PHYSICAL ARTIFACTS FOR PROMOTING BILINGUAL COLLABORATIVE DESIGN

AME ELLIOTT
Palo Alto Research Center (PARC)

Physical artifacts, such as sticky notes and mock-ups, are widely used in Human-Computer Interaction research for supporting the collaborative design of technology. Because these representations use channels of communication other than speaking and listening, they offer the potential to facilitate collaboration in bilingual groups working through an interpreter. This paper identifies challenges of bilingual design meetings based on technology development collaborations between Silicon Valley corporate research organizations and two different Japanese companies. Three of the most successful physical artifacts used in these meetings are described to illustrate ways of supporting bilingual collaboration. After discussion of the specific contributions of these artifacts, general recommendations for bilingual collaborative design meetings are discussed. The paper concludes with the recommendation that careful choreography of the work area is necessary to ensure every participant has access to the physical artifacts necessary for successful collaboration.

INTRODUCTION

Based on experience collaborating on various technology design projects with two different organizations that required bilingual meetings in English and Japanese, this paper identifies several obstacles to successful collaborative design meetings. The different projects exposed many challenges, but this paper focuses on how physical artifacts can enhance collaboration. The problems described, the examples of artifacts for addressing the problems, and the recommendations for supporting collaboration are all specifically concerned with bilingual design meetings, a narrow subset of all the meetings necessary for developing complex technology.

The recommendations in this paper are grounded in experience with meetings at Ricoh Innovations, the Silicon Valley research lab of the Japanese office automation company, and at PARC, in collaboration with an undisclosed Japanese company. In both cases the meetings were not only bilingual, but also cross-cultural. A cross-cultural meeting may be held in only one language, but opportunities for misunderstanding still exist based on different expectations about participants' non-verbal cues, such as seating location, gaze, and self-presentation style. Meetings with participants from Silicon Valley and Japan produce numerous opportunities for misunderstanding because each culture has different expectations about in-meeting behaviors, such as the appropriateness of periods of

EPIC 2005, pp. 158-164, ISBN 1-931303-27-4.

silence, authority to make binding decisions in real time, and the relationship between individuals' roles in the organizational hierarchy and the validity of their contributions (Brannen 2003:97-100). These expectations are particularly salient during collaborative design meetings, where one metric of a successful meeting is contribution from all the participants, a metric that might not be appropriate for evaluating the success of other kinds of meetings during the project lifecycle.

The participants expected collaborative design meetings to differ from other kinds of meetings in several key ways. First, all of the content of a design meeting cannot be prepared in advance because the participants work together to produce the output during the meeting. Second, the end-users of the technology, rather than participants' individual organizations are the client for a design meeting. Finally, design meeting are exploratory and the outcome is subject to revision. Because the organizations involved use iterative design methods, the collaborative design meetings were intended to provide an informal venue for examining alternative designs, with the understanding that modifications would happen later.

PROBLEMS USING INTERLEAVED TRANSLATION FOR DESIGN

Even though the participants agreed on the goals, many design meetings were still problematic, in part because of the communication problems arising from bilingual interleaved translation. When using interleaved translation, each participant's comments are paraphrased every few sentences by a single interpreter translating to and from English or Japanese. Interleaved translation is only one format for bilingual meetings; another example is simultaneous translation, where an interpreter talks over a speaker with a lag of a few seconds, repeating their words in a different language. All translation formats have advantages and disadvantages, but interleaved is generally a better fit for meetings that encourage informal discussion with impromptu comments in both languages. The possibility for opportunistic contributions was important, and during our collaborative design meetings, participation was roughly divided between English and Japanese speakers, and either could begin speaking at any break in the conversation. However, interleaved translation also placed several limitations on design meetings.

Loss of momentum – The biggest limitation of interleaved translation is that only one person's comments are translated at a time and the interpreter's attention is a scarce resource. Even though the Silicon Valley researchers originally came from many cultures and some were non-native speakers of English, all of them were accustomed to interrupting others to interject their thoughts into fast-paced discussions. As a group they had less experience participating in translated meetings and seemed to find the forced turn taking of interleaved translation more frustrating than the Japanese participants. An additional problem with repeating every idea in the second language was that some of the participants spoke both English and Japanese, but had to wait while a comment they understood in the original language was repeated a second time before they could respond. Maintaining enthusiasm was difficult when the meetings using interleaved translation took not twice, but three times longer than similar meetings held only in English.

Self-Censorship – One reason the loss of momentum frustrated some Silicon Valley participants was the perceived loss of spontaneity, a trait particularly valued in meetings during the early phase of the design process. Some of the collaborative design meetings were brainstorming sessions, and the loss of spontaneity was damaging because evaluation of an idea's worthiness should not take place during the brainstorming session. Unfortunately, brainstorming with interleaved translation produced

long pauses while people waited to speak, and these pauses encouraged self-censorship while participants decided if their idea was worth being repeated in another language.

ARTIFACTS FOR SUPPORTING BILINGUAL COLLABORATION

Physical artifacts, such as sticky notes and mock-ups, are well understood to promote collaboration for the design of new technologies because they help create a shared understanding between participants (Arias et al. 2003:349). Because they introduce additional channels of communication, artifacts are particularly useful for avoiding problems arising from interleaved translation. The primary advantages of the artifacts are allowing non-verbal ways to participate and encouraging candid exchange of ideas by relaxing participants. Making artifacts during collaborative design meetings helps avoid loss of momentum because participants have something to work on while they're waiting for translation. Visible artifacts also help with self-censorship because they allow other participants to ask questions about something they've seen someone work on, but not yet heard discussed.

Persona posters, hats and bags, and everyday objects are three different kinds of physical artifacts for supporting bilingual collaboration. These artifacts were particularly helpful during bilingual meetings, but the artifacts and their surrounding practices were derived from generally effective HCI brainstorming techniques (Buchenau and Fulton Suri 2000:424-433 and Oulasvirta et al, 2003:125-134). A brief description of how PARC used each kind of artifact during design meetings with a Japanese company follows.

Persona Posters – Cooper describes personas as amalgams of end-users that provide sufficiently detailed descriptions so that all the members of a project can visualize how the persona will respond to a design (Cooper 1999:124). For our collaborative design meetings, we divided the participants into teams of five, mixing English and Japanese speakers with an interpreter. Participants were told to imagine they were making a movie of their technology vision and that they should use images cut from stacks of Japanese magazines to share their vision. They used the magazines to communicate what their end-user looks like in terms of appearance, personal style, likes and dislikes, and daily activities. Each team made a single poster to explain their vision of an individual end-user.

The persona posters helped bilingual collaboration in several ways. By using Japanese language materials we reinforced that our end-users were Japanese and that during the process of designing for them speaking Japanese is normal and necessary. Even if participants needed to wait for the interpreter to describe why someone else had clipped a particular image, they could still negotiate with each other using their magazine clippings almost as trading cards without sharing a common spoken language.

Figure 1 Cutting photos from magazines to create persona posters.

Hats and Bags: A Day in the Life – Although both the end-users of our technology and some of the participants in the design meetings were Japanese, our participants differed in age, gender, and attitude from the typical end-users. To demonstrate their persona posters, people acted out a day in the life of their persona in front of the group. In preparing to take on the character of their persona, the actors picked out hats and bags from a large selection and used them as props to advertise that they were acting as a persona, not as themselves. The hats and bags helped the bilingual collaboration process because they encouraged everyone to relax and be silly by giving them permission to act as someone else. Physical humor exposed information about individual personalities to speakers of the other language that they would not get otherwise because interactions were mediated through the translator. Acting as someone else helped develop empathy for the end-users and helped the Japanese participants understand that even though the end-users were also Japanese, they were not designing for themselves.

Figure 2 Selecting hats and bags to act as a persona (some identities concealed).

Everyday Objects as Props – To get inspiration for technology ideas during a brainstorming session, we brought in everyday household objects, including toys, to use as prompts for the inspiration process. During this exercise, each participant selected items from boxes containing objects with interesting physical properties and used that object to tell a story about a technology use scenario, for example about how a child could interact with a stuffed animal to communicate with a parent far

away. The everyday objects helped bilingual collaborative design by allowing participants to avoid loss of momentum because they could keep reasoning with their object while waiting to be interpreted. Having objects on a table in front of each person also helped participants avoid censoring themselves because other people could see what they were working on and direct questions to them about what they were doing.

Figure 3 Using everyday objects to imagine device behaviors.

RECOMMENDATIONS FOR BILINGUAL DESIGN MEETINGS

Persona posters, hats and bags, and everyday objects are examples of physical artifacts that helped overcome some problems with interleaved translation during bilingual collaborative design. However, to use these artifact s successfully, they must be integrated into the overall meeting format. The following are general recommendations for facilitating successful bilingual collaborative design meetings:

Set ground rules for interpreting and then make everyone follow them – Talk to the interpreter before the meeting and stress that because everyone should be able to participate freely in the meeting, everyone's comments must be interpreted, even if they try to wave away interpretation. Also clarify to everyone that the interpreter will interrupt two people speaking to each other in the same language to translate. In addition to allowing everyone present full access to all discussions, these interruptions are important for counteracting two common hierarchy issues in Japanese organizations: subordinates talking only to their superiors instead of directly to the group and supervisors asking their subordinates (who often have better English skills) to address the group on their behalf. The ground rules should clarify everyone's comments will be translated by the interpreter, not by members of their own organization.

Normalize different behavior during the meetings – For a brainstorming meeting we asked participants not to wear ties and handed out team sweatshirts for everyone to wear, attire different from the suits they normally wore. Cues about how to behave succeeded in creating a new kind of meeting norm where people felt comfortable making outlandish suggestions. Wearing silly hats actually helped elicit candid comments by sending a message that this is a different kind of meeting and different kinds of rules applied. For some parts of the meeting we asked people to work seated on the floor, and the Japanese participants immediately took of their shoes and sat, with the Silicon Valley participants sheepishly taking off their shoes too.

Work in small groups with different combinations of people – Over the course of multi-day collaboration workshops, we explicitly formed and reformed small groups of different people into teams. By frequently changing around who works together, problems with inter-group dynamics, such as pairs talking only to each other without waiting for translation, can be avoided through new team assignments.

CONCLUSION: CHOREOGRAPH FOR COLLABORATION

By incorporating physical artifacts into bilingual design meetings following the above guidelines, PARC overcame some problems with interleaved translation. Persona posters, hats and bags, and everyday objects were effective in avoiding loss of momentum and self-censorship because they allowed non-verbal ways to participate and encouraged candid exchange of ideas by relaxing participants. However, the artifacts and the meeting management recommendations alone are unlikely to succeed without careful choreography of how participants use the workspace.

Choreography is necessary to make sure every person is in within arm's reach of all the necessary materials, a requirement for enabling participation. For example, during the early part of one design discussion, only one participant and the interpreter were standing within arm's reach of markers and a white board, while the other team members sat on the opposite side of the table. The two scribes could write in English or Japanese, depending on who was speaking, but only the two of them could record anything, which undermined the opportunity for others to communicate nonverbally through sketches or to make notes to themselves to remind them of important points to explain when their turn to be interpreted came. By stopping the discussion, removing the table, and asking everyone to stand by the whiteboard, more people participated in the discussion.

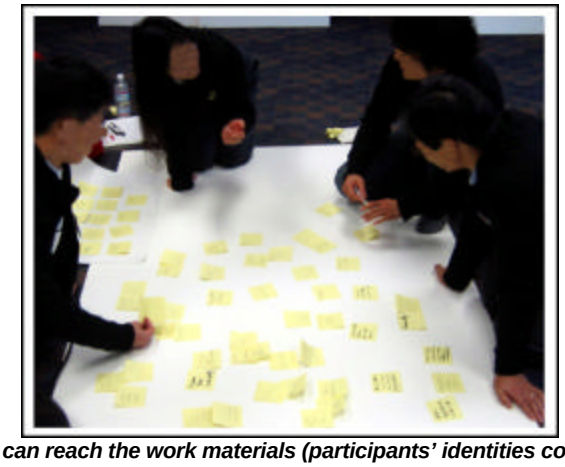

Figure 4 Everyone can reach the work materials (participants' identities concealed).

Choreography is also needed to insure that individuals don't escape the group and work completely independently. Over the course of multiple design meetings, one participant would listen to instructions and then go sit down away from his team to complete a version of the design task on his

own, making sketches and writing text to explain his ideas on his own paper. When finished, he would return to the group and commandeer the interpreter to go through each point of his complex ideas. Repeated requests for him to rejoin the group while he worked alone went ignored, but choreography succeeded in getting him to participate with other group members. Moving tables and chairs removed places to sit away from the group and drove the loner participant to work alongside others. Repeatedly placing sticky notes on top of his own paper while he wrote coerced the loner to record ideas in the shared format. Placing his notes on a wall alongside other sticky notes encouraged him to engage with other people's ideas because when asked if his notes should be placed next to sticky notes for one idea or another, he had to listen to the ideas to make that decision.

As these examples show, physical artifacts can overcome some of the problems with bilingual collaborative design meetings. However, the ways in which people interact with the artifacts, each other, and the workspace must be carefully choreographed to insure that the meetings succeed.

Acknowledgments - Many thanks to my colleagues: Victoria Bellotti, Diane Schiano, Ed Chi, Francine Chen, and Steve Smoliar for their help during many of these meetings. Thanks also to our collaborators for their creativity, patience, and good humor.

REFERENCES

Arias, Ernesto G., Hal Eden, Gerhard Fischer, Andrew Gorman, and Eric Sharff
2002 Transcending the Individual Human Mind: Creating Shared Understanding Through Collaborative Design. In John M. Carroll ed., *Human-Computer Interaction in the New Millennium* , New York: ACM Press. pp 347-372.

Brannen, Christalyn
2003 *Going to Japan on Business*. Berkeley: Stone Bridge Press.

Buchenau, Marion and Jane Fulton Suri
2000 Experience Prototyping. Paper presented at the Conference on Designing Interactive Systems New York, August 17-19.

Cooper, Alan
1999 *The Inmates Are Running the Asylum* , Indianapolis, IN: Macmillan Computer Publishing.

Oulasvirta, Antti, Esko Kurvinen, and Tomi Kankainen
2003 Understanding Contexts by Being There: Case Studies in Bodystorming, Personal and Ubiquitous Computing 7(2):125-134.