Cognitive skills and leadership performance: The nine critical skills

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A B S T R A C T

Over the years, a growing body of evidence indicates that certain cognitive skills are a critical determinant of leader performance. In the present effort we show that application of these skills is typically founded in case-based knowledge. Subsequently, we identify nine key skills people in leadership positions employ when working with case-based knowledge to address leadership problems: 1) problem definition, 2) cause/goal analysis, 3) constraint analysis, 4) planning, 5) forecasting, 6) creative thinking, 7) idea evaluation, 8) wisdom, and 9) sensemaking/visioning. Individual and situational contingencies shaping effective application of these thinking skills is discussed. In addition, the implications of findings bearing on leader thinking skills for leader assessment and leader development are considered.

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Introduction

People's performance in leadership roles, roles calling for the effective exercise of interpersonal influence (Bass & Bass, 2008; Yukl, 2011), is an exceptionally complex phenomenon. As a result, leadership performance can be understood using a number of different meta-models. Zaccaro (2014) has argued that four meta-models are commonly employed in studies of leadership: 1) the leader as teacher meta-model evident in studies examining transformational leadership (e.g., Bass, 1990) or leader-member exchange (e.g., Graen & Uhl-Bien, 1995), 2) the leader as politician meta-model evident in studies of charismatic leadership (e.g., Mumford, 2006) and interpersonal appraisal processes (e.g., Shondrick, Dinh, & Lord, 2010), 3) the leader as warrior meta-model evident in studies of championing (e.g., Markham & Smith, in press) and leader ethics (De Hoogh & Den Hartog, 2008) and 4) the leader as problem-solver meta-model evident in studies of leader initiating structure (Fleishman, 1953) or studies of leader wisdom (e.g., Sternberg, 2013).

Of these models, it can be argued that the leader as problem-solver meta-model has received less attention, substantially less attention, than the leader as teacher, leader as politician, or leader as warrior meta-models. It is true many studies have examined the relationship of initiating structure to leader performance (Judge, Piccolo, & Ilies, 2004; Keller, 2006). More centrally, to structure, and structure appropriately, the performance of others one must, in the kind of complex dynamic environment confronting leaders, be intelligent. And, in fact, many studies have shown that intelligence is positively related to leader emergence and performance (Daly, Egan, & O'Reilly, 2015; Lord, De Vader, & Alliger, 1986).

Intelligence, however, ultimately refers to the speed and depth of peoples' information processing when working on complex problems (Tyler, 1964). Intelligence is a capacity strongly influenced by heredity (Gottfredson, 2004). For those of us interested in

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improving leader performance, this is not good news. We cannot do much, at least with adults, to improve peoples' intelligence. Thus, from a practical perspective, the leader as problem-solver meta-model is often viewed as something of a "dead end".

Intelligence, however, is a basic ability – an ability giving rise to more rapid acquisition of expertise and complex problem-solving skills (Vincent, Decker, & Mumford, 2002). Put differently, the effects of intelligence on leadership performance are mediated through expertise, knowledge, and skills for working with this knowledge. And, clearly, interventions can be developed to provide people with the knowledge they need to perform in complex tasks (Goldstein & Ford, 2002) – including leadership tasks. Moreover, the available evidence indicates that we can formulate interventions to provide people with the skills they need to work with this knowledge as they work on leadership tasks (Scott, Leritz, & Mumford, 2004). As a result, the leader as problem-solver meta-model may not be quite the "dead end" many assume.

With this point in mind, our intention in the present effort is fourfold. In keeping with current models of complex cognition (Mumford, Medeiros, & Partlow, 2012), we will begin by examining the nature of the knowledge, or expertise, people need to perform leadership tasks. We will examine the key skills that allow people to work with this knowledge in solving the kinds of problems posed by leadership tasks. In considering each of these skills, we will examine the strategies for skill execution that contribute to better, or worse, performance of those asked to solve the types of problems people confront in leadership roles. Finally we will consider the implications of these observations for the assessment and development of leadership potential.

Knowledge

Expertise

Experts possess deep, well-organized, knowledge, and more knowledge, bearing on the requirements for performance in certain domains. Studies of expertise commonly assume knowledge is acquired as a function of experience, and reflection on this experience, as people work on tasks within this domain (Ericsson, 2009). Accordingly the question arises as to whether expertise, or experience held to give rise to expertise, is, in fact, positively related to leader performance. Recently, Goodall and Pogrebna (2015) examined the performance of Formula One racing teams vis-à-vis coming in first, second, or third place in Formula One auto races. Leaders' expertise was assessed based on their years of driving experience. It was found that teams whose leaders had five or more years of experience as Formula One drivers were typically the most successful. Other work by Andrews and Farris (1967), Barnowe (1975), and Goodall, McDowell, and Singell (2014) also points to the importance of leader expertise and experience on team performance.

The impact of expertise on leader performance, however, doesn't directly address the question as to whether leader knowledge is critical to leader performance, in part, because experience provides people with other attributes of value in leadership roles such as stronger, denser, networks (Vessey, Barrett, Mumford, Johnson, & Litwiller, 2014). Some initial evidence bearing on this concern has been provided by Connelly et al. (2000). In this study, the critical incident performance of 1818 Army leaders was assessed along with objective indices of leader performance (e.g., medals won). Knowledge was appraised through a conceptual organization measure (Royer, Cisero, & Carlo, 1993). Here, participants were asked to sort 78 leadership tasks into categories, or concepts, and the viability of these concepts were appraised by assessing their similarity to the key dimensions of leadership identified by Fleishman et al. (1991). It was found that leadership knowledge was correlated in the 0.20 to 0.40 range with critical incident performance and achievement in leadership roles. Other work by Mumford, Marks, Connelly, Zaccaro, and Reiter-Palmon (2000) has shown that effective organization of these knowledge structures increased as a function of experience in Army leadership positions.

The impact of knowledge on performance in leadership roles, moreover, does not appear specific to Army leaders. For example, Howell and Boies (2004) contrasted 19 pairs of matched product champions and non-champions. Interviews with the champions and non-champions were content analyzed with two types of knowledge being assessed 1) contextual knowledge (e.g., knowledge of firm strategy) and 2) normative knowledge (e.g., knowledge of how decisions were made in the firm). It was found that the contextual knowledge was strongly, positively, related to effective packaging and selling of new ideas ($\bar{r} =$ 0.46). Normative knowledge had positive, albeit weaker, effects ($\bar{r} = 0.17$) on champions' effective packaging and selling of ideas.

Yet another effort pointing to the importance of knowledge in leader performance has been provided by Hedlund et al. (2003). In this study, a measure of tacit knowledge, experience-based knowledge, was developed based on interviews with Army officers. Subsequently a knowledge measure was formulated where officers were asked to indicate the approach they would take in handling various, non-standard, leadership problems. It was found that this measure of tacit knowledge was strongly positively related to senior officers' appraisal of participants' leadership effectiveness as battalion commanders ($r = 0.47$), with tacit knowledge adding to the prediction obtained from measures of general intelligence.

Case-based knowledge

If one grants that knowledge, knowledge acquired with experience, is critical to the effective performance in leadership positions, then a new question comes to fore. What types of knowledge are leaders working with? Lord and Shondrick (2011) classify types of knowledge used by the followers of leaders as symbolic, connectionist, and embedded. This distinction of key types of follower knowledge reflects a more general distinction of the types of knowledge that may be used by people in addressing complex problems. Hunter, Bedell-Avers, Hunsicker, Mumford, and Ligon (2008) describe the types of knowledge that can be used in solving complex problems – problems of the sort leaders must grapple with. Specifically, Hunter and colleagues argue complex