

Motorola Labs Content Enhanced Presence



Connectedness Through the Use of Mobile Devices

December 2005

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Executive Summary

Motorola has conducted extensive research on the topic of Content Enhanced Presence (CEP) and would like to launch a new service that taps into the fundamental human need for feeling connected. However, the client needs to discover types of content that can enable or help people to feel more connected with each other. In essence, the question that had to be answered was a matter of how “presence” can be conjured through technological means. This question was addressed via research and analysis conducted by students from the School of Information at the University of Michigan. This project was completed as a part of the coursework for “Use of Information,” a course designed to address fundamental concepts of information usage in various organizations.

The goals of the research project were stated as follows:

- to define “connectedness,”
- to produce a list of types of content that could be shared to make people feel more connected, and
- to present the client with data to enhance their brainstorming process as it relates to developing new services.

To achieve these goals over the course of the semester the team performed ethnographic/observational research and a series of in-depth, individual interviews. As a result of observations the research target was reconfirmed, and the team decided to interview undergraduate students at the University of Michigan since the majority of them frequently use mobile devices to stay in touch. Moreover, observational research gave the team a better understanding of possible uses of mobile devices and supplied invaluable information for the development of the discussion guide for in-depth interviews.

A series of ten individual interviews that followed observational research applied “reconstructive technique,” a concept used in contextual inquiry process, to discover individuals’ thoughts, behaviors, attitudes, and emotions related to the concept of connectedness, and technological means of achieving it. In addition to recalling the reconstructive episodes, the interviewees were asked to complete two ranking exercises. The first exercise provided eight “modes” of contextual information that they could potentially know about someone they were about to get in touch with, while the second suggested ten types of actual content that could be transmitted via mobile device from one person to another. The participants were asked to rank which items made them feel more connected to others and which did not.

Each of the interview sessions was conducted by two members of the team, one acting as the interviewer and the other taking notes. At the conclusion of all ten interviews, the team carried out interpretive sessions to better familiarize themselves with all the interviews. Following the interpretive sessions, the team analyzed the collected data by constructing an affinity diagram. Affinity analysis of the interview data allowed the team to construct the definition of connectedness.

Connectedness between persons is defined as a feeling of inclusion in others’ lives as a result of sharing experiences and communicating emotions, opinions, and day-to-day information on a regular basis.

The participants felt that availability, schedule, mood, and location/proximity were the most important contextual variables that they would like to know about someone they are going to get in touch with. The team has also discovered that there are several factors that affect the choice of communication method: level of connectedness, environment, desire for immediate response, seriousness of the topic, and distance between the people communicating.

These findings will allow Motorola to develop new features for mobile devices and services that could help people feel more connected.

Organizational Background

Motorola Inc.

Motorola is a *Fortune* 100 global company whose goal is to “[transform] innovative ideas into products that connect people to each other and the world around them...[T]he company strives to keep its commitment of making things better and life easier.”¹ Motorola’s focus is to provide the consumer with seamless mobility solutions for all areas of their life. The company’s concept of seamless mobility “...means you can reach the people, things and information you need in your home, auto, workplace and all spaces in between. Seamless mobility harnesses the power of technology convergence and enables smarter, faster, cost-effective and flexible communication.”²

Founded in 1928 in Chicago, Illinois as the Galvin Manufacturing Corporation, Motorola has been providing cutting edge technology to the general public. Over the past 77 years, their products have included innovative firsts such as the walkie-talkie, the portable radio, the pager, the cellular telephone, embedded microprocessors, and HDTV technical standards. Today, Motorola is divided into four separate businesses, Connected Home Solutions, Government & Enterprise Mobility Solutions, Mobile Devices, and Networks. In 2004 the Corporation had sales of over US \$31.1 billion.

Motorola Labs

Motorola Labs is an applied research organization that works on “mid- to long-term” technical solutions for the real world. The Labs concentrate on work that serves to advance the technological innovations needed for seamless mobility. Employing more than 800 “technologists,” Motorola Labs supports seven “Centers of Excellence:” systems and physical sciences, physical realization, wireless access, networks and systems, applications, content and services, and human interaction research.³

“We exist to create disruptive new technologies that will enhance easy, uninterrupted access to what people value most – communication, information, entertainment, monitoring, and control. We are developing new ways to give people the experience of being connected from any location, at any time they choose, to any device, regardless of the service. We are creating seamless mobility.”⁴

User Centered Solutions Lab

The User Centered Solutions Lab at Motorola operates under the simple charter statement, “We create communication concepts and technologies to help people feel more connected.” They conduct research on such diverse subjects as family and friend communication behaviors; messaging behaviors; photo and music storing, searching, retrieval, and sharing; social

¹ Motorola Corporation. “Motorola History.” Retrieved October 2, 2005, from <http://www.motorola.com/content/0,,115-110,00.html>

² Motorola Corporation. “About Motorola.” Retrieved October 2, 2005, from <http://www.motorola.com>

³ Motorola Labs. “Our Global Presence.” Retrieved October 2, 2005, from <http://www.motorola.com/content/0,,5815-8960,00.html>

⁴ Motorola Labs. “The Technology Organization.” Retrieved October 2, 2005, from <http://www.motorola.com/content/0,,258-8896,00.html>

awareness; and presence. We worked for a team of technologists including Crysta J. Metcalf, Ph.D, Ambiga Dhiraj, Vernell Chapman, and Guy Romano.

The Motorola team's research for this project is focused on Content Enhanced Presence (CEP) and the ideas of connectedness.

Situation Description

The research conducted by Motorola on Content Enhanced Presence (CEP) has as its primary goal the development of technologies to help people feel more connected. There are a number of dimensions relevant to the concept of CEP, relating primarily to the realms of cognitive, psychological, and social sciences. When applied to and considered within a communication or technology context, CEP enables heightened sense of presence by means of content that serves to enhance social awareness. Two fundamental aspects of this dynamic are expressed by:

- the generation and sharing of “lightweight” content (i.e. content that puts very little burden on the sender to generate)
- ambient receipt/reception of content

Statement of Need

The client wanted to know what types of content relating to presence or “awareness” could and should be shared among friends who live in the same geographic location. Our project goals included:

- defining “connectedness,”
- producing a list of types of content that could be shared to make people feel more connected, and
- presenting the client with data to enhance their brainstorming process.

Research & Analysis Methodology

Overview & Rationale

The research was conducted through a combination of observation and individual interviews. Analysis was conducted based on the framework provided by *Rapid Contextual Design* (Holtzblatt, Wendell, Wood, 2005) with a special emphasis on capturing “insights” by means of affinity notes and diagrams.⁵ Participant names and other identifying characteristics have been removed from the final report, all affinity notes, and diagrams.

Ethnographic / Observational Research

Observational research was conducted as a preliminary step for finalizing the project proposal, reconfirming the research target, and developing the discussion guide. The observational research was conducted several times in different locations, including mass/public transit, a coffee house, a student activity center, and other areas on the University of Michigan campus. This research assisted the team in better understanding some of the situational contexts of mobile device usage.

The observational research helped confirm the target audience for interviews, undergraduate students at the University of Michigan. This choice was based upon the team’s observation that undergraduates use mobile devices to stay in touch with others both locally, for instance, classmates, friends, and roommates, and far away, such as family and friends from back home.

In-depth Interviews

A discussion guide was developed to address the client organization’s its goals and motivation for the project. The team took into account the feedback provided by class instructors, results of the previous observations, and techniques described in class.

The discussion guide (Appendix B) was written with the contextual design concept of “reconstructive technique” as a means of asking questions in a manner that would reveal attitudes, behaviors, emotions, and thoughts related to the subject of “connectedness” and associated topics.⁶ Initially, the guide included a single ranking exercise in which participants were asked to consider eight modes of contextual information that they could possibly know about someone else and rank them according to how connected they would feel to someone else if they knew this particular information about another person (Appendix C). However, mid-way through the interview process, the discussion guide was changed to eliminate redundant or unproductive questions, to provide the interviewer with better instruction and probes, and to add an additional exercise that asked participants to consider and rank different types of information content that they could share with others (Appendix D).

Recruitment of participants was done at the University of Michigan with the help of a number of graduate student instructors who taught undergraduate classes. They were given a short brief to read or email to their respective classes. Initially, the goal was to recruit eight to twelve participants for structured research including four individual interviews and a mini-focus group

⁵ Holtzblatt, K., Wendell, J.B., Wood, S. (2005). *Rapid contextual design: A how-to guide to key techniques for user-centered design*. San Francisco, CA: Morgan Kaufmann.

⁶ Ibid.

of four to six people. After consulting with course instructors and the client the team decided to focus solely on in-depth, individual interviews. Operating under the assumption that individual interview would yield richer results, questions were created to elicit behavioral, cognitive, and emotional aspects related to mobile device usage and the concept of connectedness.

Ten individual interviews were completed between in October and November of 2005. The interviews were conducted in private study rooms in the undergraduate library. On a rotating basis one team member acted as interviewer, while another took notes. Participants signed informed consent forms; the interviews were recorded for future consultation. Interviews lasted approximately 45 minutes to an hour, and participants were given a \$25 gift check at the conclusion of the session. After each interview the note-taker typed up the notes and shared them with the rest of the team.

All participants were undergraduate students under the age of 22 who regularly used mobile devices as part of their daily routine. More detailed profiles are available in see Appendix A. 9 participants were female and one was male. The team had hoped for a better gender balance among participants, however, due to blind recruiting techniques and volunteers' availability, this was not achieved.

Data analysis and reporting was conducted by means of capturing affinity notes which were later compiled into an affinity diagram. After all interviews were completed, team members met as a group to construct affinity notes. Approximately 300 affinity notes were produced from the data collected in the ten interviews. The team met on three occasions over the course of ten days to brainstorm, capture insights, and map out its understanding of important themes in the research context. The resulting affinity diagram highlighted major themes and patterns in the interview responses.

Findings

The findings of this research break down into three categories: aspects of connectedness, information people like to know about one another, and factors that affect people's choice of communication method. Each of these aspects is reviewed individually in the following section, and a diagram of each category can be found at the end of each subsection.

Connectedness

As part of the interview process, participants were asked to define the term "connectedness" and what it meant to them, as well as to describe what it feels like to be connected to others. They were also probed throughout the interview about the connectedness concept as it related to who they felt connected to, what kinds of information they shared with people they were connected to, and how they stayed in touch with these people. As a counterpoint, participants were asked to define the term "disconnected" and identify and explain instances in which they felt disconnected. The resulting comments from these lines of questioning formed a working definition of connectedness as it relates to this project.

Connectedness between persons is defined as a feeling of inclusion in others' lives as a result of sharing experiences and communicating emotions, opinions, and day-to-day information on a regular basis.

Several points about connectedness repeatedly emerged in the interview answers, giving a broad view of all aspects of being connected to another person. The first component of connectedness that was frequently discussed was the fact that face-to-face interaction is highly valued, as it is the form of communication most likely to create a feeling of connectedness between individuals. Meeting in person allows individuals to see each others' facial expressions and body language which, many participants noted, add forms of context to a conversation that can not be duplicated by speaking on the phone or in writing. One participant stated that he shares deep emotional information with distant friends over the phone but that he feels "more removed" because he cannot see the other person's facial expressions. This feeling of removal causes this participant to avoid talking about personal information over the phone to local friends and instead, to plan get-togethers so they can talk in person. "Emotional response matters most in communication," he continued (Participant 6).

Along the same lines, interviewees indicated that sharing deep emotions and serious information leads to a high degree of connectedness. As one participant stated, "quality is important versus quantity," when it comes to information sharing, and she would learn more about the person knowing about their life-changing experiences rather than their food preferences (Participant 1). Participants expressed desires to know about the goals and ideals of their friends and family members, their opinions of world events, and their problems. Similarly, participants share this same kind of information about themselves with the people to whom they feel most connected. They were eager to share this type of emotional content with others because they wanted their friends and family to be able to come to them when experiencing emotional distress, and, said one participant, "It helps to know that someone cares if you are struggling" (Participant 7). Another participant expressed that, "The positive thing about being connected with someone is feeling more emotional support" (Participant 8).

A person's level of connectedness does not depend solely on sharing deeply meaningful information, however, but is enhanced by also knowing details about others' lives. Sharing humorous incidents with friends came up in several interviews, as did knowing basic likes and dislikes about the people one is connected to. Gossip, schedules, and relationship status were also mentioned as things that are shared between close friends. Being aware of the "little things" often adds profundity to a relationship.

Another aspect of connectedness revealed in the interviews was that the frequency of contact between people directly corresponds to the level of connectedness one feels. The interviews showed that most participants have people who they communicate with on a daily basis just to "check-in." When asked to name people she is connected to, a participant responded, "I talk to my mom and dad everyday" (Participant 4). Another participant speaks with her long-distance boyfriend up to thirty times per day and feels that these short conversations add a level of intimacy to their relationship that would be otherwise hard to achieve (Participant 1). Others mentioned phone calls or instant messages sharing "silly" things and general schedule information. When asked to name someone who they used to be connected to but now feel disconnected from, participants often mentioned friends from high school. Since going off to college the frequency of their communication has been reduced considerably, and many felt that this led to less exchange of information and less understanding of each others' lives.

In the same vein, our research revealed that technology enables connectedness. By being able to communicate in multiple ways, participants managed their personal connections using many different methods including face-to-face meetings, phone calls, instant messaging, text messaging, e-mail, and e-communities such as Facebook.com.⁷ Participants' dependence on technology as a means of feeling connected to others is especially evident when technology fails or is not available. One participant, who has high school friends in many countries around the world, repeatedly stressed that she lost contact with many of these classmates because they lived in places where they did not have the same level of access to technology as she does in the United States (Participant 8). Another student described a recent time when her long-distance boyfriend broke his cell phone and she could not talk with him whenever she wanted. It frustrated her immensely not to be able to talk, text, and send pictures back and forth (Participant 1). Participants also stressed that they felt disconnected and even unsafe at times when they did not have phone reception. Participants rarely turn off their cell phones, and many received calls and/or text messages during their interviews.

Participants commented on the fact that connectedness has both definite benefits and definite disadvantages. Positive aspects of connectedness cited frequently include emotional support, mutual understanding, and not feeling alone. "I don't like being alone," stated one participant. She went on to explain that connectedness gives people the feeling that, "what's going on between you is the only thing going on" (Participant 4). Another participant, giving the example of feeling stressed at midterms, explained that people with whom you have a connection share the same experiences and can relate to you and understand your stress (Participant 7). A further aspect of mutual understanding that was discussed frequently was the idea that when people share a bond of connection, "you don't need to fully explain yourself" because you already know each others' backgrounds. This was described as a relief; it is more difficult to communicate

⁷ Other e-communities mentioned include HI5.com, MySpace.com, and LiveJournal.com.

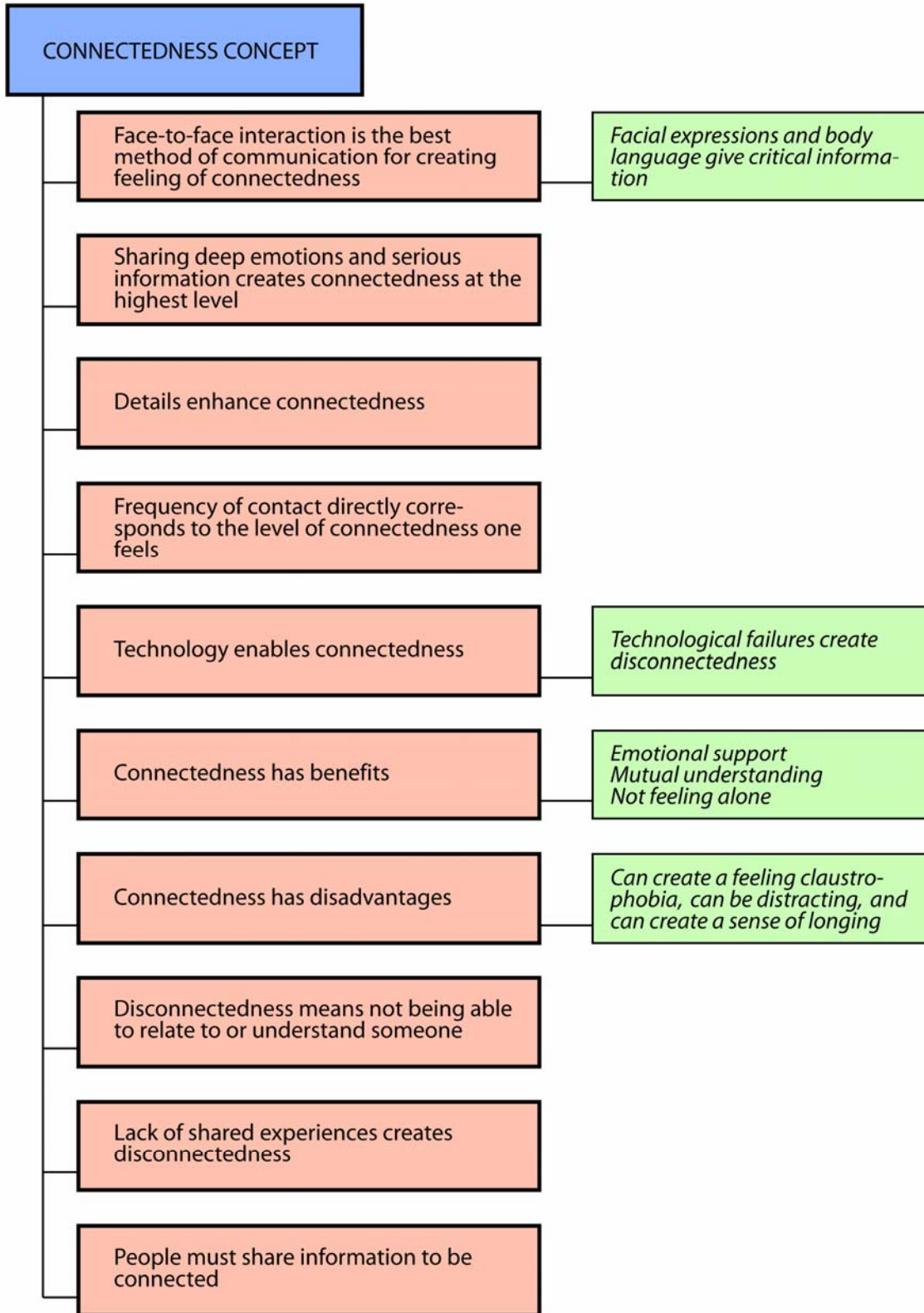
with people to whom one feels less connected (Participant 5). Participants also discussed disadvantages of connectedness, including a feeling of claustrophobia, increased distraction, and a sense of longing. At times, explained one participant, “there is no room for myself” in relationships in which she is closely connected to another person (Participant 10). Knowing what goes on in someone’s life can be distracting, claimed another participant (Participant 7). Several participants discussed the idea that they miss people to whom they feel connected but don’t see on a daily basis. When they don’t speak to these people a feeling of longing is formed.

A clear definition of disconnectedness emerged when discussing the counterpoint question, “What does it mean to be disconnected from someone?” Disconnectedness, explained many participants, means not being able to relate to or understand someone. “They don’t know what’s happening in my life,” said a participant when talking about friends who attend another university (Participant 5). However, disconnectedness can also be felt with people with whom participants had constant contact. One participant explained that to her disconnectedness is “not being able to talk to someone about anything,” and used the example that talking to her roommate, who she is not friends with, “is like talking to a wall” (Participant 2). Similarly, another participant said that if someone is very different from her, it will be difficult to feel a sense of connection with them.

Participants frequently experienced feelings of disconnectedness to friends who are far away. One common reason participants discussed was a lack of shared experiences. Without these, it is very difficult for people to feel a sense of deep connectedness. One participant explained disconnectedness as “a natural progression in life,” while another stated, “Things change, so I understand how my connections with my high school classmates have disappeared” (Participants 10 and 8). A feeling of constantly having to “catch-up” with people who they don’t see on a regular basis impeded many participants’ feelings of connectedness. One participant who lives off-campus even felt that her friends who lived in the dorms were more connected because they share the same space and see each other every day (Participant 1).

Underlying all of the facets of connectedness discussed so far is the core concept that people must share information to be connected. The kinds of information that can be shared to create a sense of connectedness between people will be discussed in the following section.

Figure 1: Affinity Diagram Results – Connectedness



Information People Like to Know About Each Other

During the interviews participants talked about kinds of information they know about people they are close to and kinds of information they share with these people. They were also asked how they would react in two hypothetical situations: contacting a new friend about going to dinner and planning a party or a trip to the movies. Finally, they were asked to complete two exercises where they ranked items that help create context for situations or information that can be shared among friends. The participants indicated which items made them feel the most connected to others and which had little or no effect on their feelings of connectedness. The results are available in *Tables 1* and *2*. Participants ranked the items that made them feel most connected as “1”, and items that did not affect connectedness as “8”. The following section discusses the items that people valued most to create a sense of connectedness.

Table 1: Information State Preferences (N = 10)

Content	Mode	Number at this mode	Average Ranking	Qualification	
				Pro	Con
Mood (emotional state)	1	5	2.2	<i>“If I know how they’re feeling then I feel connected because I can judge how they will react.”</i>	<i>“I want to talk to someone despite [their] mood.”</i>
Availability (with others or alone)	4	3	3.7	<i>“Are they alone or with others? That way I know what we can talk about.”</i>	N/A
	6	3		Doesn’t want to keep a person from others they may be with.	
Communication method (email, phone, text)	2	2	3.8	Important because a call or text messaging is faster than email.	Connection depends on more who it is than what the method of communication is.
	3	2			
	4	2			
	7	2			
Occupation (leisure, school, work)	5	4	4.1	N/A	Has nothing to do with connectedness. It’s not a barrier to being connected.
Proximity (close by or far away)	8	3	5.0	<i>“Knowing people are close [is important to me]”</i>	<i>“Doesn’t necessarily influence connectedness.”</i>
Location (at home, school, work)	6	3	5.1	Knowing that someone is in the mall (location) is more important info than knowing someone is far away.	<i>“Just knowing where someone is doesn’t help me feel connected.”</i>
Activity (busy or free)	3	4	5.5	<i>“That way I can know what we can talk about.”</i>	<i>“Doesn’t have to be an extended period of time [talking] just to feel connected.”</i>
Status (almost there, just leaving)	8	3	6.6	If you know that someone has just left, it means you can anticipate seeing them.	Doesn’t really matter unless person you are calling is in a rush.
	7	3			

Interpretation

Overall, there is a clear preference for knowing whether someone is in the “mood” to talk, is able to talk privately, which method of communication would be best, and knowing what someone is doing. Least favored was “status” or knowing if the person was just arriving or departing a physical location.

The results show:

- Being able to know or convey mood averaged highest at 2.2 with a mode of 1 (5 out of 10 participants chose ranked mood the highest).
- Availability averaged 3.7 with modes of 4 and 6 (3 out of 10 participants ranked this fourth and sixth).
- Communication method averaged 3.8 with modes of 2, 3, 4, and 7 (2 out of 10 participants ranked this second, third, fourth, and seventh).
- Occupation averages 4.1 with a mode of 4 (4 out of 10 participants ranked this fifth).
- Status averaged last at 6.6 with modes of 7 and 8 (3 out of 10 participants ranked this seventh and eighth).

Table 2: Content & Media Preferences (N = 5)

Content	Mode	Number at this Mode	Average Ranking
Schedules/event details	3	2	2.6
Digital photos/videos	2	2	2.8
Contact info	1	2	4.0
	7	2	
E-community invites	3	2	4.4
Relationship status	N/A	N/A	5.6
Emoticons	5	2	6.0
Music	N/A	N/A	6.4
Party invitations	5	2	6.6
	7	2	
E-cards	8	2	7.8
Directions	9	2	9.0

Interpretation

Overall, there is a clear preference for sharing content or media that conveys a sense of being part of someone else’s life or sharing one’s own life with others (for instance, schedules or images/videos that capture the moment).

The results show:

- Being able to share schedule/appointment/event details averaged the highest at 2.6 with a mode of 3 (2 out of 5 participants ranked this third).
- Digital photos/videos averaged 2.8 with a mode of 2 (2 out of 5 participants chose this second).
- Although contact information averaged 4.0, the modes were 1 and 7 respectively (2 out of 5 each chose this first and seventh).
- Directions averaged last at 9.0 with a mode of 9 (2 out of 5 chose this ninth).

Availability emerged as one of the most important pieces of information people can share with one another. The questions, “Can you talk?” and “Are you alone?” define the basic idea of what availability means to the participants. They frequently cited concerns about interrupting others while the person was in the middle of an important task such as class, meetings, or other conversations. Much of this concern was generated from personal experiences of being interrupted at bad times. Participants handle these types of disruptions on a case by case basis. One participant noted that when using her mobile phone, she frequently screens calls during “bad times” and sends calls that she knows to be unimportant directly to voice mail (Participant 5). Another participant told the team that she had recently received a call when she was busy but she felt an obligation to continue the phone call because the caller was far away and they had not communicated for some time (Participant 4). Participants are also quite interested in knowing whether the person they are attempting to contact is alone or with others. If participants are not sure if a person is alone, they tend to censor their remarks to ensure the privacy of their conversation. Another aspect of the question “Are you alone?” discussed by a participant was that she felt that people were more likely to be able to have conversations if they were alone (Participant 1). Knowing availability information beforehand makes people more comfortable when contacting others.

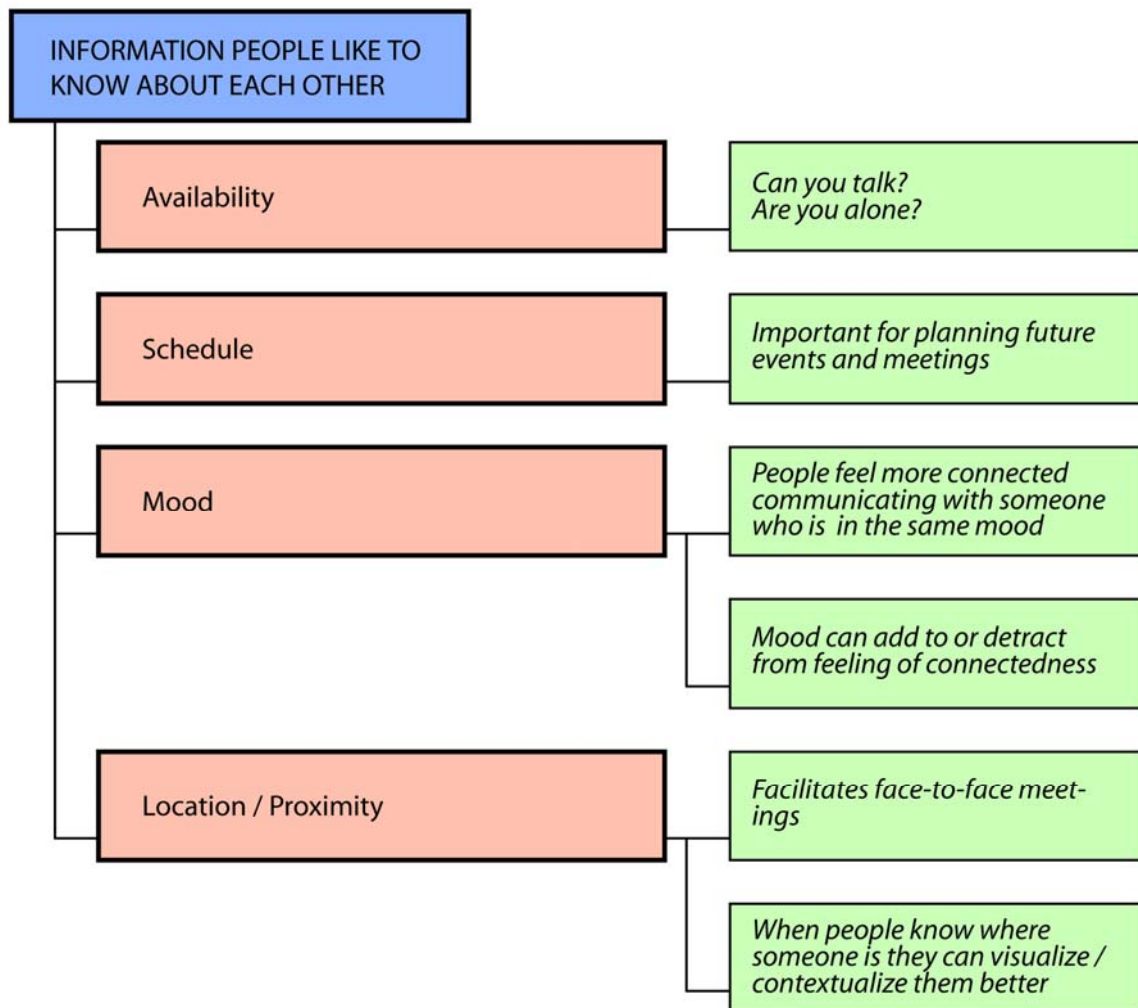
Similarly, knowing a contact’s schedule emerged as something that participants are interested in. This was mentioned many times when participants responded to the hypothetical situation questions about planning a party or going to the movies. Knowing others’ schedules helps plan for future events. Participants also use schedule knowledge to help them decide when to contact others. One participant makes calls to her family and friends only when she knows their schedules, and calls at a time when she believes them to be free. Knowing a person’s schedule makes this participant feel less anxious and more relaxed (Participant 4). Similar answers about the benefits and usages of schedule information were received from many participants.

The interviews showed that participants placed high value on knowing someone’s mood. Mood reflects one’s emotional state and thus is considered to be more important than someone’s current activity or actions. Knowing one’s mood can increase the feeling of connectedness (Participant 1). People tend to feel more connected when they are communicating with someone who is in the same mood as they are. For instance, one participant explained that she is able to relate to her roommate much better when their moods match, either they are both in a good mood or both are stressed because of upcoming exams (Participant 7). If both parties are in the same mood, it will help them to be on the same page. On the contrary, if one person is in a good mood, while the other is struggling or grumpy, the dissonance in their moods will create a feeling of disconnectedness even if they are normally close (Participant 3). Mood also steers the conversation, determines the topics that will be discussed, and affects one’s interpretation of things said (Participant 2). It is clear from participants’ responses that mood can add to or detract from the feeling of connectedness.

It is important to note, however, that several participants stated that they would not want to know someone’s mood before getting in touch with them. Not only can mood change very easily throughout a conversation, but participants also felt that mood is something that they can and should figure out once they talk to the other person (Participants 1 and 2). Not a single participant stated that knowing that someone is in a bad mood would affect his/her decision to get in touch with that person.

The participants felt that location and proximity were moderately important pieces of information for two reasons. First of all, if the goal of getting in touch over a mobile device was to set up a face-to-face meeting, knowing someone’s location could facilitate this meeting. Similarly, if participants knew that the person they wanted to talk to was nearby, they could just walk over and meet in person instead of calling or sending a message. One participant stated that if he knew where his girlfriend was, he could put a timeframe on how long it would take her to get to their meeting point (Participant 6). Secondly, knowing where someone is at the moment could help add context to the conversation and visualize the interlocutor, given that the person is familiar with the location. However, the participants felt that neither location nor proximity contribute strongly to the feeling of connectedness. For instance, one participant said, “Just knowing where someone is doesn’t help me feel connected” (Participant 4).

Figure 2: Affinity Diagram Results – Information



Factors That Affect People’s Choice of Communication Method

The participants were asked a series of questions regarding their choice of communication method. People may choose to speak face-to-face with one another, by phone, by email, by text

messages, using instant messaging, or by posting a message to an online community. The reasons behind the choice of communication method expressed by the participants depend on a number of factors. These include the necessity of a particular level of connectedness, the assessment of their current environment, the desire for immediate contact or response, the nature of the topic, and the physical distance between individuals.

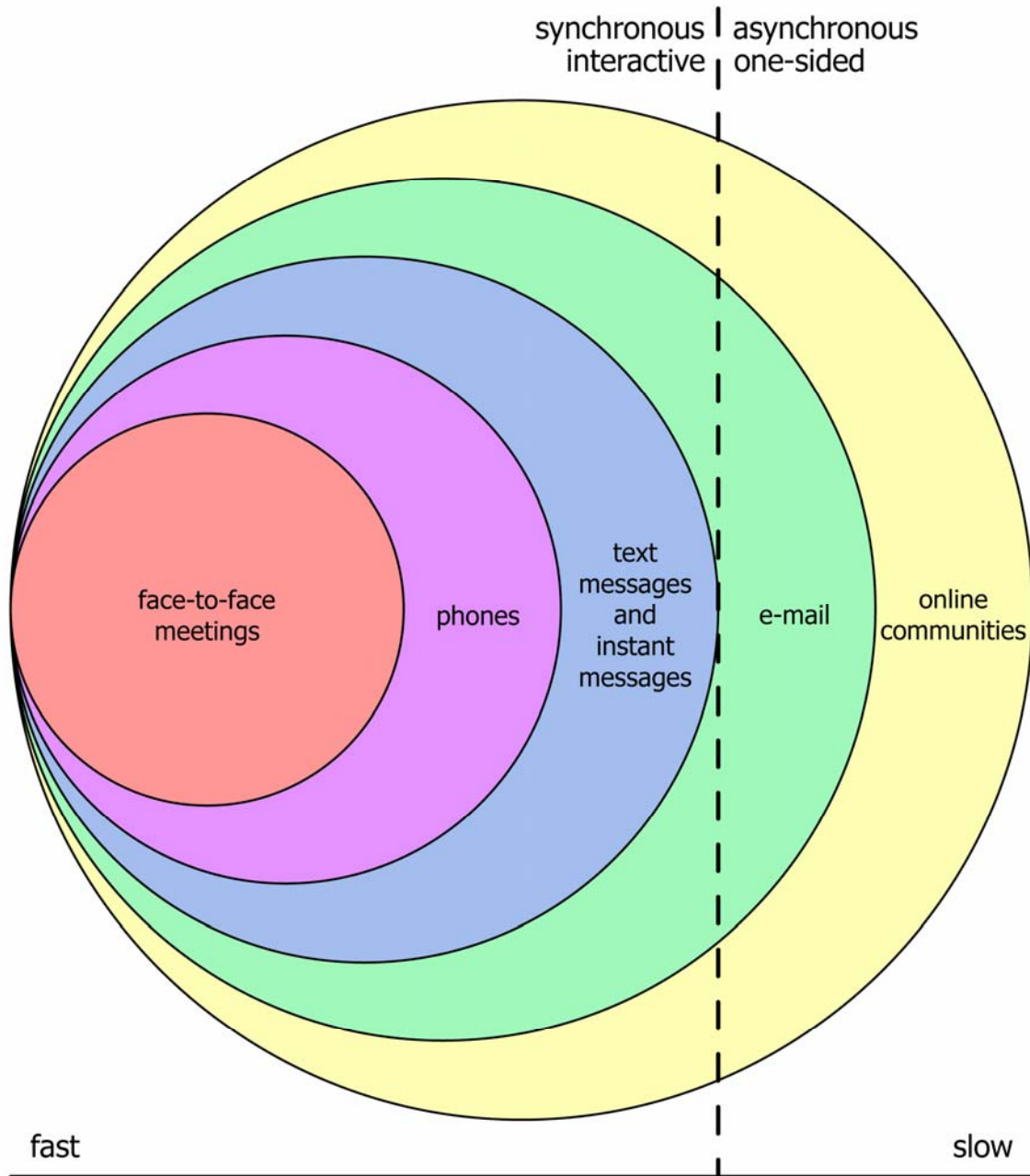
One factor determining the choice of communication method is the level of connectedness desired between the people communicating. Participants who want a high level of connectedness expressed that face-to-face interactions as a communication method were the best. One participant stated, “Face-to-face communication gives you non-verbal cues such as body language and facial expression. I’m afraid of being misinterpreted so I would not be sarcastic online” (Participant 2). Phone was another method of communication that participants used to enhance feelings of connectedness. Email and instant messaging are considered to be impersonal by some participants. According to one, “You can be misinterpreted. Email is so cold” (Participant 4). Another participant agreed that phone usage is better than instant messaging for enhancing connectedness by stating, “I feel most connected by using the phone. I have some problems with [instant messaging] because I feel that I can be misunderstood... [I]t lacks...intonation” (Participant 7).

Another factor determining the choice of communication method is one’s assessment of the surrounding environment. Participants choose communication methods depending on where they are. For example, one participant said that she used text messaging during class, “Text messages are for quick contacts, but they’re especially good for quick contact in class when you can’t pick up phone to talk” (Participant 2). Similarly, another participant explained, “My mode of communication depends on where I am, like, if I’m in class, so I use [instant messaging]” (Participant 8). Responses to incoming communication are also affected by one’s environment. One participant simply said, “I won’t answer the phone at a bad time, and I’ll just let it go to voice mail” (Participant 5).

The degree to which one needs to feel an immediate sense of connectedness is the key factor in any decision about which method of communication to use. The desire for an immediate response was a common theme in all interviews. For example, when the need for contact is immediate, a kind of cognitive calculation is made to achieve the greatest degree of connectedness given one’s own situation and whatever is known about the other person’s situation (Participant 3). Given that participants prefer face-to-face exchanges, all other considerations and methods of communication serve the purpose of arranging such meetings, except in cases when this is not possible due to the distance involved. In situations like this, another technology, such as a mobile phone or text message, will act as a surrogate for an in-person meeting (Participant 6). Ultimately, how quickly the technology establishes a feeling of connectedness, given the circumstances that participants face, determines whether or not it will be used.

Figure 3 shows the distribution of the relative speed of various communication methods.

Figure 3: Speed of Information Transfer

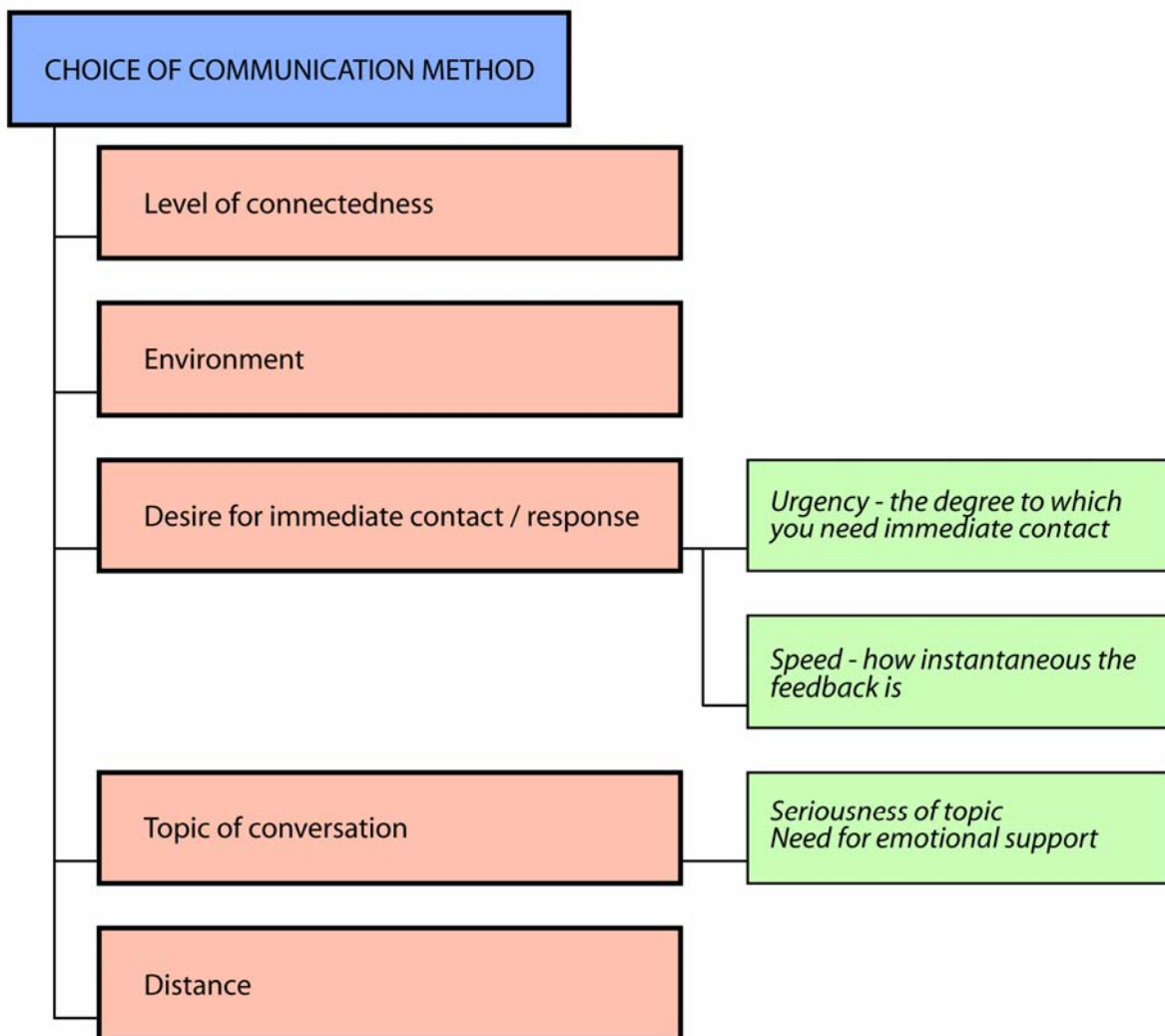


The topic of conversation is another factor in determining a method of communication. If it is a serious matter or a need for emotional support, face-to-face interactions or phone calls are selected. One participant said, “I don’t really have deep phone conversations with the friends that I see often because there’s no need. It usually happens face-to-face” (Participant 5). Another said, “I do not like talking about personal stuff on the phone.” She continued, “Face-to-face meetings are important. They are fun and more personal” (Participant 6). Similarly, one

participant believes in “talking to people directly either [on a] cell or face-to-face...as a way of really getting to the point or emotional problem” (Participant 4).

Distance also factors into the equation of communication method choice. Participants explained that generally they share very personal information in long conversations over the phone only with people who live far away. Thus, the technology affords something as close to “being there” as is possible, given the context or circumstances such as a student being away from home (Participant 3). In these cases, the nature of what is discussed becomes detailed, much like the in-person exchanges that local friends share. These instances also involve a degree of visualizing where the other person is at the moment, either based on familiarity with the location or the other person’s ability to convey such details in conversation (Participant 6).

Figure 4: Affinity Diagram Results – Communication Method



Implications

At this moment, the User Centered Solutions Lab (UCSL) at Motorola has several groups working on projects related to Content Enhanced Presence (CEP). For instance, right now the UCSL is field-testing a prototype of a program that allows people to share information, in real time, about what kind of music they are listening to on their computer. Friends can send each other instant messages with their feelings about the music to provide feedback. The UCSL designed the program to facilitate CEP through the sharing of musical preferences among groups of friends. The team's research will serve to inform the UCSL's brainstorming process as they continue to develop concepts for the generation of new products and services. The UCSL wants to use this research to determine what topics they should approach next as they continue to create innovative projects in the field of CEP. What types of content are people most interested in sharing with one another? What types of content create the greatest feeling of connectedness among friends? The University of Michigan team hopes that the research presented in this paper will be helpful for this process.

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Appendix A: Participant Profiles

Participant 1

Female, Sophomore. Dance Major.
Born in Manhattan, but moved to Michigan at the age of 5.
Her family lives only 45 minutes away.
In a long-distance relationship.
Uses myspace.com, LiveJournal, cell phone, text messaging, camera on her phone.

Participant 2

Female, Sophomore. Possible Communications Major.
From Michigan. Her family lives about 45 minutes away. Very close to Mom.
Has 2 younger siblings.
Single.
Uses cell phone, IM, text messaging, Facebook.

Participant 3

Female, Sophomore. Undecided.
From Michigan. Her family lives about 1 hour away. Has a brother at EMU.
Single.
Uses cell phone, camera on phone, 3 way-calling, e-mail, IM, landline for incoming calls.

Participant 4

Female, Sophomore. Undecided.
From Michigan. Her family lives about 2 hours away. Has brothers.
Has a boyfriend in Ypsilanti.
Uses cell phone, IM, e-mail, landline for incoming calls.

Participant 5

Female, Freshman. Undecided between Psychology and Communications.
From Northern Michigan. Family lives about 3 hours away. Has older brother and sister.
Recently ended a long-term relationship.
Uses cell phone, Nextel beeper function, receives text messages, e-mail, IM, landline for local calls.

Participant 6

Male, Freshman. Health and Bio-chemistry major.
His family lives about 45 minutes away. Has 5 younger siblings.
In a relationship for the past 2 years.
Uses cell phone, email, IM, landline for incoming calls.

Participant 7

Female, Sophomore. Undecided Major.
From Michigan. Her family lives 2 hours away. Has a younger brother.
Single (assumption based on the fact that she never mentioned having a partner).
Uses cell phone, receives text messages, IM, e-mail.

Participant 8

Female, Senior. Architecture Major.

Born in Chicago, moved to Ecuador when she was 4. Identifies herself as Latin. Has two younger sisters, one in the US and one in Ecuador.

Single (assumption based on the fact that she never mentioned having a partner).

Uses cell phone, landline w/calling card, e-mail, HI5, IM

Participant 9

Female, Junior. Started in Engineering, now transferring to School of Education.

Her family lives only 45 minutes away.

Single (assumption based on the fact that she never mentioned having a partner).

Uses cell phone, text messaging, IM, IM on the phone, email.

Participant 10

Female, Sophomore. History/Psychology Major.

From Michigan. Family lives 2 hours away. Has older and younger brothers.

Has a boyfriend.

Uses cell phone (Talk2Talk plan w/Mom), IM, e-mail, text messaging, Facebook

Appendix B: Discussion Guide

Discussion Guide

I. Introduction (5 minutes)

Background/purpose of discussion/ground rules:

- Thanks for your time/for coming in
- Here to talk about staying in touch with people
- There are no right or wrong answers; we're interested in what you think/feel and the way you go about doing things.
- Feel free to say what you think or feel
- Occasionally, I may interrupt for a clarification of what you say
- Taping discussion so I can review the tapes/make a final report
- However, all responses are confidential; no names are used
- If at any time you feel uncomfortable about a question feel free to say "pass" and we will move on to the next question

Respondents will introduce themselves and provide background information:

"Please tell me something about yourself..."

- What year are you at UM?
- Where are you originally from?

II. Behavior & Usage (10 minutes)

Who do you “stay in touch with” on a regular basis?

- For instance, how many people did you talk to yesterday or the day before?
Use first names only (for privacy).
- If you’d like, scroll through your call and dial log to remind you.
- Please explain how each person figures into your life (example: classmate, friend, sibling, parent).
- How do you stay in touch?

PROBE: For mobile/PDA devices usage.

- Does he/she live in Ann Arbor, or is s/he’s “far away?”
- Could you tell us how often to keep in touch with him/her?
- What about your parent/sibling/relative?
- Are most of these people close by or are they far away?

How do you decide what method of contact you will use to get in touch with someone else?

- Describe a situation in which you really felt “in touch” with someone who was not right there or close by?
- How about a time when you did not feel in touch with someone that you were in contact with?
- Why?

What kinds of devices do you use to stay in touch with others?

- **PROBE:** Do you use a mobile phone, PDA, laptop w/wireless
- What kinds of features or functionality do you use most often?

Tell me about the last time you used a mobile device to get in touch with someone.

- **PROBE:** Who was it? What did you talk about? How long did it last? Was this longer or shorter than usual?

Are there any differences in the length of time your contact with various people?

- Can you explain the reason for the differences?
- Does the role that that person has in your life make any difference? (e.g., parent, sibling, friend). Please explain.

In your opinion, what’s the main difference between these devices in terms of staying in touch with other people? (if applicable)

III. Connectedness Concept (10 minutes)

What does it mean to you to feel “connected” or have a connection with someone else?

[Note: do NOT let them think about networking.]

- Who do you have connections with?
- What are the key benefits of being connected? Any disadvantages?
- How do you typically stay connected with other people?
- How does staying “connected” with other people make you feel?

Think of a person you feel the most connected to.

- How do you stay connected with this person?
- When did you last talk or have contact?
- What kind of things do you talk about? What do you really talk about?
- How did you feel after talking to/contacting this person?
- How long did the interaction/contact last?

What does being “disconnected” mean to you?

- Can you describe the last time that you felt “disconnected” from someone else?
- How do you really feel in such a situation?
- How did you remedy the situation?
- **PROBE:** Did you meet up in person? Call? Use a text format?

Think about someone you don’t feel as connected to as you’ve once were.

- When did you last talk or have contact?
- What kind of things did you used to talk about? Probe: Books, movies
- What do you talk about now?
- How did you feel after talking to/contacting this person?
- How long did the interaction/contact last?
- Any particular reason why you are not still connected to this person?

Take a moment to think about the people you feel the closest to.

- What kind of information do you know about them?
- What information about yourself do you share with them?

Counterpoint:

What’s the difference between talking to someone in person vs. on a cell phone?

IV. Information Sharing (10 minutes)

Now, think back to all the times that you got in touch with or connected with your friends yesterday.

- What information did you share with them?

Is there any difference in the kind of information that you share with people based on your mode or method of interaction?

- **PROBE:** face-to-face conversation, AIM messages/emoticons/signals, text messages, phone conversation, photos, video, audio.

Think about a friend who you see often and a friend who is far away. Is information that you share with them different?

Now, think about getting in touch with a close friend—someone who is close by...

- If you were planning to get in touch with someone, what would you like to know about that person before you contact them?
- **PROBE:** feelings, mood, emotion, location, activity, and etc.

Let me give you a hypothetical situation, and you tell me what you'd do:

You've made new friends on campus. You don't really know their schedules very well, but you want to talk to them about meeting up for dinner tonight. - -

How would you contact them? Suppose you cannot get in touch with them? What then?

How about another hypothetical situation; tell me what you'd do:

You want to go to movies (or plan a party) with some friends. What kind of information would you like to know about your friends before you finalize your plans?

PROBE: movies they have seen, movies they like (music they like)...

Are there any specific kinds of information that you typically share with your friends?

Are there any specific kinds of information that make you feel closer to them?

Of all the things that you've just mentioned, which ones are the most important to you?

“Information” Examples

The respondent will be provided with a list of 8 “modes” of contextual information that one either knows about or communicates to someone else. They will be asked to rank the list in terms of if knowing the information would make them feel more connected to others (on a scale of 1 – 8), with eight being the least connected and one being the most). He/she will be asked to share responses and the reasons behind them. See Appendix C for the Ranking Mode Exercise Worksheet (AA).

The respondent will be asked to share responses and the reasons behind ranking the items.

Which one or ones would make you feel the most connected?

- Please explain why...?
- How about what you mentioned before (from earlier/different from list). How does this rank compared to the options here?
- Which ones do you care the most about?

Which ones would make you feel the least connected?

- Please explain why...
- Why do you care about these the least?

***Counterpoint:
What’s missing
from this list?***

“Content” Examples:

The respondent will be provided with a list of ten examples of “content.” They will be asked to rank each one in terms of whether being able to send/receive this would make them feel more connected with others (from 1 – 10, with 1 being the most likely to make one feel connected and 10 being the least likely). See Appendix D for the Ranking Content Exercise Worksheet (AB).

The respondent will be asked to share responses and the reasons behind ranking the items.

Which one or ones would make you feel the most connected?

- Please explain why...

Which ones would make you feel the least connected?

- Please explain why...

<p><i>Counterpoint: What’s missing from this list?</i></p>
--

V. Conclusion

Announce that the interview is almost over. Ask respondent if there’s anything else that he/she would like to share.

Thank the respondent and end the interview.

Appendix C: Ranking Exercise AA

Instructions: Below is a list of types of information that can help create the context of a situation. They are things you can know about a friend, or that you can tell to a friend about yourself. These types of information would help you to complete these sentences:

- “If I knew about a friend’s _____ I would feel more connected to them.”
- “If I was able to tell a friend about my _____ I would feel more connected to them.”

Please rank these different types of information using a scale of 1 – 8, whereby knowing this or communicating it to someone else would make you feel more connected to this person.

For example:

- 1 – the most likely to make you feel connected to someone else (++++)
- 8 – the least likely to make you feel connected to someone else (----)

Please use each number only once.

Mode/State	Rank
Mood (emotional state)	
Proximity (close by/far away)	
Activity (busy, free)	
Location (in office, at home, in transit)	
Occupation (work, school, leisure time)	
Availability (with others/alone)	
Status (almost there/just leaving)	
Mode of Communication (phone, text, email, no contact)	

Appendix D: Ranking Exercise AB

Instructions: Please rank these different kinds of information or media on scale of 1 to 12, in terms of whether receiving this from or sending it to someone else would make you feel more connected to this person.

For example:

- 1 – the most likely to make you feel connected (++++++)
- 12 – the least likely to make you feel connected (-----)

Information / Media	Rank
Digital photos/Videos (including ones you just took)	
Music/Movie Trailers/Games	
Events details/appointments/schedules	
Directions (e.g., MapQuest)	
Emoticons (☺, ☹, ☺)	
Contact info (e.g., address, phone number, email address)	
eCards (example: Hallmark)	
eCommunity invitations (e.g., Friendster, Facebook, Dating.com)	
Invitation/Party Details	
Relationship status (e.g., single, involved)	
Other: _____	

Appendix E: Ranking Exercises - Complete Distributions

Table 3: Information State Preferences – Complete Distribution (N = 10)

Participant No:	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Mood	1	1	3	1	2	2	2	1	1	8
Proximity	7	8	4	6	1	7	5	8	8	1
Activity	5	6	2	3	7	3	3	2	3	7
Location	4	5	6	8	4	5	6	6	4	2
Occupation	3	3	7	5	5	8	8	5	2	5
Availability	6	4	1	2	6	4	1	4	6	3
Status	8	7	8	4	8	6	7	7	5	6
Comm. Method	2	2	5	7	3	1	4	3	7	4

Table 4: Content & Media Preferences - Complete Distribution (N = 5)

Participant No:	#6	#7	#8	#9	#10
Digital Photo/Videos	2	6	1	3	2
Music	7	2	9	8	6
Schedules/Event Details	3	1	3	2	4
Directions	6	10	11	9	9
Emoticons	4	5	6	5	10
Contact Info	1	7	10/4	1	7
E-Cards	9	8	7	7	8
E-Community Invites	10	3	2	4	3
Party Invites	5	9	8	6	5
Relationship Status	8	4	5	10	1

Appendix F: IRB Form

Informed Consent Form
School of Information Course 501: “The Use of Information”
Group Projects on User Information Needs Analysis

We would like you to participate in an interview as part of a University of Michigan School of Information graduate course on “The Use of Information.” The data collected as part of this study will be used to help MOTOROLA better understand how the people it serves use information. The interview questions will relate to your information needs and use relevant to services that MOTOROLA provides.

Your participation is voluntary and you can withdraw at any point.

To assure confidentiality as required by standard University of Michigan research guidelines, we will separate participant names from the data; in addition, study findings will not identify individual participants.

In addition, this interview may be recorded to help the graduate student researcher remember what has been said for later analysis. If it is recorded, the interviewer will ask for permission to do this and have you sign an additional consent below. All tape recordings and notes from this study will be stored in a secure place until they are destroyed at the end of the semester.

For further information about this study, please contact:
Professors Joan C. Durrance durrance@umich.edu or Soo Young Rieh rieh@umich.edu at the University of Michigan School of Information.
Telephone 734-647-3576.

The SI 501 graduate student team members include: Olga Khroustaleva, Chris Korintus, Ricah Marquez, Julie Shadford. Contact Email: rmarquez@umich.edu

Thank you!

(Please sign one copy of this form and keep one for your reference.)

1) I have read the information above and I consent to be interviewed as part of this study.

Your signature

date

2) It is ok with me to tape this interview and I understand that you will destroy the tape at the end of the semester.

Your signature

date

Appendix G: Motorola Payment Form

School of Information: 501 Project – Team Motorola

Thank you for taking part of this survey! We really appreciate you sharing your thoughts and feelings with us. Because of your participation, you will receive \$25 (American Express gift card). Before you receive the money, please provide the following:

Print Name:

Signature:

Date:

(Don't forget to sign the AMEX receipt.)