# Coherent Conversation Initiation in Multiplex Communicative Ecologies

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*This article reports on results from an ethnographic study of student inter-action at a design school. The aim of the article is to explore the relation between communicative affordances, mode choices and coherence strategies in multiplex communicative ecologies. This is accomplished by focusing on the choices made when initiating conversations in this setting. First the complete communicative ecologies of three international students in the design school are mapped, in order to demonstrate the options available, and focus is then turned to in-group interaction in particular. It is shown that the choices made can be related to the communicative affordances of the tools and the environments in relation to different considerations regarding attention. Whose attention do you want? When do you want attention and what kind of attention do you need? Can you get the attention of the other through the mode of your choice, and is now a good time to do so? In this discussion, the physical location of the participants is also taken into account. In conclusion, balanced awareness is introduced as a relevant feature in coherent conversa-tion initiation, and suggestions for design are presented.*

*Keywords: affordances, coherence, communicative ecologies, conversation ini-tiation, instant messaging, interaction*

As communicators in technology rich environments, we have access to an increasing number of different tools for communication. For instance, when making plans with a colleague in the modern workplace, you may choose to walk over to the colleague's office, make a phone call, send an

email or an SMS, or use Instant Messaging (IM), to mention a few common options. In addition, it is possible to begin conversing in one mode, continue in another, and finish in a third mode, allowing for topics to travel in between modes and locations in these multiplex communicative ecologies.

Ecological psychology states that each environment provides its inhabitants with *affordances*, that is, options for action (Gibson 1977, 1979). Some of these are especially relevant in relation to communicative action (Hutchby 2001). The overarching aim of the current article is to explore the relation between communicative affordances, mode choices and coherence strategies in multiplex communicative ecologies. The main focus is on how participants initiate conversations in a coherent manner and how they deal with the choices they need to make in that process. The analysis centers on interaction in a shared physical environment where participants have access to technological tools for interaction, and so the ways in which the communicative affordances of the digital tools become incorporated in the complete environment is of particular interest.

*Attention* is a central concept in research on face-to-face conversation initiation (cf. Mondada 2009, Baron 2008). In technology-mediated interaction, mutual attention is not always a prerequisite for coherent conversation initiation. However, issues concerning attention have often been discussed in this context (cf. Nardi 2005). Previous research on technology-mediated interaction has further shown that the lack of simultaneous mutual attention which text-based forms of communication provide can be both advantageous and disadvantageous. For example, some argue that text-based interaction, due to the lack of contextual awareness, gives participants greater control over the situation than in face-to-face (f2f) interaction (Baron 2008; Nardi, Whittaker & Bradner 2000), whereas others argue that the more contextual information available the more successful the interaction (Erickson & Kellogg 2000).

A more specified aim of the current article is thus to empirically investigate how different aspects of the notion of attention come into play when initiating conversations in the different modes available. Building on previous research on attention, coherent conversation initiation is here defined as *catching the attention of suitable people at a suitable time in a suitable manner.* This theoretically grounded definition attempts to il-

lustrate that coherent conversation initiation is not always about achieving simultaneous mutual attention from all potential participants. The analysis of the empirical material in turn has revealed more specific strategies for coherent conversation initiation.

The material explored in the current analysis was gathered in March 2007 as part of an ethnographic field study among a group of international university students at a design school in Sweden. After a brief introduction to previous research and to the current study, the methodlogy is presented in detail in the first part of the article. In order to introduce the communicative options available to the participants, the results section begins by mapping the communicative ecologies of three of the participants in the design school, and the more detailed results then concern in-group interaction only.

The results show that different levels of context need to be included in the analysis, and that the participants take different considerations regarding attention into account when initiating conversations. In the results section, these are grouped into the following three categories:

- *Privacy:* Whose attention do you want and whose do you not want? What types of activities do you want to give public attention and which are private?
- *Urgency:* How soon do you need the others' attention and what kind of attention do you want?
- *Availability:* Can you get the attention from the other through this particular mode, and is now a good time to do so?

Furthermore, the results indicate that coherent conversation initiation in these multiplex situations benefits from finding the right balance between high and low context awareness. These findings are used as a basis for suggested design considerations, through the introduction of the concept of *balanced awareness.*

## Theory and Previous Research

The current study combines ethnographic and theoretically underpinned analyses. In practice, this means that while approaching the material with an eye open for the unexpected, certain theoretical concepts have also in-

fluenced the focus of analysis. In the following, some of these concepts will be further explicated.

Traditionally, linguistic investigations of coherence have mainly focused on the links between textual elements, that is, on textual cohesion (Halliday & Hasan 1976). Research on coherence in conversation has further shown that sequential structure is a relevant tool for coherence maintenance (Schegloff 1990). In addition, it has been demonstrated that not only cotextual links but also contextual ones are relevant, moving focus from local to global coherence issues (cf. Gernsbacher & Givón 1995; Korolija 1998). For instance, Korolija (1998) summarizes previous research on coherence and shows how apart from links with the surrounding text, that is, the cotext, situation and background knowledge also influence how coherence is maintained (for an example of how coherence is related to task design, see Örnberg Berglund 2009a, and for further discussion on coherence in face-to-face and computer-mediated interactions, see Örnberg Berglund 2009b). However, the ways in which coherence and context interrelate during conversation initiation has not been a common topic of investigation.

Within conversation analysis, opening sequences in e.g. telephone interactions have been thoroughly described (Schegloff 1968; 1979). A much less commonly investigated area, however, is pre-opening sequences. Mondada describes pre-beginnings in the following manner:

> *In face-to-face conversations, these sequences are characterized by an intense body activity in space, through which participants achieve their social and spatial convergence and conjunction, in order to initiate a coordinated common entry in the interaction. In this phase, even before beginning to speak, participants achieve the mutual orientation of their bodies and of their gaze: the pre-conditions for social interaction are visibly and publicly assembled in time, within the progressive establishment of a mutual focus of attention and a common interactional space.* (Mondada 2009, 1)

She also refers to Whalen and Zimmerman (1987), who have investigated pre-opening sequences in telephone interaction, and included actions "such as researching or choosing the telephone number, composing it

[and] preparing the message to be delivered to the called institution" (Mondada 2009, 7). Coherent conversation initiation, as defined in the current article, includes both pre-opening and opening sequences, and also touches upon broader issues relating to mode choices, as we are dealing with multiplex communicative ecologies.

By combining interactional approaches to conversation initiation with ecological theory, it is possible to investigate how the options for interaction that are available to participants in conversation affect interactional and conversational patterns. Each environment provides affordances (Gaver 1996; Gibson 1977; 1979; Hutchby 2001) for communication, affecting how we can express and perceive communicative actions. These affordances can be investigated at the level of the options provided in the complete communication environment, including digital tools for interaction, that is, at the communicative ecology level.

To analyze a communicative ecology means to investigate the links between different modes of interaction available to an individual in a specific environment and how these relate to social relationships and discourse. Instead of analyzing media in isolation, they are viewed as part of a system of different media complementing each other. According to Foth and Hearn (2007), a communicative ecology consists of three layers: the social, the discursive and the technological layer. Furthermore, they identify different dimensions which influence the communicative ecologies, such as networked/collective, global/local and online/offline. They also suggest that private/public could be another such dimension, and claim that activity is a further influential factor.

Communicative affordances can also be investigated at the level of the design of the tools and how this influences more detailed interactional patterns. The communicative affordances of the ecology and the different modes involved influence the ways in which mutual orientation can be established and maintained.

Investigations of how the medium influences interactional patterns can be found within the field of computer-supported cooperative work (CSCW), where a number of studies deal with the importance of awareness in computer-mediated interaction (cf. Nardi 2005). For instance, Neustadter and Greenberg (2002) relate to a broad context in their discussion of coherence, by including the notion of presence awareness.

Nardi, Whittaker and Bradner (2000) have a similar research agenda. Based on an ethnographic study, mainly building on interview data, they introduce the concept of *outeraction* to refer to the functions of IM that are not about information exchange, but rather about managing communication. By showing that IM is used to *negotiate availability*, to *maintain a sense of connection* in an *active communication zone* and to *switch media*, they argue that studies of interaction can benefit from expanding the scope to include multiple interaction sequences and multiple modes.

The fact that technology-mediated interaction often provides less context awareness than face-to-face interaction has been approached from different perspectives in previous research. With a more positive outlook, Baron (2008) discusses how participants in text-based interaction can control the volume of their interactions. Similarly, Nardi, Whittaker and Bradner (2000, 6) refer to how text-based interaction allows for "plausible deniability of presence", resulting in a higher degree of control over the interaction. Contrarily, Erickson and Kellogg (2000) introduce the notion of social translucence to illustrate how interaction benefits from high visibility, awareness and accountability.

The current article adds to research within these fields by focusing specifically on conversation initiation and by investigating links between different modes and different sites of interaction.

## The Ethnographic Study

### *Setting the Scene*

The present study was conducted among a group of international students working with interaction design at a design school. Here, education follows methods of studio-based learning, which implies that the students complete different design projects, individually or in groups, in the school building, where they have access to a physical studio landscape and computer labs. The teachers take on the role of mentor and apart from some lectures, most of the interaction between teacher and students takes place by the computers where the students work, with the student projects in focus.

I spent three weeks in the environment with the students. During this time, they were working on projects where they were to come up

with ideas for multilayered design and create prototypes in the multi-media platform Flash. As the projects were individual, the interaction between the students took place on a voluntary basis. Many of the students expressed that they felt stressed to finish their ambitious projects before deadline, and one of them claimed that this resulted in less inter-action than usual.

In the studio, all students had their own workstations. These desks were located within small cubicles, and the height of the walls between desks could be altered. The studio was shared with another student group (their section of the studio is not included in the following images).
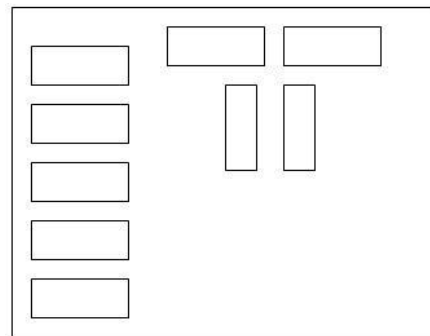


*Figure 1. Photo of the studio space.*

*Figure 2. Alignment of the student desks in the studio space.*

Some of the students had laptop computers at their desks in the studio. Others chose to do their computer work in the computer labs instead. In the school there were two computer labs, both located on the same floor as the studio. The labs had 16 computers each, arranged in four lines of four computers, all facing the same direction. The computer labs were open to all students in the school. All students had email accounts, all had cellphones with most of their classmates on their contact lists, most used IM and the core group analyzed had all or most of the other group members on their buddy lists. As we shall see, the digital tools employed were an integrated part of the environment, which demonstrates the complexity of the interrelation between online and offline.

In addition to being the place for project work, the school is also an important social space. The combination of often highly motivated students and a workspace with these social qualities resulted in them spending whole days, evenings and sometimes even nights in the environment. They often cooked there and socialized with each other and with students in other classes over lunch, dinner, or coffee in the student kitchen area. In addition, technological artefacts were often used for socializing.

The specific student group I observed had nine students (their names in this article have been anonymized). All of them spoke English fluently, and English was seen as the common language of interaction in the class. The native languages of the students were English (Aaron and Felicia), Chinese (Dina and Isaac), Malay (Bea), Swedish (Ella), Greek (Greg), Portuguese (Charles) and Italian (Helen). Bea also spoke Chinese fluently, Felicia was also fluent in Swedish, and Charles and Helen took Swedish classes.

During my time in the environment, six of the students were most often physically present in the school (Aaron, Bea, Charles, Dina, Ella and Helen). Two of the students were there approximately 50 percent of the time (Felicia and Greg), and one student was present only occasionally (Isaac). Of the six students that were there the most, two mainly worked in the studio (Charles and Helen) and four mainly in the computer labs (Aaron, Bea, Dina and Ella). The other three students mainly worked in the studio (Felicia, Greg and Isaac).

*Methods and Material*

The strategies employed for material gathering in this environment included observations, gathering of log files, diaries, and interviews.

Focusing on in-group interaction made it possible to get informed consent from all involved. In addition to oral consent from everyone in the class, I received signed forms of informed consent from all but one student (Isaac). Since this student was seldom present in school and did not take an active part in the group, I decided to exclude him from the analysis. In addition, one of the other students was ill at the beginning of my visit and did not want to take an active part in the study (Helen). The students were informed that they could choose to withhold any information from me (for example log files that they did not wish to

share), but that I would appreciate it if they would inform me if they had done so.

*Observations*

During the first week in the environment, I conducted general observations, complemented by unstructured interviews, which served to give me an insight into the communication habits of the students in this environment. Based on the findings from these, three students were chosen for more detailed observations during two days each (Aaron, Bea and Charles). These students were chosen because they all spent most of their days in the school, and because of their diverse working and communication habits; one of them would mainly work in the studio (Charles), and the other two in the computer labs (Bea and Aaron). The student working in the studio had told me that he did not use communications media as often as some of his classmates, and the two students working in the computer lab both claimed to use communications media relatively often.

During the individual observations (more than 60 hours total) I shadowed the participants throughout the day, but completely focused observations only took place as the participants were sitting at their computers. Included in the detailed field notes are, for example, time stamps for when the participants checked their email accounts, alerts and replies in IM, phone calls and SMS messages, and face-to-face interactions; the names of people they interacted with and topics of conversations; whether the participant had his or her headphones on or off; information about others in the room, etc.

The field notes were on a few occasions complemented by photographs and audio or video recordings.

*Log files*

During the six days of detailed observations, I asked the students to share log files from text-based interactions within the group. I only received log files from IM conversations, and even though this is clearly the most commonly used text-based medium, based on the observations and diaries I know that at least one in-group sms and two in-group emails have not been submitted.

Four of the nine students did not send me any log files at all. Apart from the two who were excluded from the analysis, another student also did not want to submit her log files because of time constraints (Felicia). However, the in-group interaction that this student participates in over IM is part of the log-files submitted by her classmates. A fourth student only used IM to converse with people outside class and did not have any in-group log files to share (Greg).

Altogether I have access to log files with six participants forming eleven dyads (pairs of interactants), whose conversations range in frequency of contact from one conversation only during the six days to several conversations daily (in total: 7474 words in 1689 messages, divided into 120 sessions). As the main focus here is on interaction within the physical environment of the design school those conversations which with certainty take place within the school building (90 conversations) have been separated from those where one or both participants are located in their homes and those taking place during the weekend. These 30 conversations are excluded from the current analysis.

*Diaries*

Those students included in the study who were not individually observed were asked to keep diaries of their conversations for two days each. In the diaries they were asked to report on approximate time for the conversation, mode, participants and topics. In order to get an even spread of the participants' writing of diaries, we agreed on dates for diary keeping together. In total I received eight diaries from four students.

*Interviews*

The three students that were individually observed were asked to take part in interviews, and all agreed. These were conducted three weeks after the detailed observation phase, and contained quite general questions about communication habits.

The scheme below (Table 1) shows the strategies for material gathering over time. The hours of observation reported here are based on start and stop times. Thus, breaks are included, even though these only consisted of general observation.

| Week | Day | General observations | Detailed observations | Log files | Diaries | Interviews |
|------|-----|---------------------|----------------------|-----------|---------|------------|
| 1 | Monday | 5,5 hours | | | | 6 unstructured |
| | Tuesday | 4 hours | | | | 2 unstructured |
| | Thursday | | Testing methodology, 1,5 hours | X, test | Testing methodology, 2 diaries | |
| 2 | Monday | 1 hour (+ informing about project) | | | | |
| | Tuesday | 3 hours | Testing methodology, 30 minutes | | | |
| | Wednesday | 3,5 hours | | | | |
| | Thursday | 45 minutes | Aaron, 11 hours | X | 1 diary (Dina) | |
| | Friday | 1 hour | Aaron, 8 hours | X | 1 diary (Greg) | |
| 3 | Monday | 30 minutes | Bea, 11 hours | X | 2 diaries (Greg, Ella) | |
| | Tuesday | 20 minutes | Bea, 13 hours | X | 2 diaries (Ella, Felicia) | |
| | Wednesday | | Charles, 12 hours | X | 1 diary (Felicia) | |
| | Thursday | | Charles, 9,5 hours | X | 1 diary (Dina) | |
| | Friday | 7 hours | | | | |
| 7 | | | | | | 3 structured (Aaron, Bea and Charles) |

*Table 1. Details concerning collected data over time.*

*Comments on Observational Scope*

In relation to observational scope it can be noted that much of the material included here has been given to me by the participants. As maybe not

everything has been reported, I cannot claim that what I have access to is the complete picture of in-group interaction during these six days. It is also important to keep in mind that I have not been able to conduct close observations when the participants leave their rooms (for example, during breaks), which means that some of these conversations are not included at all, and those that are included are not reported with as much detail as I was able to report when they were working at their computers. Furthermore, it should be noted that the main source of linguistic data, apart from some brief unsystematic voice and video recordings, is the IM log files.

## Results

The first part of the results section reports on the communicative ecologies and the media employed by the participants, included in order to illustrate the options available. This is followed by a sub-section summarizing some of the interview results concerning mode choices. The remainder of the results section elaborates on different considerations which the participants take into account when acting on the affordances of the shared space, and examples from observations and log files are given in order to illustrate the patterns found.

### *Communicative Ecologies – Mapping Out the Options*

Communicative ecologies can be mapped on the basis of an individual, a group, or a larger community. In the current article, I map out the material communicative ecologies of the three individual participants whom I observed most closely in order to illustrate the options available for interaction. Each individual ecology provides a number of communicative options, and those acted upon in turn become part of the local communicative context of that individual. From this follows that the local context can comprise one or more semi-simultaneous engagements in different conversations.

In the charts presented below, comments from the interviews are incorporated in connection to the different modes. Here, it should be noted that the interviews mainly included questions concerning technological tools for interaction, and so few comments were received concerning face-to-face interaction. Further comments are provided after the final chart.
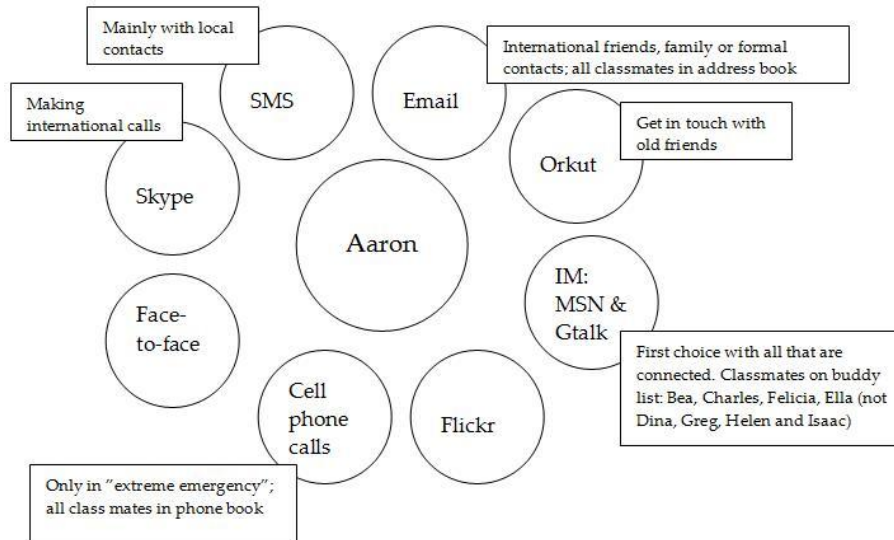
Mainly with local contacts

Making international calls

International friends, family or formal contacts; all classmates in address book

Get in touch with old friends

SMS

Email

Orkut

Skype

Aaron

IM: MSN & Gtalk

First choice with all that are connected. Classmates on buddy list: Bea, Charles, Felicia, Ella (not Dina, Greg, Helen and Isaac)

Face-to-face

Cell phone calls

Flickr

Only in "extreme emergency"; all class mates in phone book

*Figure 3. Aaron's communicative ecology.*

Friends back home; sometimes with local friends

Not used as frequently anymore, since you can send offline messages in IM; all classmates in address book

SMS

Email

Skype

Friendster

Get in touch with old friends

Making international calls

Bea

Face-to-face

Cell phone calls

IM: Yahoo MSN

Would never send an email to someone who is on IM. Classmates on buddy list:
Aaron, Charles, Dina, Ella, Felicia, Isaac (all but Helen and Greg)

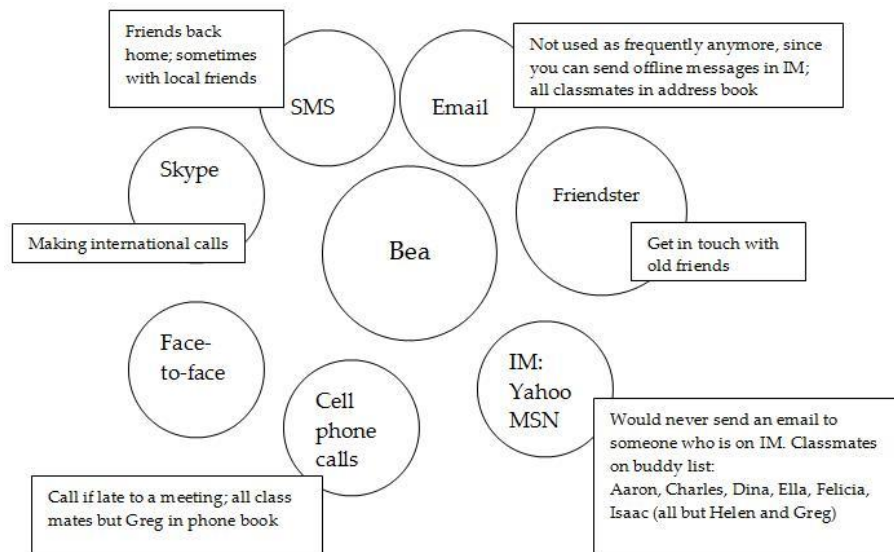Call if late to a meeting; all class mates but Greg in phone book

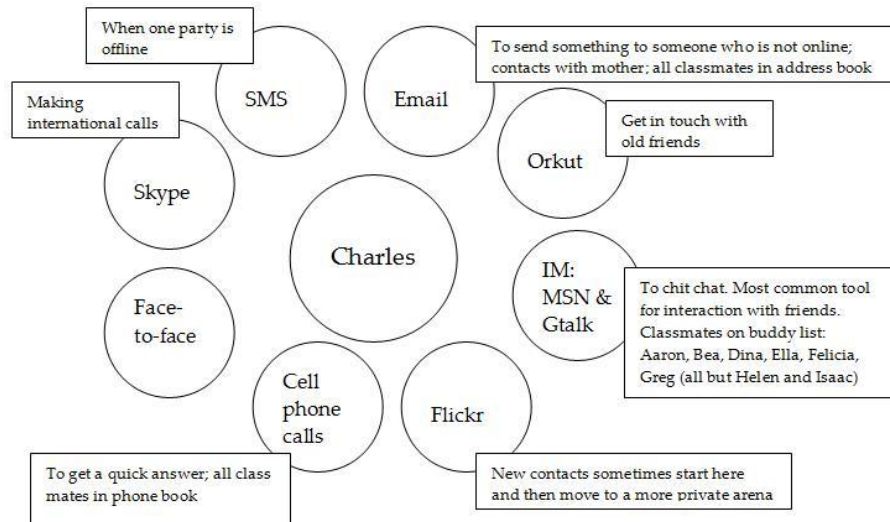*Figure 4. Bea's communicative ecology.*

*Figure 5. Charles' communicative ecology.*

All three ecologies are quite similar. They include modes such as face-to-face interaction, email, cell phones used both to make phone calls and to send text messages (SMS), Instant Messaging (IM), internet telephony (Skype), and social networking sites such as Orkut, Friendster and Flickr. One main difference when comparing the ecologies concerns how SMS is used; Bea claims hardly ever to use it for local interaction and Aaron hardly ever for interaction with international contacts. Another difference concerns who of their classmates they have added to their lists of contacts.

The observations and diaries show that the in-group interaction in which these students engaged mainly took place face-to-face or over IM. The few exceptions are an in-group SMS, as noted during one of the observations and an in-group cellphone call and two emails, reported in the diaries. The SMS and the cellphone call were both to class mates not physically located in the school, and the emails were both forwarded messages to the whole group (one social and one with information from the school).

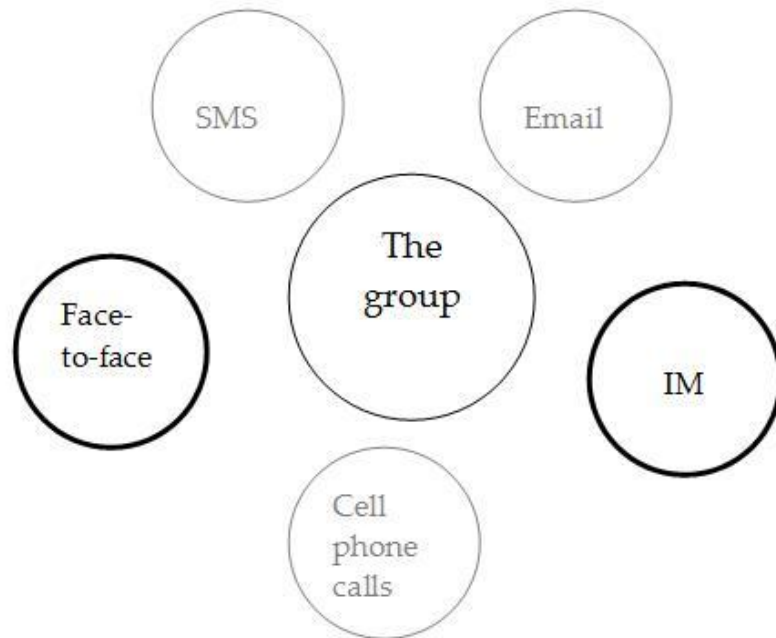Figure 6 illustrates the communicative ecology of the student group, with the modes mainly employed highlighted.

*Figure 6. The communicative ecology of in-group interaction.*

Most of the IM conversations were carried out via MSN, and the others in Gtalk. One of the participants used Miranda, in order to be able to combine different IM channels in one interface. Figures 7 and 8 are screen shots from MSN Messenger and Gtalk illustrating interaction between two fictional participants as shown on the screen of the participant "07researcher". These illustrations provide a general overview of some of the features of the most commonly employed IM tools. In addition to the interfaces presented here, participants in IM interaction also have access to so called buddy lists, where it is possible to provide information about current status and availability for interaction.
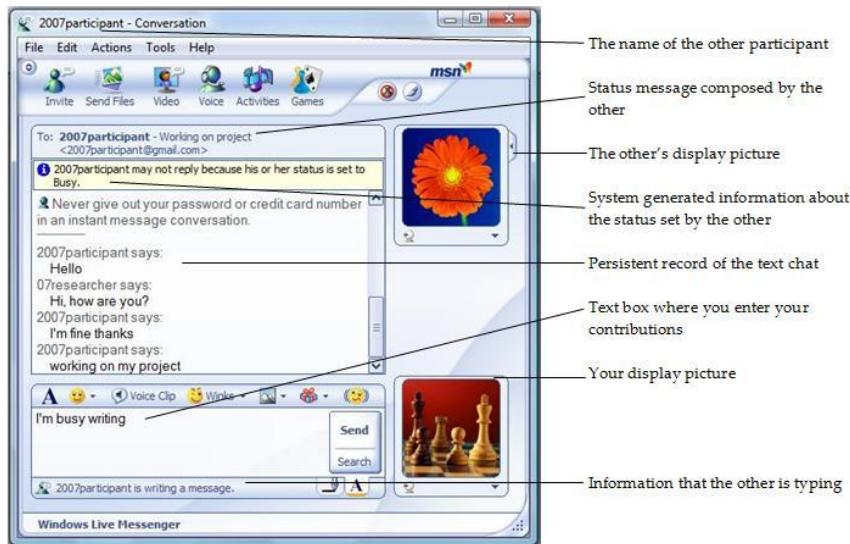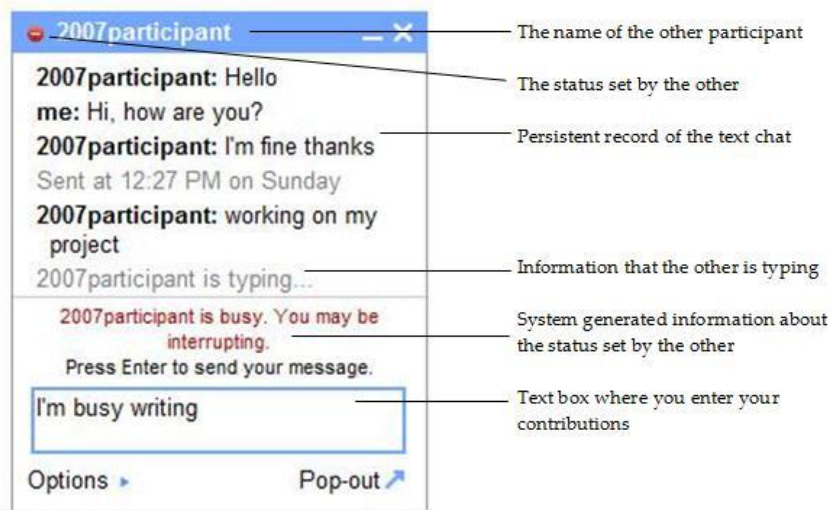
*Figure 7. Screen shot from MSN messenger 7.5.*



*Figure 8. Screen shot from Gtalk.*

### Self-reported Conversation Initiation Considerations

Below is a summary of results from the interviews where the participants were asked questions relating to mode choices, included here in order to illustrate some of the reasoning behind mode choices in the complex ecologies in which they are participating.

### Self-reported Mode Choices

Interesting to note is that when asked to rank email, phone, IM, and SMS in order of importance, the three students all had different rankings. Here, we need to bear in mind that this concerned their general usage of the tools, not just how they were employed for in-group interaction.

| Ranking | Aaron | Bea | Charles |
|---------|-------|-----|---------|
| 1 | IM | Email | Email |
| 2 | SMS | IM | Phone calls |
| 3 | Email | SMS | IM |
| 4 | Phone calls | Phone calls | SMS |

*Table 2. Ranking of commonly used communications media.*

They were further asked to explain their choices and were also asked to give their thoughts on why IM was such a frequently used tool during the observations, and these results are summarized in the following.

For Aaron, this ranking concerns both frequency of usage and restlessness of non-usage. He elaborates on his usage by explaining how he uses his cellphone mainly with his local friends to send SMSes and how email is mainly used with international friends. However, for all friends available on IM, this is his first choice.

The reasons why IM is so popular (a life-line according to Aaron) are in his view that it is the cheapest and most real-time way of keeping in touch with friends. He mentions the power of the buddy lists and status messages as a great advantage. However, he thinks that IM is not the ideal mode of communication, as misunderstandings easily occur when

interacting via text. The possibility to include emoticons and other symbols is an important tool in avoiding miscommunication, in Aaron's view.

Aaron might send an SMS if he or the contact he is trying to reach is not online through IM, but due to the cost of SMS, IM is always his first choice. One occasion when email could be useful would be if Aaron has a lot on his mind and he would want to get it all across without being interrupted.

Bea explains her ranking by claiming that even though she might use IM more frequently, she feels that email is more important to her content wise. She thinks that the popularity of IM is due to the fact that it is convenient and does not crash on computers, the application is small on your computer screen, it is good for transferring files and it is the fastest way to communicate. She also thinks it is good that you can see all your contacts in a glance. In addition, if the person she tries to contact is offline, Bea would rather send a longer off-line IM message than opening up the email account and sending an email.

Furthermore, Bea describes that her ranking would have been different in her home country where she would be at work, in that the phone would be more important in that situation.

Charles tells me that he uses instant messaging more than email, but he thinks that email is more important since it is more serious and secure than IM. For example, he knows that he and his contact both will have a record of the exchange in the email account, which is more difficult to know with IM. His thoughts on why IM is so popular concerns that it is easier and more instant than for example email.

Within the group, Charles uses SMS when he or the others are not connected. He would never send an SMS when the other person is online, mainly because of the cost difference. He sees SMS more as an emergency or out of home or school method of reaching people. He sometimes uses the phone if in need of an immediate answer, and if it would take too long to type and wait for a reply. Furthermore, Charles might send an email even though someone is online, for example to show a finished project.

From the interview we can also see that the students have different reasons for choosing IM over face-to-face interaction both when located in different rooms and in the same room.

Aaron describes how he uses IM for practical reasons to communicate with those that are not physically located in the same room as him. He thinks that nobody wants to get up and walk all the way to someone else's desk to ask them something unless they themselves want to take a break. If he were to work in the same room as his friend Charles, he thinks he would send IM to talk about things that he would not want to bring up in front of the others.

Bea prefers to send IM over talking to her classmates face-to-face since IM is more subtle and does not disturb in the same way. She also tells me that she uses IM primarily for messages that do not need an immediate reply. The same reasons hold for IM conversations with someone in the same room, with the additional comment that she is too lazy to shout.

Charles uses IM to communicate with others in the same building in order to take advantage of the possibilities to multitask. He also sometimes uses it in order to preserve the silence and not disturb the concentration of the others. He sometimes sends IM to Felicia who is working next to him, simply because the option is available. He also describes having used "primitive instant messaging" with Felicia, through the passing of notes.

Let us now turn to an analysis of further dimensions of conversation initiation, during which several of the points made by the participants will be discussed.

### Further Dimensions of Conversation Initiation

The results of the current study indicate that conversation initiators consider different dimensions related to attention, here summarized under the headings *urgency*, *privacy* and *availability*. These three will be discussed and exemplified in the following, and even though they are addressed separately, it will become clear that they are interlinked. It should further be noted that these are not seen as the only influencing factors – for instance, one reason why face-to-face is preferred for work-related topics might be that the participants need to show each other what they are working on. However, these dimensions are clearly influential.

*Privacy: Whose attention do you want and whose do you not want? What types of activities do you want to give public attention and which are private?*

When initiating a conversation in a mixed-mode context, one consideration relates to *privacy*. Here we can distinguish between the shared context in the physical space, which may or may not include potential overhearers, and the more private shared context in IM. Is the topic discussed something which others than the person you are talking to should hear?

In the interview, Aaron referred to how he might use IM to talk about things he would not want to bring up in front of the others present. Similarly, the observations show that IM is often used to talk about private issues or even about others who are physically present in the same room. Example 1 shows an excerpt from an IM conversation between Aaron and Bea in Computer lab 1. First, the figure illustrates the flow of interaction visually, with arrows indicating conversation initiation. This is followed by a compilation of observational notes and IM log files, where face-to-face (f2f) interaction is reported verbatim when such detailed notes exist.

In this example, Aaron and Bea are working in the same computer lab as some students from another group, and Aaron teases Bea about them in IM.

*Example 1. Private commentary.*
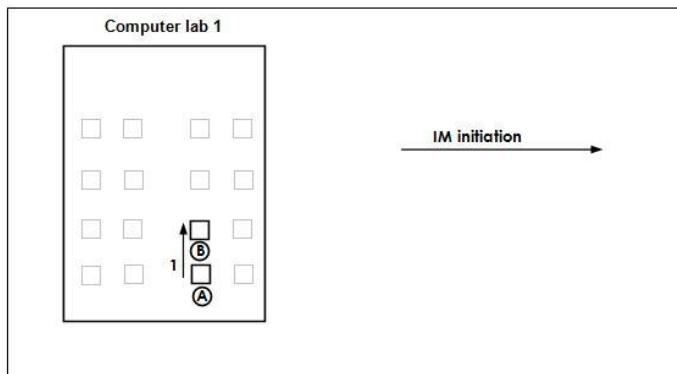
| Line | Mode | Time | From | To / with in f2f | Message |
|------|------|------|------|-----------|---------|
| 1 | MSN | 09:46:07 | Arro | BEAY | u hitting on any of these guys? |
| 2 | MSN | 09:46:11 | BEAY | Arro | Nope |
| 3 | MSN | 09:46:11 | Arro | BEAY | they're cute na!? |
| 4 | MSN | 09:46:13 | BEAY | Arro | Nope |

In the observations, some strategies for conducting private interacttion in the face-to-face mode have also been identified. For instance, both whispering and code switching, where participants switch between, for example, English and Chinese occurred (the latter both in face-to-face interaction and in IM). In all of these cases we should consider the influence of audience, including the researcher. In addition, we should remember that these behaviours do not necessarily indicate that participants are talking about private issues that they want to keep from the others present, it could simply be that by whispering, they do not want to disturb. However, it might nevertheless be considered rude behaviour.

Apart from private secrets and gossip, topics concerning private planning are also seen as suitable for IM interaction rather than being publically displayed face-to-face. As Charles states in the interview, one reason for this might be that one does not want to disturb the others in the room. The results from the observations, the diaries and the log files show that IM plays a prominent role in making local plans. For instance, 47 percent of the 90 IM conversations included in the log files include plan making, whereas only 14 percent of the 180 observed face-to-face interactions deal with this topic.

Furthermore, it appears that work-related topics might be viewed as suitable for face-to-face interaction. Again, the results from the observations, diaries and log files show that work-related issues occur more commonly in the observed face-to-face conversations (63 percent) than in the IM conversations in the log files (30 percent).

Other times when the participants go public are when they want everyone physically located in the same room to hear about some news. Here, they either talk to the group face-to-face or send multiple IMs. Interesting to note is that the students observed here never used the

multiparty IM feature. The two strategies which they do employ will be exemplified in the section on multiplex coordination below.

*Urgency: How soon do you need the others' attention and what kind of attention do you want?*

*Urgency* is another dimension which participants consider when initiating conversation and choosing between the modes available in the ecology. Does the matter at hand require an immediate response or can it wait? One of the affordances of IM has been reported to be its immediacy (Nardi, Whittaker & Bradner 2000). However, as will become apparent in the discussion on availability below, it is not always certain that you will be able to reach the person you are addressing through this mode. This is in line with Bea's comment in the interview, where she states that IM is best suited for issues where no immediate reply is needed. Instead, urgent matters often warrant physically moving around. In the observed face-to-face interaction, discussions of current activities mainly occur in connection with people moving in-between rooms. IM is not used to a high degree to deal with current activities, which might suggest that conversations dealing with this topic often demand immediate response. In addition, it could be that people involved in current activities are on the move and do not have access to IM at the moment or can easily inform the others while heading for the scene of action.

A related question concerns whether you need shared focused attention or if you prefer to be able to multitask. The fact that face-to-face interaction demands immediate responses and focused attention makes it difficult to multitask in this context, and the observations show that participants in face-to-face interaction very rarely were involved in conversational multitasking. In IM, on the other hand, the message remains visible on screen and the other person does not know exactly when you have read it (cf. Erickson & Kellogg's 2000 notion of *accountability*), providing you with the option to choose when to reply (cf. Baron's 2008 notion of *volume control*). In the interview, Charles referred to the possibilities to multitask as an advantage with IM, and in the observations, the participants often act upon this affordance, not least in order to coordinate joint activities by engaging in conversations with different people semi-simultaneously.

Example 2 illustrates conversational multitasking, where Bea is simultaneously involved in IM conversations with both Dina and Charles, here on a work-related topic. In the example, merging excerpts from the two conversations, those messages that are part of the conversation between Bea and Charles are shown in bold face type. In an attempt to increase clarity further regarding the different perspectives at hand, Dina's contributions are shown on a white background and Charles' on a dark grey background. The contributions made by Bea, who is the only one with access to both conversations, are shown on a light grey background. Furthermore, arrows are used to indicate the specific instances where we can see how the different conversations feed into each other.

*Example 2. Conversational multitasking.*
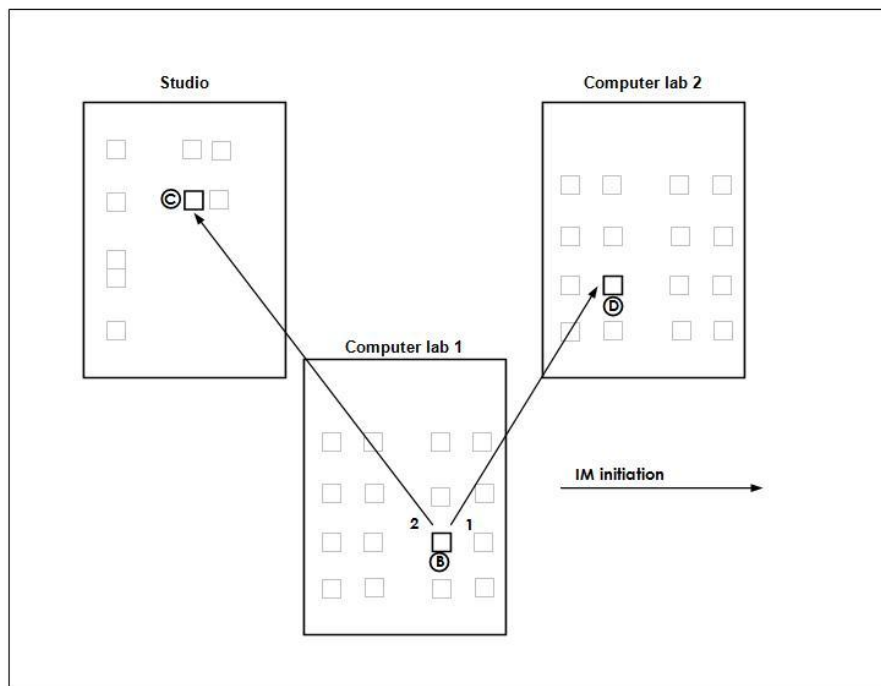
| Line | Mode | Time | From | To/with in f2f | Message |
|------|------|------|------|----------------|---------|
| 1 | MSN | 17:22:27 | BEAY | Dina@school... | should I apply? |
| 2 | MSN | 17:22:43 | Dina@school... | BEAY | hmmmm, hmmmm, hmmm |
| 3 | MSN | 17:22:48 | BEAY | Charles | Do u think i should send in my portfolio? |
| 4 | MSN | 17:23:02 | Charles | BEAY | Try the market |
| 5 | MSN | 17:23:05 | Charles | BEAY | = ) |
| 6 | MSN | 17:23:06 | Dina@school... | BEAY | yes, actually i think u should apply:P |
| 7 | MSN | 17:23:22 | BEAY | Charles | u think so? |
| 8 | MSN | 17:23:26 | BEAY | Dina@school... | Okie |
| 9 | MSN | 17:23:33 | BEAY | Dina@school... | bcos Charles ask me to apply |
| 10 | MSN | 17:23:39 | BEAY | Charles | Ookie |
| 11 | MSN | 17:23:44 | Charles | BEAY | if you get it you think what u should do |
| 12 | MSN | 17:23:46 | Dina@school... | BEAY | hehe, yeah, why not |
| 13 | MSN | 17:23:47 | BEAY | Charles | dina said yes to |
| 14 | MSN | 17:23:53 | BEAY | Charles | i will have to go |
| 15 | MSN | 17:23:54 | BEAY | Charles | i guess |
| 16 | MSN | 17:24:01 | BEAY | Dina@school... | but what if i got it? |
| 17 | MSN | 17:24:09 | BEAY | Charles | i dunno |
| 18 | MSN | 17:24:13 | BEAY | Charles | i am worried |
| 19 | MSN | 17:24:19 | BEAY | Charles | and i dun wanna think about it |
| 20 | MSN | 17:24:53 | Dina@school... | BEAY | hmmm, i don't know. because u said this is your dream company |
| 21 | MSN | 17:24:58 | Charles | BEAY | i know |
| 22 | MSN | 17:25:03 | Charles | BEAY | me neither |
| 23 | MSN | 17:25:08 | Charles | BEAY | = / |

Interesting to note here is how the two simultaneous conversations feed into each other. Here, Bea tells Dina that Charles thinks she should apply and vice versa (in lines 9 and 13 respectively). However, the messages

themselves do not reveal that she has found this out in simultaneously ongoing IM conversations. Further on, we can also see another example of how the content of one of the conversations moves across conversational boundaries, as Bea's question to Dina in line 16 seems to have been influenced by Charles' statement in line 11. By choosing to initiate these conversations in IM rather than face-to-face, Bea is able to keep both conversations going at the same time, and can strive for a common conclusion.

We can also see how a combination of different modes is sometimes employed to establish shared attention. For instance, if working in different rooms it is possible to use IM in order to locate the other person before walking over there. Example 3 illustrates this.

*Example 3. Raising awareness and negotiating mode switches.*
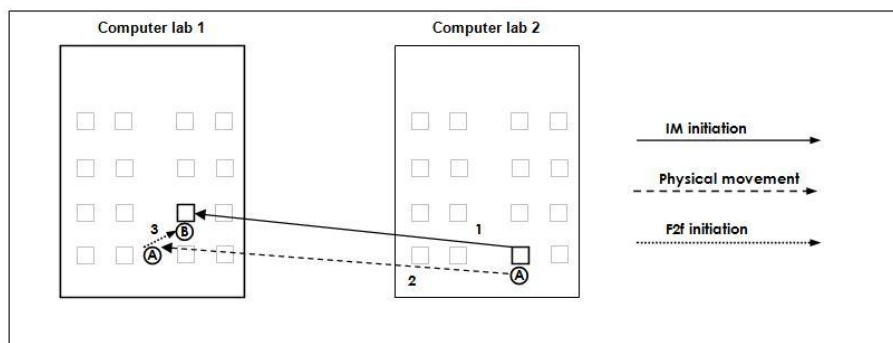


| Line | Mode | Time | From | To/with in f2f | Message |
|---|---|---|---|---|---|
| 1 | MSN | 11:14:10 | Arro | BEAY | Beay? |
| 2 | MSN | 11:14:11 | Arro | BEAY | you there? |
| 3 | MSN | 11:14:26 | BEAY | Arro | Yes |
| 4 | MSN | 11:14:30 | BEAY | Arro | Whatsup |
| 5 | MSN | 11:14:36 | Arro | BEAY | where do i find rounded edges option |
| 6 | MSN | 11:14:36 | BEAY | Arro | dont ask me to go over u come |

*(Cont'd.)*

*(Cont'd.)*

| 7 | MSN | 11:14:39 | Arro | BEAY | for a polygon? |
|---|---|---|---|---|---|
| 8 | MSN | 11:14:43 | Arro | BEAY | no no...no need |
| 9 | MSN | 11:14:52 | BEAY | Arro | for illustrator? |
| 10 | MSN | 11:14:54 | Arro | BEAY | Yep |
| 11 | MSN | 11:15:41 | BEAY | Arro | i dunno the fast way |
| 12 | MSN | 11:15:51 | Arro | BEAY | aah ok. dont worry. i'll find it |
| 13 | MSN | 11:15:57 | BEAY | Arro | but i can show u |
| 14 | MSN | 11:16:00 | Arro | BEAY | Helen got the Japan internship? |
| 15 | MSN | 11:16:05 | BEAY | Arro | YEAP!!!! |
| 16 | MSN | 11:16:06 | BEAY | Arro | Ehheee |
| 17 | MSN | 11:16:07 | Arro | BEAY | :D cool !! |
| 18 | MSN | 11:16:11 | BEAY | Arro | so good |
| 19 | MSN | 11:17:03 | BEAY | Arro | u wanna come i can show u |
| 20 | MSN | 11:17:36 | Arro | BEAY | Yep |
| 21 | MSN | 11:17:37 | Arro | BEAY | Coming |
| 22 | f2f | 11:19 | Aaron | Bea | *Aaron arrives and Bea shows him how to work the tool he asked about. Aaron says thanks and leaves.* |

Here, we see how Aaron first checks to see whether Bea is available and how they then negotiate about a face-to-face meeting. In lines 14-18 they also briefly touch upon an issue which Dina has been reporting on in face-to-face interaction.

Similar examples can be found in same-room interaction, as being in the same room does not guarantee that you will be able to catch the other's attention face-to-face. My observations include examples where participants have to rephrase their questions and sometimes complement their verbal action by elaborate non-verbal calls for attention.

An often contributing factor here is that the students wear ear phones most of the time while working at their computers and thus partially iso-

late themselves from their physical surroundings, controlling the volume both literally and metaphorically.

Sometimes, IM is used to attract attention in this setting. While, for instance, Bea refers to IM as being subtle, thus not causing much disturbance, contrarily the students also seem to think that it is a good way to catch the attention of the others. For instance, during the observations, Aaron complains to Ella that it is difficult to catch her attention, and she tells him to contact her via MSN instead. Furthermore, the observations show that if the participants are located at their computers when they receive new messages they always interrupt current activities to do immediate checks.

Example 4 below illustrates attention catching through IM. In this example, IM is used in an innovative way to call upon attention (line 2) and Bea playfully responds both in IM (line 3) and face-to-face (line 4). Unfortunately, we do not know the exact timing of the IM message in line 3 in relation to the face-to-face utterance in line 4, but the main point to be made is that this is an unusual case as conversation starts face-to-face and is later continued in IM. In the material, 9 immediate mode switches involving one dyad in same-room interaction have been

*Example 4. Catching attention via IM.*
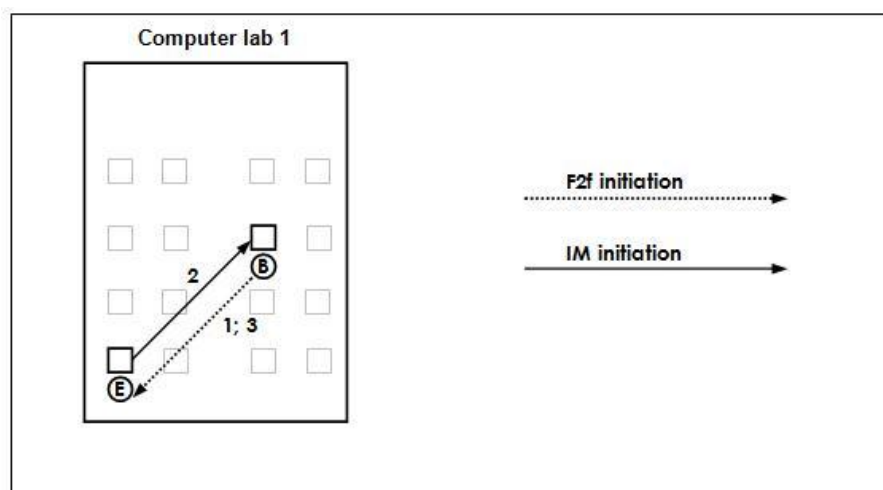
| Line | Mode | Time | From | To/with in f2f | Message |
|------|------|------|------|------|---------|
| 1 | f2f | 15:54 | Bea | Dina and Ella | *Bea starts talking to Dina and Ella about wanting to send off jpgs rather than creating flash. She then continues working again.* |
| 2 | MSN | 15:57:08 | Ellie | BEAY | Hello! |
| 3 | MSN | 15:57:15 | BEAY | Ellie | Yeah |
| 4 | f2f | 15:57 | Bea | Ella | **Bea:** Yes darling? |
| 5 | f2f | 15:57 | Ella | Bea | **Ella:** I haven't finished talking to you! We should try to work regular working hours. |

identified, and only in two of these the mode switch is from face-to-face to IM. One reason for this pattern might be that once a connection has been established face-to-face, it is often possible to maintain mutual orientation until the conversation is concluded (with an exception in the example above).

*Availability: Can you get the attention from the other through this particular mode, and is now a good time to do so?*

The third consideration relates to the central role of *availability* in relation to attracting attention, and in fact it consists of a number of related sub-questions. First, one might ask whether the mode is available in this particular ecology. For instance, tools that are connected to your stationary PC at home might not be available in the computer lab at the school. Second, you need to know whether the person you want to contact is even potentially available through the mode of choice. For instance, is the person added to your contact list in IM, or does he or she normally visit the school? The third question concerns whether the person you are looking for is in place at this particular moment. Fourthly, you will need to consider whether this is a good time for him or her to engage in a conversation with you. In the following we will look closer at the implications of questions three and four.

One way in which IM supports availability awareness is through the status messages and presence symbols that are provided in the buddy lists. However, results from the interviews indicate that these status settings are not very reliable, and whereas general presence awareness might be beneficial, the status settings are difficult to employ on a more detailed interactional level.

Aaron has two different IM statuses, to indicate that he is in school or at home. In addition, at school he will set his status to busy, in order to indicate to those contacting him that he might not be able to reply right away. He still expects to be contacted despite the busy setting. He will also type additional messages, for example lyrics from songs, to indicate what mood he is in. Similarly, he likes to look at the messages of his peers in order to get a quick update on how they are doing. He also likes to look at his buddy list in order to feel part of a larger community than the one including only his classmates.

Bea uses the same general status message at school and at home, simply because she knows that she will forget to change it when switching locations. If she is doing something in particular, like for example a conference call, she might indicate this. In line with Aaron, Bea's use of the busy status does not mean that she does not want any messages. Instead, when she is really busy she will switch to the off-line mode, while staying online. Her good friend Dina knows this and uses a similar strategy, so the two of them keep contacting each other even though they are "off-line".

Charles does not change his status to indicate whether he is at home or in school, but sometimes he will add messages which he often forgets to remove. He thinks that his contacts most often respect his busy settings, but if necessary he will add a "don't disturb" message. Most of the time he does not pay attention to the status messages of his friends, and he might contact others that are busy, especially if he sees someone online that he has not been in touch with for long.

One convention which seems to be prevalent is the way in which the busy status is not seen as a clear indication that one should not disturb. This might relate to the fact that these messages are fairly static and, in contrast to face-to-face interaction, they do not display nuances or adapt to the emergent situation. The findings from both interviews and observations indicate that status messages do not function as ways of knowing

exactly when to initiate conversations in this group. Instead, IM conversations sometimes include specific questions concerning the location of the other, as illustrated in Example 3 above and in Example 5 below.

*Example 5. Raising awareness.*
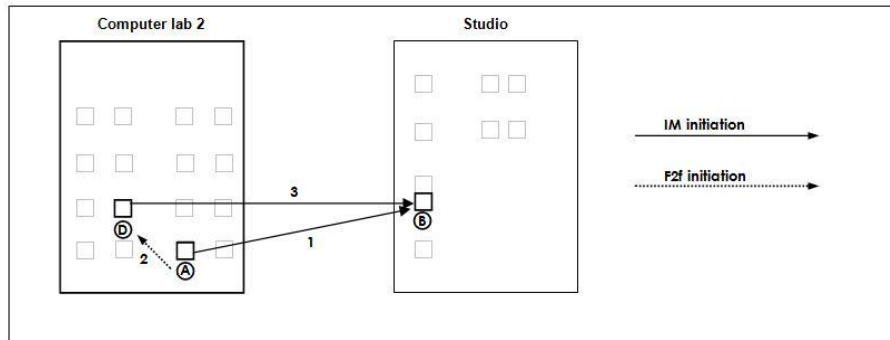


| Line | Mode | Time | From | To/with in f2f | Message |
|---|---|---|---|---|---|
| 1 | MSN | 17:53:41 | Arro | beay@umea | Beay |
| 2 | MSN | 17:53:45 | Arro | beay@umea | you there |
| 3 | MSN | 17:53:46 | Arro | beay@umea | ¨ |
| 4 | MSN | 17:53:47 | Arro | beay@umea | _ |
| 5 | MSN | 17:53:49 | Arro | beay@umea | ?? |
| 6 | MSN | 17:54:03 | Arro | beay@umea | Have a Illustrator question I need to ask you |
| 7 | f2f | 17:54 | Aaron | Dina | **Aaron:** Dee, do you know where Bea is? |
| 8 | f2f | 17:54 | Dina | Aaron | **Dina:** In the classroom |
| 9 | MSN | 17:54:35 | Dina@school... | beay@umea | aaron wants to find u |

Here, we see how Aaron sends an IM to Bea regarding her whereabouts and his errand, but he receives no response. He then asks Dina (line 7), who is sitting in the same computer lab as him, whether she

knows where Bea is located. Dina then sends an IM to Bea (line 9), but does not receive a reply until two hours later when Bea writes her from home.

It is not always easy to detect availability for interaction in face-to-face communication either. How do you know whether a person working at his/her computer is available for interaction? It seems that one way of judging this is to focus on adjoining activities. For instance, a finding from the observations concerns the way in which movement influences interactional patterns. It is striking that in face-to-face interaction, movement is often seen as a window of opportunity which participants choose to act upon in order to initiate conversations. In the cases where the observed participant or others leave their desks in order to start conversations this is not surprising; however, we also find several examples of this involving those working in the same room. 25 percent of the same-room conversations (34 of the total 131 same-room conversations) are initiated in connection to movement. In 21 of these cases, the person moving also initiates conversation, whereas in the 13 remaining cases, the person who is not in movement sees this as an opportunity to initiate a conversation with the person on the move. This indicates that, in this setting, being on the move equals being accountably in between tasks, which might be seen as providing good opportunities to make contact.

### Initiating Multiplex Coordination: Contrasting Two Similar Examples

In order to demonstrate how *urgency*, *privacy* and *availability* enter into choices regarding what mode to communicate in, two instances of multiplex coordination will be presented. In both examples, several people are involved in making plans, and both include multiple co-located participants and an IM link to someone outside the room. In one case the same-room coordination begins face-to-face and in the other via IM. Before I discuss the potential reasons for this, a brief introduction to the two cases is needed.

Example 6 shows one instance of multiplex coordination, where Ella asks the others via IM if they would like to come out with her for lunch and then switches to face-to-face interaction.

*Example 6. Multiplex coordination – lunch plans.*
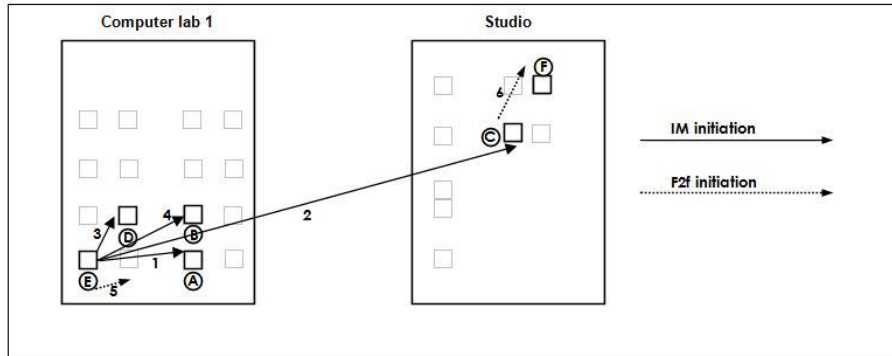


| Line | Mode | Time | From | To/with in f2f | Message |
|---|---|---|---|---|---|
| 1 | MSN | 11:30* | Ellie | Arro | Feel like eating at shanghai? |
| 2 | MSN | 11:30 | Arro | Ellie | |
| 3 | MSN | 11:30 | Arro | Ellie | cooked |
| 4 | MSN | 11:30 | Arro | Ellie | shitloads |
| 5 | MSN | 11:30 | Ellie | Charles | Feel like eating at shanghai? |
| 6 | MSN | 11:41:53 | Ellie | Dina@school... | Feel like eating at shanghai? |
| 7 | MSN | 11:41:59 | Ellie | BEAY | Feel like eating at shanghai? |
| 8 | MSN | 11:42:09 | Dina@school... | Ellie | hmmmm. sorry...... |
| 9 | MSN | 11:42:09 | BEAY | Ellie | i am sorry |
| 10 | MSN | 11:42:18 | Dina@school... | Ellie | Beay brings noodle for me:) |
| 11 | | 11:42 | Ella | Bea | **Ella:** come on guys – everyone is like "I'm sorry". |

*(Cont'd.)*

*(Cont'd.)*

| 12 | MSN | 11:42:23 | BEAY | Ellie | i feel like wating vanezia |
|---|---|---|---|---|---|
| 13 | f2f | 11:42 | Ella | Bea | **Ella:** Oh, Venezia, what do you mean, do you want to go there? |
| 14 | f2f | 11:42 | Bea | Ella | **Bea:** maybe tomorrow |
| 15 | MSN | 11:42:52 | BEAY | Ellie | i will go tmr |
| 16 | MSN | 11:42:55 | BEAY | Ellie | i didnt do much today |
| 17 | MSN | 11:43:08 | BEAY | Ellie | Muakssss |
| 18 | MSN | 11:30 | Charles | Ellie | Hmm, I brought food today... maybe tmr |
| 19 | MSN | 11:30 | Ellie | Charles | ok nobody seems intressted today... |
| 20 | MSN | 11:30 | Charles | Ellie | = ) |
| 21 | MSN | 11:30 | Ellie | Charles | ask felicia! |
| 22 | MSN | 11:30 | Charles | Ellie | don't worry... we'll go tomorrow |
| 23 | MSN | 11:30 | Charles | Ellie | she says ok |
| 24 | MSN | 11:30 | Ellie | Charles | Haha |
| 25 | MSN | 11:30 | Ellie | Charles | Very funny |
| 26 | MSN | 11:30 | Charles | Ellie | when everybody wants, she doesn't |
| 27 | MSN | 11:30 | Charles | Ellie | Hehehe |
| 28 | MSN | 11:30 | Charles | Ellie | = P |

\* The shaded time slots were self-reported by study participants and therefore only include approximate time.

In lines 1, 5, 6 and 7, Ella sends the following question to Bea, Dina, Aaron and Charles (Charles is working in the studio and the others are in the computer lab with Ella): "Feel like eating at shanghai?". Everyone replies in IM, and in response to their negative attitudes, Ella speaks out in line 11: "come on guys - everyone is like: I'm sorry" addressing those present in the room. This can be seen as a strategy for her to summarize the individual responses she has received and deliver them to all without having to type back in each of the IM conversations. She then notices Bea's suggestion in her IM message in line 12 about going to another restaurant tomorrow instead, and comments on this face-to-face in line 13. Bea replies face-to-face that she will go tomorrow, and develops this in IM where she states that she did not do much today. Ella also sends an IM to Charles in line 19 with the following message: "ok nobody seems intressted today...". In line 21, she then asks him to ask Felicia, who is in the studio with him, and gets the reply: "she says ok" in line 23.

Another example of multiplex coordination is when Aaron coordinates the schedule for the final day of presentations. However, instead of initiating same-room interaction via IM here, he talks to his co-located classmates face-to-face. This is illustrated in Example 7.

*Example 7. Multiplex coordination – presentation schedule.*
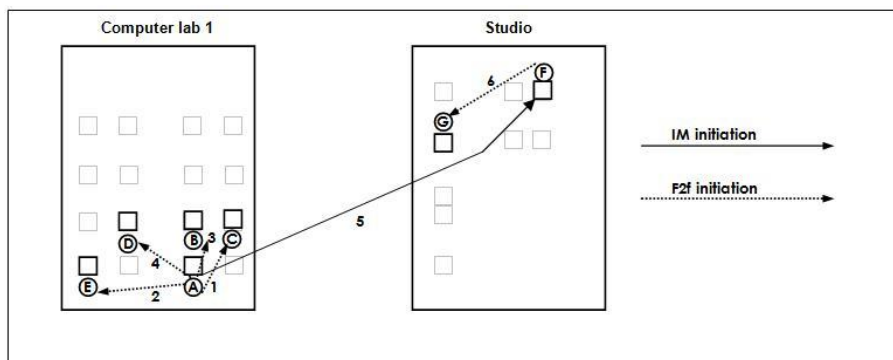
| Line | Mode | Time | From | To/with in f2f | Message |
|------|------|------|------|----------------|---------|
| 1 | f2f | 11:54 | Aaron | Charles | **Aaron:** ehm… Charles when do you want to present tomorrow? *No reaction from Charles who is wearing earphones. Asks again.* |
| 2 | f2f | --- | Aaron | Ella, Bea, Dina | **Aaron:** Ella, Dina, Bea when do you want to present tomorrow? Ella? |
| 3 | f2f | --- | Ella | Aaron | **Ella:** I guess before lunch. |
| 4 | f2f | --- | Bea | Aaron | **Bea:** Before lunch. |
| 5 | f2f | --- | Ella | The others | **Ella:** Maybe we should do everything on Tuesday? |
| 6 | f2f | --- | Charles | The others | **Charles:** As I always say: I prefer a horrible ending than a neverending horror. |
| 7 | Gtalk | 11:56 | Aaron | Felicia | Felicia |
| 8 | Gtalk | 11:56 | Felicia | Aaron | Aaron |
| 9 | Gtalk | 11:56 | Aaron | Felicia | When do you wanna present tomorrow |
| 10 | Gtalk | 11:57 | Felicia | Aaron | Whenever |
| 11 | Gtalk | 11:57 | Aaron | Felicia | 930 – 10 is free |
| 12 | Gtalk | 11:57 | Aaron | Felicia | and all slots after 1330 |
| 13 | Gtalk | 11:57 | Felicia | Aaron | you like that document added feature that we can all write the same time into? |
| 14 | Gtalk | 11:57 | Felicia | Aaron | 930 then |
| 15 | Gtalk | 11:57 | Aaron | Felicia | yep i was filling it up for head teacher |
| 16 | Gtalk | 11:58 | Aaron | Felicia | can you ask greg and helen? |
| 17 | Gtalk | 11:58 | Aaron | Felicia | or just greg? |
| 18 | Gtalk | 11:58 | Felicia | Aaron | Helen is in the pc lab |
| 19 | Gtalk | 11:58 | Aaron | Felicia | ok Greg? |

*(Cont'd.)*

*(Cont'd.)*

| 20 | Gtalk | 11:59 | Aaron | Felicia | RESPOND !! |
|----|-------|-------|--------|---------|------------|
| 21 | Gtalk | 11:59 | Aaron | Felicia | NOW !! |
| 22 | Gtalk | 11:59 | Aaron | Felicia | :P |
| 23 | Gtalk | 11:59 | Felicia | Aaron | he says 1330 then |
| 24 | Gtalk | 11:59 | Felicia | Aaron | and freaking CHILL OUT |
| 25 | Gtalk | 11:59 | Felicia | Aaron | he has headphones on and is greek for godssake |
| 26 | Gtalk | 11:59 | Aaron | Felicia | muaaahh! :) |
| 27 | Gtalk | 11:59 | Aaron | Felicia | just teasing you |
| 28 | Gtalk | 12:00 | Felicia | Aaron | but in capital letters |
| 29 | Gtalk | 12:00 | Felicia | Aaron | that is loud |
| 30 | Gtalk | 12:01 | Felicia | Aaron | i never hear you yell but you yelling on gchat is scary |
| 31 | Gtalk | 12:01 | Aaron | Felicia | me yellow |
| 32 | Gtalk | 12:01 | Felicia | Aaron | not red? |

After checking the preferences of his co-located classmates face-to-face in line 1, Aaron sends an IM to Felicia in the studio to see what she would prefer, first calling upon her attention by typing her name in the chat in line 7. He then asks her about the whereabouts of the other classmates and tells her to check with those that are in the studio in line 16–17. She does so, and while waiting for her reply, Aaron is teasing her for the delay in her response by "yelling" at her with capital letters in lines 20-22, something which they continue to discuss in the remaining excerpt. In this respect, Example 7 also illustrates how the textual affordances of IM can be used to express urgency.

The different strategies chosen in these two examples can be explained by looking at the three suggested dimensions. As far as privacy is concerned, it might be that lunch plans are seen as of a more private nature than the project related scheduling plans, which could influence the mode choice. It might also relate to levels of urgency – to plan something which the teacher has asked for might be considered more urgent

than to make plans for lunch. It is also important here to consider who is available for interaction in which mode. Whereas Ella has the possibility to send IM to all from the group physically present in the computer lab, Aaron does not have Dina among his contacts. Another issue relating to availability concerns the stream of action in which the multiplex coordination is situated. Whereas the schedule planning discussion begins shortly after other face-to-face interaction, the lunch planning discussion is initiated after a 20 minute period of silence and seemingly focused work at the computers.

## Concluding Discussion

The results from the current study suggest that participants initiating conversations in mixed-mode contexts consider different dimensions relating to *attention*. These dimensions of *urgency, privacy* and *availability* are often interlinked, and their relative importance might shift with regard to the current activity. For instance, extreme urgency might make you not consider whether the other is busy or not.

What, then, characterises the relationship between the affordances of the modes employed and the strategies for coherent conversation initiation? One important factor seems to be how much information is available concerning current activities and where attention is paid. Here, we can consider two extremes: one in which much information concerning the attention levels of the other participant is available (cf. *social translucence* in Erickson & Kellogg 2000), and one in which little information concerning attention levels is available, leaving the participants in control over the interaction (cf. *volume control* in Baron 2008).

An important factor influencing awareness of attention levels through a specific mode concerns where participants are located relative to one another. If both IM and face-to-face interaction are available when physically located in the same room, the control ascribed to IM will be decreased. This relates to the fact that in this situation, your conversational partner will know that you should be able to see the incoming message and thus you could be held accountable for not replying (Erickson & Kellogg 2000). In this respect, IM and face-to-face interacttion become more equal in a shared space. Contrarily, participants in this study showed that it is possible to control the interaction also in a shared

space, for instance by using earphones and partially isolating themselves from the ongoing activities and face-to-face interruptions.

A design related question then concerns whether it is possible to design for complete awareness, while retaining control of the communication. Many IM tools are trying to do both, by including subtle presence awareness in combination with semi-synchronous interaction. However, as we have seen, the way these students employed IM, it was neither completely translucent, nor did it give complete control.

For instance, results from both observations and interviews indicate that the status settings are not reliable, as different conventions seem to apply. Whereas general presence awareness might be beneficial, the status settings are difficult to employ on a more detailed interactional level; status messages do not function as ways of detecting appropriate times to initiate conversations in this group, and consequently questions may remain unanswered. Here, co-present participants in IM interaction may be able to judge whether or not the other is busy in a more detailed manner than distant participants. Similarly, in face-to-face interaction, we often have ways of deciding appropriate times for initiating conversation. For example, from the observations it became clear that movement is often a central component in conversation initiation in this mode.

Furthermore, we can note that IM is reported to be used both in order to interrupt less abruptly than in face-to-face interaction and in order to catch attention. My observations show that at all times when the participants are located at their computers and are not involved in face-to-face interaction they quickly check as soon as they receive alerts in IM. This means that they are constantly interrupted, and even though in a less intrusive way than in face-to-face interaction (cf. Garrett & Danziger 2007), they do not have complete control over the interaction.

So, how then can we design for balanced awareness of attention levels in a mixed mode environment? One suggestion would be to develop IM awareness support further to indicate windows of opportunity for conversation initiation in a more efficient way. One way of realizing this would be to allow for chosen information about current whereabouts to be logged and shared automatically. In fact, some such automatically collected information is already shared via the buddy lists, as information is provided, for instance, when a participant has been idle for a certain peri-

od of time. However, just because someone is present working at his or her computer does not necessarily mean that that person is available for interaction, and further information might be useful. It might also be possible to track selected information concerning physical location within the semi-shared environment automatically and link this to IM. However, of course, integrity and privacy issues also need to be considered, and it would be necessary to find a way not to reveal the details concerning current activities, but instead to represent an appropriation of availability in abstract terms. Such a solution would make the status settings more reliable and thus more useful. The remaining question is then how control might be retained in a situation with such high context awareness. I would argue that the key to volume control relates to the notion of accountability (Erickson & Kellogg 2000). By not giving away information about exactly when a new message has been read it should still be possible to maintain control over the interaction.

An additional practical solution increasing control and decreasing the observed interruptions would be to combine the more detailed and automatically logged information concerning windows of opportunity with ways of filtering in-coming alerts. If all alerts were collected in one interface and you could choose how intrusive you wanted them to be, you might increase both productivity and control. The person on the other end could also set level of urgency, and urgent messages might override some of your settings, but you, as receiver, would always have the highest degree of control. By giving out information about the settings chosen, but not about the time when the message is viewed, control for both participants would remain high in distant interaction, and should increase in co-present interaction (see Örnberg Berglund 2007 for a related discussion).

On a final note, it is also interesting to see how the modes of IM and face-to-face interaction can be used to complement each other in the current context. For instance, conversations sometimes consist of two phases where interaction most often begins in IM and then continues face-to-face. This ordering relates to the fact that approaching someone through IM is seen as less intrusive, for instance in that the receiver of the message can choose when to read it and when to respond. This implies that it should be possible to integrate the interruption in relation to ongoing activities, and that the degree of control on behalf of the

receiver should be higher than in face-to-face interaction. Whereas this is true in some respects, it is important to remember that we also saw that the participants usually checked new messages right away, indicating that the alerts also have a great intrusive power. Once the connection has been established the conversation might continue face-to-face under the right circumstances.

The combination of the face-to-face and the online contexts might also explain why some affordances of the IM interface, designed with interaction among physically dispersed participants in mind, were never acted upon. For instance, despite the fact that IM does support shared desktop features, this was never used. Instead, participants would move around to view each others' projects. Similarly, the multiparty conversation feature was never employed for multiplex coordination. One reason for this might be that not everyone was available in the mode of choice and an additional explanation might be that it was relatively easy to summarize the separate online threads in the shared face-to-face context. This indicates the importance of considering communicative affordances in relation to both the shared physical context and the specific tools employed.

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