# Human and Technology Leadership Roles in Virtual Teams

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## INTRODUCTION

Effective leadership can make a difference in the success of a team, and virtual teams are no exception. However, virtual teams present special challenges, particularly in the expression of the context-rich and personal influence that is such an important part of leadership (Bell & Kozlowski, 2002). Communication through computer-mediated channels requires a different awareness of leadership roles and how they can be expressed. In fact, the communication system itself has roles to play, some of which might be perceived by team members as leadership roles. We begin with a brief summary of the historical context of leadership and existing research on leadership in computer-supported teams. We then discuss opportunities for research on enhancing leadership in virtual teams, particularly from the perspective of integrating human with technology roles.

## BACKGROUND

Leadership has a long and interesting history of theoretical perspectives and practical application. Leadership has been examined in terms of personality traits, as specific behaviors or behavior patterns, in terms of different styles, as typologies, or with respect to the contingencies of the situation (Bass, 1990). The different perspectives present increasingly complex views that take into account not just the individual leader but the impact and importance of the context, both social and organizational. In virtual teams, the context also includes technology, since virtual teams rely on computer-mediated environments.

Leadership can be defined as the exercise of influence for the purpose of achieving goals (Bass, 1990). In virtual teams, "e-leadership" has been defined as a social influence process that is mediated by advanced information technologies "to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups, and/or organizations" (Avolio, Kahai, & Dodge, 2001, p. 617). The process of influence is central to exercising leadership. Influence is traditionally exercised through face-to-face communication, but in computer-mediated environments, the influence process is quite different. One of the most interesting aspects of leadership in virtual teams arises from the situation itself, namely the integration of the role of technology in what is traditionally a personal influence situation. Thus, it is particularly relevant to ask how human and machine roles affect leadership in virtual contexts.

Virtual teams can be defined as a group of individuals who are geographically and/or organizationally and otherwise dispersed and who rely on collaboration technologies to carry out team activities (Dubé & Paré, 2004; Zigurs, 2003). Collaboration technology can be defined as an integrated and flexible set of tools that support team communication, process, and information sharing.

Table 1 summarizes key perspectives on leadership, showing the development of ideas from a fairly simple trait perspective to more complex interaction and systemic views. The table shows the implications of each characterization for virtual teams, that is, the types of challenges that arise in this new environment, and the resultant implications for technology design.

## LEADERSHIP ROLES IN VIRTUAL TEAMS

An early study of human and machine roles in face-to-face computer-supported teams provides a foundation for an analysis of leadership roles (Zigurs & Kozar, 1994). The study examined three categories of group

*Table 1. Characterizations of leadership and implications for virtual teams*

| Leadership Perspective | Overview | Selected Observations | Implications in Virtual Teams | Implications for Technology Design |
|---|---|---|---|---|
| Trait (Stogdill, 1948) | Effectiveness is defined in terms of required personal traits, such as physical characteristics, personality, ability. | Managerial motivation and managerial skills appear to be most promising predictors. | Traits might be difficult to assess in virtual environments, since cues are reduced. | Media-rich technologies such as video conferencing provide more verbal and non-verbal cues, though task type must be taken into account. |
| Power-influence (French & Raven, 1959) | Effectiveness is a function of the source and amount of power available to the leader. Types include reward power, position power, personal power, coercive power, referent power. | Leaders are more effective when they have at least a moderate amount of position power and develop personal power as a supplement. | Power and influence are more difficult to express in virtual environments, where cues are reduced. | Media-rich technologies can help to communicate position power, e.g., via video cues and voice inflection; personal profiles of participants can remind the team of positions. |
| Behavior (Blake & Mouton, 1964) | Emphasizes what leaders do in terms of effective and ineffective behaviors, e.g., consideration and initiating structure. | Context is a moderator for conditions in which consideration or structure work best. | Behavior is expressed through communication and needs to be explicit. | Communication tools should be designed to provide diverse formats for structuring messages that will support different types of behaviors. |
| Situational-Contingency (Hersey & Blanchard, 1977) | Success depends on situational factors. Factors are many, e.g., nature of task, external environment, role expectations, authority relationships. | Task-oriented style tends to be more effective in extremely favorable or unfavorable conditions, while relational style works in moderate conditions. | Technology environment introduces another contingency factor. | Technology should include tools to support the group in determining the characteristics of the situation, e.g., mood meter, social agents, awareness alerts. |
| Transformational vs. transactional (Burns, 1978) | Transformational leadership focuses on developing followers into leaders. Transactional leaders focus on exchange of rewards for performance and punishment for non-compliance. | Transformational leadership generates higher levels of effort, satisfaction, commitment, performance. | Skills for developing followers are likely to be different in a virtual environment, e.g., leader behaviors would be modeled differently in distributed environments than in person. | Technology that identifies both individual and group accomplishment and growth is needed, e.g., personal and group expertise profiles, role simulations. |
| Self-leadership (Manz, 1986) | Emphasizes developing positive thinking patterns and work practices in discipline, competence, self-confidence. | Focusing on giving workers more control over their tasks increases motivation and satisfaction. | Virtual environments might create more opportunities for controlling communication. | Collaborative technologies should be designed to give users a feeling of autonomy and control, e.g., ability for each team member to control agenda. |
| Full-range leadership (Avolio, 1999) | Leadership is a total system in which leaders and followers interact, influence, and develop each other and the context. | Transformational leadership has a consistently positive effect on developing rewarding contexts. | Virtual environments are consistent with this concept because technology is part of the system and a resource for leadership. | Design tools that build user confidence and autonomy, e.g., built-in process expertise. |

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