A COST-BENEFIT ANALYSIS OF FACE-TO-FACE AND VIRTUAL COMMUNICATION: OVERCOMING THE CHALLENGES

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Virtual communication has become the norm for many organizations (Baltes, Dickson, Sherman, Bauer, & LaGanke, 2002; Bergiel, Bergiel, & Balsmeier, 2008; Hertel, Geister, & Konradt, 2005). As technology has evolved, time and distance barriers have dissolved, allowing for access to experts worldwide. The reality of business today demands the use of virtual communication for at least some work, and many professionals will sit on a virtual team at some point (Dewar, 2006). Although virtual communication offers many advantages, it is not without challenges. This article examines the costs and benefits associated with virtual and face-to-face communication, and identifies strategies to overcome virtual communication's challenges.

Advantages of Face-to-Face Communication

Face-to-face communication has a number of significant advantages, and many observers argue that there is no replacement for face-to-face contact, regardless of how far technology has evolved (Duke, 2001; Oxford Economics, 2009). For example, face-to-face contact facilitates the transfer of tacit knowledge (Bower, Hinks, Wright, Hardcastle, & Cuckow, 2001), or knowledge that is not written or definable, but gained through experience (Griffith, Sawyer, & Neale, 2003). When communicating face-to-face, the speaker can draw on visual cues from the audience to gain quick, immediate feedback and make rapid adjustments as necessary (Storper & Venables, 2004). Visual cues and social presence in face-to-face dialogue also enable members to more easily learn about one another's background, skills, experiences, and areas of expertise (Rosen, Furst, & Blackburn, 2007). These cues build trust within groups that interact face-to-face (Storper & Venables, 2004). Although organizing and planning for face-to-face contact can be difficult and costly, this in itself can send a message of value to the recipients (Storper & Venables, 2004).

Disadvantages of Face-to-Face Communication

Although face-to-face communication has long been the trusted mode of contact, it also has a number of disadvantages. Research suggests that minority expression is lower in face-to-face groups, inhibiting trust in heterogeneous groups and creating unequal participation among members (Krebs, Hobman, & Bordia, 2006; Lind, 1999; McLeod, Baron, Weighner Marti, & Kuh Yoon, 1997). Additionally, facilitating face-to-face contact between co-workers or with clients is often unrealistic for certain organizations, as business travel is too costly (Rosen et al., 2007, Storper & Venables, 2004). [See Table 1].

Advantages of Computer-Mediated Communication

Recent developments in technology have enabled a new medium for communication, known as computer-mediated-communication (CMC), or virtual communication. Specifically, CMC refers to, "…any form of exchange that requires the use of a computer…" (Dietz-Uhler & Clark, 2001). CMC

has many advantages for organizations given increased globalization and the need for rapid knowledge transfer across borders and time zones. Additionally, CMC addresses many of the disadvantages of face-to-face communication, such as cost and minority expression. CMC has saved major transnational organizations up to $50 million (Bergiel et al., 2008), proving it to be a cost-effective way of conducting business (Baltes et al., 2002; Cascio, 2000; Hill, 2000).
In addition to cost savings, CMC eliminates the non-verbal cues and power differences (Bower et al., 2001) that inhibit equal participation, resulting in more equal levels of participation within heterogeneous groups (Dietz-Uhler & Clark, 2001; Hertel et al., 2005; Lind, 1999). Dietz-Uhler and Clark (2001) found that when groups engaged in CMC followed by a face-to-face discussion, they perceived their interactions as more enjoyable than groups who did not engage in CMC prior to a face-to-face discussion. Dietz-Uhler and Clark (2001) argue that this difference was attributable to the fact that CMC enables greater freedom of thought, in turn improving the dialogue. Moreover, Lind (1999) and Nowak (2003) found that women reported feeling more social presence and were more satisfied in a CMC environment than men.

Also, CMC can create equal opportunities in the workplace. Physically disadvantaged employees have greater access to the virtual environment than the physical workspace, creating teams that are more diverse in makeup and fostering greater creativity and innovation. Moreover, as performance in a virtual team is evaluated solely on productivity (given that physical appearance remains anonymous), age and race discrimination are greatly reduced in a virtual setting (Bergiel et al., 2008). However, as technologies offer greater information richness, these differences may begin to reappear.

In addition to cost and minority expression, CMC has a number of other advantages. CMC addresses time constraints (Cascio, 2000), as asynchronous technologies (with a delay between sender and recipient, such as email) allow users to communicate at any time and location with access to the technology (Dietz-Uhler & Clark, 2001; Rosen et al., 2007). Additionally, CMC provides organizations with access to experts that would otherwise only be accessible at very high travel costs (Cascio, 2000; Rosen et al., 2007). Moreover, CMC holds promising implications for recruitment. With CMC, organizations can recruit talented individuals who may not be willing to relocate for a job but are willing to work virtually (Bergiel et al., 2008; Cascio, 2000). Generally speaking, Dietz-Uhler and Clark (2001) argue that CMC is a practical alternative to face-to-face communication, as participants report it to be enjoyable, effortful and valuable.

Disadvantages of Computer-Mediated Communication

Although CMC provides myriad benefits to organizations in terms of cost, diversity, recruitment, and access to expertise, it also has a number of disadvantages- both logistical and deep-rooted. CMC poses countless technical and logistical problems, which often are very time-consuming, such as scheduling, coping with time delays and encountering software problems (Bergiel et al., 2008; Bower et al., 2001; Powell, Piccoli, & Ives, 2004). Specifically, synchronous CMC (modes of technology that occur in real-time, such as video-conferencing or instant messaging) can be difficult to schedule due to time zone barriers (Bergiel et al., 2008). Training and technological expertise issues also arise in a virtual environment, (Bergiel et al., 2008; Powell et al., 2004) as team members frequently lack the training necessary to function effectively and navigate the technology in a virtual environment (Bergiel et al., 2008). This results in what is referred to as a generational gap between those comfortable with technology (the under 30's) and those less comfortable (Bergiel et al., 2008).

CMC also generates many interpersonal challenges. The absence of non-verbal cues and tacit knowledge transfer makes communication difficult (Bower et al., 2001; Lantz, 2001; Hill, 2000; Powell et al., 2004). These deficiencies eliminate social presence and hinder relationship formation, cohesion and trust, all of which are imperative to a virtual team's success (Cascio, 2000; Powell et al., 2004). Specifically, this lack of social presence creates an environment in which members easily misinterpret facts or make incorrect assumptions. Virtual team members often incorrectly assume others' intentions when they do not respond to emails or misinterpret the meaning and emotion of written language (Bergiel et al., 2008; Dewar, 2006). Furthermore, these interpersonal struggles can induce conflict, which is harder to discover and manage in a virtual team, and negatively impacts productivity (Bergiel et al., 2008; Hertel et al., 2005; Rosen et al., 2007). Specifically, Stark and Bierly (2009) found a positive correlation between highly virtual groups and interpersonal conflict, such that groups with high levels of virtuality also exhibited higher levels of interpersonal conflict.

Additionally, CMC poses coordination challenges. It can be difficult to establish a vision and mission in a virtual team due to the flexibility of time, space and the lack of visual cues (Dewar, 2006). Due to cultural and language differences, knowledge sharing can also be difficult in a virtual team (Bergiel et al., 2008; Powell et al., 2004). Powell et al. (2004) found that culturally diverse virtual teams experienced coordination and communication issues. Moreover, a lack of proper databases and people trained to maneuver knowledge can result in "information overload" (Rosen et al., 2007). When coordinating with external or intra-organizational constituencies, the speed and ease of virtual communication can send a message of unimportance to the recipient (Storper & Venables, 2004). When communicating virtually, recipients may deduce that they are not significant enough to warrant the expense of face-to-face time. In general, Baltes et al. (2002) argue that CMC groups are rarely more effective, take less time and are less satisfied than face-to-face groups. [See Table 2].

Strategies for Making CMC More Effective

Interpersonal Measures

Although CMC faces challenges, organizations continue to rapidly adopt virtual communication systems. It is imperative that organizations recognize these challenges and learn to use CMC effectively. Interpersonal dimensions, such as enhancing communication and increasing social presence are two areas that impact virtual team effectiveness (Cascio, 2000; Dewar, 2006; Guo, D'Ambra, Turner, & Zhang, 2009; Hill, 2000; Lin, Standing, & Liu, 2008; Ji, Hollenbeck, & Zinkhan, 2008; Powell et al., 2004; Storper & Venables, 2004). In fact, Lin et al. (2008) found that social factors were the most significant predictors of virtual team performance and satisfaction (see Table 5). Recommendations for enhancing communication include setting ground rules regarding communication frequency, effective qualities of communication, extent of feedback, and knowledge access. According to Dewar (2006), predictable and timely responses between members lead to greater levels of trust in a virtual team. Cascio (2000) also suggests setting times for regular meetings as well as individual accessibility by phone or email, but to avoid relying on email as the sole means of communication. Members should also rely on a common database to store and share knowledge (Hertel et al., 2005; Powell et al., 2004). In terms of defining effective communication, Guo et al. (2009) found when virtual teams engaged in the dialogue technique, a strategy for developing a shared mental model of effective communication [see Table 4], they reported greater cohesion, communication satisfaction and team decision-process satisfaction than virtual teams who did not use the dialogue technique. Furthermore, virtual teams who used the dialogue technique did not differ from face-to-face teams who did not use the dialogue technique. These results suggest that virtual teams who use the dialogue technique may perform to the level of face-to-face teams (Guo et al., 2009).

Another strategy for improving virtual communication is to increase social presence by allowing members to meet face-to-face (Cascio, 2000; Hertel et al., 2005; Hill, 2000; Lin et al., 2008; Powell et al., 2004; Storper & Venables, 2004). Social presence cues, or another person's presence in a communicative situation, have shown to increase trust, help members form better relationships with one another, and increase perceptions of reciprocity, quality, loyalty and favorability in a CMC environment (Ji et al., 2008; Hertel et al., 2005; Lin et al., 2008; Powell et al., 2004). Powell et al. (2004) found that virtual teams who held early face-to-face meetings formed better interpersonal relationships, trust, respect, socialization and an improved understanding of the project. As much of the work done in a virtual team is task-focused, research suggests these face-to-face meetings should focus on relationship building, setting ground rules for effective teamwork, resolving conflict and technology use (Hertel et al., 2005; Lantz, 2001; Powell et al., 2005).

Strategic Measures

In addition to enhancing interpersonal communication, strategic measures and actions can be taken to make virtual teams more effective. These measures include improving understanding, coordination and training among members. Specifically, virtual team leaders should place a high emphasis on establishing a clear vision for the team. For instance, encouraging members to share their personal gains from the team will create a vision that speaks to all members (Dewar, 2006).

Additionally, Powell et al. (2004) found that virtual teams who established shared norms for behavior, set goals and agendas and developed a clear structure for meetings had greater success. Dewar (2006) recommends that virtual team members should strive to "take a systems view" in understanding how their role coordinates with the rest of the organization. By providing virtual teams with broader resources and information (such as organizational charts, other teams on their level and stakeholders involved in the project), members can adopt a better understanding of their team's role in the organization (Hertel et al., 2005; Dewar, 2006).

In terms of training, organizations must be cognizant of the generational differences that exist regarding comfort with technology (Bergiel et al., 2008). Virtual teams members should be trained to use the required software, manage an anonymous environment, provide anonymous participation and feedback, follow social protocol and respect cultural differences (Cascio, 2000; Hertel et al., 2005; Powell et al., 2004). Powell et al. (2004) and Hertel et al. (2005) found that virtual team members who had received training in these areas functioned more effectively than virtual teams without training.

Task-Technology Fit

Another strategy that organizations can adopt for more effective use of virtual communication is recognition that the mode of communication often depends on the nature of the task being performed. In other words, face-to-face and virtual communication are more effective for certain tasks than others. Face-to-face communication is a more appropriate measure for ambiguous or unstructured tasks, such as setting strategy, making difficult decisions, resolving conflicts, or negotiating with another party (Baltes et al., 2002; Hertel et al., 2005; Lin et al., 2008; Powell et al., 2004). Baltes et al. (2002) found that face-to-face groups who performed intellective or decision-making tasks were more satisfied with the outcomes than CMC groups who performed the same tasks. Furthermore, face-to-face communication is more appropriate when working with external clients or customers (Powell et al., 2004). Although some virtual communication may enhance the interaction (such as email), research suggests there is significant profitability in maintaining face-to-face contact with external clients, and is no substitute for the value that face-to-face communication brings (Duke, 2001; Oxford Economics, 2009).

However, there are tasks in which virtual communication may be more effective. Specifically, structured, non-immediate or passive tasks may be more appropriate to conduct virtually (Dewar, 2006; Hertel et al., 2005; Lin et al., 2008; Powell et al., 2004). For instance, Hertel et al. (2005) found that brainstorming electronically can yield higher quality results than if conducted face-to-face. In instances when virtual communication is the chosen mode for all tasks, it is important to utilize the best form of CMC depending on the task (Powell et al., 2004). For instance, synchronous communication, (i.e. audio or video-conferencing) should be utilized when engaging in knowledge-sharing or relational tasks, such as brainstorming, decision-making, or handling interpersonal conflicts (Dewar, 2006; Powell et al., 2004; Rosen et al., 2007). Synchronous devices with limited social presence (i.e. chat rooms) should be utilized for more informal sharing, such as small talk or social conversations (Rosen et al., 2007). Research suggests it is best to utilize asynchronous communication (i.e. email) for passive information seeking, structured tasks, or matters that do not

require an immediate response, such as routine analyses or monitoring the status of a project (Dewar, 2006; Lin et al., 2008; Powell et al., 2004).

Individual disposition should also be taken into account when determining the appropriateness of virtual communication. Certain individuals who rely on human interaction to stay energized and on-task, or require external structures (such as an office space or meeting room) to produce quality work (Bergiel et al., 2008) may not be psychologically suited to work in a virtual team [See Table 3].

Conclusion

As technology evolves and borders dissolve, virtual communication has become the norm for many organizations. The debate over whether virtual communication is a viable alternative to face-to-face communication is ongoing. According to the literature, if used effectively and appropriately, virtual communication shows a promising avenue for organizations to pursue. When utilizing virtual communication, special attention must be paid to the mechanisms and members involved, to ensure maximum benefit to the organization. Regardless of the debate, organizations must recognize that virtual communication is sustainable, and with the right tools, technology, people and processes, organizations can utilize virtual technologies to achieve high quality and satisfying results.

Table 1:

Advantages and Disadvantages of Face-to-Face Communication

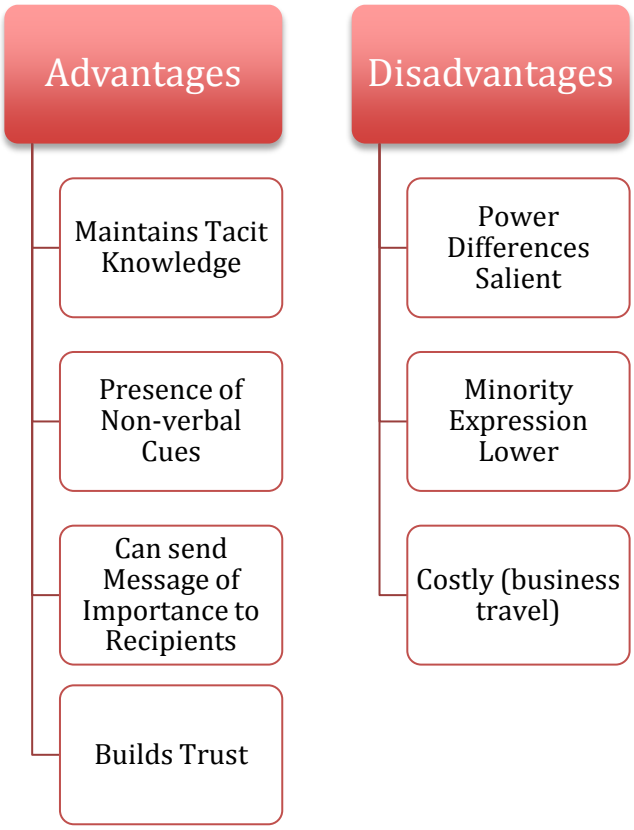


Table 2:

Advantages and Disadvantages of Virtual Communication

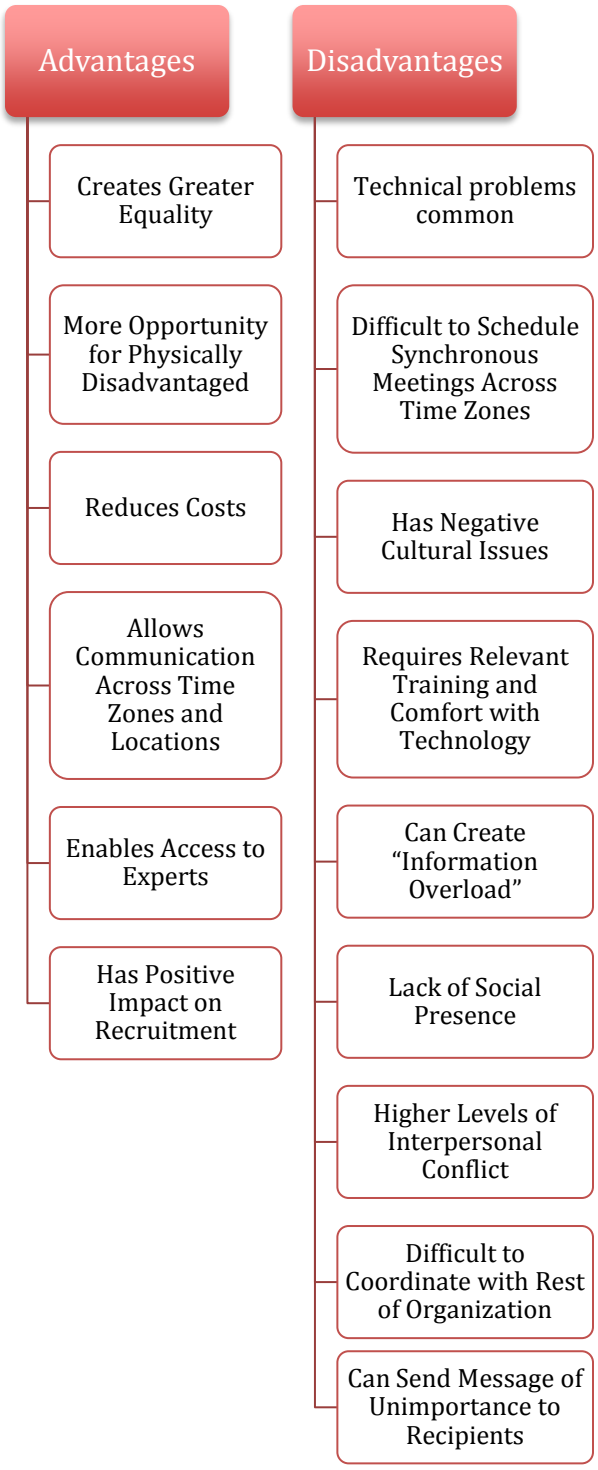


Table 3:

Strategies for Making CMC More Effective

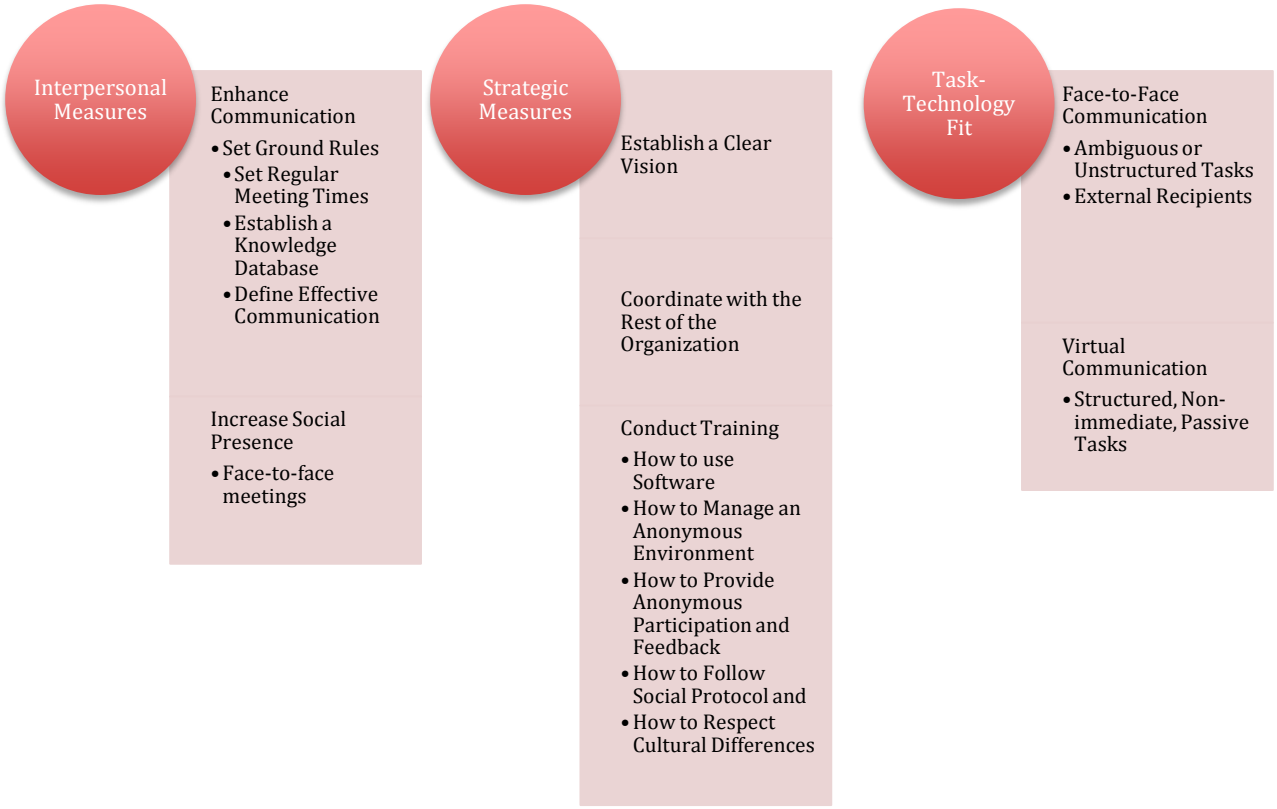
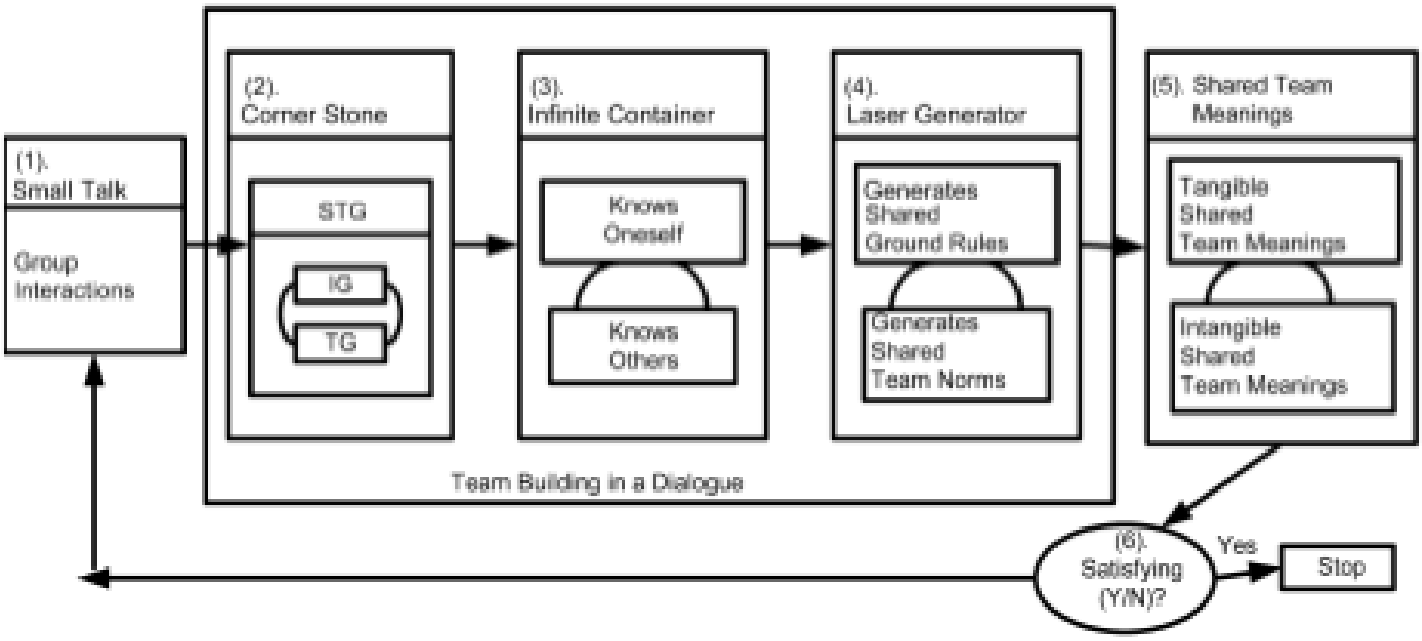
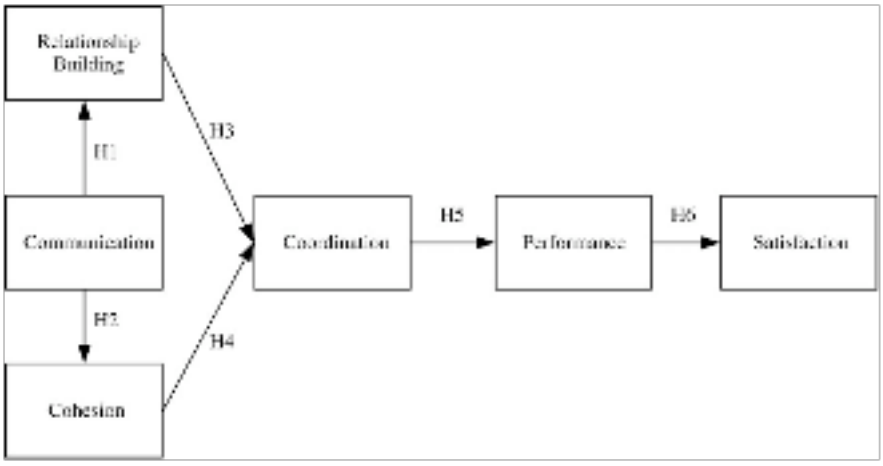


Table 4:
Dialogue Technique



Source: Guo et al. (2009) adapted from Huang et al. (1998)

Table 5:
An Integrated Model of Virtual Team Effectiveness



Source: Lin et al. (2008)

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Bergiel, B. J., Bergiel, E. B., & Balsmeier, P. W. (2008). Nature of virtual teams: A summary of their advantages and disadvantages. *Management Research News, 31*(2), 99-110.

Bower, D. J., Hinks, J., Wright, H., Hardcastle, C., & Cuckow, H. (2001). ICTs, videoconferencing and the construction industry: Opportunity or threat? *Construction Innovation, 1*(2), 129-144.

Cascio, W. F. (2000). Managing a virtual workplace. *Academy of Management Executive, 14*(3), 81-90.

Dewar, T. (2006). Virtual teams—Virtually impossible? *Performance Improvement, 45*(5), 22-25.

Dietz-Uhler, B., & Bishop-Clark, C. (2001). The use of computer-mediated communication to enhance subsequent face-to-face discussions. *Computers in Human Behavior, 17,* 269-283.

Duke, S. (2001). E-mail: Essential in media relations, but no replacement for face-to-face communication. *Public Relations Quarterly, 46*(4), 19-22.

Griffith, T. L., Sawyer, J. E., & Neale, M. A. (2003). Virtualness and knowledge in teams: Managing the love triangle of organizations, individuals, and information technology. *MIS Quarterly, 27*(2), 265-287.

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Hertel,G., Geister, S., & Konradt, O. (2005). Managing virtual teams: A review of current empirical research. *Human Resource Management Review, 15*, 69-95.

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Krebs, S. A., Hobman, E. V., & Bordia, P. (2006). Virtual teams and group member dissimilarity. *Small Group Research, 37*(6), 721-741.

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Abstract: A meta-analysis of research comparing decision making in face-to-face versus computer-mediated communication groups was conducted. Results suggest that computer-mediated communication leads to decreases in group effectiveness, increases in time required to complete tasks, and decreases in member satisfaction compared to face-to-face groups. All of the moderators tested (anonymity in the group process, limited versus unlimited time to reach decisions, group size, and task type) were significant for at least one of the dependent variables. The article concludes with cautions about the unbridled rush by organizations to adopt computer-mediated communication as a medium for group decision making and implications of the present findings for theory and research on computer-mediated communication and group decision making.

Bergiel, B. J., Bergiel, E. B., & Balsmeier, P. W. (2008). Nature of virtual teams: A summary of their advantages and disadvantages. *Management Research News, 31*(2), 99-110.

Abstract: Purpose – This paper aims to extend knowledge about virtual teams and their advantages and disadvantages in a global business environment. Design/methodology/approach – Based on a literature review and reported findings from interviews with experts and practitioners in the field, the paper has identified and discussed the advantages and problems associated with creating and managing virtual teams. Findings – In today's competitive global economy, organizations capable of rapidly creating virtual teams of talented people can respond quickly to changing business environments. Capabilities of this type offer organizations a form of competitive advantage. Originality/value – By identifying the advantages and problems associated with virtual teams, organizations will be better able to successfully establish and manage such teams.

Bower, D. J., Hinks, J., Wright, H., Hardcastle, C., & Cuckow, H. (2001). ICTs, videoconferencing and the construction industry: Opportunity or threat? *Construction Innovation, 1*(2), 129-144.

Abstract: The paper discusses the potential impact of videoconferencing on practices and processes within the construction industry, based on analyses carried out on its use and impact in the healthcare sector – which like construction involves technology-intensive processes which are dependent upon cross-professional and cross-disciplinary relationships and communications, operate within an increasingly regulatory and litigious climate, and involve organizationally fluid, virtual, teams spanning several sub-industries. Recently published research evidence from the healthcare sector suggests that whilst videoconferencing and other advanced information and communication technologies (ICTs) have pervasive capabilities, successes in their application may be short lived and modest in achievement. In use, their actual uptake and application have been

found to be fundamentally affected by a range of social and operational issues, such as fears over a new formalization and trackability of previously informal conversations; a rebalancing of power relationships (between professionals using the ICTs as well as between doctor and patient); pressures on social/ cultural and procedural alignment between participants; and personal and corporate attitudes to the technologies (including simply disliking the ICT). There is also evidence from the healthcare sector to suggest that ICTs increase the complexity of the delivering healthcare, and that the limitations of the technologies emphasize an existing dependency of communications and processes on tacit knowledge which is not readily formalized for communication via ICTs. However, the paper also notes an increasing pressure on the construction industry to respond to the globalizing potential that ICTs offer for the supply and delivery of knowledge-based services, and discusses the implications of the issues found in the health-care sector for the use and potential abuse of ICTs in the construction industry that will have to be successfully addressed in order to avoid ICTs being perceived as threatening and to allow their use to help organizations address the globalizing marketplace.

Cascio, W. F. (2000). Managing a virtual workplace. ***Academy of Management Executive, 14*****(3), 81-90.**

Abstract: Virtual workplaces, in which employees operate remotely from each other and from managers, are a reality, and will become even more common in the future. There are sound business reasons for establishing virtual workplaces, but their advantages may be offset by such factors as setup and maintenance costs, loss of cost efficiencies, cultural clashes, isolation, and lack of trust Virtual teams and telework are examples of such arrangements, but they are not appropriate for all jobs, all employees, or all managers. To be most effective in these environments, managers need to do two things well: Shift from a focus on time to a focus on results: and recognize that virtual workplaces, instead of needing fewer managers, require better supervisory skills among existing managers. Taking these steps can lead to stunning improvements in productivity, profits, and customer service.

Dewar, T. (2006). Virtual teams—Virtually impossible? ***Performance Improvement, 45*****(5), 22-25.**

Abstract: Discusses challenges of working in virtual teams and methods that can be utilized to overcome them. Utilizes VASE (vision, assumptions, systems, expecting white water) model for effective use of virtual teams.

Dietz-Uhler, B., & Bishop-Clark, C. (2001). The use of computer-mediated communication to enhance subsequent face-to-face discussions. ***Computers in Human Behavior, 17,*** **269-283.**

Abstract: A study assessing the effects of synchronous and asynchronous computer-mediated communication on subsequent face-to-face discussions was conducted. Participants were asked to read a short article about internet censorship. Then they were randomly assigned to one of three

groups: a synchronous (internet chat) group, an asynchronous (internet discussion board) group and a control group. Both the internet chat group and the internet discussion board group engaged in an on-line dialog about the article they read. They then followed the on-line dialog with a face-to face discussion. The control group had no on-line discussion but instead immediately began a face-to-face discussion. Finally, all completed a questionnaire about their experience. The results showed that face-to-face discussions preceded by either synchronous or asynchronous computer-mediated communication were perceived to be more enjoyable and include a greater diversity of perspectives than face-to-face discussions not preceded by computer-mediated communication.

Duke, S. (2001). E-mail: Essential in media relations, but no replacement for face-to-face communication. *Public Relations Quarterly, 46*(4), 19-22.

Abstract: Discusses the importance of electronic mail (e-mail) on media relations in the United States; Benefits and advantages of using e-mail; Comparison of e-mail with voice mail, fax and face-to-face communication; Use of e-mail in the practice of public relations.

Griffith, T. L., Sawyer, J. E., & Neale, M. A. (2003). Virtualness and knowledge in teams: Managing the love triangle of organizations, individuals, and information technology. *MIS Quarterly, 27*(2), 265-287.

Abstract: Information technology can facilitate the dissemination of knowledge across the organization— even to the point of making virtual teams a viable alternative to face-to-face work. However, unless managed, the combination of information technology and virtual work may serve to change the distribution of different types of knowledge across individuals, teams, and the organization. Implications include the possibility that information technology plays the role of a jealous mistress when it comes to the development and ownership of valuable knowledge in organizations; that is, information technology may destabilize the relationship between organizations and their employees when it comes to the transfer of knowledge. The paper advances theory and informs practice by illustrating the dynamics of knowledge development and transfer in more and less virtual teams.

Guo, Z., D'Ambra, J., Turner, T., & Zhang, H. (2009). Improving the effectiveness of virtual teams: A comparison of video-conferencing and face-to-face communication in china. *IEEE Transactions on Professional Communication, 52*(1), 1-16.

Abstract: As virtual teams become more and more important in organizations, understanding how to improve virtual team relational development and meeting outcomes is vital to project success. The objective of this study was to investigate how the dialogue technique that facilitated building of shared understanding in virtual teams can be used to enhance virtual team relational development and decision outcomes in a Chinese cultural context. The results from an experiment demonstrate that the adopted dialogue technique can indeed help team members develop their team relations and enhance their perceived team meeting outcomes. Video-conferencing virtual teams with shared mental models may be engaged as effectively as traditional face-to-face teams. Moreover, this study

reveals that the dialogue technique can enhance face-to-face team outcomes. Therefore, the findings of this study have both theoretical and practical implications for helping teams develop shared understanding of effective communication and enhance decision-making outcomes in the Chinese cultural context.

Hertel, G., Geister, S., & Konradt, O. (2005). Managing virtual teams: A review of current empirical research. *Human Resource Management Review, 15*, 69-95.

Abstract: This review summarizes empirical research on the management of virtual teams, i.e., distributed work teams whose members predominantly communicate and coordinate their work via electronic media (e-mail, telephone, video-conference, etc.). Instead of considering virtual teams as qualitatively distinct from conventional teams, the degree of virtuality of teams is understood as a dimensional attribute. This review is guided by a lifecycle model in which five phases are distinguished in the management of teams with high virtuality: Preparation, launch, performance management, team development, and disbanding. The main focus of the review is on quantitative research with existing virtual teams in organizational contexts. However, experimental research and case studies are considered when no field studies are available. The major research results are summarized for human resource management tasks within these phases, and recommendations for practitioners are derived.

Hill, J. (2000). Internet conferencing provides more cost-effective solution. *Presentations, 14*(1), 14.

Abstract: Focuses on the teleconferencing technology utilized by California firm Seagate Software Inc., for various product or marketing events. Driving factor behind the company's decision to venture into the Internet conferencing business; Advantages gained from using teleconferencing technology through the Internet; Industry observers' belief that Internet conferencing will never replace face-to-face communication.

Ji, H. S., Hollenbeck, C. R., & Zinkhan, G. M. (2008). The value of human warmth: Social presence cues and computer-mediated communications. *Advances in Consumer Research - North American Conference Proceedings, 35*, 793-794.

Abstract: Explores the salience of social presence cues in computer-mediated communications. Conducted 2x2 between subjects factorial to assess the effect of social presence cues. Found that social presence cues were positively correlated with customers' perceptions of reciprocity, site quality, consumer loyalty and favorability toward the site, in turn stressing the importance of social presence cues in computer-mediated-communications.

Krebs, S. A., Hobman, E. V., & Bordia, P. (2006). Virtual teams and group member dissimilarity. *Small Group Research, 37*(6), 721-741.

Abstract: The consequences of demographic dissimilarity for group trust in work teams was examined in a virtual (computer-mediated) and a face-to-face (FTF) environment. Demographic dissimilarity (based on age, gender, country of birth, enrolled degree) was predicted to be negatively associated with group trust in the FTF environment but not in the computer-mediated environment. Participants worked in small groups on a creative task for 3 consecutive days. In the computer-mediated environment, participants worked on the task for an hour per day. In the FTF environment, participants worked on the task for 20 minutes per day. Partial support was found for the effectiveness of computer-mediated groups in reducing the negative consequences of dissimilarity. Age dissimilarity was negatively related to trust in FTF groups but not in computer-mediated groups. Birthplace dissimilarity was positively related to trust in computer-mediated groups. Implications for the successful management of virtual teams are discussed.

Lantz, A. (2001). Meetings in a distributed group of experts: Comparing face-to-face, chat and collaborative virtual environments. *Behaviour & Information Technology, 20*(2), 111-117.

Abstract: This paper focuses on Collaborative Virtual Environments, and their potential to support work meetings for geographically distributed experts. The research question concerns the difference between face-to-face-, chat, and CVE meetings with regard to efficiency, communication process, problems with the technology, enjoyment and competence development. A small group of experts were observed during their natural work meetings. Six of the groups scheduled meetings were held three times in a chat environment and three times in a CVE. Results suggest s that chat and CVE meetings are experienced as more task oriented than face- to-face meetings, and t hat avatars support turn taking and are enjoyable.

Lin, C., Standing, C., & Liu, Y. (2008). A model to develop effective virtual teams. *Decision Support Systems, 45*(4), 1031-1045.

Abstract: A review of the literature shows the factors that impact on the effectiveness of virtual teams are still ambiguous. To address this problem we developed a research design that included a meta- analysis of the literature, a field experiment and survey. The meta-analysis identified factors which impact on the effectiveness of virtual teams which were then validated by a field experiment and survey. The results of the study indicate that social dimensional factors need to be considered early on in the virtual team creation process and are critical to the effectiveness of the team. Communication is a tool that directly influences the social dimensions of the team and in addition the performance of the team has a positive impact on satisfaction with the virtual team. A major contribution of the paper is an integrated model of factors that contribute to virtual team effectiveness.

Lind, M. R. (1999). The gender impact of temporary virtual work groups. *IEEE Transactions on Professional Communication, 42*(4), 276.

Abstract: Much knowledge work involves temporary work teams. Increasingly, these teams are not

face-to-face but virtual teams. This paper explores the gender impact of virtual collaboration as compared to face-to-face teams. Descriptive statistics are used to show the different perceptions of the group experience based on gender and on face-to-face versus virtual team experiences. Women in the virtual groups perceived that the group stuck together more and helped each other more than did the men. Also, the women were more satisfied with the virtual group than men and felt that group conflict was readily resolved. In comparing the experience of women in the virtual groups to women in the face-to-face groups, the face-to-face women were less satisfied with the group experience than their virtual counterparts and perceived that conflict was smoothed over.

McLeod, L. P., Baron, R. S., Weighner Marti, M., & Kuh Yoon, M. (1997). The eyes have it: Minority influence in face-to-face and computer-mediated group discussion. *Journal of Applied Psychology, 82*(5), 706-718.

Abstract: Results of an experiment comparing face-to-face groups with anonymous and identified computer-supported groups challenged theoretical arguments (V. S. Rao & S. L. Jarvenpaa, 1991) that computer-based group decision support systems (GDSS) can increase group decision quality by facilitating expression of minority opinions. In groups working on a hidden-profile investment decision task, minority opinion holders expressed their arguments most frequently under anonymous GDSS communication, but the influence of the minority arguments on private opinions and on group decisions was highest under face-to-face communication. These results suggest that the conditions that facilitate the expression of minority arguments may also diminish the influence of those arguments. The implications of these findings for a normative view of social influence, for social presence theory, and for the effects of GDSS on participation rates in group discussion are discussed.

Nowak, K. L. (2003). Sex categorization in computer mediated communication (CMC): Exploring the utopian promise. *Media Psychology, 5*(1), 83-103.

Abstract: Cue-lean media lack the physical information people traditionally rely on for social status attributions. It is possible the absence of this visible physical information reduces the influence of categorizations such as biological sex. If this were true, then cue-lean media may facilitate more egalitarian participation in interactions where all voices are equal (Hert, 1997; Lea & Spears, 1992; Rice & Love, 1987; Siegel, Dubrovsky, Kiesler, & McGuier, 1986). These predictions are part of what has been called the utopian promise of cue-lean media.
At the same time, these social status attributions are mentally salient, perceived to provide useful information, and frequently used in the person perception process (Bodenhausen & Macrae, 1998). It is possible that the mental salience of these categories sustains people's reliance on them whether the physical indicators are visible or not. These contrasting predictions were tested using a between-subjects experimental design. Forty-two undergraduates at a large midwestern university took part in this experiment. Participants engaged in the desert survival task across networked computers using text. Following the interactions, more than 1/3 of participants did not assign their partner to a sex category. The majority of those who made an attribution of their partner's biological sex were inaccurate. Those who did not assign their partner to a sex category felt more

immediacy and credibility as compared to those who did. Female participants reported the medium as being able to provide more social presence than did male participants. Implications for the utopian predictions in computer-mediated interactions are discussed.

Oxford Economics USA. (2009). *The return on investment of U.S. business travel.* Retrieved January 28, 2010, from http://www.ustravel.org/sites/default/files/09-10-09_Oxford%20Economics.pdf

Abstract: Business travel is under scrutiny. Corporations, responding to weakening profits, have targeted travel as an immediate candidate for cost savings. In addition, meetings and incentive travel have been recently maligned in public forums as excessive. Perhaps more than at any other time in recent history, business travel is being evaluated from all sides. To be useful, this evaluation should center on a fundamental business question: what is the relationship of business travel to company performance? Of course business travel generates significant economic value through its direct injections into the transport, hospitality, and other service sectors. This is not to be ignored. But the real value of business travel relates to its impact on individual company performance and, by extension, the performance of the U.S. economy. This study seeks to define exactly this. The approach is based on a combination of two separate surveys of corporate executives and business travelers, a review of related research, and an econometric analysis of the effects of business travel on corporate performance. The results of this collective analysis show a robust and irrefutable relationship between a company's investment in business travel—including internal meetings, trade shows, conferences, incentives, and sales—and its profitability.

Powell, A., Piccoli, G., & Ives, B. (2004). Virtual teams: A review of current literature and directions for future research. *Data Base., 35*(1), 6.

Abstract: Information technology is providing the infrastructure necessary to support the development of new organizational forms. Virtual teams represent one such organizational form, one that could revolutionize the workplace and provide organizations with unprecedented levels of flexibility and responsiveness. As the technological infrastructure necessary to support virtual teams is now readily available, further research on the range of issues surrounding virtual teams is required if we are to learn how to manage them effectively. While the findings of team research in the traditional environment may provide useful pointers, the idiosyncratic structural and contextual issues surrounding virtual teams call for specific research attention. This article provides a review of previously published work and reports on the findings from early virtual team research in an effort to take stock of the current state of the art. The review is organized around the input – process – output model and categorizes the literature into issues pertaining to inputs, socio-emotional processes, task processes, and outputs. Building on this review we critically evaluate virtual team research and develop research questions that can guide future inquiry in this fertile are of inquiry.

Rosen, B., Furst, S., & Blackburn, R. (2007). Overcoming barriers to knowledge sharing in virtual teams. *Organizational Dynamics, 36*(3), 259-273.

Abstract: In the fast-paced business environment of the 21st century, virtual teams can be a potential source of competitive advantage for many organizations. Virtual teams allow organizations to tap into the knowledge and expertise of employees regardless of their geographic location. However, the benefits of working virtually can only be realized if team leaders and team members are motivated to share their unique knowledge with each other. This might not always occur when team members have never met or worked together. In this article, we use extensive interview and survey data from virtual team members and leaders in multiple organizations to identify six barriers to knowledge sharing in virtual teams. We also examine the "best practices" effective teams employ to overcome these barriers and facilitate the exchange of important knowledge. The insights presented here should provide virtual team leaders with tools to maximize a virtual team's capacity to make better, faster, and more innovative decisions.

Stark, E. M., & Bierly, I., P. (2009). An analysis of predictors of team satisfaction in product development teams with differing levels of virtualness. *R&D Management, 39*(5), 461-472.

Abstract: The purpose of this study is to empirically examine and assess the moderating effects of extent of virtualness on a variety of well-established predictors of new product development team satisfaction. We focus our study on 178 different new product development teams from a variety of industries and use extent of virtualness as a structural characteristic of the teams, measuring it on a continuum. The predictors of team satisfaction we studied are relationship conflict, familiarity, goal clarity and preference for group work. Primary findings include: (1) relationship conflict has a more deleterious effect on team member satisfaction as teams become more virtual, mainly because it is very difficult for team members of virtual teams to resolve their interpersonal disputes; (2) the relationship between preference for group work and team satisfaction is moderated by extent of virtualness, such that preference for group work increases team satisfaction more as virtualness increases; (3) goal clarity and familiarity are not moderated by extent of virtualness, but have a significant direct effect on team satisfaction.
Managerial and research implications of these findings relative to new product development teams are also discussed.

Storper, M., & Venables, A.J. (2004). Buzz: Face-to-face contact and the urban economy. *Journal of Economic Geography, 4,* 351-370.

Abstract: This paper argues that existing models of urban concentrations are icomplete unless grounded in the most fundamental aspect of proximity; face-to-face contact. Face-to-face contact has four main features: it is an efficient communication technology; it can help solve incentive problems; it can facilitate socialization and learning; and it provides psychological motivation. We discuss each of these features in turn, and develop formal economic models of two of them. Face-to-face is particularly important in environments where information is imperfect, rapidly changing, and not easily codified, key features of many creative activities.