper concludes that structural engineers have the capabilities of processing the right and left brain functions in unison, a low probable co-existence that many scholars subscribe to. Furthermore, women leaders in structural engineering field, in particular, can prove to be better leaders, as they possess the duality in thinking, possessing both EQ and IQ, an effective and sustainable advantage.

1. Introduction to strategic leadership and leadership ethics

Leadership has become an increasingly investigated subject by scholars globally, as definitions vary in perception, depth, interpretation, and more importantly, culture. A collection of seemingly interchangeable words within the diverse definition of leadership generally includes: vision, positive influence, integrity, trust, inspiring, motivating, leading by example, helping others realize their potential, selflessness and making a difference. To generate a perspective on the proceeding discussions, I include just a few of other common definitions by Scholars of the subject matter.

1.1 Definition of Leadership

➤ The Collins English Dictionary. (1998 HarperCollins Publishers) leadership (n) 1. The position or function of a leader. 2. the period during which a person occupies the position of leader: during her leadership very little was achieved. 3. a. the ability to lead. b. (as modifier): leadership qualities. 4. the leaders as a group of a party, union, etc.: the union leadership is now very reactionary.

This definition of leadership I feel is very vague because it only focuses on the position, tenure and ability of leader(s), either as a singular or collective whole. It fails to express the more important points of the purpose of effective leadership. Peter Drucker defines a leader as someone who has followers. To gain followers requires influence (see John Maxwell's definition below) but doesn't exclude the lack of integrity in achieving this. Indeed, it can be argued that some of the world's greatest leaders had no integrity (Hitler, for example) and have adopted values that would not be shared by many people today. John C Maxwell, "In the 21 Irrefutable Laws of Leadership," sums up his definition of leadership as "leadership is influence - nothing more, nothing less." This perception of leadership promotes the ability of the leader to influence

others - both those who would consider themselves followers, and those outside that circle. A leader would exhibit strong character, “since without maintaining integrity and trustworthiness, the capability to influence will disappear.”

- Warren Bennie: Leadership is a function of knowing yourself, having a vision that is well communicated, building trust among colleagues, and taking effective action to realize your own leadership potential.

- Roman Catholic Diocese of Rochester: Leadership is the process of influencing the behavior of other people toward group goals in a way that fully respects their freedom.

Like most Christian beliefs, the emphasis on respecting their freedom is an important one. “Jesus influenced many diverse people during his ministry but compelled no-one to follow Him” (“Five standards...leaders”).

1.2 Definition of Ethics

The field of ethics, also called moral philosophy, involves “systematizing, defending, and recommending concepts of right and wrong behavior.” Scholars investigate where our ethical principles come from, and what they mean. Ethics seem to coincide with answers to questions focusing on the issues of universal truths, the “will of God,” and the “role of reason in ethical judgments.” Philosophers use the term “Normative ethics” in defining ethics as a more practical task, which is to arrive at moral standards that regulate right and wrong conduct. This may involve articulating the “good habits that we should acquire, the duties that we should follow, or the consequences of our behavior on others.” Yet another term, used by Philosophers, “applied ethics,” involves examining specific controversial issues, such as “abortion, infanticide, animal rights, environmental concerns, homosexuality, capital punishment, or nuclear war” (“The

Internet Encyclopedia of Philosophy”). The lines of distinction on ethics are made more complicated across cultures, where applied business ethics are often blurry, because it also depends on more general normative principles. Within each individual or organization, a question remains to be answered for every questionable action taken – was it ethical under the “letter of the law” or “spirit of the law?” Perhaps, understanding the different general approaches to leadership can narrow the gap between the two guiding principles of business ethics.

1.3 Leadership Styles

There are a number of ways of exploring leadership style. If leaders can successfully understand their natural style of leadership, and explore how that style might be changed to fit different circumstances and different people, then their leadership is much more effective. Some scholars might refer to this as the main principle of “contingency theory” of leadership, or the “situational leadership model” (Cannella 230). Knowing their strengths and abilities, and leaving other parts of their leadership to others is another vital element of being a great leader. Adopting different leadership styles in different situations is not intrinsically manipulative. It should be quite the reverse, allowing people the freedom to grow in confidence and adopt new responsibilities that give them internal reward. The following are two styles of leadership, adopted by many, briefly defined.

“Transformational Leadership” concept, as James MacGregor Burns states, “is a relationship of mutual stimulation and elevation that converts followers into leaders and may convert leaders into moral agents. It occurs when one or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation or

morality”. Transformational leadership is about the ability of the leader to motivate and empower their followers:

The goal of transformational leadership is to ‘transform’ people and organizations in a literal sense – to change them in mind and heart; enlarge vision, insight, and understanding; clarify purposes; make behaviour congruent with beliefs, principles, or values; and bring about changes that are permanent, self-perpetuating, and momentum building (Bass and Avolio, 1994).

Transactional leadership, as frequently contrasted with transformational leadership, is a concept where the leader gains commitment from followers on the basis of a straightforward exchange of pay and security in return for reliable work and often involves applications of “rewards and punishment.” Transactional leadership conjures a managerial image, while transformational leadership evokes images of extraordinary individuals with inspirational visions such as Martin Luther King, Jr., or Ghandi.

2. Emotional Intelligence (EQ) of leaders of Physics and Math

Whether it is by nature or nurture (not the focus of this paper), engineers are comfortable with mathematical equations. Structural engineers are engineers nurtured, through higher education and field experience, to appreciate the forces of nature: applying physics to predict the forces and stresses of physical structural members or materials of construction; dealing with deterministic probable events of high winds or seismic activities in any given geographic area; and defining measurements of acceptance against codified criteria in order to deliver public safety. It would seem that every conclusion is attained through factual data, used in rigorous structural analyses, giving the public’s perceived value of routine design that comes from an efficient process of calculating certainty and predictability. But here’s a reality check: I am a

registered Professional Engineer (P.E.), and have been practicing in the field of structural engineering for over twelve years. The structural world is not at all precise, nor predictable. In reality, structures are much less certain and the forces we design structures to resist can defy prediction, and the complexity of projects and the inter-relationship between design and construction promotes a strong linkage between creative thinking and decision-making in order to realize our contribution for the greater human good. This follows then, that we must apply some higher form of emotional intelligence to subsidize this duality of thinking, utilizing both left and right brain. Is this possible? From my own experience and the experiences of my colleagues, I strongly believe that practicing structural engineers, both by nature and nurture, can possess the “emotional intelligence,” highly regarded as an important trait of an effective leader. Let’s examine the definitions of “EQ,” as scholars try to define it.

2.1 Definition of EQ

Emotional Intelligence - EQ - is a relatively recent behavioral model, rising to prominence with Daniel Goleman's 1995 Book called 'Emotional Intelligence'. The early Emotional Intelligence theory was originally developed during the 1970's and 80's by the work and writings of psychologists Howard Gardner (Harvard), Peter Salovey (Yale) and John Mayer (New Hampshire). Emotional Intelligence is “increasingly relevant to organizational development and developing people, because the EQ principles provide a new way to understand and assess people's behaviors, management styles, attitudes, interpersonal skills, and potential.” Emotional Intelligence is an important consideration in human resources planning, job profiling, recruitment interviewing and selection, management development, customer relations and customer service, and more.

The EQ concept argues that IQ, or “conventional intelligence,” is too narrow; that there are wider areas of emotional intelligence that dictate and enable how successful we are. Success requires more than IQ (“Intelligence Quotient”), which has tended to be the traditional measure of intelligence, ignoring essential behavioral and character elements. We've all met people who are academically brilliant and yet are socially and inter-personally inept; haven't we all heard of the term “geeks,” or more popularized by the movie, “nerds?” And we know that despite possessing a high IQ rating, or high “SAT scores,” success does not automatically follow (“Emotional Intelligence... Value”).

Emotional Intelligence, as defined by Salovey and Mayer's (1990, 1997) consists of four parts: (1) the ability to perceive one's own emotions; (2) the ability to perceive others' emotions; (3) the ability to manage one's own emotions: and (4) the ability to manage others' emotions. Salovey and Mayer, along with other leadership scholars argue that the central characteristic of EQ is empathy, which they defined as “the ability to comprehend another's feelings” and to place oneself in the other person's shoes. Moreover, empathy is emerging as an important leadership trait not only to ‘transformational’ leaders, who exhibit relationship-oriented skills, but also just as equally to “transactional” leaders, who exhibit task-oriented skills.

I would consider that the four parts of EQ can be equally attributable to the two types of leadership styles, the ‘transformational’ leadership styles would subscribe to strong abilities to perceive or recognize one's own emotions, as well as others', while the ‘transactional’ leadership style would be perceived exhibiting the later two parts of EQ, the ability to manage one's own emotions, as well as others. The ability to manage one's own emotions, or self-control, may be especially important to “transactional leaders, who must delay self-gratification as the tasks at hand may not be completed and objectives may not be achieved even after working long hours,

and overcoming frustrations when encountering problems, and finally, maintaining confidence when facing difficult goals.”

So why would we want a leader with a high EQ? Based on scholars’ definition and understanding of the concepts of EQ, by developing our EQ, we can become more productive and successful at what we do, and help others to be more productive and successful too. The process and outcomes of EQ development also contain many “elements known to reduce stress for individuals and organizations, by decreasing conflict, improving relationships and understanding, and increasing stability, continuity and harmony.”

2.2 EQ of a leader

According to a research by the Center for Creative Leadership, developing leaders’ EQ has proved to be increasingly important in today’s dynamic corporate world since “the primary cause of executive derailment involves an emotional competence deficit” (“Emotional Intelligence”). Articles published in *The Leadership Quarterly* (13) are consistent in identifying empathy and control of emotions as traits effective leaders should possess. Evidence in studies provided that empathy is not only an important trait for leaders who manage their subordinates with emotions, since human beings can exhibit high levels of optimism as well as frustrations in any given situation, but also “contributes to the cognitive skills used by transactional leaders.” The studies also found that in order to solve problems, leaders may rely on empathy, to predict “perspective taking,” which Boland and Tenkasi (1995) described as “analyzing, discerning, and considering the merits of another’s point of view.” Transactional leaders generally tend to be task-oriented and must be organized, budget, and schedule-driven. In developing their vision for the organizations, transactional leaders would generally require “pattern recognition, the ability to synthesize information and identify patterns in a collection of unorganized information” (R.H.

Humphrey 2002). Hence, empathy, defined as the “desire to understand others’ feelings and the ability to do so,” is also a major contributor to both pattern of recognition and problem solving, two skills highly developed and exercised by structural Professional Engineers.

The day I passed the State Board exam in Civil Engineering, I knew I just accepted a big responsibility. To hold public safety paramount! I had been training up to that day, to apply the theoretical laws of physics and integration of mathematical models and equations to a more practical use, designing building structures. I was told what to do and obeyed without hesitation, as my parents had instilled in me, as implied by their own actions, that submission was not a weakness but rather an act of respect even in difficult and compromising situations, hence a strength in character. As soon as I received my “rubber stamp”, my boss brought construction drawings/plans to my cubicle for me to “wet-stamp,” a term used to indicate original set of drawings submitted for construction. Naturally, I felt a strong sense of accomplishment, pride, and more importantly, control. I was finally in responsible charge of my projects and learned very quickly that it takes a good understanding of the people around you to make a project successful, achieving its desired results. More importantly, nourishing personal relationships with my team members provided a strong foundation for any task or projects at hand to be completed successfully. I knew that I would enjoy becoming a leader of an engineering firm one day.

2.3 EQ in leadership processes

Some scholars have claimed to have examined how leaders with high EQ apply emotional leadership in their everyday working processes. According to some articles from The Leadership Quarterly, one of the key duties of leaders is to manage the emotions of group members, as previously described fourth component of EQ, which may include a direct influence

on members' "frustrations and optimism." The scholars' research indicated that transformational leaders scored higher on optimism than other types of leaders because they are likely to set challenging goals, to encourage the group members to reach their potential. However, these leaders must convince their members that these challenges are obtainable goals, thus creating and maintaining optimistic moods amongst the group members, which is crucial to achieve desirable results. In the same token, transformational leaders must also be able to soothe or help members cope with their frustrations and support them when they fail to achieve their goals, whereas a transactional leader would be seen exercising punishment in this given situation. I would argue however that for these transactional leaders to set challenging goals, they must also possess traits of task-oriented leaders, or transactional leaders, in order to organize and plan group activities, to develop a vision that guides members around obstacles, and ultimately directing them to a path that leads to success.

Research suggests that there are two different types of leaders (transformational and transactional), and therefore it makes sense to hypothesize that the different leadership types will require different emotional leadership skills. I would argue, however, that effective leaders must exhibit empathy and control of emotions, which are traits exercised by both types of leaders. I would have to believe then, though they may be hard to find, that a structural engineer possessing empathy can make a great and effective leader, making it possible for "transformational" and "transactional" leadership style to co-exist within one person. Bales (1950) argued that few people are high on both "relationship" and "task-oriented" dimensions because "time spent on one dimension reduces the time available to spend on the other dimension." Structural engineers are trained to conduct research, dissect data, formulate objectives, and solve problems. We are task-oriented as the desired end results are dictated by

many factors such as cost, time, and resources, among others. However, our main goal is to design structures to suit the needs of those who will occupy them. To achieve this goal, we must learn to plan, organize, and manage all resources, to ensure a smooth transition from the initial meeting of the client, to the design phase, to the construction phase, and finally the “turn-key” phase, delivering the desired result to the end consumer, the occupants of the structure. To be successful in these processes, we must also learn “relationship-oriented” skills, traits of transformational leaders, in order to solve problems more effectively, in a timely manner, to exceed customer satisfaction, and ultimately gain their loyalty. And to exceed customer satisfaction, we must first understand their needs, hence displaying empathy to understand their feelings. We must also display empathy to gain cooperation of not only internal team members, but also gain the respect of construction workers who are to uphold our construction details and specifications. Too often, I find myself suppressing the negative effects of obstacles within a working environment. For example, in scheduling projects between team members, I make every effort to give relative time consideration commensurate with the member’s capabilities and experience, and partner the individuals with complimentary skills, in order to promote cross-training and mentorship, in lieu of frustrations, competition, and rivalry. This in turn builds group solidarity and increases morale as we thrive on creating shared emotional experiences and strengthen personal relationships, thus creating feelings of optimism, motivation, and confidence, which ultimately lead to improve levels of performance.

2.4 Structural Engineering as male-dominated field

Careers in Math and Sciences have always been dominated by men around the globe and structural engineering field is no different. One of the observed reasons why there are so few women in engineering is the often subtle but sometimes direct discouragement that girls and

young women get from adults, their peers, and the media. Needless to say, as a society, we have a responsibility to pull a collective effort to create an environment that would foster girls' interest in engineering, and to challenge our own stereotypes of what is good for girls and women.

I will share some commonly held myths that often discourage girls from pursuing engineering careers (as I have faced the same obstacles but succeeded to jump over these hurdles):

MYTH: Boys are better at math and science than girls.

REALITY: There is no difference in ability to learn math and science between boys and girls.

MYTH: Girls don't like technology.

REALITY: Girls are very interested in technology, but cultural differences in the way boys and girls are raised typically limit the experiences girls have with different technologies.

MYTH: Women can't succeed professionally in engineering careers.

REALITY: Engineering is still a male-dominated profession, but women can and do build success careers in this field. As more women enter and work their way up through the engineering workforce, the profession is becoming more female-friendly (“Celebration of Women in Engineering”).

2.5 Women leaders in Structural Engineering

According to the National Academy of Engineering, cited on their website, women account for 20% of engineering graduates and only 9% of American engineers (registered engineers, or P.E.) are women (what happened to the other 11% degreed women engineers? The website didn't clarify the gap). Here are the facts: “women account for 50% of the US population; there is a shortage of skilled workers; and polls of business leaders indicate that the

number one barrier to growth is due to shortage of skilled workers.” These current workforce projections would suggest that, unless women and minorities are encouraged to study science, technology, and engineering, the U.S. will not have the trained personnel necessary to meet the demands of the economy to build or improve our infrastructure (Grigg 120).

Only six percent of the Fortune 500’s top management positions are held by women, and it is progressing very slowly (Rubin). Women engineers, from my own experiences and that of my colleagues, add other perspectives to problem solving and emotional approaches to effective teamwork that enable project teams to generate more creative solutions and better address and customize individuals’ or group members’ needs. This is where I see a solid linkage between a higher IQ level and emotional intelligence. Furthermore, it is the “maternal” instinct that drives us to be sensitive to our work environment. We cannot just “leave work at work.” Job related concerns will be brought home, without a doubt. We often communicate more openly than men and are not afraid to ask very personal questions, with good intentions to understand fully the situations at hand. Hence, businesses would benefit from engaging women engineers, as they gain better understanding of their customers’ needs, improve product designs, and ultimately sustaining a competitive advantage in the marketplace.

3. Conclusions

“Women make the better bosses,” according to a study published in Knight Ridder Newspapers, where researchers found that through higher scores across the board, “Females are more likely to serve as role models, mentor subordinates and encourage creativity than their male counterparts” (Rubin).

I have to agree with many research that in many cases, female executives were more likely to be transformational leaders – “defined as those who mentor, inspire and foster

innovation and teamwork—the kind of skills that have been shown to strengthen contemporary organizations.” In contrast, men were more transactional – “appealing to subordinates’ self-interest and using reward and punishment as incentives.” Although the fact remains that men still dominate both the engineering and the executive suite, it is women who exemplify a more effective leadership style.

This paper concludes that, whether it is through nature or nurture, I find emotional leadership in practicing (licensed Professional Engineers) women structural engineers, whom I believe have the highest probability of possessing dualities of thinking in combining engineering, science, and math (hence a higher IQ), which are manifested in probability and risk analysis, professional judgment, and the nature of expertise (Vick 2002). A woman’s perspective, as nurtured through her life, education, and career, brings sensitivity, through her intrinsic nature, to a cognitive process that underlie the whole substance of judgment, probability, and expertise, which are undeniably linked as “indispensable elements of professional practice” of engineering, and indeed of thinking itself (Vick 2002). Furthermore, I would propose to encourage and support women in structural engineering to take leadership roles, as I have. However, the problem remains, America has a shortage of engineers. As countries like India, China, and many other Asian countries, nurture structural engineers, even women structural engineers, at a much higher rate, perhaps the bigger question must be, will America let its Corporate family find its “Emotional Leaders” elsewhere?

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