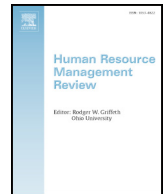


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## When does virtuality help or hinder teams? Core team characteristics as contingency factors

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### ABSTRACT

In this paper, we seek to encourage scholars to consider how reliance on technology-mediated communications can bring both promises and perils to team-based work structures. Specifically, we argue that a team's core characteristics (including skill differentiation, temporal stability, and authority differentiation) will differentially affect the challenges and opportunities presented by the team's reliance on virtual means of communication. First, we will discuss how varying degrees of each core characteristic can affect outcomes when teams rely on virtual communication. We then propose how configurations of the three characteristics and virtuality can enhance understanding in both research and practice. We advance propositions that we hope will serve as a starting point for scholarly discussion about how the literature on virtual teams can leverage the existing theories and knowledge on team structure and interdependencies.

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Organizations have turned to team-based work structures as a means of responding to the increasing demands associated with rapid environmental changes, globalization, and heightened technical complexity. At the same time, the need to coordinate geographically dispersed units with diverse skillsets has limited the ability of organizations' to co-locate team members. As a response to these demands and constraints, organizations are relying increasingly on information and telecommunication technologies to facilitate teamwork among individuals who have the necessary expertise to meet the demands of a given project or task (Townsend, DeMarie, & Hendrickson, 1998), notwithstanding cultural, spatial, and temporal boundaries (Gibson & Gibbs, 2006; Kirkman & Mathieu, 2005; Scott & Wildman, 2015). However, a reliance on technology-mediated communications in team-based structures poses unique challenges relative to teams in which members are co-located and meet face-to-face, such as difficulties in communicating across boundaries (Montoya-Weiss, Massey, & Song, 2001), social loafing (Alnuaimi, Robert, & Maruping, 2010), and developing trust within the team (Jarvenpaa & Leidner, 1999). The promises and perils that technology-mediated communications can bring to team-based structures have therefore raised important research questions concerning both the conditions under which these technologies can benefit teams and the best means to manage teams that rely extensively on such modes to coordinate taskwork.

Within the extant literature, several reviews have focused on specific issues related to technology-mediated communication in teams, or *virtual teams* (Gibson, Huang, Kirkman, & Shapiro, 2014; Hertel, Geister, & Konradt, 2005; Martins, Gilson, & Maynard, 2004; Scott & Wildman, 2015). Surprisingly, there has been limited conceptual or empirical work that has attempted to synthesize what has been learned about technology-mediated communications, or virtual teams, with the extensive literature on traditional

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groups and teams. However, one must recognize that the literature on groups and teams provides little in the way of a roadmap for scholars to integrate the accumulated body of research focusing on virtual modes of communication and teams. As noted by Hollenbeck, Beersma, and Schouten (2012), the mainstream literature on groups and teams has “a confusing plethora of alternative team taxonomies and no consensus regarding how to describe or classify teams” (p.82). This has contributed to a belief that the distinctiveness of virtual teams, relative to face-to-face teams, and their diversity in form and function, render them less suitable for the application of existing frameworks concerning work teams (Bell & Kozlowski, 2002). We argue that scholarship will proceed more effectively by first recognizing that a team's level of reliance on technology-mediated communication, or *team virtuality* (Kirkman & Mathieu, 2005), is an important attribute on which work teams may be distinguished. Furthermore, teams high on virtuality may also differ on other important theoretical dimensions. To a considerable extent, these other characteristics of the team determine both the opportunities and challenges that implementing higher levels of virtuality poses to teams and their organizations. We take a contingency approach to conceptualizing how team virtuality influences team outcomes, such as learning and adaptation, efficiency, and innovation, as well as member identification and satisfaction.

Whereas the geographic distribution of team members often dictates the level of team virtuality, we suggest that other dimensions, namely skill differentiation, temporal stability, and authority differentiation, can present either obstacles or opportunities to practitioners who seek to make greater use of technology-mediated communications in how they choose to design, implement, and manage team structures. Thus, the chief aim of our paper is to propose an integrative theoretical framework that will allow future research to leverage the extant knowledge from research on traditional work groups, technology-mediated communication, and virtual teams. We first briefly review the literature on communicating through virtual means and core team characteristics. Next, we consider how the separate influences of three core team characteristics (skill differentiation, temporal stability, and authority differentiation) on various team outcomes (e.g., efficiency) may differ depending on the level of team virtuality. We then present formal propositions concerning these contingency relationships. Finally, we consider how team virtuality affects relationships between various configurations of these core characteristics and team outcomes. This framework may also have important practical implications by suggesting how technology-mediated communication may be beneficial or counterproductive in different environments, and whether richer virtual modalities (e.g., videoconferencing vs. email) may be needed for teams that must rely extensively on virtual communication. We aim to provide researchers with a conceptual lens based upon the existing literature on workgroups and teams that aids in organizing and motivating future work incorporating team virtuality. In doing so, we envision a literature on virtuality in teams that avoids the blind spots, fragmentation, and effort wasted on reinventing conceptual material (i.e., the “not invented here” syndrome) that often sidetracks new streams of literature.

## 1. Communicating through virtual means

The extensive literature surrounding the use of technology-mediated communication in workgroups and teams has developed across many research domains. Early research examining the differences between face-to-face and technology-mediated groups demonstrated some of the potential advantages of utilizing technology as a medium for accomplishing work in teams, for instance decision-making (Hedlund, Ilgen, & Hollenbeck, 1998; Lam & Schaubroeck, 2000) and member satisfaction (Thompson & Coovert, 2002; Warkentin, Sayeed, & Hightower, 1997). As organizations have sought to implement new technologies into team-based structures, researchers began to identify hurdles that these teams may need to overcome. For example, they may face unique difficulties in promoting team identification (Fiol & O'Conner, 2005; Wiesenfeld, Raghuram, & Garud, 2001), managing diversity across boundaries (Gibson & Gibbs, 2006; Scott & Wildman, 2015), and determining how to best lead virtual teams (Bell & Kozlowski, 2002; Hoch & Kozlowski, 2014). All of these challenges have the potential to mitigate, and in some cases supersede, the advantages of coordinating tasks through a virtual work structure. This has led some researchers to draw comparisons between ‘virtual’ and ‘traditional’ teams and has created what we view to be a rapidly expanding gulf between the mainstream literature on work teams and research on the topic of “virtual teams.”

Within the literature on virtual teams, the previously widespread view that teams are either virtual or not is increasingly challenged as being “unrealistic and artificial” (Kirkman & Mathieu, 2005, p. 701; see also Cramton, 2001; Griffith, Sawyer, & Neale, 2003; Martins et al., 2004). This perspective acknowledges that geographic dispersion may lead to team members using virtual means of coordinating task activities, however this does not preclude teams that are co-located from using virtual tools as well (Kirkman & Mathieu, 2005). Indeed, it would be difficult to imagine, in today's workplace environment, a complete absence of mediating communication technologies (e.g., email, video-conferencing, shared calendars, etc.). Almost all teams are likely to employ at least *some* type of technology to coordinate tasks and accomplish work. This led Kirkman and Mathieu (2005) to put forth the concept of team virtuality, which refers to the extent and value of utilizing information and communication technologies within work teams. Moreover, the artificial dichotomization of teams, into being either virtual or not virtual, may not encourage researchers who specifically investigate teams high on virtuality to pay heed to the broader literature on workgroups and teams, particularly as this emerging stream of research develops its own nomenclatures and research questions, thus broadening the gulf in scholarship.

Henceforth, where we refer to higher levels of team virtuality, we follow Kirkman and Mathieu (2005) in referring not only to a team's frequency of use of technology-mediated communications, but also to the informational value provided by these technologies, and the extent to which the communication is synchronous or asynchronous (i.e., some virtual media afford richer information exchange than others). For example, videoconferencing provides nearly the same information quality exchange as face-to-face communication. On the other hand, email cannot convey visual or audio cues often needed to interpret information (Kruger, Epley, Parker, & Ng, 2005), and its asynchronous nature reduces the likelihood members will engage in spirited

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