

Collaboration as Community-Building

A Case Study of Collaboration Profiles



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Scope of Work

Objective

Understand how the members of one department collaborate, as a case study of collaboration within a corporate environment

Tasks

1. Document the collaboration inventory of the department's collaboration styles, needs, work practices, issues. Document what works for whom, what does not work, and why (not)
2. Explore collaboration profiles
 - a. How do people like to be contacted?
 - b. What means do people choose to collaborate with others?
 - c. What other factors contribute to collaboration choices made?
 - d. Are people aware of their own teammates' collaboration profiles? If so, how?
 - e. Are people aware of their own collaboration profiles? How do they convey this?

Methods

Observation, contextual inquiry & interviews, survey

Deliverables

1. Report out on collaboration profiles (this document)
2. Establishment of department member contact guide

Related Work

Leverage involvement and methods used in other corporate studies:

Co-Location Study investigation of work practices, needs and issues of employees located at customer sites

Meeting Capture Study observations and interviews on how people share, capture, and re-use information

Meeting Support Experiment study on the use of collaborative note-taking tools for meeting support

Team Room Survey survey on the use of collaborative team room facilities and services

Case Study Background

Many of MITRE's customer organizations operate in distributed locations and/or asynchronously and find it difficult to collaborate despite having tried one or more of the large number of collaboration tools in the marketplace. With increasingly mobile workers and the accepted practices of telecommuting and flexible time, our customers and our own company are faced with the need for better collaboration support.

How can we best help them? In MITRE's Information Technology Center, we have ethnographers and human-computer interaction specialists with the skills to study work culture and work practices. We also have systems architects, technology designers, and implementers. In short, we have everyone needed to go from understanding a group's collaborative technology needs to implementing technology solutions in support of today's mobile, more flexible worker. Internally, we also have a need for different and better collaboration tools to work more closely together as a multi-faceted organization (e.g., project-related teams, communities of interest, departments, and divisions) — a situation that parallels that of many of our customers. Who better to study than ourselves?

This investigative study was designed to help us better understand current work practices, workarounds, collaboration needs and issues by applying social science techniques to characterize group work processes. A follow-up to this effort would be to identify solutions for better collaboration among team members, extending beyond project and department boundaries. This work is intended to benefit the Information Technology Center's customers and the corporate environment as a whole

We focused on one particular department within the Information Technology Center: the department of Multimedia and Collaboration. The department consists of 34 software developers, engineers (artificial intelligence, network and distributed systems, multi-disciplinary systems, and information systems), and internet applications technicians. Department members are distributed across locations and customer sites, as well as time zones. Department members are often mobile, telecommute or work from alternate locations, and frequently engage in the permitted use of flexible time scheduling. 21 department members are male, 13 female.

Using well-established ethnographic techniques, we studied a small, distributed work group within this department and also interviewed random department members to understand how employees contact and communicate with each other. We collected anecdotes on current work practices and compared and contrasted what is working with what is not.

Collaboration Styles

There are distinct, individual preferences for how people select a medium to communicate with others. As Zigurs and Qureshi have stated, today's collaboration teams virtually exist in workspaces established by individual configurations and time [Zigurs & Qureshi 2006]. In fact, groups most effective at collaboration are able to draw on a variety of technology [Kayworth & Leidner, 2000]. While some members of the targeted department like to use instant messaging as first choice, there are others who prefer email or phone or speaking to someone face-to-face. Some department members even have a different set of preferences for how they like to be contacted. One person we interviewed stated, *"I don't have a preferred way of being contacted, but there are ways I don't like to be contacted (i.e., using email for nearly synchronous conversation when IM would do)."*

There are many factors which affect the choice of communication and collaboration: individual preferences, individual experience with the technology and its ease of use, the need for documentation, and the urgency of the task [Hollingshead et al, 1993; Robey et al, 2000]. For the people we interviewed, the three most important factors are immediacy of response required, content of communication, and the need for a historical record. A variety of other factors also influence the means for collaborating - including obvious factors such as proximity and asynchronicity (because of e.g., differences in time zone, mobility, or work schedule) – as well as some more subtle factors such as previous experience in getting a response, the need to interrupt, perceived annoyance, and awareness of someone's availability. *"I have a mental model of people's response rates with certain media."* *"I use personal experience with reliability and response rate when selecting a method for contacting people."* For a number of people we interviewed, prior relationship with someone, comfort level, and role influence communication choices, but for others, those factors make no difference at all.

In the interviewed department, instant messaging (IM) is most used for quick questions or sharing of URLs and other "tidbits" of information. Instant messaging is also often used for awareness before establishing contact – to see if someone is available for quick chat, phone call, or even face-to-face communication. IM is reportedly the easiest method to use once a comfortable relationship has been established between individuals, and it also works well when "stealth" is important (e.g., during meetings, late at night when people are working from home, etc). Of all methods of communication and collaboration discussed during the interviews, instant message appears to have the most social protocols and issues associated with it. While some people would never use IM to make contact for the first time, others would never use it to initiate communication with people of perceived status. IM was also mentioned as being highly intrusive as well as requiring the most cognitive task switching. There are double standards when it comes to using IM; there are people who sign onto IM to see who is around or to contact people, but sign out when they do not need it because they do not want others to "disturb" them. *"I keep it off unless I want to use it."* *"I log in to contact others but don't stay on since I don't want to be disturbed."*

Email is a preferred method for communication for the department when time and location are not issues. Email is usually selected for more formal communication, low-level details, organizing thoughts, or when it is desired to keep a historical record of interactions. Email also appears to be the preferred means for sharing documents. Even when team resources are placed on Microsoft SharePoint sites or in electronic document exchange folders,

notification and accompanying details are distributed via email. Sometimes even coordination of version control is handled through emailing documents.

Some members of the department prefer to pick up the telephone or walk over to someone's office when they have a question, but others maintain that they are not "phone people," and many prefer to use electronic means. According to a recent Gartner report, "by 2015, 80% of work outcomes will need explicit input and cooperation by two or more people, and the work will seldom be done face to face" [Morello & Burton, 2005]. While this trend is reflected at MITRE, there are still people who prefer traditional face-to-face style of communication. One interviewee stated that some people are just better talkers, so while his preferred means is IM, he will talk to others face-to-face after establishing (via IM) that they are in their office. Telephones are most often used for introductions, discussions, or lengthy back and forth dialogue. Interestingly, a number of interviewees stated that they never leave voicemail; if they cannot reach their party by phone, they will hang up and send a message via email.

65% of participants responding to a previously-conducted team room survey at the MITRE Corporation indicated that their meetings either always or often include remote participants and that phone conferencing is the most popular method (85%) of group collaboration [Aquilina and Drozetksi 2005]. However, department members seem to favor video teleconferencing over phone conferencing because of the visual cues.

Video teleconferencing is generally useful when used on a regular basis with the same participants. Repeated practice in using VTC technology may be enough to get over the obstacles as found by Majchrzak and Malhotra who noted that most team leaders found video teleconferencing "would get in the way of the work" [Majchrzak & Malhotra, 2003]. According to our interviewees, the more simultaneous VTC connections at MITRE, the worse the quality of both audio and video. Collaboration is also made more complicated when some team members are distributed and others are co-located [Crampton, 2001; Sarker & Sahay, 2002]. Single, remote participants of the department find it difficult to contribute to discussions because they "*cannot get a word in*" or are not clearly heard. Participants who phone into a VTC find it nearly impossible to contribute and blame the lack of visual cues on the general lack of awareness to their presence. The most often cited problem with VTCs at MITRE is data transmission which is "*unacceptable.*" As a workaround, many members of the department prefer to use Microsoft NetMeeting to share data or collaborate on tasks. Distributing materials via email or through electronic document exchange folders is another common practice.

Telephone conferencing is also useful when it becomes habitual. Like VTCs, it is difficult for a single phone participant to contribute to the discussion when several other participants are sitting together in a single room. As noted by Fang and Neufeld, there is "a propensity to have collocated members get together in a room during audio-conferences. This frequently leads to conversations that are not clearly audible to those on the other end of the phone. Further, the remotely located members tend to become less assertive during these meetings as they feel the lack of visual cues that the collocated members are privy to" [Fang & Neufeld, 2006]. Large teleconferences can be "disastrous" even when all parties are equally distributed despite the increased awareness of others on the phone. While Meeting Place works well for teleconferencing at MITRE (and for non-MITRE guests), use of it requires advance preparation and scheduling.

Lastly, the use of Microsoft SharePoint is not looked upon favorably by members of the interviewed department; the "non-intuitive" and "cumbersome" user interface deter

department members from using it. Some people like the idea of Wikis more than others, and others feel that Wikis fall into disuse more often than not.

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Interview Details

This section summarizes the data collected from unstructured interviews with eight members of the department. The responses from these interviews helped create a survey for use in building a department collaboration profile.

Each interview lasted between ten minutes and a half hour; the length of the interview was dictated by the flow of the dialogue. The interviews did not consist of a structured question and answer session but rather a discussion on collaboration styles, work practices, and issues. The following questions were used to guide the conversations:

- Do you collaborate with others on projects? How large are your teams? Are the teams distributed?
- How do you communicate and collaborate both with individuals and your project teams?
- Which methods seem to work best and which don't work well at all?
- How do you share and disseminate information and documents?
- What factors contribute to collaboration choices made?
- Are you aware of your teammates' collaboration profiles? If so, how?
- How do you like to be contacted? How do you convey this?

The resulting data was compiled and organized into tables or grouped into topics, as follows:

- Table 1 summarizes preferred communication choices and factors affecting those communication choices, either positively or negatively.
- Tables 2-5 detail the summarized data from Table 1. Each table depicts a single preferred communication medium (instant message, email, telephone, or face-to-face) with respect to factors influencing that choice. Supporting data is represented by paraphrased comments recorded during the interviews. Note that, since the interviews were largely unstructured, lack of data in some of the tables does not indicate agreement or disagreement with any of the factors – it simply indicates that the interviewees did not mention that particular factor in respect to that particular collaboration choice.
- The last section shows compiled remarks on team collaboration methods: video conferencing, phone conferencing, and document sharing and repositories. Advantages and disadvantages of each method or tool are indicated, where applicable. In addition, comments on methods are grouped by topic such as awareness, participation, and logistics.

Collaboration Styles: Factors Affecting Communication Choice

| Factor Affecting Use | IM | Email | Phone | Face-to-face |
|---|-----|-------|-------|--------------|
| Noise in environment | + | | - | |
| Immediacy/urgency of response | + | - | + | + |
| Reliability (probability of getting someone to respond) | | + | | + |
| (A)synchronicity (work schedule/time zone) | + | + - | | |
| Getting through (when you need to interrupt) | + | | | |
| Person's status or role | - | | - | |
| Annoyance/disturbance | + - | + | - | - |
| Familiarity, personality, level of comfort | + - | + | + - | - |
| Historical record / persistence | - | + | - | - |
| Formality | - | + | + | |
| Proximity | | | | + |
| Awareness of availability | + | | | |
| Level of collaboration/involvement | + | | + | + |
| Amount of back and forth | + | - | + | + |
| Content of communication | + | + | + | + |
| Mobility (mine – on travel, at another location) | + - | + | - | - |
| Mobility (other person's) | + | + | | - |
| Multi-party (many to many) | + | + | + | + - |
| Cognition (interruption, task switching) | - | + | - | |

Table 1 Summary of positive & negative influences of selecting media to contact others

| Instant Message | | |
|---|--|--|
| Factor Affecting Use | I would use IM... | I would not use IM... |
| Noise in environment | <ul style="list-style-type: none"> for conversations when phone conversations would be overheard | |
| Immediacy/urgency of response | <ul style="list-style-type: none"> when I need an immediate response | |
| Reliability (probability of getting someone to respond) | | |
| (A)synchronicity (work schedule/time zone) | <ul style="list-style-type: none"> as a semi-synchronous collaborative system | |
| Getting through (when you need to interrupt) | <ul style="list-style-type: none"> when I know someone often works from another location when someone is in a meeting or closed door situation | |
| Person's status or role | | <ul style="list-style-type: none"> to contact the department head |
| Annoyance/disturbance | <ul style="list-style-type: none"> because it is less intrusive than showing up at someone's door | <ul style="list-style-type: none"> because it is so intrusive because it's too easy and therefore too many people IM me! when I am busy and do not wish to be disturbed |
| Familiarity, personality, level of comfort | <ul style="list-style-type: none"> to contact colleagues or people I know well to contact people whether or not I've contacted them before | <ul style="list-style-type: none"> to contact someone I do not know |
| Historical record / persistence | <ul style="list-style-type: none"> to look at logs for context of old conversations | <ul style="list-style-type: none"> because it is too ephemeral |
| Formality | | <ul style="list-style-type: none"> to contact someone for the first time because it is difficult to express oneself in a polite, non-threatening way |
| Proximity | | |
| Awareness of availability | <ul style="list-style-type: none"> to see if someone is online to see if someone is in their office before I IM, phone, or walk to office | |
| Level of collaboration/involvement | <ul style="list-style-type: none"> frequently with people with whom I have established working relationships | |
| Amount of back and forth | <ul style="list-style-type: none"> because it involves less overhead than email when I am not busy | |
| Content of communication | <ul style="list-style-type: none"> for quick questions mostly for non-business related activities for technical questions, banter, scheduling, supporting requests to clarify issues when I want to share a URL or tidbit | |
| Mobility (mine – on travel, at another location) | | <ul style="list-style-type: none"> when I am away from my desk, on travel, or working in a lab |
| Mobility (other person's) | | |
| Multi-party (many to many) | <ul style="list-style-type: none"> for multi-party chat | |
| Cognition (interruption, task switching) | | <ul style="list-style-type: none"> because cognitive task switching is not easy |

Table 2 Data collected from interviewees on use of instant message, categorized by influencing factors

| Email | | |
|---|--|--|
| Factor Affecting Use | I would use email... | I would not use email... |
| Noise in environment | | |
| Immediacy/urgency of response | <ul style="list-style-type: none"> • if no urgent need to contact someone • if no immediate response is required | <ul style="list-style-type: none"> • when I need an answer to something |
| Reliability (probability of getting someone to respond) | <ul style="list-style-type: none"> • when I know people are good at responding | |
| (A)synchronicity (work schedule/time zone) | <ul style="list-style-type: none"> • to communicate across time and space • because the other person does not have to be there • because I work in a different time zone | <ul style="list-style-type: none"> • when it requires back and forth • for nearly synchronous conversation |
| Getting through (when you need to interrupt) | | |
| Person's status or role | | |
| Annoyance/disturbance | <ul style="list-style-type: none"> • when I want to share something without interrupting | |
| Familiarity, personality, level of comfort | <ul style="list-style-type: none"> • to contact someone I don't know | |
| Historical record / persistence | <ul style="list-style-type: none"> • for historical record of interactions • as a permanent, persistent record | |
| Formality | <ul style="list-style-type: none"> • for formal communication • to enforce a level of formality | |
| Proximity | | |
| Awareness of availability | <ul style="list-style-type: none"> • when I am not sure someone is in their office | |
| Level of collaboration/involvement | | |
| Amount of back and forth | | <ul style="list-style-type: none"> • when there is too much overhead |
| Content of communication | <ul style="list-style-type: none"> • to share documents • to announce availability of documents in shared space • for coordination of meetings • when I have something to introduce or explain | |
| Mobility (mine – on travel, at another location) | <ul style="list-style-type: none"> • because I can retrieve it from any location • when I am on travel | |
| Mobility (other person's) | <ul style="list-style-type: none"> • to contact someone on travel | |
| Multi-party (many to many) | <ul style="list-style-type: none"> • when I need to contact multiple people at once | |
| Cognition (interruption, task switching) | <ul style="list-style-type: none"> • when I need to think through my thoughts • when I want to review communication before sending | |

Table 3 Data collected from interviewees on use of email, categorized by influencing factors

Telephone

| Factor Affecting Use | I would use the telephone... | I would not use the telephone... |
|---|--|---|
| Noise in environment | | <ul style="list-style-type: none"> in the cube environment where I work |
| Immediacy/urgency of response | <ul style="list-style-type: none"> when IM is not available and I need to contact someone right away because it is quick | |
| Reliability (probability of getting someone to respond) | | |
| (A)synchronicity (work schedule/time zone) | | |
| Getting through (when you need to interrupt) | | |
| Person's status or role | | <ul style="list-style-type: none"> to contact certain people because I may not be able to get through if there are gatekeepers |
| Annoyance/disturbance | | <ul style="list-style-type: none"> because it is so intrusive |
| Familiarity, personality, level of comfort | <ul style="list-style-type: none"> to make a cold call when contacting someone for the first time | |
| Historical record / persistence | | <ul style="list-style-type: none"> to leave voicemail |
| Formality | <ul style="list-style-type: none"> when natural communication is desired | |
| Proximity | | |
| Awareness of availability | | |
| Level of collaboration/involvement | <ul style="list-style-type: none"> when I need to collaborate with someone but not on a daily basis | |
| Amount of back and forth | <ul style="list-style-type: none"> for meetings for discussions | |
| Content of communication | <ul style="list-style-type: none"> for questions for administrative stuff for discussions | |
| Mobility (mine – on travel, at another location) | | <ul style="list-style-type: none"> when I am not in my office when I am on travel (I don't check voicemail) |
| Mobility (other person's) | | |
| Multi-party (many to many) | <ul style="list-style-type: none"> (Meeting Place) when I need to talk to more than one person at the same time | |
| Cognition (interruption, task switching) | | <ul style="list-style-type: none"> when I need to think things through |

Table 4 Data collected from interviewees on use of telephone, categorized by influencing factors

Face-to-face

| Factor Affecting Use | I would communicate face-to-face... | I would not communicate face-to-face... |
|---|--|---|
| Noise in environment | | |
| Immediacy/urgency of response | <ul style="list-style-type: none"> • if I needed an answer right away | |
| Reliability (probability of getting someone to respond) | <ul style="list-style-type: none"> • when I need to talk to X because it's easier to grab him in the hallway | |
| (A)synchronicity (work schedule/time zone) | | |
| Getting through (when you need to interrupt) | | |
| Person's status or role | | |
| Annoyance/disturbance | | |
| Familiarity, personality, level of comfort | | |
| Historical record / persistence | | |
| Formality | | |
| Proximity | <ul style="list-style-type: none"> • if the person is nearby (this is my preferred mode) • because I prefer to get up and walk around • but, if I can, I shout through the wall | |
| Awareness of availability | | |
| Level of collaboration/involvement | <ul style="list-style-type: none"> • if I know someone but have not worked with that person | |
| Amount of back and forth | <ul style="list-style-type: none"> • with people who are too chatty for IM but are better talkers in person | |
| Content of communication | | |
| Mobility (mine – on travel, at another location) | | |
| Mobility (other person's) | | |
| Multi-party (many to many) | | |
| Cognition (interruption, task switching) | | |

Table 5 Data collected from interviewees on face-to-face communication, categorized by influencing factors

Comments on Team Collaboration Methods

Video Teleconferencing (with some people participating by telephone)

General *useful when habitual*

- + VTCs are useful for regular (distributed) meetings and discussions.

Logistics & set up

- + The automatic dial connection is fairly smooth and seamless.
- If a room is empty, there is no way to drop that connection without hanging up on everyone.
- In most rooms, you can see only one room at a time – depending on where people are talking.
- It is difficult to see people because of the camera angle.

Technology *multiple connections make it worse*

- + Remote participants can see and hear well enough.
- The audio is relayed 1-2 seconds before the video.
- Image quality is very poor.
- When multiple people are connected by phone, I am reminded of the poor technology.
- If there are multiple connections, it's hard to hear clearly.
- If people don't sit near the microphones, the sound is very bad.

Participation *remote participants cannot participate as easily*

- I am often the only person at my end which makes it hard to get a word in.
- When I am the only one on my end, it makes it hard to be heard.
- Often, when I am finally able to make a contribution, dialogue has advanced too far.
- With multiple connections, it's hard to get floor control.
- Sometimes it is hard to interject from a remote location when slides are being transmitted and visual cues are missing.
- People calling in to VTC are better off being silent participants.

Awareness *visual cues make it easier but phone participants are worse off*

- + Participation is easier than via phone conferencing because of the visual cues.
- People forget that I'm there.
- When multiple people are connected by phone to a VTC, people forget about who is there; people often leave the room without hanging up the phone.

Data transmission & workarounds *data transmission not acceptable; better to use Microsoft NetMeeting or transfer folders*

- + I download documents from (or upload documents to) transfer folder for sharing during VTCs.
- + I use backchannels (IM and email) to send around links, slides, documents during VTCs or telecons.
- + We share documents via Microsoft NetMeeting or transfer folders.
- The quality of VTC is not good enough to share data.
- Most people don't realize how bad data transmission is.
- Transmitting data subsumes the video connection with people so you cannot see the presentation and remote participants simultaneously.

Phone conferencing

General *useful when habitual*

+ It works well when collaboration teams become used to it (i.e., weekly meetings).

Participation *not easy*

- It's hard to get a word in.
- Large phone conferences can be "disastrous."

Awareness *more aware of multiple, remote participants than just a single, remote participant*

- + When all participants are remote, there is better awareness of the many individuals.
- People forget that I'm there.
- Out of sight, out of mind.

Document sharing & repositories

Tools in practice

- **Email**

I am able to include relevant information when I attach files.

I use it as a push method for sharing.

I use it to alert others to documents placed in Microsoft SharePoint and my electronic document exchange folder.

+ It's faster than using any repository.

- When we use email to collaborate on the same document, it requires verbal communication to coordinate control.

- **Community Share**

I mostly use to retrieve information.

I will deposit only product reviews or white papers if they appeal to a larger audience

- Logging into Microsoft SharePoint from a Mac is difficult (credentials are not always accepted).

- It's much faster to email stuff than place on Microsoft SharePoint.

- It is the most non-intuitive tool I have ever used; I hate it.

- It has a cumbersome UI to use.

- It's horribly broken; I use as little as possible.

- I refuse to use it.

- **Transfer folder**

I often use it for sharing materials during VTCs.

Places product reviews or white papers or things that appeal to larger audience here.

- **Microsoft NetMeeting**

+ It is a great way to collaborate during VTCs or phone conferences.

+ It works much better for sharing slides during VTCs than data transmission.

- It is not useful when working with people external to the company.

- The screen resolution can be frustrating when you cannot see the whole screen.

- Only one person can drive at a time.

- It has never worked for me.

- **MeetingPlace** (for data sharing)

+ It is a great way to collaborate during VTCs or phone conferences.

+ It works much better for sharing slides during VTCs than data transmission.

- It requires advance preparation and reservation.

- There are often not enough ports available for all parties.

- Only one person can drive at a time.

- **Wiki**

+ Browsers are universal.

+ Wiki is platform agnostic.

- I don't like because it falls into disuse.

- I never mastered the wiki language.

- It's too passive.

- Wiki is an excuse for not actually writing anything.

- When anyone can contribute, no one does.

- **Groove**

+ Chat was ok, but I eventually used the phone instead.

- The firewall killed the audio and video.

- Groove ignores the firewall, exposing sensitive material to collaborators external to the company.

- LiveLink

- AFS project space

- CVS

- Subversion repository

- Microsoft Communicator

+ I can drag and drop documents in here easily and quickly (but not across the firewall).

Collaboration Profile Survey

1. Where is your main office?

2. Do you ever work out of another location? Where?

3. In an average week, how much of your time do you work in your main office?

4. What time does your work day usually start/end?

5. How do you prefer to be contacted? (If more than one way, please prioritize. If N/A, please state.)

| I like to be contacted by... by | IM | Email | Phone | Cell | F2F |
|--|-----------|--------------|--------------|-------------|------------|
| project members / co-workers | | | | | |
| other members of the department | | | | | |
| people outside of the department you have had some contact with before | | | | | |
| people you've never been in contact with before | | | | | |

6. How do you prefer to contact others? (Provide details if it varies by context)

| I contact... by | IM | Email | Phone | Cell | F2F |
|--|-----------|--------------|--------------|-------------|------------|
| project members / co-workers | | | | | |
| other members of the department | | | | | |
| people outside of the department you have had some contact with before | | | | | |
| people you've never been in contact with before | | | | | |

7. Please provide the contact information you wish to share with the department.

| | |
|-----------------|--|
| Name | |
| IM | |
| Alternate email | |
| Phone(s) | |
| Cell(s) | |

8. Which other factors typically influence your method of communication? In which ways?

| | |
|---|--|
| Noise in environment | |
| Immediacy/urgency of response | |
| Reliability (probability of getting particular person to respond to you via particular mechanism) | |
| Asynchronicity (work schedule diff/time zone) | |
| Getting through (when you need to interrupt) | |
| Person's status or role (e.g., DH) | |
| Fear of annoyance/disturbance | |
| Familiarity, personality, level of comfort | |
| Historical record / persistence of communication | |
| Formality | |
| Proximity | |
| Awareness of availability | |
| Level of collaboration/involvement | |
| Amount of back and forth | |
| Content of communication | |
| Mobility (yours - on travel or at another location) | |
| Mobility (other person's) | |
| Multi-party (many-to-many) | |
| Cognition (interruptions, task switching) | |