Guest Editorial Essay

Leadership in Virtual Teams: Past, Present, and Future

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ABSTRACT

Virtual teams are an integral part of many organizations today. Due to dispersion of their members in time and space, a virtual team tends to rely on electronic communication and information technologies to accomplish its work. The dispersion of members is also presenting new leadership challenges: cultural, geographic, and time differences make it difficult for a leader to provide structure to followers, evaluate their performance, inspire and develop them, and enable them to identify with the organization. An understanding of the role of a virtual team’s context, including that of the technological support employed, in influencing leader-follower interactions and their effects on a team’s performance would be of great benefit to researchers and practitioners. This paper summarizes the state of the literature on leadership in virtual teams. It also summarizes the papers in this special issue and presents some directions for future work on leadership in virtual teams. The reviewed work suggests that we are just beginning to understand leadership in virtual teams.

Keywords: group support systems; leadership; virtual teams

INTRODUCTION

As globalization, inter-organizational alliances, and the development in communication technology lead to the dispersion of work, virtual teams are emerging as an important work structure. In its pure form, a virtual team would be a temporary arrangement of individuals belonging to different organizations and cultures, possessing different functional backgrounds, and working across different time zones on a common task. Due to dispersion of its members in time and space, a virtual team tends to rely on electronic communication and information technologies to accomplish its work. Virtual teams offer a wide range of benefits for organizations (Townsend, DeMarie, & Hendrickson, 1998), such as access to previously unavailable expertise, enhanced cross-functional interaction, and higher productivity.
According to Avolio, Kahai, and Dodge (2000), increasing deployment of communication and information technology in organizations is rapidly creating new frontiers for what constitutes effective leadership in the information environment. Leadership in virtual teams is one such frontier. Cultural, geographic, and time differences among members of a virtual team make it challenging for a leader to provide structure to followers, evaluate their performance, inspire and develop them, and enable them to identify with the organization. Unfortunately, research on leadership in virtual teams has not kept pace with the growth of virtual teams. In their extensive review of 200 Group Support System (GSS) experimental studies, Fjermestad and Hiltz (1999) reported that leadership has been virtually ignored in the literature on technology mediated work. Researchers and practitioners would benefit from knowing the role of a virtual team’s context, including that of the technological support employed, in influencing leader-follower interactions and team performance. The papers in this special issue address the call for this knowledge.

This paper summarizes the state of the literature on leadership in virtual teams. Specifically, it summarizes laboratory studies of electronic teams (i.e., teams whose work is mediated by communication and information technologies), field studies of virtual teams, and the papers published in this special issue. It also presents directions for future research.

### Past Research on Leadership in Virtual Teams

Empirical work on leadership in electronic teams has largely focused on student teams put together temporarily in laboratory settings. While such teams cannot be considered as purely virtual, they share vital attributes with virtual teams, including electronic interaction among members, temporary nature of teams, and leader facilitating team work without having any authority over team members or credibility built from past work with the team. Thus, past laboratory studies on leadership in electronic teams provide an important foundation for building new knowledge about virtual team leadership. We briefly review these studies after dividing them based on whether or not they manipulated leadership behavior, followed by a review of empirical work on leadership in virtual teams.

#### Laboratory Studies That Did Not Manipulate Leadership Behavior

Table 1 summarizes the laboratory studies that did not manipulate leadership behavior. Leaders were either elected by group members or designated by researchers in these studies. The results indicate that the presence of leaders in electronic teams, by itself and in interaction with the features of technology and a team’s input factors, can affect team process and outcomes. They also suggest that technology features may in some cases, substitute for leadership. For instance, the process structure provided by a GSS in the form of a normative set of steps to follow may make the process structure provided by a leader redundant, thereby undermining the leader. These studies, however, offer little help in prescribing leadership behavior because they did not manipulate leadership behaviors systematically.

#### Laboratory Studies That Manipulated Leadership Behavior

These studies, summarized in Table 2, suggest that participative, directive, transformational, transactional, and instrumental behaviors of leaders appear to make a difference in electronic teams. Various contextual factors, including the nature of task (e.g., task structure, task interdependence), operating conditions (e.g., rewards and facilitation), and/or technology features (e.g., anonymity), interact with these leadership styles to influ-
Table 1. Laboratory studies that did not manipulate leadership behavior

<table>
<thead>
<tr>
<th>Authors</th>
<th>Key Significant Findings</th>
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</thead>
<tbody>
<tr>
<td>Barkhi, Varghese, Pipino, &amp; Pirkul, 1998.</td>
<td>- In negotiation tasks between members with different motives, the presence of a leader lowered the willingness of group members to disclose information.</td>
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<tr>
<td>George, Easton, Nunamaker, &amp; Northcraft, 1990</td>
<td>- Anonymous groups with leaders and non-anonymous groups without leaders were most satisfied. - Unequal levels of participation were more likely in manual groups without a leader and in GSS groups with a leader.</td>
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<tr>
<td>Harmon, Schneer, &amp; Hoffman, 1995</td>
<td>- Audio-conferencing system does not mute a leader’s influence or influence attempts.</td>
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<tr>
<td>Hiltz, Johnson, &amp; Turoff, 1991</td>
<td>- The presence of a leader was associated with higher decision quality. - The presence of a leader reduced the level of agreement among members in the presence of statistical feedback provided by the GSS.</td>
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<tr>
<td>Kim, Hiltz, &amp; Turoff, 2002</td>
<td>- The presence of a leader was associated with higher decision quality, greater levels of participation, and greater satisfaction with decision process. - The presence of a leader interacted with the nature of coordination. Specifically, sequential coordination groups with a leader were more satisfied with their decision process than sequential coordination groups without a leader.</td>
</tr>
<tr>
<td>Lim, Raman, &amp; Wei, 1994</td>
<td>- In leaderless groups, the GSS tended to promote equality of influence attempts but in groups with an elected leader the GSS did not stop the leader from exercising influence to a greater degree than others.</td>
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ence group process and outcomes. However, these results should be viewed with caution because they employed groups of students in same-time, same-place settings, which limits their generalizability.

**Field Studies**

There has been relatively few published field studies that have examined leadership in a virtual team setting. These have been summarized in Table 3 and indicate that in addition to mentoring and individualized consideration behaviors, which are components of transformational leadership, instrumental behaviors that move the team forward and keep it on schedule (e.g., regular, prompt, detailed, and integrative communication) are critical for effective leadership in virtual teams. While the field studies examined teams that are closer to “naturally occurring” virtual teams than those examined by laboratory studies, their conclusions should be accepted with caution due to limited statistical validity and the use of student teams rather than organizational teams.
**Table 2. Laboratory studies that manipulated leadership behavior**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Key Significant Findings</th>
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| Hoyt & Blascovich, 2003       | - Technology did not make a difference in leadership effects.  
- Followers of a transformational leader produced less output but of higher quality, were more satisfied, displayed greater cohesiveness, trusted their leader more, and showed greater value congruence than followers of a transactional leader.  
- Trust fully mediated the effects of leadership style on satisfaction and cohesiveness.                                                                 |
| Kahai, Sosik, & Avolio, 1997  | - Participants made more supportive remarks under participative leadership than directive leadership.  
- Participative leadership was more conducive to promoting solution proposals for a semi-structured problem, while directive leadership was more conducive to generating solution proposals for a more structured problem. |
| Sosik, Kahai, & Avolio, 1998  | - Higher levels of transformational leadership were associated with higher levels of elaboration and originality.  
- Groups in the identified high-transformational condition demonstrated higher flexibility than groups in the identified low-transformational condition.  
- Leadership effects disappeared in the anonymous condition, probably due to anonymity substituting for leadership – anonymity by itself may be encouraging flexibility of thinking. |
| Kahai, Sosik, & Avolio, 2003  | - Transformational leadership helped overcome social loafing that occurred when individual input was anonymous and was pooled for group rewards.  
- Anonymity enhanced the effects of transformational versus transactional leadership on solution originality, group efficacy, and satisfaction with the task. |
| Kahai, Sosik, & Avolio, 2004  | - The perceptions of leader participativeness and directiveness were positively associated with the level of participation in a creativity task.  
- Level of participation, in turn, was positively related to group performance, indicated by uniqueness and quality of solutions, but negatively related to group member satisfaction. |
| Kahai & Avolio, 2006          | - Participants working with a transformational confederate were more likely to argue against illegal copying of “copyrighted” software than those working with a transactional confederate.  
Groups exposed to such arguments were associated with greater deviation among its members in intentions to copy.  
- Participants working with a transactional confederate were more likely to argue in favor of illegal copying of “copyrighted” software.  
Groups exposed to such arguments were associated with a higher mean of intentions to copy. |
Table 2. Cont.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Key Significant Findings</th>
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| Sosik, Avolio, & Kahai, 1997 | . Transformational leadership led to higher levels of group potency than transactional leadership. Group potency in turn was positively associated with group effectiveness. 
. The effect of transformational versus transactional leadership on group potency diminished in presence of anonymity in the brainstorming phase, which relied on individual effort, but increased in presence of anonymity in the report generation phase, which required collective effort. |
| Sosik, Avolio, & Kahai, 1998 | . Both transactional goal setting and inspiring leadership had a positive impact on group creativity when the effects of components of transformational and transactional leadership were examined. 
. Intellectual stimulation and individualized consideration affected group creativity negatively. |
| Sosik, Kahai, & Avolio, 1999 | . Flow mediated the effects of perceptions of transactional and transformational leadership only in the anonymous condition. 
. Anonymity led to marginally more positive effect of perceptions of transformational leadership on flow. |
| Tan, Wei, & Lee-Partridge, 1999 | . Individually, facilitation and leadership were found to increase decision quality. 
. Leadership also improved process satisfaction. 
. Leadership and facilitation interacted to affect post-meeting consensus: in the absence of leadership, consensus reduced with facilitation and in the absence of facilitation, consensus increased with leadership. |

**CURRENT RESEARCH**

To advance the limited knowledge on leadership in virtual teams, a call was made for submission of papers to a special issue on this topic. Three papers were accepted and are included in this Special Issue. They are summarized in Table 4. Hambley, O’Neill, and Kline (this issue) suggest in their field study that it is the leaders who set the coordination and the emotional tone of the virtual team. Tarmizi, de Vreede and Zigurs (this issue) point out that many of the less difficult and less important tasks faced by a virtual team leader should be automated. This permits the leader to give more attention to important aspects of facilitating the team’s work. Wickham and Walther (this issue) suggest that more than one leader can emerge in a virtual team, simply because there are many different roles to fill. Team members consider perceived amounts of communication, intelligence, and encouraging and authoritarian behaviors to identify emergent leaders.

**FUTURE RESEARCH**

The research performed to date on leadership in virtual teams represents the beginning of the work on this topic. The work
**Table 3. Field studies**

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<thead>
<tr>
<th>Authors</th>
<th>Key Significant Findings</th>
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<tbody>
<tr>
<td>Kayworth &amp; Leidner, 2002</td>
<td>- Highly effective virtual team leaders acted as mentors for other team members and showed understanding toward them.</td>
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<td>- Effective leaders communicated regularly and promptly and provided sufficient details in their communication.</td>
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<td>- Leaders also clarified the roles of the members of the team.</td>
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<td>Yoo &amp; Alavi, 2004</td>
<td>- Emergent leaders sent more electronic messages than others in the team.</td>
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<td>- Demographics do not play a role in emergence of leaders.</td>
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<td></td>
<td>- Emergent leaders sent more task oriented messages than non-leaders.</td>
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<td></td>
<td>- There were no significant differences for expertise-related messages.</td>
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<td></td>
<td>- Emergent leaders enacted three roles: initiator, scheduler, and integrator.</td>
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**Table 4. Current research**

<table>
<thead>
<tr>
<th>Author (Nature of study)</th>
<th>Key Significant Findings</th>
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</thead>
<tbody>
<tr>
<td>Hambley, O’Neill, &amp; Kline</td>
<td>- Leadership is critical in virtual teams.</td>
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<tr>
<td>(Field study)</td>
<td>- It is important for leaders to establish regular virtual team meetings and ensure that these meetings are well organized.</td>
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<td>- Personalizing the relationships between the leader and his/her virtual followers, as well as between the team members is important.</td>
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<td>- Virtual team leaders and members need to learn how to use different media effectively.</td>
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<td>Tarmizi, de Vreede, &amp; Zigurs</td>
<td>- Less difficult and less important tasks faced by a leader should be automated.</td>
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<tr>
<td>(Field study)</td>
<td>- Encouraging participation and ownership are important but difficult tasks for a leader.</td>
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<td>- By encouraging participation, an open and positive environment might encourage participants to take more responsibility for their community.</td>
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<td>Wickham &amp; Walther</td>
<td>- More than one leader can emerge from a virtual team due to the different roles required.</td>
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<td>(Laboratory experiment)</td>
<td>- Appointing a leader does not ensure that the assigned member will remain in that position in a virtual team.</td>
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<td>- Team members perceived emergent and assigned leaders as:</td>
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<td></td>
<td>o the most frequent communicators;</td>
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<tr>
<td></td>
<td>o more intelligent; and</td>
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<td>o providing encouragement to their team.</td>
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done so far has laid the foundation for valuable research that can be conducted to study leadership in virtual teams. The possibilities for future research are indicated below.

- Examining the effects of specific leadership behaviors (e.g., contingent rewarding) that make up different leadership styles (e.g., transactional leadership style). This would enable the development of more specific and useful guidelines for leading in virtual teams.
- When examining the effects of transactional and transformational leadership
styles, explore the effects of combining different levels of specific transactional and transformational behaviors.

- Examining individual and collective leadership in virtual teams.
- Examine how contextual factors, including the nature of task, operating conditions, and/or technology features, may interact with leadership in virtual teams to influence group process and outcomes. This examination would be significant due to the presence of diverse ethnic, national, and organizational backgrounds, the complexity and confusion of communication, and the variety of temporal and spatial virtual work arrangements possible in virtual teams. Some examples of contextual factors that could affect the effectiveness of virtual team leadership but remain unexplored include communication media richness, goal-frustrating events, and leader-follower gender.

CONCLUSIONS

Competition, offshoring of work, and the growth of the Internet and similar globally linking technologies are contributing to an increase in the use of virtual teams. These contributors are becoming stronger which suggests that virtual teams are only likely to become a more prominent arrangement in the future. Currently, there is a significant need to examine how to best develop leadership for the virtual team context.

This paper summarized the state of the literature on leadership in virtual teams. The work to date, including the work published in this special issue, indicates that leadership in virtual teams is different in significant ways from leadership in traditional face-to-face teams. Not only does the context within which a virtual team operates make certain leadership behaviors more important than others, it also tends to interact with leadership behaviors to change their effects. Both the research community and organizations would benefit from further study of leadership in virtual teams.

REFERENCES


Small Group Research, 34(6), 678-715.
Surinder S. Kahai is an associate professor of MIS and fellow of the Center for Leadership Studies at SUNY-Binghamton. He has a B.Tech in chemical engineering from the Indian Institute of Technology, an MS in chemical engineering from Rutgers University, and a PhD in business administration from the University of Michigan. Dr. Kahai researches computer-mediated communication, leadership in electronic groups, and IS leadership. His research has been published in journals including Decision Sciences, Journal of Applied Psychology, Journal of Management Information Systems, Leadership Quarterly, and Personnel Psychology. He is currently serving on the editorial boards of Group and Organization Management, IEEE-TEM, and the International Journal of e-Collaboration. He co-edited a special issue of Organizational Dynamics on e-leadership.

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Suling Zhang is a PhD candidate in the information systems department at New Jersey Institute of Technology. Her research interests are in virtual team leadership, virtual team culture, small business management, instant messaging, and inter-organizational decision-making process. Her dissertation work investigates the relationship between leader delegation and team outcomes. Suling has taught courses in information systems and electronic commerce design.

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