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MANAGING ENGINEERING TALENT: UNIQUE CHALLENGES TO OPTIMIZE THE BEST AND BRIGHTEST

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ABSTRACT

Most engineers are bright, hard-working, reliable, and prefer to avoid conflict. An engineering curriculum tends to self-select these characteristics. By most standards, you would expect workers exhibiting these traits to require minimal supervision. But is this true? Is this how most current engineering managers lead? Looking at some current theories on leadership combined with personal anecdotes, this presentation will look at some common misconceptions about leading engineers.

INTRODUCTION

Engineers are different. There, I said it. From cartoons to movies to television shows and more, there is a reason stereotypes of engineers resonate. Yes, you can find a lot individual variation among specific engineers that you may know, but they do not detract from some of the overarching commonalities that engineers are known for.

CLASH OF CULTURES

What distinguishes a professional? Raelin (1985), in his book *Clash of Cultures*, describes professionals as having superior intellectual training, maintaining their own standards of excellence, and being supported by associations that maintain the quality of the profession. Engineers obviously fit all three of these ideas: an engineering degree is still regarded as one of the most difficult to attain; we maintain our own standards both through peer-review and in academia through ABET accreditation; and through professional associations like SME to promote the discipline and foster technical growth.

Six characteristics representing professional status are described by Raelin (1985, p. 9):

Expertise—prolonged specialized training in a body of abstract knowledge.
Autonomy—the freedom to choose the means to solving a problem.
Commitment—Primary interest is in pursuing the practice of one's own chosen specialty.
Identification—identifying with the profession and with fellow professionals, both through formal associations and through peers external to the organization.
Ethics—providing service without concern for oneself or without becoming emotionally involved with the client.
Standards—committed to help in policing the conduct of fellow professionals.

Engineers are smart—in the vast majority of cases they are hired specifically for their expertise. At a typical mine the ventilation engineer knows more about mine ventilation than anyone else on site; the same is true for the rock mechanics engineer, the explosives engineer, the planning engineer who uses sophisticated computer software—each is the expert for their particular area at the mine, that is why they have that responsibility. This can present a dilemma for the manager for each (sometimes all) of these engineers. The manager needs to keep everyone on task and focused on the objectives of the organization. Because they have reached their position by following the norms and expectations of the organization, managers tend to have a certain amount of loyalty to that organization. Engineers, on the other hand, tend to have mixed loyalties, having as much loyalty and affinity for their profession as they do for the particular company they happen to be working for at any given time. This dynamic can often lead to power struggles between the managers, based on their positional authority in the organization, and the engineers, based on their specialized knowledge (Camm, 2013).

For both groups, their status within the organization, and particularly among each other, is a prime motivator. As we see in Raelin's list, professional status is inextricably tied to perceptions of expertise and autonomy.

CREDIBILITY

Credibility can be an issue from both perspectives. While most engineers are hard-working, smart, self-motivated individuals, not all of them are. In any group, you have the stars, the reliable workers, and the slackers. Each group responds to different motivations and incentives. One of your star performers probably needs very little direct supervision, but they may need feedback to acknowledge the hard work they are performing. Appreciation and autonomy are very high values for most high-achieving individuals; that is the status they crave. For these individuals, micro-managing and second-guessing will serve as demotivators. They will still do the work, but it is unlikely to be their best work (Feser, et al, 2015).

For workers who may lack motivation, who are not the self-motivated stars, more direct management may be appropriate. One of the dilemmas this presents is the desire to provide the environment for them to be productive, while at the same time not give the perception of unfair favoritism or unequal opportunity. This presents a challenge for engineering managers (Bolman & Deal, 2013).

Which brings us to the credibility of engineering managers. Unfortunately, engineers are provided with comprehensive technical training, but limited management training. Adding another level of complexity is the common practice of most engineers are promoted based on their technical expertise, and find themselves in a management position that requires a very different set of interpersonal and group dynamic skills.

A large body of research consistently demonstrates that managers (not just engineering managers, all managers) have a blind spot in assessing their own abilities to lead (Argyris & Schön, 1974). It is so common that it is almost a cliché for professionals in leadership positions to blame everything that is wrong with the organization on their subordinates, only to have experts come in and determine that the leader is the source of most, if not all the dysfunctions (Bolman & Deal, 2013; Burns, 1978; Christie, et al, 2011).

While it is beyond the scope of this preprint, it is important for a leader to define their leadership style (Ferch, 2005; Northouse, 2007). To accomplish this, they also have to spend some time in self-evaluation, to know themselves and what approach fits best with their personality (George, et al, 2007; Jung, 1957). Otherwise, the manager will be perceived to be insincere, and will be in danger of losing all credibility with their engineering staff (Camm, 2016).

IDEAS FROM TEACHING

Both of us teach in mining engineering programs, so we experience on a daily basis the dynamic of interacting with bright, motivated individuals. Well, *most* of them are bright and motivated.

Some lack the drive associated with success, and some are, well, not so bright. And there is the dilemma—working with intelligent, highly-motivated individuals can be a uniquely rewarding experience. It can also spoil you as a teacher, and also as a manager. You are usually rewarded for providing them a large amount of autonomy and flexibility in accomplishing goals, and are often pleasantly surprised with creative results.

Conversely, every teacher knows the challenge of dealing with lazy, unmotivated, and not-so-bright students (these characteristics can come in a maddening combination of one, two, or all three characteristics in any given student). Students like this usually respond best to more directive instruction, rigid guidelines and deadlines, and no mercy for absences or late work.

FINAL THOUGHTS

Particularly in mining, managers often are engineers. Experienced engineers, even once they get to management, often know more than their junior charges—at least in the beginning, and even then not always. Part of the human condition is a constant striving for status among each other as we form social groups. An important dynamic in the smooth functioning of a group of engineers is to remember how important status is for each engineer; the manager that learns to manage this need will go a long way toward harmony in the workplace.

REFERENCES

Argyris, C. & Schön, D. A. (1974). *Theory in practice: Increasing professional effectiveness.* San Francisco, CA: Jossey-Bass Publishers.

Bolman, L. G. & Deal, T. E. (2013). *Reframing organizations: Artistry, choice and leadership* (5th ed.). San Francisco, CA: Jossey-Bass.

Burns, J. M. (1978). *Leadership.* New York: Harper Torchbooks.

Camm, T. W. (2013). *Power and politics in organizations.* SME annual meeting, Denver, CO. Preprint 13-110.

Camm, T. W. (2016). *Pseudo leadership and safety culture.* SME annual meeting, Phoenix, AZ. Preprint 16-059.

Christie, A., Barling, J. & Turner, N. (2011). Pseudo-transformational leadership: Model specification and outcomes. *Journal of Applied Social Psychology, 41*, 2943-5984.

Ferch, S. (2005). Servant-leadership, a way of life. *The International Journal of Servant-Leadership, 1*(1), 3-8.

Feser, C, Mayol, F. & Srinivasan, R. (2015, Jan.). *Decoding leadership: What really matters.* McKinsey Quarterly.

George, B. Sims, P. McLean, A. N. & Mayer, D. (2007, Feb.). Discovering your authentic leadership. *Harvard Business Review.*

Jung, C. G. (1957). *The undiscovered self.* Princeton, NJ: Princeton University Press.

Northouse, P. G. (2007). *Leadership: Theory and practice* (4th ed.). Thousand Oaks, CA: Sage Publications.

Raelin, J. A. (1985). *The clash of cultures: Managers and professionals.* Boston MA: Harvard Business School Press.