

ENHANCING EFFECTIVENESS ON VIRTUAL TEAMS

Understanding Why Traditional Team Skills Are Insufficient

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Virtual team interactions are almost always assisted by some form of computer-mediated communication technology. Computer-mediated communication is different in many ways from traditional face-to-face communication, perhaps most significantly because the communication is usually asynchronous instead of synchronous. Temporal independence of communication changes the patterns of work, decision making, and understandings about the work and the relationships between the individuals involved in the work. As a consequence, managing virtual teams is different and more complex than managing face-to-face teams, yet virtual teams are still groups of individuals that share most of the characteristics and dynamics found on traditional teams. The effective management of virtual teams requires knowledge and understanding of the fundamental principles of team dynamics regardless of the time, space, and communication differences between virtual and face-to-face work environments.

Keywords: *virtual teams; virtual work; team effectiveness; asynchronous communication*

Teams and teamwork are a ubiquitous part of getting work done in almost every organization (Hackman, 2002). Generically, a team is a group of individuals who interact interdependently and who are brought together or come together voluntarily to achieve certain outcomes or accomplish particular tasks. Some research claims that the use of teams increases capability, responsiveness, and flexibility within organizations (Griffith, Sawyer, & Neale, 2003; Maynard, 2006) partly because synergies are created among team members who have different types of expertise, experience, or knowledge (Grimshaw & Kwok, 1998; Klein & Kleinhanns, 2003). The increased use of teams in organizations is encouraged, in part, by computer-mediated

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communication technologies, which has profoundly changed how organizational members collect and distribute data and has also changed the dynamics and relationships between organizational members (Flanagin & Waldeck, 2004). Computer-mediated communication technologies also enable organizations or groups to use virtual or networked teams (May & Gueldenzoph, 2006).

WHAT ARE VIRTUAL TEAMS?

Virtual teams can use computer-mediated communication technologies to work interdependently across space, time, and organizational boundaries (Bell & Kozlowski, 2002; Lipnack & Stamps, 2000). Virtual team members may be located across the office, but almost as easily across the country or across the world, and may rarely or perhaps never meet face to face. Townsend, DeMarie, and Hendrickson (1998) characterize virtual teams as “groups of geographically and/or organizationally dispersed coworkers that are assembled using a combination of telecommunications and information technologies to accomplish an organizational task” (p. 18). Virtual teams are not required to use computer-mediated communication technologies, but this is typical given the near-universalistic nature of computer-mediated communication systems in organizations. Significantly, the use of technology alone does not make a team virtual. Almost all teams use technology to some degree, but virtuality increases as the degree of reliance on electronic communication increases. Geographically dispersed teams often have no choice except to communicate electronically, even though some individual team members may strongly prefer face-to-face interaction (Cohen & Gibson, 2003).

A virtual team has the following six attributes, sharing the first four with almost all teams:

- The team usually but not always has a definable and limited membership, and there is awareness by team members of this shared membership, and even if membership changes somewhat the team remains intact (Alderfer, 1987).
- The members of the team function interdependently, usually with a shared sense of purpose that is either *given* to them or constructed by the team itself (Alderfer, 1987).
- The members of the team are jointly responsible for outcomes (Hackman, 1987).
- The members of the team collectively manage their relationships across (and perhaps between) organizational boundaries (Hackman, 1987).

- The members of the team may be geographically dispersed (Johnson, Chanidprapa, Yoon, Berrett & LaFleur, 2003).
- The members of the team predominately rely on computer-mediated communication rather than face-to-face communication to accomplish their tasks (Maznevski & Chudoba, 2000).

A team that does most of its work through use of the telephone, e-mail, electronic bulletin boards, chat groups, electronic databases, or teleconferences, and rarely if ever meets face to face, is more virtual than a team that meets regularly face to face, even if both teams use exactly the same technologies to some extent in doing their work. The degree to which a team is virtual is a complex and multidimensional construct (Gibson & Cohen, 2003), with the major determinant of *virtualness* simply being the amount of time that members spend working thorough computer-mediated communication instead of face-to-face communication. The highest degree of virtuality is when all members work apart from each other in distant locations and *only* communicate and interact through computer-mediated communication or other distance communication technologies (Kirkham, Rosen, Gibson, Tesluk, & McPherson, 2002). An example of very limited virtualness may be a single office where files are sent across the office electronically for further work by another in the same office, yet face-to-face communication is available almost without restriction if needed or wanted. An advantage of virtual teams is that team members are able to communicate, collaborate, and create outputs irrespective of time and space, because they are not bound by temporal constraints or geographic location as are most face-to-face teams.

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Virtual team members must communicate and collaborate to problem solve, to continue the work process, and to produce a product or service,

just as any team does (Thomas, 2007). However, choosing the most effective or efficient communication technology for these interactions is not a simple process and is dependent on factors such as the nature and type of team, the team's task, the team members' access to technology (Duarte & Snyder, 2001), or even the sophistication and experience of team leaders or team members in doing virtual work.

Interdisciplinary team members (virtual or not) deal with the pull of competing loyalties and demands. One advantage of having interdisciplinary teams, including geographically dispersed teams, is that different opinions and perspectives are represented within the team and thus greater organizational learning and synergy are possible because of this added diversity. Making sense of another's beliefs or actions is a constant struggle in any team environment (Guribye, Andressen, & Wasson, 2003) and this difficulty can be exacerbated in the virtual environment because of the potential for greater diversity of the team. Yet, as noted by Jameson (2007), components of cultural identity are often hidden in mediated encounters unless intentionally revealed.

Shared goals and shared understandings are required on any team, and negotiation of these common goals is an intrinsic part of the team-building process. Effective social relationships are a required constant for effective collaborative work, virtual or face to face. Overall, social information exchange is similar in both virtual and face-to-face communication although the computer-mediated sharing of social information appears to occur more slowly at first, and so the difference is likely one of rate rather than depth of content (Vroman & Kovachich, 2002; Walther, 1995).

TYPES OF VIRTUAL TEAMS

The most important and most simple distinction between virtual and face-to-face teams may be that virtual team interactions are almost always mediated by various forms of electronic communication and computer-mediated-collaboration technology (Maznevski & Chudoba, 2000). Virtual interactions generally fall into one of four categories (Mittleman & Briggs, 1998):

- Same time and same place interactions similar to face-to-face interaction except using technologically assisted communication instead of face-to-face communication, as with e-mail across an office
- Same time but different place interactions, such as using instant messaging

- Different time but same place interactions such as using a dedicated chat room on a network
- Different time and different place interactions such as an exchange of e-mail communications as is commonly found in online classrooms or multi-office settings

These categories illustrate that almost any team is virtual to some extent at least some of the time. Face-to-face teams, for example, may use an electronic medium to send out minutes from a meeting or even to confirm decisions reached during a hallway chat. Considering teams along this continuum from only virtual to only face to face is appealing because most teams utilize some combination of face-to-face and computer-mediated communication in their interactions (Griffith & Neale, 2001). This continuum also reinforces the complexity of communication channels available to any configuration of team members and may reduce the tendency to make stark comparisons of different types of team interactions, as if virtual communication is a single type of interaction that can be easily compared or understood.

ORGANIZING VIRTUAL TEAMS IN THE WORKPLACE

It is relatively easy for virtual team members or leaders to establish procedures for information sharing within the virtual team. Facilitators can even establish different forums to distinguish among the task, social, and contextual information typically shared by team members, if they wish, and create procedures appropriate for sharing or transferring each type of information (Maznevski & Athanassiou, 2003). Organizations often establish these expectations of systems in advance of creating the virtual team. Because differences in communication practices may also emerge as members do their work across multiple boundaries including cultural, geographical, or discipline, these procedures can also be established to reconcile these issues as they arise (Gibson & Manuel, 2003). Team leaders can establish themselves as norm setters and demonstrate through practice what is expected of the team members, can teach these norms to new members, or can enforce norms if members ignore these expectations. A virtual team norm, for example, might be to encourage people to seek out information through questions when problems or confusions arise and to give the benefit of the doubt in ambiguous situations instead of making negative attributions about the motives or intent of other team members

(Maznevski & Athanassiou, 2003). Significantly, communication occurs between the individuals on a team, even though this communication may be visible to all team members (Varner, 2000). The most critical virtual team norm is likely focused on the *how* of team interaction and collaboration (Dillenbourg, 1999; Hakkinen, 2004), and this virtual process may be quite different from the process of working out team issues on a face-to-face team.

Because many organizations have several or many virtual teams working simultaneously, most organizations prefer standard operating processes for all virtual teams. These norms are assumed to reduce the time needed for team startup and effective work processes and often eliminates the need for unnecessary reinvention of operating practices every time a new virtual team starts up. Common processes may include the following (Duarte & Snyder, 2001):

- Clear rules or expectations when using certain types of technology
- Clear definition of what effective work completion means
- Agreement to team charters laying out general team norms and expectations
- Project planning including time lines and specified team member outcomes
- Documentation and reporting systems, including the electronic archive

Most of these processes are usually shared with most face-to-face teams, yet procedures and goals must be clear so that virtual team members know how they are to work and what their objectives are. In colocated teams, vague or unclear expectations can be clarified through casual conversation in the hallway, but virtual teams need more structure because this casual *chat* is not available to them, or at least not available in the same way. Again, the *how* of interaction and collaboration is critical.

Virtual teams work around project timelines and stages of team process just as face-to-face teams do. Interestingly, the virtual team formation processes typically includes forming, norming, and performing activities as identified by Tuckman (1977), but the storming stage is apparently often folded into other stages, or ignored (Johnson et al., 2003). This lack of storming may be because virtual teams have more of a task than personality focus, or perhaps because they often have established predetermined communication structures that resolve or otherwise deal with *how to do work* conflicts. Finally, although technology's function in the virtual team enables the completion of work and overcomes many of the complexities created by time and distance, these technologies still need to be understood as only a communication and collaboration tool and not as communication or collaboration itself.

The use of virtual teams adds complexity for management in many organizations because virtual teams are sociological and social systems just as is any team, but virtual teams also have their work processes intertwined with technological systems (Maznevski & Athanassiou, 2003). Virtual teams may also have enhanced levels of diversity as compared with traditional face-to-face teams because of the multitude of different disciplines, functions, professions, organizations, countries, and cultures that can be easily added into the team (Griffith & Neale, 2001). Thus, the technological element, which allows asynchronous communication to happen at different times (Yates & Orlikowski, 2002), when combined with the diversity element, adds complexity that may create additional barriers that management or leaders need to be overcome when working to create effective teams. Flanagin and Waldeck (2004) note that employee membership and identification is a challenging concern as organizations become increasingly dispersed, decentralized, and virtual. Thus, members may well have competing allegiances, and overcoming these barriers will require purposeful management strategies.

VIRTUAL COMMUNICATION

Generically, communication is the process of transferring information, meaning, and understanding between two or more parties, and there is a huge literature on how this process can be made more efficient and effective. Communication, whether virtual or face to face, is fundamental to getting any organizing or work done, as communication provides the basic building blocks with which people collaborate, make decisions, and act to achieve organizational objectives. Communication is also central to organizational socialization including sense making and affiliation (Flanagin & Waldeck, 2004).

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Virtual teams typically use computer-mediated asynchronous communication (CMAC). CMAC typically allows for multiple threads or concurrent themes of *conversation* to occur from multiple contributors all at the same time, instead of being restricted to turn-taking (with communication blocking) as is common with synchronous face-to-face communication (Berry, 2006). As well as expressing ideas simultaneously, team members in the virtual environment can express their ideas completely without interruption by others and can make these contributions at a time personally convenient or available to them (Cappel & Windsor, 2000), thus removing competition for immediate airtime. Computer-mediated communication has fewer social, political, or power context cues as found in face-to-face communication. Verbal cues such as intonation, facial expression, gestures, and contextual cues that enable listeners to *read* (or misread) the speaker's intent are missing in computer-mediated communication, and this can aid (or hinder) understanding (Sproull & Kiesler, 1991; Vroman & Kovachich, 2002). Another concern with CMAC virtual teams is that with geographically dispersed teams it is less likely that informal or unintentional information will be shared in parallel along with the text-based information, such as casual chats in the hallway or parking lot, and this may constrain understanding.

A frequently documented benefit of CMAC is that collaboration is largely unrestricted by location or time zone (Harasim, 1990). This may seem obvious, but temporal independence of communications can also change the patterns of work, discourse about work, and the relationships between the individuals involved in the work (Vroman & Kovachich, 2002). There is ongoing debate whether the lack of nonverbal cues is a hindrance or advantage in computer-mediated text-based communication, but a common although not consistent finding is that computer-mediated group interactions possess less social presence than face-to-face communication (Sproull & Kiesler, 1986), at least in the short term. This can result with work interactions being more task focused than on face-to-face teams (Hiltz, Johnson, & Turoff, 1986; Maynard, 2006), which is considered to be a *beneficial* difference, at least by some. Scott and Timmerman (1999) found that the degree of mediated communication had some minor effects on team or work identification. Johnson et al. (2003) found that virtual team members were less inhibited because of not being colocated and that ideas and feedback in the virtual environment were more frank. Confounding these apparent advantages may be differences in the technology resources available at the various sites; a lack of overlap in work hours between

locations, which may result in slowed response time; and the constraints of local work priorities and culture.

Shared understanding of task and process has a significant impact on the ability of teams to coordinate and perform well, and in creating consistency. Consistency in process and expectations results in more efficient implementation simply because shared understandings not only enable people to more easily anticipate and predict the behavior of individual team members and the group as a whole (Hinds & Weisband, 2003) but also influences ongoing communication (Yates & Orlikowski, 2002). Asynchronous communication provides a constant opportunity to *talk* through problems, share perspectives, get feedback, and answer questions that arise among team members without waiting for scheduled meetings (Hinds & Weisband, 2003). Johnson et al. (2003) found the major socialization issues in virtual teams were very similar to the issues found in face-to-face teams, including the unwillingness of team members to participate because of conflicting schedules or other issues, lack of management or team planning, and individual disagreements among team members.

BENEFITS AND PROBLEMS WITH VIRTUAL TEAMS

Virtual teams are increasingly being utilized by organizations because they give organizations the ability to bridge time and space (Kanawattanachai & Yoo, 2002). Virtual teams are also usually cost efficient (as compared with the expense and time of travel and travel coordination for synchronous face-to-face teams) and often provide a means for better utilization of distributed human resources (Lipnack & Stamps, 1999). Virtual teams can *follow the sun* and utilize 24-hour work schedules with electronic communication (Solomon, 2001), simply because different parts of the team in different parts of the world can work on various team tasks at different times. Virtual teams enable organizations to attain a broader geographic reach while maintaining effective contact with employees and customers (Maynard, 2006).

Performance is often easier to document and review in virtual teams because most interactions, commitments, and outcomes are archived automatically and electronically (Gibson & Cohen, 2003). Asynchronous processes are often more efficient because participation occurs in parallel instead of serially (with attendant communication blocking) as with most communication on face-to-face teams (Klein & Kleinhanns, 2003). In

some instances, the use of virtual teams is the only alternative to not having a team at all (Berry, 2006).

Virtual teams can amplify both the benefits and downsides of traditional teamwork. On the positive side, virtual teams that are designed, managed, and implemented effectively can harness talent and knowledge from anywhere in the world to solve problems and complete work tasks on a 24/7 schedule. However, if these teams are poorly designed and managed, the team dynamic may be weak or even fail, and outputs might be inept or nonexistent. Organizations must consciously create the conditions for effective virtual teamwork, and the success or failure of virtual teams (or the organization itself) may well be a consequence of inept leadership or management more than a consequence of technology or other factors.

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Negative outcomes are clearly possible when using virtual teams. Hinds and Weisband (2003) found that virtual team members tend to initially share less information than members of face-to-face teams. Thus, team members may have weaker shared understandings of needed outcomes, which in turn may cause negative effects on performance outcomes; however, given time these lack-of-shared-information issues appear to fade (Walther, 1995). Local priorities, which are typically tied into local performance appraisal, may also interfere with some team members fully participating in the virtual work (Klein & Barrett, 2001). Virtual work may become a less important task activity that needs to be dealt with or managed when possible and when not interfering with other local or regular responsibilities. Thus, virtual team leaders need to capture the attention of team members or risk that the virtual work will receive low priority because of perceived low importance, visibility, or salience and therefore be considered somewhat irrelevant in terms of work rewards and recognition. These issues and problems are real at least in the short term, but they

tend to fade as team members become more experienced with the logistics or systems of the virtual workplace, and so cohesion and satisfaction does form in virtual teams although this cohesion seems to take longer than in colocated teams (Burke, Aytes & Chidambaram, 2001).

To enhance effectiveness virtual teams need standardized and efficient data storage and retrieval systems in all team member locations, and the creation of these standardized systems needs to be purposeful by the organization. Perhaps surprisingly, most virtual team members prefer basic e-mail with attachments as the primary medium of communication and rarely use more advanced technologies (Gibson & Cohen, 2003); thus, the chosen computer-mediated communication systems do not need to be complex. Fail-safe technology is required for successful virtual work, but other important factors include human resource policies such as training and development for team leaders and team members regarding virtual teams and virtual work and an organizational culture and leadership that recognizes and supports virtual work teams (Duarte & Snyder, 2001). These critical factors are also necessary with traditional teams. Virtual team leaders cannot assume that good technology is the only added requirement over face-to-face teamwork for successful virtual teamwork. Both face-to-face and virtual teams demand management time, thought, and effort. Virtual team leaders and members not only need a solid understanding of the work to be done, and need their interpersonal factors dealt with just as on a traditional face-to-face team, but also need understanding of the special challenges of leading and working on virtual teams.

Building effectiveness on any team can be difficult, but certain steps can be taken to facilitate effective forming and norming of virtual teams. Many of these steps overlap with effective team building in the face-to-face environment, while a few are specific to the virtual environment. First, the perceived value of the team collaboration must be apparent to all members. Virtual team members need to know that their work is important and will be recognized as significant not only by other members on the virtual team but also by the organization. Second, each team member's role and purpose for being part of the virtual team needs to be clear not only to the individual member but also to all other members of the team. Members on any team should be chosen for specific reasons, and this overriding logic needs to be explicit to all. Third, given that computer-mediated communication technology is being used, shared accountability to team processes and protocols should be emphasized, and the benefits of compliance (or sanctions for noncompliance) should be apparent to all. Frequent and continuous communications among team members may be

the most important protocol to be supported. Finally, given a recognized tendency to task orientation on many virtual teams, team leaders should make additional efforts to make the virtual environment as friendly and human as possible (Klein & Kleinhanns, 2003).

COMMUNICATION ON VIRTUAL TEAMS

The absence of physical presence is considered by some to be the major drawback of virtual teams and virtual work (Cohen & Gibson, 2003). Some virtual team members may be less productive or satisfied because they feel isolated and detached from both the work and the other team members. Indeed, the literature on motivation and satisfaction holds that most employees are motivated and satisfied in part as a result of interactions with coworkers (Kirkham et al., 2002). Counterbalancing this constraint, however, other research suggests that virtual work reduces commonly experienced face-to-face team-process losses caused by stereotyping, personality, power or political conflicts, and cliques (Timmerman, 2000). Generalizations may be unproductive, yet because the computer-mediated environment is not time or location bound it can enable reflective and substantive feedback, which some team members may appreciate even more so than the immediate although perhaps less substantive feedback common in face-to-face communication. The reflective tone often found in asynchronous communication can lead to team identity and support, at least for some (Berry, 2006). Still, working on virtual teams or doing virtual work is likely not the best choice of work environments for all individuals.

The qualities of virtual social interactions are often judged as lacking when measured relative to traditional face-to-face team interactions (Jameson, 2007). The problem, however, may be more in terms of how individuals *compare* the virtual communication channels with the more familiar face-to-face channel, instead of comparing the effectiveness or outcomes of the interactions. Creating social relationships may be more difficult or at least slower to develop in the virtual environment (Walther, 1995), but for certain types of work this lack of social relationship may create a more task focused work environment and may lead to superior task outcomes. Johnson et al. (2003) suggest that virtual team members spend far less time on social tasks, yet other research indicates that participants in virtual learning communities actually score higher on measures on interaction than do participants in traditional face-to-face learning

communities (Hay, Hodgkinson, Peltier, & Drago, 2004). Although virtual team members may miss the *normal* face-to-face interactions of the workplace or classroom, they also typically acknowledge that these more traditional social interactions are not necessary to complete their assignments (Berry, 2006).

Most virtual teams use some combination of voice mail and e-mail, both of which are easy to use and can be sent (although not necessarily heard or read) immediately. E-mail is sometimes more efficient than voice mail because it can broadcast the same message to a large number of people simultaneously (Duarte & Snyder, 2001). When extensive information such as multiple pages of text or a video file needs to be included with a message then e-mail is clearly superior. E-mail can also be more effective when the message, or the response to it, is complex and requires a written explanation, or perhaps benefits from an attached text history with citations. E-mail makes it easy to forward messages (exact word-for-word messages instead of *précis* or interpreted messages) or to send copies or reminders of prior text conversation to others. Significantly, e-mail provides participants time to reflect, research, or reconsider their replies before responding (Khoshafian & Buckwitz, 1995), instead of the usual instant response often expected in synchronous verbal communication. Finally, e-mail provides a permanent written archive/record of the discussion with no extra effort or cost.

Evaluation of individual and group outcomes is a critical aspect for any team, including virtual teams. Fortunately, virtual team managers have very accurate records of the work done by team members because of the dated and permanent archive of all communication. These archived records are likely more accurate than the informal evaluation done through random and time-bound observations of work processes in colocated teams. Peer evaluation is also easily done virtually and is perhaps less confounded by personality or other nontask behaviors and actions as with colocated teams, and so team members can be judged on what they actually accomplish rather than what they appear to be doing (Kirkham et al., 2002), or when their work output is confounded by social or other considerations.

An appreciation of the differences between virtual and face-to-face communication is essential in developing and facilitating effective communication in the virtual team (Bordia, DiFonzo, & Chang, 1999). Many technologies for virtual teamwork are designed for functional collaboration such as sharing documents or having a discussion asynchronously but

may fail to encourage or support shared understanding and team forming processes (Kirschner & Van Bruggen, 2004). Collaboration requires a coordinated effort by team members and team leaders to identify and solve problems together (Roschelle & Teasley, 1995) and thus is more than simply exchanging information.

LEADERSHIP OF VIRTUAL TEAMS

Although many traditional leadership principles apply to virtual teams, virtual team leaders also experience challenges that may be unique to virtual teams (Grenier & Metes, 1995). Most significantly, virtual team leaders typically rely on electronic communication technology to send and receive information and thus need to modify the ways in which they provide feedback and gather data. Team leaders also need to modify the ways they interact with team members on both professional and interpersonal levels (Duarte & Snyder, 2001). Nevertheless, effective virtual team leaders still need to understand the fundamental principles of team dynamics and accountability as on any team and also need to understand the differences found when communicating in the virtual environment. Importantly, virtual spaces are *real* to the people who inhabit them (Lipnack & Stamps, 2000), and many of the usual workplace dynamics are still in play. Creating effective virtual work teams is difficult because both leaders and members of virtual teams, even if experienced with face-to-face teams, need enhanced competencies to be effective.

Leadership is integral to the team developmental process. Leaders should facilitate the team development process by presenting organizational structure and goals and explaining how the team's work aids these goals, keeping the team focused on task, and managing the logistics that could interfere with task completion (Patel et al., 1999; Vroman & Kovachich, 2002). Virtual teams have the possibility of having huge membership diversity, much less different time zones or national cultures, so virtual team leaders must also make certain that all team members get the training and support they need to enable them to facilitate discussions using technical and nontechnical methods. Effective leadership on virtual teams requires systems for monitoring behavior and should have accepted protocols for intervening early when technical or other problems arise (Maznevski & Athanassiou, 2003). Thus, training in facilitation skills is also an integral part of development for virtual team leaders as well as for team members.

Four competencies in leading effective virtual teams can be identified as critical: communication, establishing expectations, allocating resources, and modeling desired behaviors (Duarte & Snyder, 2001). These are all significant and mirror effective competencies found in face-to-face leaders but need to be exhibited while reinforcing that the virtual work itself is seen as significant and important by team members and the organization. Virtual team leaders need to find ways of making their virtual teams and the work of the team a top priority, what Gayeski (2000) terms capturing a team member's mind-share. Capturing mind-share is a common problem in both collocated and virtual teams, and even on collocated teams there is often a gap between time available to work on team activities and the time required to fully accomplish all the work activities. This challenge is more daunting on virtual teams because of the physical distance between team members and the *out of sight, out of mind* syndrome (Klein & Kleinhanns, 2003). Creating this sense of importance and significance for virtual work may be the most critical task asked of virtual team leaders.

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CREATING EFFECTIVE VIRTUAL TEAMS

As teams become more virtual they usually confront greater uncertainty and complexity because of distance, time, and cultural differences, thus increasing information processing and communication difficulties as they attempt to complete their work tasks. Being almost completely virtual can amplify some of the challenges facing teams but can also amplify the benefits of teamwork in several ways. Electronically mediated communication offers efficiency benefits by reducing the cost of coordinating travel, finding common *open* times for all members to attend meetings, and the expense of having all members of the team meet in the same place at the same time, convenient or not (Berry, 2006). Five factors that can support virtual team effectiveness include having a supportive organizational

culture, some characteristics of the task itself, technology use, team member characteristics supported by training and development, and work and team processes (Cohen & Gibson, 2003). Relatively simple organization work or team tasks can be completed virtually without the presence of higher-level collaboration skills and trust (Jarvenpaa & Leidner, 1999), but the highest levels of effectiveness require these characteristics, along with leadership and systems support (Klein & Kleinhanns, 2003). Organizational level support, for example, could include norms developed to enhance a positive virtual teamwork culture (Whitener, Brodt, Korsgaard, & Werner, 1998). Formation activities such as establishing easy communication, understanding the technology to be used and technology training, and creating explicit start-up norms and expectations for team members are more critical in virtual team start-up than in collocated teams (Gibson & Cohen, 2003). This initial work provides the common grounding needed to bridge differences between team members and helps in developing a basic operating structure that aids in creating stability and shared expectations so that tasks can be completed.

Most research over the past 20 years comparing face-to-face and virtual teams notes no significant difference in the output or performance levels (Cappel & Windsor, 2000; Hiltz et al., 1986; Straus & McGrath, 1994). In certain situations and with certain tasks, virtual teams have created superior performance (Jarvenpaa, Rao, & Huber, 1988; Maynard, 2006; Schmidt, Montoya-Weiss, & Massey, 2001). In other situations, however, especially when the team is under time constraints, virtual team performance has been found to be less than face-to-face team performance (Graetz, Boyle, Kimble, Thompson, & Garlock, 1998; Hollingshead, McGrath, & O'Conner, 1993). Possibly, the variance in performance may be dependent on the efforts and knowledge expended by leaders when establishing the virtual or face-to-face teams, or perhaps the variance is dependent on the amount of experience with virtual work among the virtual team members, or possibly due to other social factors. Uncertainty still needs to be resolved on any team, and this takes more time on the virtual team compared with the face-to-face team (Walther, 1995).

CONCLUSION

Virtual teams are increasingly common in most organizations, and business communication is increasingly intercultural, horizontal, strategic, and change focused as well (Thomas, 2007). Organizations that are

unwilling or unable to use virtual teams may find themselves losing out in an increasingly competitive and rapidly changing global economic and social environment. Some research claims that the use of virtual teams is expanding exponentially (Maznevski & Chudoba, 2000). Computer-mediated virtual teams can increase speed and agility of information transfer simply because large and complex files can be instantly sent to almost any location. Expertise and vertical integration can be leveraged easily and quickly between organizations to make resources readily available; and even additional team members can be added or removed with a keystroke. The economic and business justifications for virtual teams because of time and travel savings are difficult to deny, yet questions remain unanswered regarding the effectiveness and efficiency of virtual teams under various conditions (Grimshaw & Kwok, 1998). The technical communication advances are clear, yet enabling effective participation and team collaboration is a more complex problem.

The skill sets required for success in managing effective virtual work teams are more complex than the skill sets required for success in managing face-to-face teams. Without common technical support systems, building competencies and expertise is difficult, and this can hamper overall development, knowledge management, and sense making (Gibson & Cohen, 2003). Problematic issues such as difficulties in reaching shared understanding, in coordinating perspectives, and in establishing a sense of social presence are perhaps exacerbated in virtual interactions, and these need to be acknowledged and dealt with by management (Hakkinen, 2004). Ironically, most of the research on teams, team building, and development is still focused on traditional face-to-face teams. Perhaps simplistically, the effectiveness of virtual teams and resultant outcomes of virtual teamwork is dependent on the resolution of miscommunication and conflict, the development of adequate and competent roles within the team for working together, and facilitating good communication between team members.

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