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What Still Matters About Distance?

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At the tenth anniversary workshop of the Human-Computer Interaction Consortium the Olsons reflected on the past, present, and future of the role that geographical distance plays in the work of teams (subsequently published as Olson & Olson, 2000). A decade has passed, filled with research and technology development relevant to the issues raised in that paper. Indeed, the 555 Google Scholar citations of the "Distance Matters" paper are a good entry point to much of this research.

The issues of what effects geographical distance have on team work are important because the amount of such work is increasing. There are several reasons for this. First, organizations have increased their scope, a phenomenon often called "globalization." This is true of all kinds of organizations. Companies have long spread their reach in order to reach new markets, gain access to specialized resources, or change the costs involved in doing their work. Many universities have established branch campuses, including overseas. Second, as the kinds of problems that teams tackle have become more complex, access to a wider range of expertise has meant that teams have needed members who are at dispersed locations. This is seen in the world of university research in the increasing extent of multidisciplinary research and the creation of geographically dispersed research organizations (the term "collaboratory" was coined to cover these; many other names have been used as well; see Olson, Zimmerman, and Bos, 2008). An important third factor in the rise of geographically distributed work has been the increased cost of travel. Part of this is the increased risks associated with international terrorism. But part is also due to the sharp rise in the financial cost of travel, due to soaring fuel prices.

So, despite the kinds of challenges summarized in Olson & Olson (2000), geographically dispersed team work is increasing. The figures on the extent of virtual teams in contemporary organizations are staggering. In a recent report, the Institute for Corporate Productivity stated that 67% of companies surveyed felt that "their reliance on virtual teams" would grow in the next few years.[1] For companies that had more than 10,000 employees, this virtual teams figure was more than 80%. However, 35% of respondents ranked the difficulty of leading virtual teams as the biggest challenge ahead, placing a premium on developing virtual leadership skills. This of course should motivate researchers and technical developers to attack the challenges, with hopefully the effect of reducing or even eliminating some of the challenges. Our current goal, then, is to review where things stand with respect to these challenges after a decade of activity, reflecting on both the current situation but again looking at the prospects for the future of distributed team work.

[1] Institute for Corporate Productivity web site: www.i4cp.com/news.aspx?Postid=35765

It is useful to point out that there are a number of topologies of distributed work, and that these matter a lot when it comes to what technological or social interventions to employ. Using a team of four to illustrate, there are three broad classes of topologies:

- Hub and spoke: 3-1
- Hub to hub: 2-2
- Fully distributed: 1-1-1-1

In the hub and spoke, most members are collocated, but at least one person is remote and by themselves. In hub to hub, there are two sets of collocated participants. And, of course, in fully distributed, everyone is by themselves. Of course, as the group size grows, these topologies can become even more complicated. But they basically fall into these three broad types.

The Olson and Olson (2000) account of distance effects grouped the account of challenges into four broad categories:

- Collaboration readiness: How ready to collaborate are the participants? There are two broad aspects of this. Collaboration is a skill, and do the individual participants have such skills? A related issue is what the culture of the organization is like. In particular, are the incentives aligned with the goal of collaborating? Many organizations have a mix of competition and cooperation that they'd like to support. Too much reward for competition can impede collaboration. Similarly, people either have to trust each other to do work of high quality and on time or they have to set up contracts to insure the work is done.

- Technology readiness: What is the level of technological sophistication of both the individuals involved in a team, and in the organization itself? There is a wide range of kinds of technology that can assist in geographically distributed work, and if the team members have very limited experience it can constrain the tools that might be used. Similarly, most technologies that might be involved in distributed work require support. Does the organization have a good system of technical support that can be called upon as needed?

- Common ground: Effective collaboration requires that the participants have a common base of shared knowledge and vocabulary. This can be especially challenging for multidisciplinary collaborations. But participants in different locations also have very different contexts that can be a challenge for communication.

- Nature of the work: It is difficult to do tightly coupled or ambiguous work at a distance. Too much rich communication is required, and it will often take far longer to work out than if the tightly coupled work is done where people can work face-to-face.

In a follow-on chapter (J. Olson et al, 2008), the importance of management and decision making in distributed work is added to the list.

- Management and decision making: Collaboration at a distance requires good leadership, and a sense by all of the participants that decisions are made fairly and clearly.

In reviewing the future of distributed work, they highlighted three kinds of issues that they argued would never go away:

- Time Zones: When the participants are in different time zones, coordination can be quite difficult. The overlap in work days may be small or even non-existent. Participants can be at different points in their diurnal rhythms.

- Culture: Two kinds of culture can make it difficult to establish common ground and good management practices. One is national culture, and increasingly distributed collaborations are crossing national boundaries. Of course, even within national boundaries there can be cultural differences as well. The other broad kind of culture is organizational culture. Different organizations can have different approaches to management and decision making, different incentives, and different vocabularies and conceptual schemes.

- Trust: As Charles Handy (1995) has claimed, "trust takes touch." This implies that it can be difficult to establish or maintain trust among geographically distributed participants.

The details of these challenges can be found in the Olson and Olson (2000) paper and the J. Olson et al chapter (2008).

Getting closer to the realm of specific behaviors, two types of activities appear to be much harder for remote colleagues when compared with their collocated peers (Umarji, DeLine, and Venolia, under review):

- Planned meeting: There are many types of meeting, each of which has its own unique characteristics and requirements. For example a weekly status meeting is typically an orderly progression around the table, whereas a brainstorming session is much more chaotic and may make extensive use of whiteboards or flip-chards. Topologies also introduce variations. For example in a fully-distributed meeting all parties participate on the same basis, where a hub-and-satellite configuration introduces asymmetries that put the satellite participant at a distinct disadvantage. Teleconferencing technologies such as speakerphones and videoconferencing introduce both technological and social complexities and can impede the conversation as

much as help.

- Ad-hoc conversations: Coworkers initiate conversations to get an answer to a question or to get "another pair of eyes" on a problem. They generally prefer face-to-face communication because of the richness of social cues and the effortless shared use of computers, whiteboards, and other secondary media. Instant messaging may be used when required by distance, and email may be used for low-priority questions or to broadcast a requestk. The conversation may migrate between these media as needs dictate. While some ad-hoc conversations are initiated intentionally, others are opportunistic in nature, piggybacking on chance encounters or before or after planned meetings or other ad-hoc conversations. Remote coworkers have fewer opportunities for ad-hoc communication. Remote coworkers are "out of sight, out of mind" compared to their collocated colleagues, so may be left out of the give and take of ad-hoc conversation.

In the remainder of this extended abstract, we'd like to review some of the things that we feel have changed the situation from a decade ago. To anticipate our conclusion, the challenges are still there. But there are encouraging signs of new classes of technologies and social interventions and changed circumstances that offer hope of mitigation. There is a lot of work yet to be done, so this will continue to be an important area for research and development. But given the importance of this way of working in the future, such research and development should have a high priority.

Examples of hopeful signs:

Collaboration readiness

Better understanding of the role of incentives in work

A realization that mistrust can be a barrier to smooth work, and that there are ways to consciously build trust. Some collaborations have even set up explicit contracts for delivering high quality work on time, with financial consequences for failure.

Technology readiness

Emergence of a broad range of new technologies that are widely used

Facebook for awareness

Shared calendars for awareness

Mobile technologies

More ackchannels available

IM for side conversations in a teleconference

Technologies are increasingly easy to use and reliable

Common ground

Knowledge management, shared knowledge available to everyone

Awareness through

Social computing , sharing – Facebook, Twitter, etc.
IM, awareness tools
Much better audio, video options
Social proxies
…give a sense of the remote person's situation and therefore do not attribute delays to bad character.

Fast response times from people who are "always on their computers"

Nature of the work

Increased realization that one has to divide and conquer.
People are also having face-to-face meetings to kick off a project.

Management and decision making

Tons of books and articles on how to manage "virtual teams"
Recognition of the importance of leadership.

Time Zones

Asynchronous awareness tools (such as code check ins,/outs)
Adjusting work hours

Culture

More awareness of the nature of cultural differences
We could look up the sales of Culture Shock book series.

Trust

Some promising results on establishing and maintaining trust at a distance
Better support for awareness, presence

Planned meetings

Free IP-based audio and video teleconferencing systems
Shared note-taking applications such as GoogleDocs and Microsoft OneNote can be used as a substitute for whiteboards

Ad-hoc conversations

Shared note-taking applications
Screen-sharing
Ubiquitous home WiFi networks (in western countries) allow for continuous monitoring of email and IM on the evening
Full-text search makes it easier to self-answer questions based on local and server-based email and file repositories

We believe that the future is promising. People are recognizing that distance matters and that they can do something about it with both social interventions and technical support for both awareness, information sharing, and communication.

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