SI 689 CSCW

Microsoft Groove

Evaluation Project - Final Report

December 4th, 2008

Yung-Ju Chang

Elaine Engstrom

Mark Goetz

Katie McCurdy

Tanuj Shah

Table of Contents

1. Executive Summary

Can student groups effectively plan and conduct meetings using a collaborative software product? This was our fundamental question as we set out to analyze Microsoft Groove's utility as a meeting tool. Microsoft Groove (or 'Groove') is an application designed to allow distributed teams to collaborate on documents, plan and conduct meetings, and share information. Groove is intended for corporate use, but we were curious to find out how Groove would perform for students, who normally have looser meeting agendas and structure. We decided to conduct ethnographic studies to analyze how student meetings in Groove compared to student meetings in person.

The following questions guided our project and helped us formulate our methodology:

1. How do student groups manage and plan in-person meetings?
2. How do they manage meetings using Microsoft Groove?
3. What are the differences between in-person meetings and meetings held in Groove?
4. How effective is Groove as a student group meeting tool?

We conducted three observation sessions with each of two student teams; we first observed each team in of theirs face-to-face meetings, and then we observed the teams as they used Groove to plan and conduct two subsequent meetings. Both groups were working on highly creative, collaborative work (for low fidelity and high fidelity prototypes) for the School of Information's Interface and Interaction Design class. Because the teams chose not to plan their meetings using Groove, we focused our observations and findings on how team meetings differed between in-person and on Groove chat, including how teams used Groove's various tools to better communicate their ideas.

Key Findings:

We discovered that, as expected, teams preferred to meet in person instead of in Groove. Groove meetings were more project-focused and had fewer breaks than in-person meetings, but they were also less productive. Teams reported that problems with decision-making, awareness of other team members, language, conversational tone, typing speed, and conversation threads becoming jumbled all contributed to lower productivity and efficiency in Groove.

However, we also observed that using Groove provided teams with some benefits over regular chat

meetings or even face-to-face meetings. For instance, we saw that holding a meeting in chat gave certain team members a stronger voice than they had in face-to-face meetings. Teams also began using some of Groove's tools to support their work; Groove's persistence allowed teams to store files, images, sketches, and even chat logs permanently within the tool.

Key Recommendations:

Based on our research, findings and user feedback, we developed a set of recommendations that would help Groove become a more productive student group meeting tool. We recommended that Groove increase awareness of other members' activity by implementing desktop sharing capabilities and user status icons. We also suggested that Groove improve its chat tool by enabling side conversations and improving notifications of new chat entries. Finally, we recommended that Groove enhance the meeting tool by improving meeting agenda visibility and design, placing the meeting tool in its own window, and allowing meetings to vary in rigidity and structure.

This study suggests that while Groove is not an ideal student group meeting tool, its features can allow groups to communicate through more channels than chat alone. With some usability enhancements, Groove could become a more widely-used collaboration tool among student groups.

2. Microsoft Groove

2-1. Overview

Microsoft Office Groove is a desktop application designed for document collaboration in teams with members who are regularly off-line or who do not share the same network security clearance. Groove's core concept is the shared workspace, which main feature is a set of files to be shared, plus other aids for group collaboration. Groove users can create workspaces, add documents, and invite other Groove members to a workspace. Users can customize their workspace by adding such tools as a file management tool, sketchpad tool, and photo sharing tool. When participating users are off-line, changes for their workspaces copies are queued, either on an Office Groove Server that mediates the workspace or via other participants (peer-to-peer), to be sent to users when they come on-line. When multiple users edit one document at the same time, changes may conflict and multiple versions will be shown until an editor decides which changes will become final. Groove's basic set of services (including always-on security, persistent chat, store-and forward messaging delivery, firewall/NAT transparency, ad-hoc group formation, and change notification) may be customized with tools. Groove's uses have included coordination between emergency relief agencies where different organizations do not share a common security infrastructure and where offline access is important. It is also used as a staging system for documents in development, where content can be worked up then transferred to a portal when complete. (Wikipedia) Groove is available as a free download for 90 days from the Microsoft website.

2-2. Typical Users

Groove's target audience are users from two separate entities such as separate corporations or non-profit organizations such as in the non-profit example mentioned above that do not share a common security infrastructure and where offline access is important. For this study, we attempted to find actual Groove users through many online sources such as professional groups, Facebook groups, and forums; but we were not able to obtain Groove users who were available to take part in our study. We then changed our focus to concentrate on the project centered culture at SI, and study project teams who had little or no experience with Groove, but were willing to try it out.

2-3. Key features of Microsoft Groove

Groove allows users to store and share documents in one central place, and it offers other optional add-on tools such as chat, discussion, a meetings section, sketchpad, issue tracking, notepad, pictures, and forms. Groove enables meeting collaboration through the following features:

2-3-1. Launchbar : The gateway into Groove
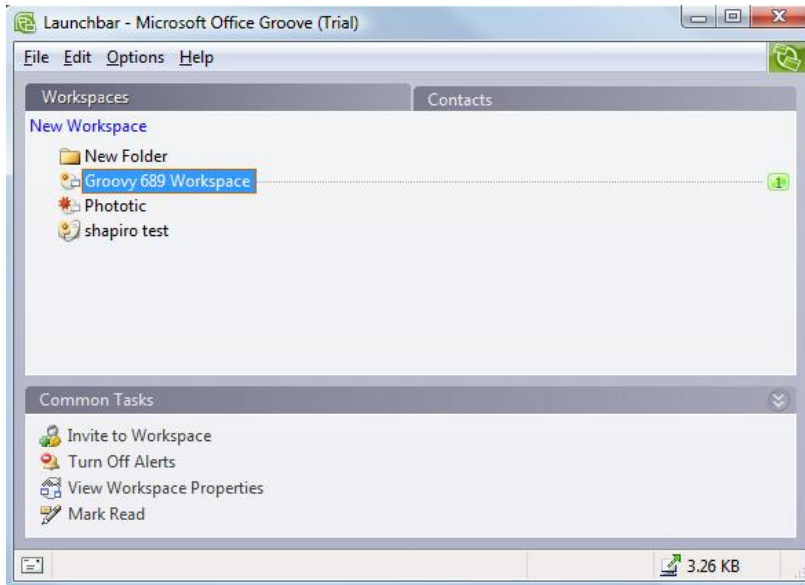
The Launchbar has three tabs: Workspaces, Contacts and Common Tasks. The "Workspaces" tab lists all the workspaces (groups) the user is a member of, and allows a new workspace to be created. The "contacts" tab lists all contacts associated with the user, and the contacts' status. The "Common Tasks" menu allows users to change alerts and view preferences, create new folders and send e-mail to contacts through a chosen e-mail program.

2-3-2. Toolbar Updates

Constant updates of Groove Workspace happenings are relayed to the user through a small pop-up window from the user's toolbar along the bottom of their screen. In addition, a Groove icon is placed in the user's Windows tray.
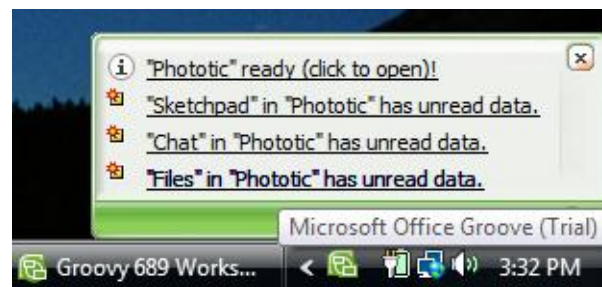
2-3-3. Basic Layout of Groove

The screen features that consistently appear throughout Groove are the "Workspace Members" area (top right side of the screen), tools tabs (along the bottom of the screen) and the header. The "Workspace Members" area allows the user to see who is virtually present in the workspace - who is online in Groove, who is online but does not have their Groove workspace open, and who is offline. This awareness helps users know who is immediately available, and who is not. New users can be invited in this area.
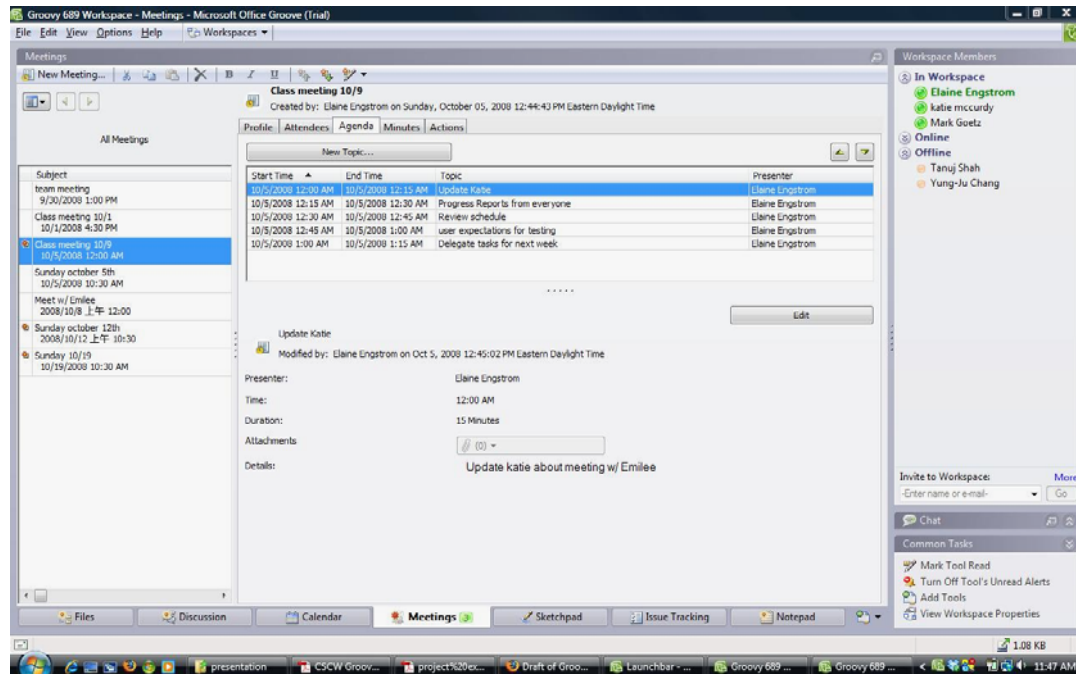
The middle section of the Groove layout is populated by the tool choices available in the tabs along the bottom of the screen. In the above screenshot, the meetings tool is highlighted. The meetings tool was the primarily area of focus for this project, along with the chat section which is discussed in the next section. We repeatedly encouraged the two teams to use the meetings tool to help them run their meetings, but we found that users preferred not to use Groove's meeting planning tool, as explained further in the findings section.

The meetings tool consists of five sub-tabs:

- Profile - states meeting logistics such as meeting date, start time, end time, and location. Any files pertinent to the meeting can be attached here and a short summary of the meeting can also be included in the "Details" area of this tab.
- Attendees - outlines who is acting as "Chairperson" and "Minutes-Taker" (if assigned), and all

attendees of the meeting. A notes field is included for any other additional notes.

- Agenda - The agenda outlines the topics of the meeting to be covered. Each topic has a title, start time, end time, presenter name, attachments, and topic details.
- Minutes - The minutes tab is simply a text box for writing and saving the minutes. The agenda can be added into the minutes if desired.
- Actions - Action Items can be created and assigned to team members. Action items are also assigned a due date and priority level.

2-3-4. Chat

Below the workspace member area is the chat section. Groove group chat is persistent; so users can catch up or review prior conversations as needed.   Users can enlarge the chat workspace such as in the screenshot below.
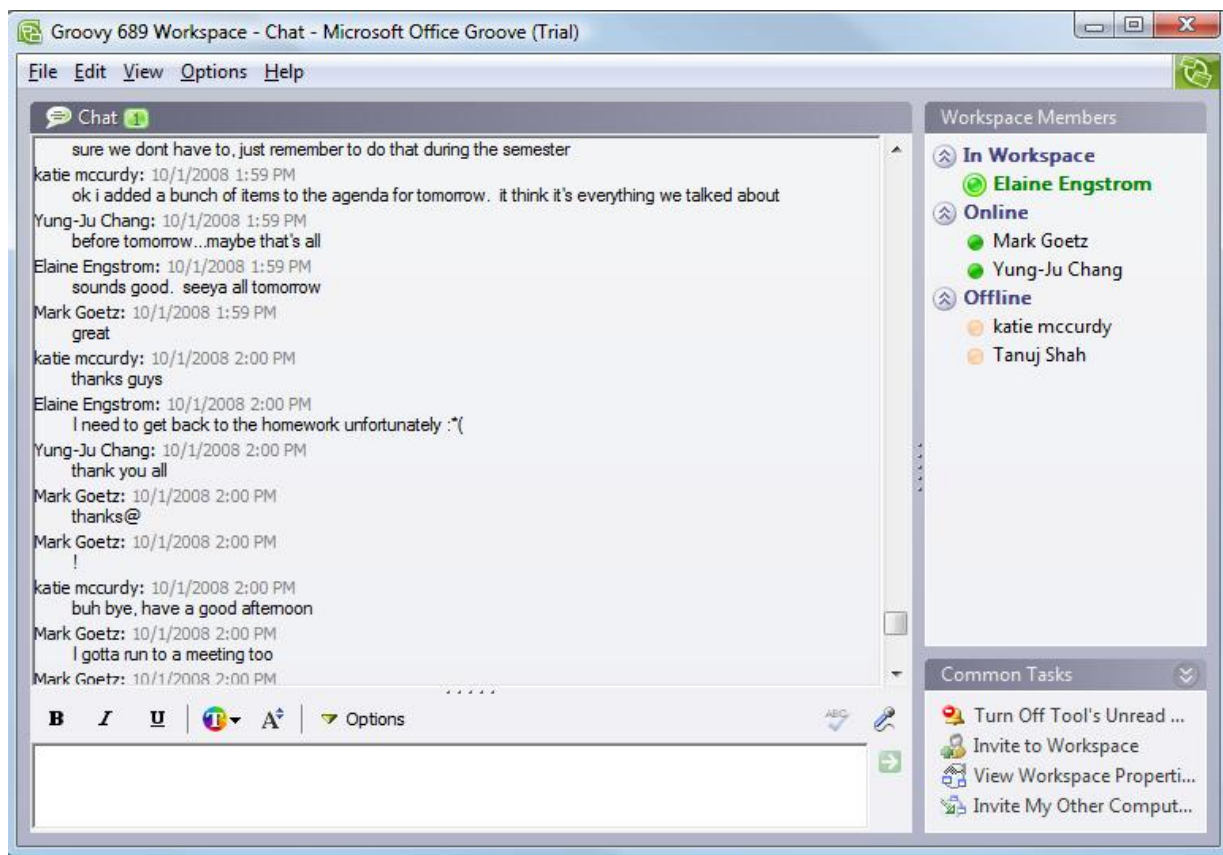
2-4. Featured Tools

We encouraged the two teams to use other Groove tools if they found them useful. The teams we observed found the following two tools especially helpful.

2-4-1. Sketchpad Tool

One team chose to use Groove's Sketchpad tool while formulating prototype ideas. In the Sketchpad, any user in the workspace can draw lines, shapes and add text.
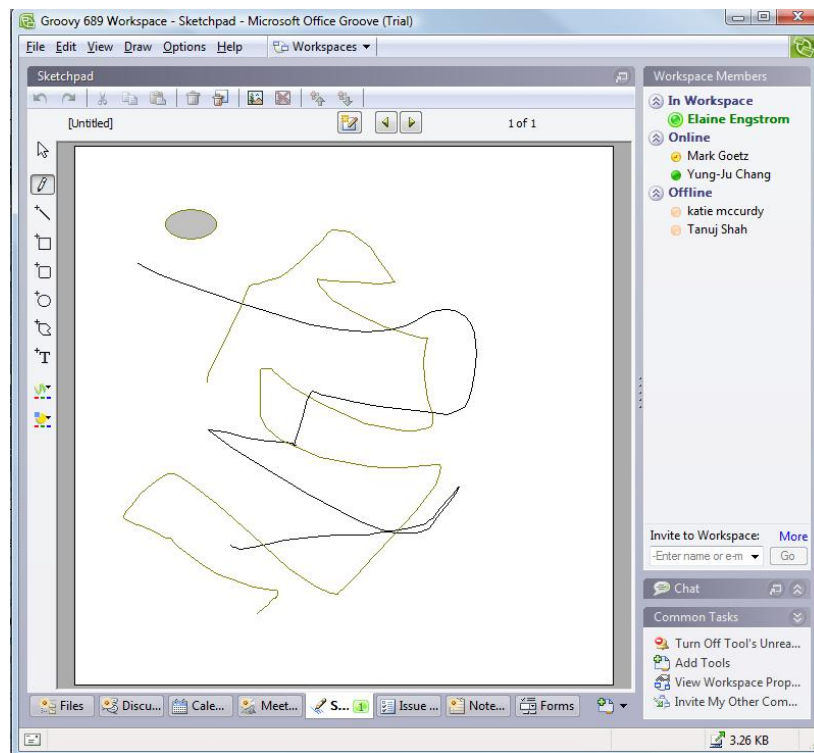
2-4-2. Files Tool

Teams also used the Files tool. The Files tool provides a place for teams to collaborate on documents. When multiple users edit one document at the same time, changes may conflict and multiple versions will be shown until an editor decides which changes will become final.
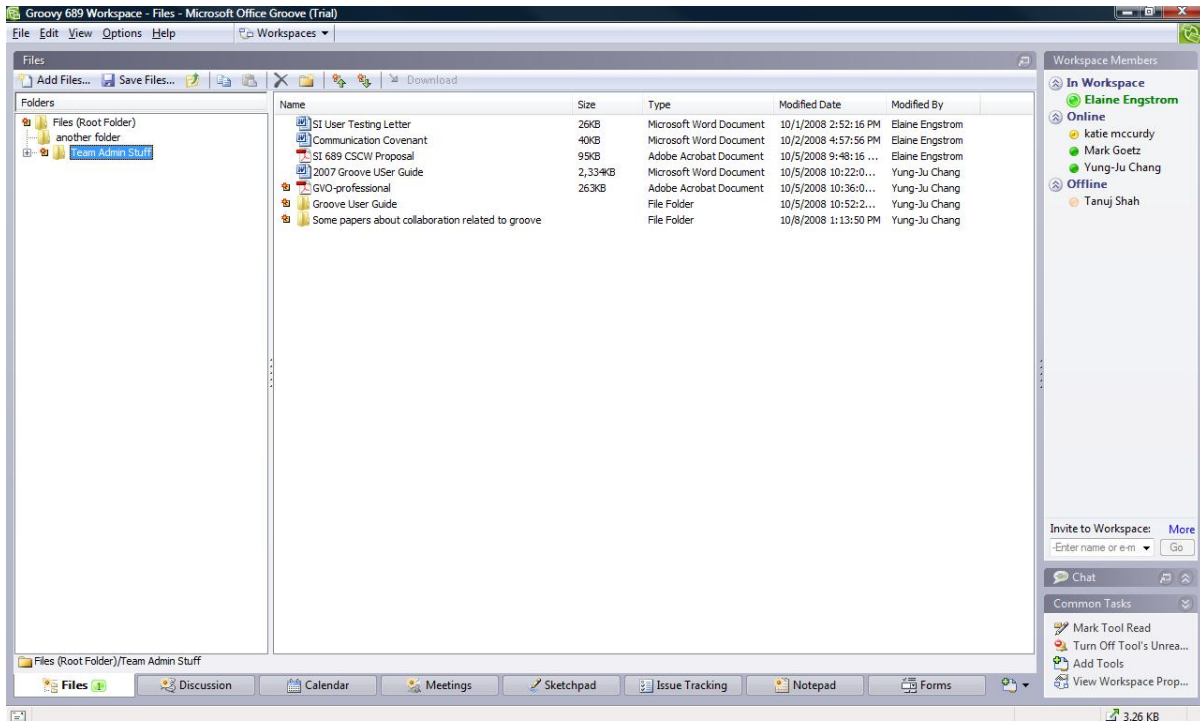
2-5. Comparative Analysis

We conducted a comparative analysis (see Appendix A) to evaluate how Groove compared to three other web-based meeting tools: WebEx, Dimdim, and Vyew. As a general overview, Groove performed quite well against these three tools. Groove does not quite have the richness of communication of its competitors, which is a disadvantage for individual meetings. Groove's lack of PowerPoint integration, video channels, and private chat detract from its value as a communication tool. However, it serves much better than the others as a persistent collaborative tool for a semester-long project. Its workspaces are a key component to storing the entirety of a project, from meetings and decisions to discussions to final deliverables, and neither Dimdim nor WebEx can compete with Groove in this area.

Vyew's features make it much more competitive with Groove. However, there are subtle differences between the two tools. Vyew is intended more for online presentations and close collaboration, due to its

web-based application and fluid meeting structure. On the other hand, Groove makes the assumption that it will be used by a group who is working together for long periods and will use Groove frequently. Groove's status as a desktop application with no ability to publish the material in its workspace supports this. Overall, we feel that a tight-knit student group similar to the ones we have studied will benefit more from Groove than from Vyew.

3. Methodology

As we planned this study, we kept in mind four fundamental questions:

1. How do student groups manage and plan in-person meetings?
2. How would they manage meetings using Microsoft Groove?
3. What are the differences between in-person meetings and meetings held in Groove?
4. How effective is Groove as a student group meeting tool?

3-1. Users

We chose to focus on the meeting management function of Groove because group meetings play a significant role in the School of Information. Both of the groups we observed were completing intensive projects for the School of Information's Interface and Interaction Design class (SI 682), and the groups had assembled at the beginning of the semester. One group had five team members, and the other had three members. The groups usually met two times per week, for a total of ten hours; they sometimes used their meetings to actually do their assigned work, and other times they would meet in person to delegate and distribute tasks. A lot of their group time was spent conceptualizing, brainstorming, and generally working on highly creative tasks. One group was working on a touchscreen mobile calendar tool, and the other group was developing a photo sharing tool. We began observing them as they were beginning to work on their low-fidelity prototypes; these were paper-based interface designs that the group created over multiple meetings. We then observed the groups as they began to create high-fidelity prototypes.

In addition to our observations, we collected baseline team member information through questionnaires; we discovered that our users ranged in age from 22 to 27, all had computer science, engineering or design degrees, and all hailed from either India or China. Users reported spending from 3 to 8 hours online, with some reporting they spent 'most of their time' online. Most of our users reported using instant messaging several times per day; and most reported having a high comfort level with technology and learning a new software product (average of 4 out of 5). For project management, most users reported using CTools or Google products such as Google Docs or Google Sites. Most reported having two or three group meetings per week, with meetings lasting 2-3 hours on average. 5 out of 7 team members liked using a meeting agenda, but most of them preferred a loose or unstructured agenda.

3-2. Observation Preparation

To prepare for our observations, each member of our team downloaded a free trial of Groove. We created our own Groove workspace, and became familiar with Groove's features and tools. We held one team meeting using Groove's chat, and we used Groove's meeting agenda tool for a few of our online and in-person meetings.

To gauge how using Groove impacts meetings, our team scheduled a total of six ethnographic studies: three observation sessions for each of the student groups. We first observed each group during a face-to-face meeting, and we then requested that the groups plan and conduct the second two meetings in Groove. We sat in the room with the groups during the initial meetings, and then we observed the teams' Groove chats during the second two meetings. We helped the teams download free trials of Groove prior to the first Groove observation, and we helped them create their own group meeting space; we then had the teams invite us into their space so that we could observe their meetings on our own computers.

In order to determine what we were going to track during the meetings, we systematically brainstormed a large number of potential metrics along some major themes like 'facial expressions and movement,' 'meeting structure,' 'communication efficiency,' 'group dynamics,' 'group memory,' 'tools,' and 'individual contributions/distractions' (see Appendix E). Our team narrowed this group of topics by determining which observations might reveal the most interesting comparisons between in-person and Groove meetings. In the end, we tracked the pace of the meeting, conflicts and decisions, confusion and clarifications, and how the group used digital and physical resources and tools. We created logging sheets, which we used to track the data; we've stored examples of these in Appendix D.

We decided that at least two of our team members would attend each meeting; each team member would track a different aspect of the meeting. After all six meetings, we decided to conduct one-on-one 'debriefing' sessions to collect group members' feedback about how the meeting went. We also decided to administer a 'post-test questionnaire' after the first Groove meeting to gather team members' written feedback on their experience using Groove.

3-3. Personas, Groupsona, and Scenarios

By observing the two School of Information project teams in their initial face-to-face meetings, we witnessed the different ways in which individual team members function as part of each team, as well as the group roles and dynamics of each team. Based on the individual attitudes and roles we observed, we

created three distinct and representative personas. We developed a groupsona that represents the different contribution styles and group interactions witnessed. Finally we made two scenarios that build upon the observations and represent the types of student group work scenarios that Groove should support. Our personas and scenarios helped us understand different personality traits and characteristics of groupwork, which we used when deciding what to observe in Groove. We also feel that the personas and groupsona would serve as a useful guide for recruiting students for future work. The Personas, Groupsona, and Scenarios are available in Appendix B.

3-4. What happened in the meetings

Our team successfully observed one in-person meeting and two Groove meetings for each team. We gathered rich data from our observations, chat logs, and user interviews and questionnaires. As we became familiar with Groove's tools and developed our user personas and scenarios, we further envisioned how dislocated groups might use Groove to successfully accomplish tasks.

The teams accomplished various tasks related to their prototype deliverables in the face-to-face and Groove meetings. In the face-to-face meetings, the teams discussed features for their prototypes; they often sketched ideas on paper, shared online examples with the rest of the team, and debated different design options. In the first Groove meeting, one team brainstormed ideas related to their low-fidelity prototype, while the other team planned and discussed how to complete project scenarios. In the final Groove meeting the first team shared prototype sketches and brainstormed more ideas, and the second team spent time planning for their high-fidelity prototype and next meeting details.

3-5. Chat versus Groove features

At this point, the scope of our project changed somewhat; we had set out to examine how the student groups would plan and conduct meetings using Groove's meeting and chat tools, but the groups declined to use Groove's meeting planning tool. However, during chat meetings, the participants progressively explored Groove and used several of its tools to support their tasks. At the beginning of the first Groove meeting a team used the discussion tool to register and share the agenda for the meeting. During the meeting when they needed to share some documents a participant added the files tool to the workspace and uploaded two documents. In the next meeting the teams were much more familiar with groove and used more of its tools. One team's task in the second Groove meeting was to decide the interaction design of a calendar for mobile devices. Every team member had a paper sketch of the design they had devised. Each of them could have scanned their document and shared it in Groove; however, the scanner at the lab

was not working. So the team explored the Sketchpad tool in Groove and started using it to reproduce their interaction designs. Three of the five members were actively involved in designing on six different pages on the sketchpad tool and all the five members were involved in the brainstorming.

These accidental explorations of the Groove tool were the true usage of the software; otherwise, the teams just used the chat for their meetings. Our findings thus ultimately focused on how team meetings differed between in-person and Groove chat, including how teams used Groove's tools to better communicate their ideas.

3-6. How we analyzed our observations

Once our observations were complete, we analyzed all six meetings as well as the pre-test questionnaires, post-test questionnaires, and debriefing results. We isolated the most significant findings from each session or set of forms, and then we grouped them by common themes which began to take shape. We attempted to compare in-person and Groove meetings wherever possible, but we also uncovered some interesting findings that didn't specifically compare the two meeting styles.

4. Findings

We discovered that, as expected, teams preferred to meet in person instead of in Groove. Groove meetings were more project-focused and had fewer breaks than in-person meetings, but they were also less productive. Teams reported that problems with decision-making, awareness of other team members, language, conversational tone, typing speed, and conversation threads becoming jumbled all contributed to lower productivity and efficiency in Groove.

However, we also observed that using Groove provided teams with some benefits over regular chat meetings or even face-to-face meetings. For instance, teams began using some of Groove's tools to support their work; Groove's persistence allowed teams to store files, images, sketches, and even chat logs permanently within the tool. We also saw that holding a meeting in chat gave certain team members a stronger voice than they had in face-to-face meetings.

We explore these findings in detail below, tying in insights from our comparative analysis, and then we suggest recommendations on improving Groove's meeting capabilities.

Finding 1 – Groove meetings had fewer breaks and were more formal than in-person meetings

In both face-to-face and Groove meetings, we tracked the level of meeting formality using the following definitions:

- **Formal**: activity that is definitely related to the project or project planning
- **Semi-Formal**: meeting warm-up, or discussion that is vaguely related to the project. Examples include 'we're almost all here, where's [so and so]?' or 'Did you read the article for class this week?'
- **Casual**: off-topic discussions, joking, or storytelling; not project-related.
- **Break**: break in interaction, for example if people leave the room

We observed in both groups' face-to-face meetings that there were periodic casual and semi-formal interactions. The graph below shows the pace of one of the face-to-face meetings; the Y axis indicates the type of conversations with 0= Casual Interaction or Break, 1 = Semi-formal interaction, and 2 = Formal work. We observed, and it is evident from the graph below, that as the meeting duration increases, casual and semi-formal interaction increase and time spent on formal work decreases.
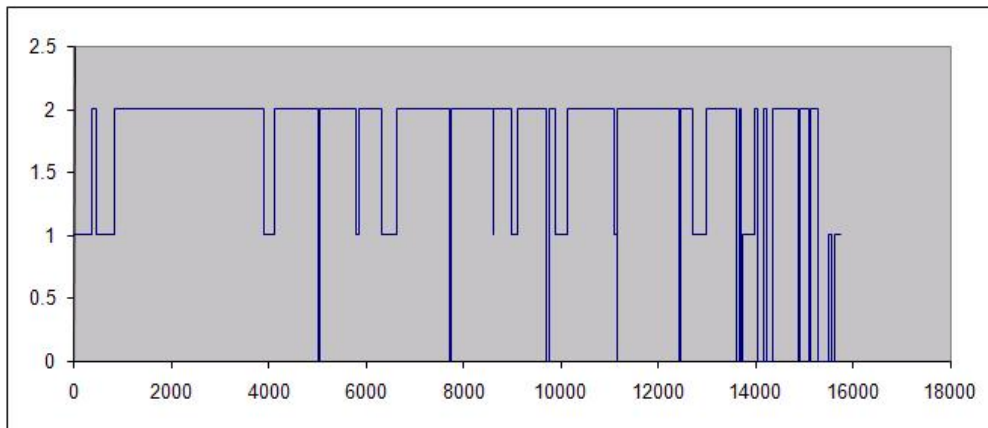
Face-to-face meeting

On the contrary, using chat resulted in a much more sustained level of formality. Similar to the breakdown found by Handel and Herbsleb (2002), chat was used mostly for work. Almost the entire meetings were 'formal,' with short periods of semi-formal activity on either end (e.g., semi-formal 5 minutes, formal 35 minutes, and then semi-formal 1 minute; as seen in the below chart.) In addition, there were many fewer casual and semi formal interactions at the beginning of the Groove meeting than there were in face-to-face meetings. The teams bypassed much of the usual warm-up activity that characterized the beginning of face-to-face meetings. The groups had identified this warm-up period as necessary for a face-face meeting, but in chat, people wanted to get to the work and finish the meeting much sooner.
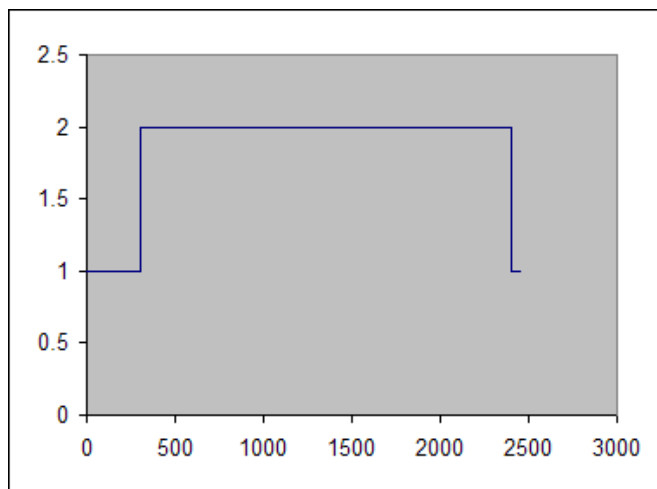
Groove chat meeting for same group

We gained some insights from both our observations and user interviews that may help explain why Groove meetings had a more sustained level of formality and fewer breaks. First, the teams knew (from experience) that conducting a chat meeting was less efficient than meeting in person; conversation threads were difficult to keep straight, and the pace of the Groove meeting was much slower than in person due to

typing speed, varying levels of English mastery, the inability to 'talk' at the same time, and the inability to hold side conversations. Because the team knew their productivity in Groove would probably be lower than in person, they focused on making sure that their meeting was fully dedicated to the project.

In addition, during Groove meetings it could be difficult to express or understand conversational tone and sarcasm, so jokes died out much faster; therefore sustained levels of casual or joking interactions are more difficult in Groove. As a result, group members tended to treat each other more formally than in face-to-face meetings.

The following excerpt from a chat meeting illustrates both the issues with tone and the haphazard organization of conversation threads.

> U02: 11/4/2008 8:02 PM
> works fine for me
> U02: 11/4/2008 8:02 PM
> anyone has anything to say
> U05: 11/4/2008 8:02 PM
> so ,what's new?
> U04: 11/4/2008 8:02 PM
> what does "what's new" refer to?
> U03: 11/4/2008 8:02 PM
> go ahead
> U01: 11/4/2008 8:02 PM
> About sites

It's hard to tell whether U4's comment 'what does "what's new" refer to?' is sarcastic or the result of genuine confusion, and U1 then tries to bring the team back on track. This example illustrates that it is really not easy to intersperse work-related and casual conversations in a chat room format.

In one group meeting, students attempted to rectify the lack of tone by using different font sizes and colors, as illustrated in the exchange below:

> U02: 11/4/2008 8:16 PM
> b) transparent bg for menu
> U04: 11/4/2008 8:16 PM
> what
> U04: 11/4/2008 8:16 PM
> is
> U04: 11/4/2008 8:16 PM
> bg
> U03: 11/4/2008 8:16 PM
> background
> U02: 11/4/2008 8:16 PM
> reduce font size

Later in this meeting, U4 explained that he was simply trying to ensure that his comments were not lost in the chat log:

U04: 11/4/2008 8:19 PM

it's not emotional, it's important information

U04: 11/4/2008 8:19 PM

what i say is important

Observation Effects

Because the teams knew they were being observed by our project team, they reported that they tended to act more formally, both in face-to-face and chat meetings, than in a usual meeting (i.e., they spent more time on project-related activities). We don't believe this skewed our results, though, because we observed all six in-person and face-to-face meetings and still found that chat meetings were much more formal than in-person meetings.

Finding 2 – Groove meetings were less productive than face-to-face meetings

Users reported, and we observed, that Groove chat meetings were less productive than in-person meetings. The following observations provide insights as to the reasons the chat meetings were less productive.

Speed of conversation

The student groups reported that the most negative feature of Groove was the difficulty of communicating only by typing. Chatting by keyboard imposes a very high production cost (Clark and Brennan, 1991), which reduced the meeting pace and caused confusion, and was therefore a detriment to the meeting process. Group members often finished each others' sentences or spoke over one another in face-to-face meetings; but in Groove, this was not possible. Groove entries were, on average, 3 to 5 words long, while spoken sentences were much longer; conversations were therefore more drawn-out in Groove than in person.

At Group 1's face-to-face meeting, we observed that the users had generally three paces of conversation: the fastest pace was about 23 sentences per minute, and occurred when the team was excited and talking over one another; the medium pace was about 15 sentences per minute; and the slow pace was about 6 sentences per minute, occurring often when one team member was drawing and the others were looking on and making comments.

We tracked comparable data during the same group's Groove chat meetings by measuring the number of chat entries (we call them 'sentences' here) per minute during the meeting. In the group's first Groove meeting, they communicated at a rate of about 7.29 sentences per minute. During the second meeting, the speed slowed to an average of 4.35 sentences per minute. These rates of conversation are similar to the slowest rate of face-to-face meetings, but the speed remained relatively consistent regardless of what activities the team members were engaged in.

In-Person vs. Groove Meeting Pace
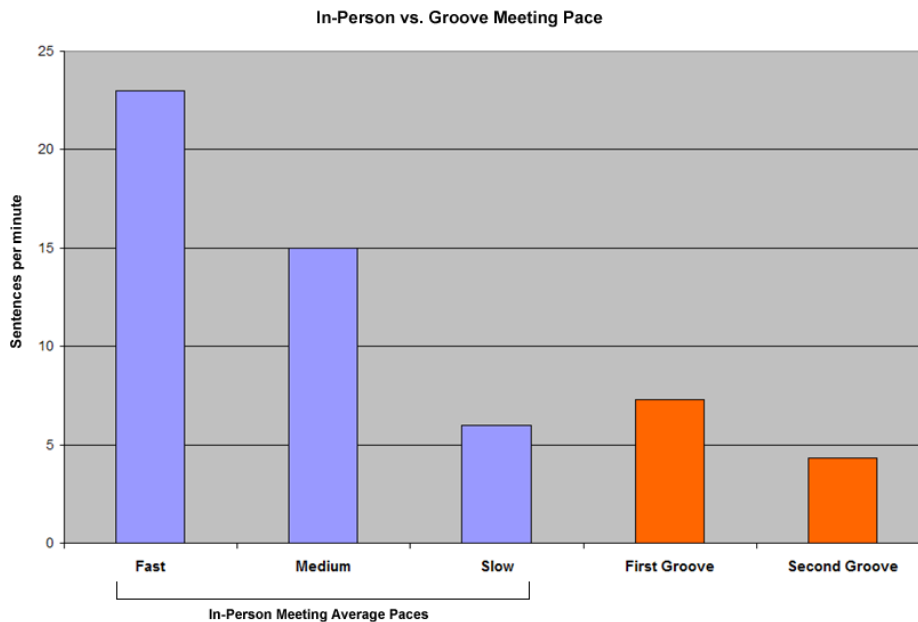
Interestingly, the team reported that their second Groove meeting was more productive, even though they were conducting the meeting at a slower pace; this is consistent with our observation that during a very confusing section of the other group's second Groove meeting, the average entries per minute increased substantially. Therefore, we might postulate that confusion in a chat meeting is correlated with a higher rate of entries per minute; although we are not sure if the high rate of entries is causing the confusion, or if people post more entries in response to feeling confused. This implies that in the context of a chat meeting, a slow-paced meeting may be more productive than a fast-paced meeting. But overall, the chat meetings' slowness seemed to reduce productivity.

Dividing tasks and collaborating

We observed that in face-to-face meetings, teams would often collaborate on the same task; these teams were creating highly creative documents like interface prototypes, so often one person would work on the prototype while other team members would give real-time input. In Groove, it was not possible to effectively collaborate on such a task due to the lack of copresence (Clark and Brennan, 1991); one team

tried to use Groove's sketchpad to hash out interface ideas, but the sketchpad has limited capabilities. The team was able to communicate very rough ideas to one another, but they were not able to effectively collaborate on one unified sketch. The team therefore found this task more difficult in Groove than in person. It is worth noting here that Groove does have audio, but our users did not utilize this feature during our observations. Audio may have enhanced the productivity during tightly-coupled tasks like the one mentioned above, because users can then rely on two forms of sensory perception (vision and hearing) instead of just one.

The ability to have side conversations or split into sub-groups was another aspect of face-to-face meetings that was not available in Groove. We observed that in face-to-face meetings, groups' ability to 'divide and conquer' would help move the meeting along more quickly because each sub-group could solve problems and address specific issues. In effect, the ability to hold side conversations allows groups to multitask; in Groove, since everyone must see every other team member's posts, the group loses its multitasking abilities. This idea was supported by our users as well; one user suggested in a follow-up interview that Groove should incorporate the ability to hold side conversations.

Conversational drift

One major reason conversations in Groove were unproductive and difficult was because the conversations tended to drift quickly from topic to topic. Groove's chat does not easily allow any one person to 'hold the floor' or control a conversation, so group members tended to interject with comments more often than they would in a face-to-face meeting. The general topic of conversation would usually remain project-related, but it was easy for the group to quickly jump to a new topic without resolving the prior topic. An example of this from Group 1's first Groove chat follows:

> U04: 11/4/2008 8:10 PM
> > I think the back button in Conola sucks
> U01: 11/4/2008 8:10 PM
> > hmmm…
> U02: 11/4/2008 8:10 PM
> > ya i read the comment
> U01: 11/4/2008 8:11 PM
> > though i think that the sequential approach they are taking is nice
> U05: 11/4/2008 8:11 PM
> > so you dont like groove?

Finding 3 – Lack of awareness of other team members' activities contributed to Groove meetings' inefficiency

Generally, face-to-face meetings allow better awareness of other team members than Groove meetings, due to the benefit of copresence (Clark and Brennan, 1991). Users can speak and look directly at each other, they can see what other teammates are doing, and they can show each other artifacts (such as a computer screen, a drawing, etc). Face-to-face meetings also allow participants to collaborate on the same activity, like drawing on a single sheet of paper. Groove's main awareness feature is that it signals who is "in the meeting", who is "online" and who is "offline". This feature is helpful because it allows the entire group to know who is at their computer or not; thus users know whether or not they're likely to receive an immediate reply from another group member. Other tools we examined in our comparative analysis did not offer this degree of awareness; Groove's awareness feature was one of its strengths.

However, there is no way to see what other group members are doing at a given time, and so difficulties arise in making sure everyone is on the 'same page.' At the face-to-face meetings we observed, a team member would frequently present a website or a sketch to the team. During this time, the meeting would pause while the rest of the team members paid attention. In Groove, users must paste a URL into the chat and hope other team members will both click the link and understand the point of the webpage. In addition, since the chat meeting does not generally pause when someone shares a link, team members may have to catch up on the chat conversation when they return.

As mentioned, one team found Groove's sketchpad tool helpful for sharing very rough prototype ideas with one another. Although Groove displays who is in the sketchpad tool, it doesn't show which members are working on a given sketch at a given time; so the team had to expend extra effort to communicate this information to one another.

So, although Groove's awareness features provided basic awareness of other team members' Groove locations, team members did not have enough information to effectively regulate their conversation and activities based on awareness of others' tasks.

Finding 4 – Groove altered team decision dynamics

We found that meeting in Groove could have both a positive and negative effect on the way teams made decisions. While the two following findings seem to contradict one another, we observed and gathered from user feedback that Groove affected group decision behavior in these ways.

1. Decisions were usually more difficult to make in Groove

Due to many factors, teams found that it could be difficult to come to a consensus while holding a meeting in Groove. Conversation threads easily became mixed up, especially during high-volume periods of chatting. If some team members were quiet, their silence was sometimes taken as dissent. Additionally, since chat messages can only be sent when completed, group members could not indicate agreement with positive utterances (like 'uh huh'). Without positive evidence that their groupmates understood them (Clark and Brennan, 1991), group members became confused. Additionally, it was impossible for group members to complete each others' sentences to communicate agreement, as we often saw in face-to-face meetings. We heard from both teams at least once that they needed to meet afterward face-to-face to finalize a decision that they had been unable to finalize during their Groove meeting.

Example: coordinating the time and place of next meeting

During one team's second Groove meeting, we observed a 16-minute period during in which the group was attempting to plan their next meeting. As group members rapidly offered dates and times when they were and were not available, the conversation became more and more confusing. We observed that the team often had to repeat or clarify information during this time period; in fact, 8 of the 9 clarifications we observed over the course of this meeting occurred during this planning phase. The following chat excerpt illustrates the team members' confusion:

> U07: 11/3/2008 10:38 AM
> She said Sat evening
> U07: 11/3/2008 10:38 AM
> not afternoon
> U06: 11/3/2008 10:38 AM
> i mean sun afternoon
> U07: 11/3/2008 10:38 AM
> Sun day morning
> U08: 11/3/2008 10:38 AM
> I'm confused…
> U07: 11/3/2008 10:38 AM
> That is what [U8] suggest
> U07: 11/3/2008 10:38 AM
> It is sun day morning
> U06: 11/3/2008 10:39 AM
> it bad for me to meet sat night though, that's what i'm trying to say
> U08: 11/3/2008 10:40 AM
> so we already have Sunday morning. the question is when else?

In addition, we saw that the average number of entries per minute increased significantly during this time period. Over the course of the entire 40-minute meeting, the average number of entries per minute was 4.4. But the average number of entries during the 16-minute planning phase was 5.5; and for the other 24 minutes of the meeting that were not solely devoted to meeting planning, the average number of entries per minute was 3.7. As we mentioned before, we cannot be sure if the high rate of entries causes confusion, or if people post more entries in response to feeling confused; more research focusing on this specific phenomenon could help determine causality.
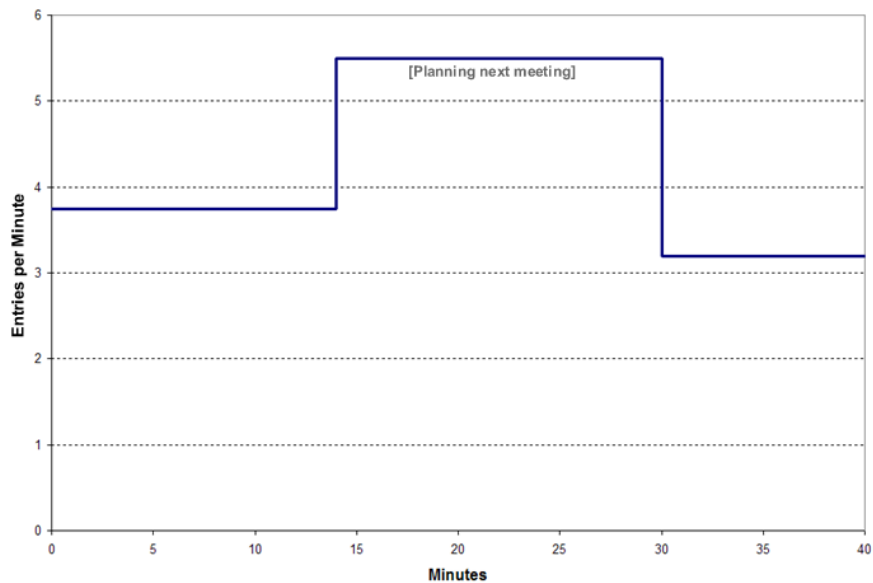
The group became frustrated during this meeting-planning period, and one team member reported after the meeting 'there still may be some misunderstandings about the next meeting that are not fully resolved.' Both teams also reported that they usually coordinate using many channels – phone, in-person, chat, etc.; so using just Groove to coordinate was not aligned with their usual methods. As a comparison to this confusing 16-minute meeting-planning phase, we observed that this same group was able to resolve the next meeting time and place in 4 minutes in the face-to-face meeting; so planning in Groove took four times as long and was not fully resolved.

2. Disagreement was costly in Groove, so teams sometimes made decisions more quickly than in person

The student groups reported that it was more difficult to express disagreement in a chat meeting, so they felt that it was sometimes easier to assent and move on with the meeting. Due to the high time and energy costs of disagreeing, teams sometimes made decisions more quickly in Groove than they would in person. This could be a negative effect, as teams might make more rash decisions than they would if they debated in person. However, this might also be a positive effect as it might allow teams to expedite their decision-making processes. We did not gather substantive data about the quality of specific Groove meeting decisions, but we did hear from our users that they were able to make minor decisions relatively easily using Groove - as one group said in a debriefing session, "at least we made some small decisions."

Finding 5 – Groove chat meetings gave a voice to marginalized team members and allowed for more egalitarian participation

Groove offered some unanticipated benefits to the teams by altering the group dynamic. Since no one person can 'hold the floor' in a Groove meeting like in a face-to-face meeting, and since side conversations are not supported in Groove, we found that some of the more shy group members participated more in the Groove meetings than they did during face-to-face meetings. This was especially true for one of the teams; the team was comprised of three team members who spoke one language, and two team members who spoke another. None spoke English as their first language. We saw that in the team's face-to-face meeting, the first three team members would sometimes break into a project-related discussion in their own language; this would effectively shut the other group members out of the discussion.

Groove allowed for more egalitarian participation first because all members were forced to speak English during the entire meeting, so Groove placed them on the same basic level (although some members' English was better than others.) Since there were no side conversations, members' posts were equally 'heard' by all other members of the group; this created an opportunity for the more marginalized team members to have their voice heard. This confirms a previous finding from McDaniel et al. (1996) that more people are able to contribute to a conversation in chat than in face-to-face meetings. Again using the example of how members established conversational tone, we saw that one such previously shy group members used bold and red font to emphasize what he was saying:

U04: 11/4/2008 8:19 PM

it's not emotional, it's important information

U04: 11/4/2008 8:19 PM

what i say is important

Even though others members asked U4 to change back to regular font, U4 kept this bold and red font for the remainder of the chat meeting. U4's use of 'loud' fonts was a way for U4 to speak more loudly and make more of an impact than during in-person meetings. U4's statement 'what i say is important,' while ostensibly meant to be joking in tone, was perhaps more of an attempt to establish some authority and respect.

Groove's meeting structure also allows more participants to contribute; we found in our comparative analysis that Groove's meeting structure was looser than Dimdim's or WebEx's. Both Dimdim and WebEx enforce meeting structure through explicitly chosen roles. Most importantly, both tools require one person be designated as the "presenter," who is the only person allowed to control the displayed slides, share their desktop, and update the whiteboard. Dimdim also places a limit on how many people are allowed to use the audio channel at any time. As a result, group participation in the meeting tools we examined is limited to just a few members. Groove's approach to roles is much more relaxed; the manager(s) don't necessarily run the meeting, and everyone can participate in the discussion equally.

Additionally, Groove offers tools to collaborate and get work done, such as the sketchpad, issue tracker and file repository. These tools enable and encourage participation from all group members. Dimdim and WebEx, which are positioned more as meeting tools, do not have any of these features. Vyew is much closer in functionality to Groove in terms of collaboration, and it is difficult to assess which of the two tools is better suited to encouraging participation.

Finding 6 – Participants preferred not to use Groove's meeting planning tool

Although we explicitly asked teams to only plan their meetings using Groove's meeting planning tool, both of the teams chose not to do so. Teams reported that they usually did not rely on detailed agendas, and they preferred a loose agenda structure. They also stated that since their class syllabus was very detailed, they could rely heavily on that document to dictate what their activities should be at a given time. It seemed, therefore, that Groove's meeting tool may have been too formalized or too many steps for the teams.
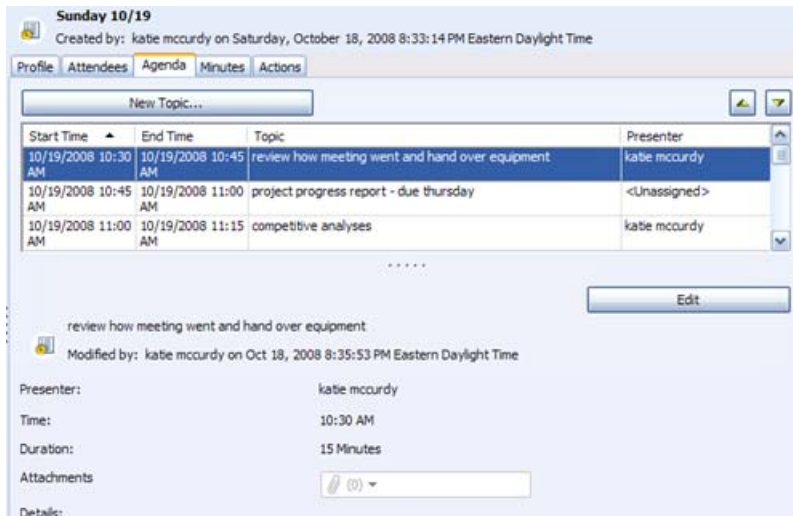
Sample Groove meeting agenda

In the screenshot above, three agenda items appear at a time. Users must scroll through the list to see the other items, and there is no way to see the whole agenda at once. There is also no way to e-mail or export the agenda.
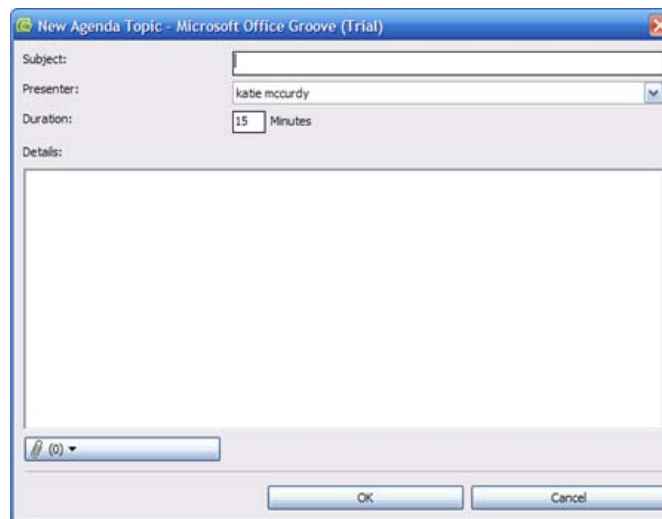
New Agenda Topic

To add a new agenda item, the meeting planner clicks on the 'New Topic' button so that the above window will open. Each topic requires a subject, presenter, and duration; extra details are optional. The agenda is therefore intended for groups that hold traditional meetings with very formal agendas; since our groups preferred a less formal agenda, they were not willing to put in the time and work to create a highly detailed meeting agenda.

One team used Groove's discussion tool, which is basically a large text box, to post an informal agenda for one chat meeting; we found this interesting because it supported our theory that these users were looking for a less rigid agenda planner.
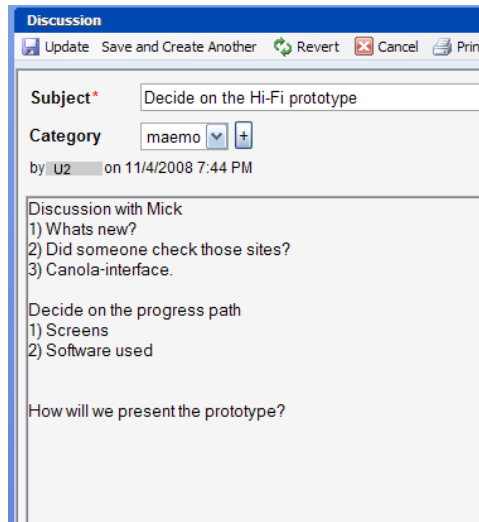
Using the Discussion tool to create an agenda

We concluded that for student groups who rely heavily on a very detailed syllabus schedule and prefer loose meeting agendas, Groove's meeting planning tool appeared to be too cumbersome.

Finding 7 – Groove features are good tools for setting user permissions, but they did not quite serve for meeting purposes

Groove allows users to be given one of three permission roles by default: managers, who have control over the content and can also other users to join the workspace; normal users, who can edit the content in the workspace; and guests, who can simply observe the workspace. Although these roles are quite useful in general, they do not fit the needs of a single meeting. Managers do not have any additional power in meetings, such as enforcing the agenda or maintaining control over the meeting flow. It is difficult for a single member to hold the floor of a meeting. However, this does mean that all users have the ability to contribute to the meeting, which may not always be true in face-to-face meetings. Users indicated that they appreciated a meeting structure in which everyone could contribute. The student groups we studied usually did not have formalized roles, although one group designated a member as the manager for the current project and the other group had an informal leader who helped facilitate group decisions. This meeting structure was also replicated in Groove; the group members did not use the role mechanism at all.

Finding 8 – Groove's tools did not allow users to efficiently share rich media

Although Groove's communication tools are sufficient to conduct a meeting and make decisions, our users were unable to communicate using the richness of material that is possible in face-to-face meetings. While one team found the sketchpad tool helpful to share brainstormed interface designs, the group's focus on sketching also revealed the shortcomings of this tool. In the group's Groove meeting, group members had prepared sketches on paper ahead of time and wanted to discuss them as a group. The group members were unable to import the sketches into Groove easily. One group member scanned his sketch and posted it on the group website, while another one re-created his sketch using the sketchpad tool. The sketchpad tool took up far more time than the group had budgeted, and as a result only one member was able to share their sketches during the meeting. Additionally, group members could only show the entire sketch; they could not detail individual parts of interest.

Group members were also unable to share screens using Groove, which was frequently done during face-to-face meetings as a method of exploring already existing solutions. They spent more time sharing and observing websites in person than in Groove. Without a proper screen-sharing mechanism, group members can only post the URL of a website that may be of interest. Other group members must then split their attention between the meeting and their browser, and they cannot see the exact point of interest on the website.

We also found that the three meeting tools we reviewed in our comparative analysis all had richer communication channels than Groove. Groove does have some features that are present in the three tools, such as public chat, audio channels, a discussion forum, and a public whiteboard. However, the meeting tools all feature several additional communication channels that Groove does not, including private chat outside the meeting, live video, telephone connections, and desktop sharing. The video and desktop sharing features were felt to be the most critical, as the visibility provided by them (Clark and Brennan, 1991) allow participants to share information that cannot be described with text or voice alone. Additionally, each tool has its own particular area of expertise – WebEx allows for recorded video and remote desktop control, Vyew's 'Vyewbooks' allow simultaneous presentation of various types of content, and Dimdim supports PowerPoint and PDF presentations.

Finding 9 – Teams found value in Groove's sketchpad and file management tools

Although we will recommend that Groove make improvements in order to excel as a student group meeting tool, we found that teams appreciated some of Groove's tools for communication and sharing.

Sketchpad

One team used Groove's sketchpad tool to communicate prototype ideas to one another during a meeting; although the teams stated that it would have been easier for them to share this type of work in person, they found that the sketchpad allowed them to quickly communicate and discuss conceptual ideas. One group member used the sketchpad tool to create seven mockups for the team's high-fidelity prototype, putting each mockup on a separate page. The other group members then looked through these mockups and gave feedback. Although the sketchpad tool was found to be less time-efficient than sharing paper sketches, it provided additional benefits. The sketches are still present in the workspace as of 12/3/2008, and can be consulted by any group member at any time, whereas paper sketches cannot be shared as easily.
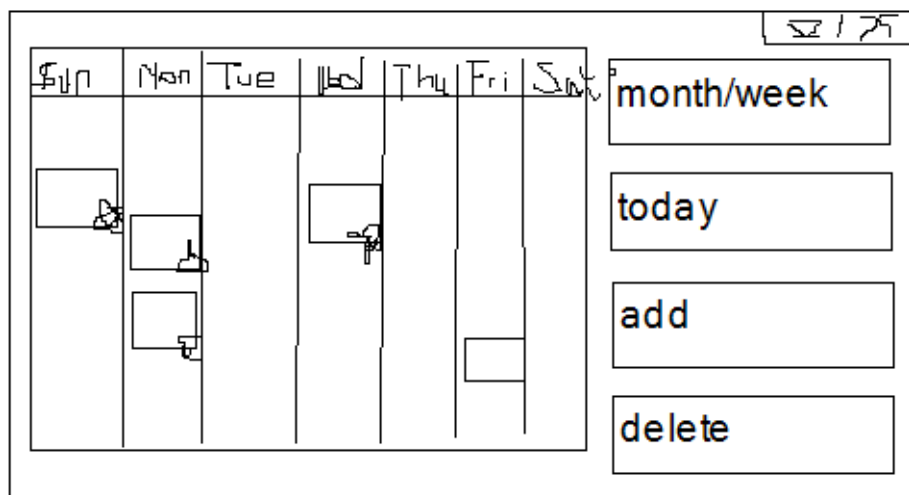
One team member's sketch of a calendar tool

File Management

We also observed that a team continued to use Groove's 'Files' tool after the observation period. The team apparently is still using the Files tool to store and share project information; our testing period with this team ended as of 11/3/08, but the below screenshot shows that the group used this tool as recently as 11/26/08.
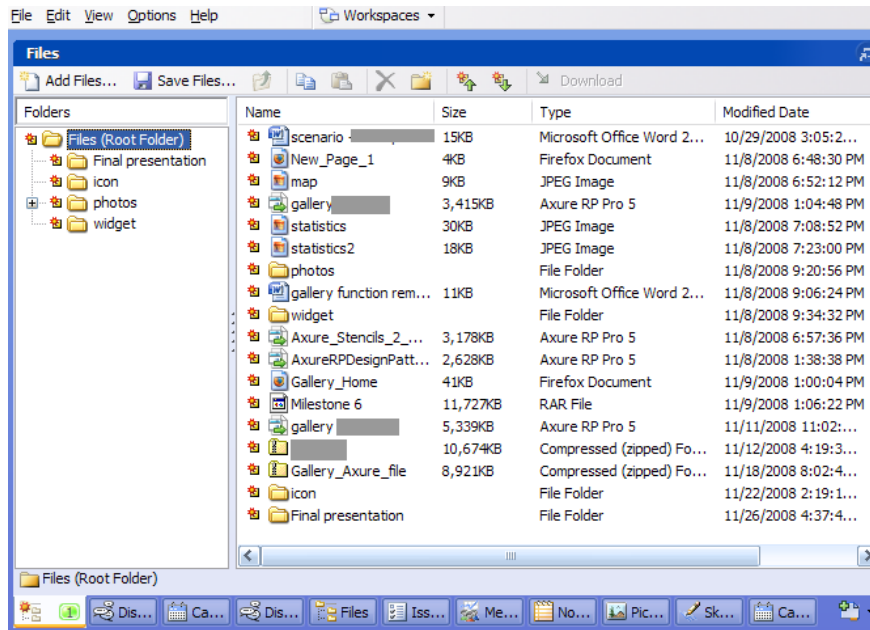
One team continued to use Groove's file management tool

It does not appear that this group is using any other of Groove's tools at this point, but we found it significant and promising that the team preferred Groove's file management system over other more commonly-used systems like CTools. In this way, Groove complements team meetings by providing a secure and dependable repository for team documents. This represents an instance where a system has proven to have value that is not supplied by ordinary face-to-face interactions, following the guidelines that Hollan and Stornetta (1992) set that a telecommunications system should go "beyond being there" and supply functionality that is difficult or impossible in ordinary interactions.

Finding 10 – Groove's workspace persistence is essential for long-term work

Groove's use of workspaces means that it is very persistent. Content entered into a Groove workspace will remain there until a group member explicitly deletes it. This makes it an ideal single point of storage for all of the work and discussion related to a project. Student groups are likely to find it essential to keep a record of their group's current status and decisions, as suggested by Hollan and Stornetta (1992), and Groove should prove to be invaluable in that sense. It also gives context to the work; thus, a Groove workspace resembles a physical workspace. Per the findings of Handel and Herbsleb (2002), the record of previous chat messages gives users a degree of context, allowing them to catch up on decisions that they may have missed. Additionally, the chat takes place in the same location as the work and documents. As found by Whittaker et al. (1994), unplanned interactions frequently occur around shared documents; thus, Groove workspaces support unplanned interactions very well.

In our comparative analysis, Groove and Vyew shared a similar degree of persistence in terms of the way that the individual applications work. However, a few external factors make Vyew a better choice for persistence. While Vyew is an entirely free tool, Groove is only available as a free 60-day trial. Once the trial expires, the information in the associated workspace is unreachable. On the contrary, data entered into Vyew will always be available. Additionally, Vyew's web-based nature allows participants to log in and view their content from anywhere, whereas participants can only access Groove workspaces through a computer that has Groove installed.

5. Recommendations

Based on our research, findings and user feedback, we have developed a set of recommendations that would help Groove become a more productive student group meeting tool.

Recommendation 1: Increase awareness and perception of other members' work and activity

Better awareness of other team members' work and activities would benefit groups using Groove to conduct meetings. It would allow groups to more successfully collaborate on highly-creative tasks, it could help groups facilitate decisions, and it could help groups regulate their activity and conversations. We developed the following awareness recommendations based on some of the difficulties that the groups we observed experienced.

1. Incorporate 'Recent Activity' and 'Desktop Sharing' tools

We observed that teams had trouble sharing information and collaborating on design work using Groove. Groove should incorporate a "Recent Activity" tool into its interface that would display thumbnail screenshots of all team members' most recent work activity. The thumbnails could be refreshed on a regular basis (for example, every 15 seconds), so that all team members could have a general idea of the tasks the other members are working on. If a team member wants to share their live desktop with other users, they would be able to do this as well. For privacy reasons, the 'Recent Activity' tool would give users the ability to share only a certain window with other users, as opposed to their entire desktop; this would allow users to keep things like e-mail private. Coupled with Groove's audio tool, the ability to share a live desktop would allow teams like the ones we observed to collaborate much more effectively on highly collaborative or creative work. Additionally, Mark et al. (1999) found that groups using NetMeeting, a similar tool, had increased participation by remote users when application sharing was enabled. It would be reasonable to predict a similar benefit from application sharing in Groove.
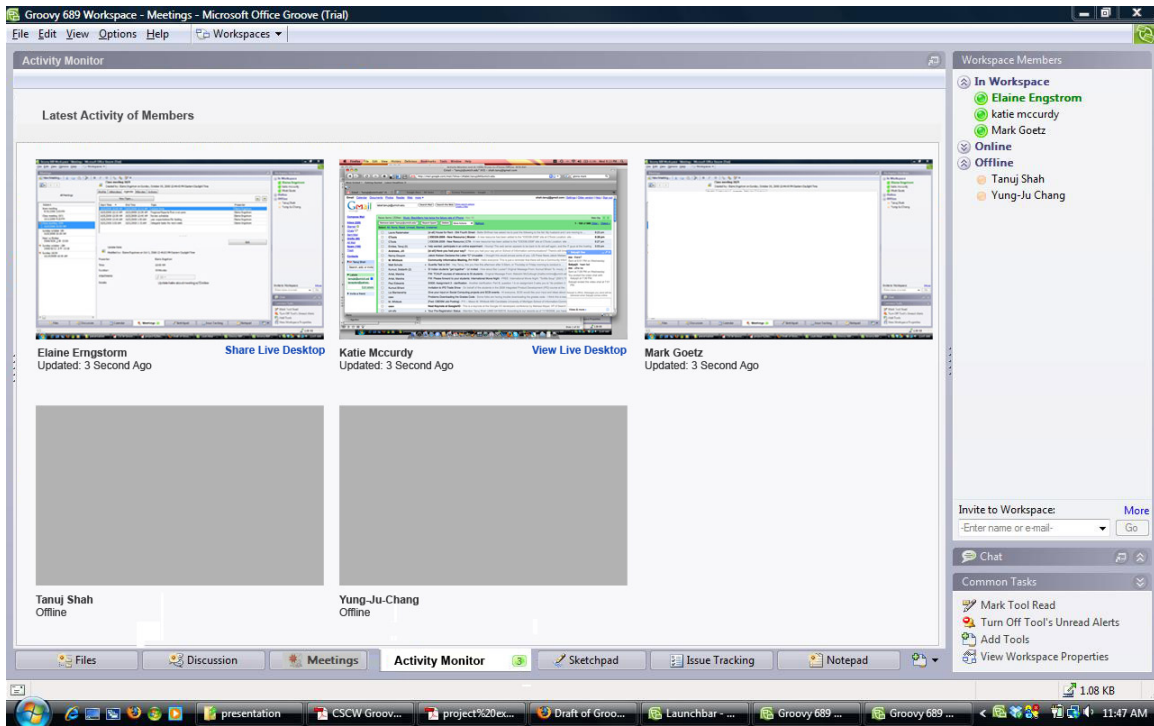
'**Last Activity' desktop sharing tool**

2. Improve sketchpad

Currently Groove's 'Sketchpad' tool allows users to add and work on as many sketch pages as they want. Our users observed that there was no way to know which page of the tool different team members were working on, and there was no way to see which member was sketching within the tool. Groove should add awareness functionality to this tool so that team members could see which sketchpad page other members are working on, and members should also be able to see each other's cursors in real time.

3. Add status icons and messages

Groove should enable users to use icons to reflect their current status, a feature implemented by Dimdim. The status icon could appear next to each person's username in the top right of the workspace. Status icons would include things like taking a break, agree, disagree, be right back, problem, listening, etcetera; more research and observation of Groove chat meetings would inform potential additional status icons. Groove could also allow users to enter a custom status message in case none of the pre-defined icons fit the user's need. Status icons and messages would allow team members easy access to basic information about other members, but they could also be a valuable way for users to come to a consensus during meetings (using the 'agree' icon). Using icons to signify team consensus would allow teams to ensure that the entire team is 'on board' with a given decision; there could not be any silent observers.

4. Add meeting statistics

Groove could contain a way for teams to access meeting metrics during team meetings; the metrics would provide information like who has spoken, how much each person has contributed, the average pace of the meeting, and the amount of time since the last break. This capability would help a team check in on quiet members, take breaks if needed, and stay aware of their meeting pace and productivity.

Recommendation 2: Bolster chat

1. Notify users when a new entry comes in

If one scrolls up in the chat to read prior entries, there should be some kind of notification when a new entry comes in. Currently there is no such feedback in Groove; so when a user needs to catch up on prior entries, they may continue to fall behind on current entries as well. One of our users complained that this caused her to fall more behind in Groove's chat than she usually does in other chat tools, like MSN. Other chat tools commonly notify users with a visual cue when a new entry comes in, and Groove should follow this convention.

2. Enable side chat conversations

Groove should support side conversations between two or more people. We observed that in face-to-face meetings, team members tended to split into sub-groups to accomplish tasks or have side conversations; this is currently not supported in Groove. One team member stated in a Groove meeting debriefing session that he was accustomed to working in a small side group during meetings, and he missed this capability when working in Groove. Additionally, Whittaker et al. (1994) pointed out that most informal conversations tend to occur between just two participants, bolstering the need for a communication channel that only involves two people. We propose a design change that would add a single click action to each person's name in Groove - upon clicking a user's name, one could open a chat with them. Users should also be able to select more than one person with whom to chat or invite more people as they go. This ability is a common feature in many chat applications, including the meeting tools we examined in our comparative analysis.

3. Create a way to help keep conversation threads straight

If Groove's chat tool had a function that could help users determine which chat entry belonged to which conversation thread, this would increase Groove chat productivity and decrease user confusion. We are unsure of the exact mechanism by which this could be accomplished, but we believe it is an idea worth pursuing.

Recommendation 3: Improve 'meetings' tool usability

1. Improve agenda visibility and design

Groove should make it easier for users to see a complete agenda. Currently the default is to only see three agenda items at a time; users have to change their default settings to see more items at once. Groove should provide users with the ability to paste agenda items into email or another format; currently the agenda is only available within Groove's agenda window inside the meeting tool. It's important that Groove provide users with flexibility around agenda viewing, as different groups manage and share agendas in different ways. Users should also be able to mark agenda items as 'complete' when they've finished with them; this would help the team stay temporally and visually connected with the agenda as they move through the meeting.

2. Place meeting tool in its own window

Users should be able to look at meeting tool items (profile, attendees, agenda, minutes, actions) while performing other tasks instead of having to toggle between the 'meetings' tab and other tabs. The entire meeting tool could, for instance, open in a separate or parallel window. This would help the team members follow along with the agenda or perform other meeting-related tasks while simultaneously working within other Groove tools.

3. Allow meetings to vary in rigidity and structure

Although we requested that our teams use Groove's meeting tool to plan and conduct their meetings, they declined to do so. We observed that one group used Groove's freeform text discussion tool to post a meeting agenda; but the meetings tool structure appeared to be too rigid for the groups' purposes. We therefore recommend that Groove add flexibility to the meetings tool so that meetings can differ in level of formality. Meeting parameters could be set during the meeting creation process; for instance, agenda item duration or 'owner' could be optional add-ons that users could select through a Vyew-like meeting creation wizard.

Groove should also allow users the flexibility to assign agenda items to subgroups. Our users stated that they often divide into sub-groups for specific tasks; in order for the agenda to be used during working meetings, it should support this practice.

6. Discussion

While we believe we gained some valuable insights during this study, we recognize that a few factors, outlined below, may have narrowed the scope of our findings.

Limited observation

Because of the limited time, we observed only one face-to-face meeting and two groove chat meetings for each group. Although we developed significant findings over the six meetings, we believe that our findings could be further validated with more supporting data. For the student groups we observed, the structure and the theme of each meeting depended greatly upon the progress of their project; so each meeting could differ greatly from the one before. For example, we observed that in one face-to-face meeting the students worked on the same piece of paper simultaneously, which could never happen in chat meetings. This finding was fortunate and timely because this face-to-face meeting observation just happened to occur during the time when both of our groups were working on a Low-fidelity (or paper-based) prototype for their project. If the meeting we observed had not been during this week, the meeting might have only consisted of conversation and we would not have discovered this finding. Similarly we also had only two Groove chat meeting observations, and team m embers experienced a learning curve for using Groove's chat and meeting tools; thus we believe that our findings might have also been affected by the groups' unfamiliarity with the software. Because of these issues, we would have liked to have more time to conduct observations of either face-to-face or chat meetings so that our findings could be based on more data and not so dependent on individual meetings.

Observed user group

Another factor that affected our outcomes was the selection of the user groups. Initially we attempted to find volunteer groups in the Groove user community, but we were unable to obtain individuals who were willing to participate in our project. Ultimately we looked for students groups in SI and got two responses. The two groups were cooperative and able to learn to use Groove relatively quickly, and our observations generally went very well. However, there were still two issues with the groups we chose. First, our two groups were very similar in certain aspects: they all were from SI; they all were SI 682 groups; they all were international students; and none had ever used Groove before. The narrow range of the groups may have caused our findings to be too specific because we observed similar patterns of meetings for similar types of student groups. Second, the two groups are not typical for Groove;

i.e., Groove's targeted audience is business users rather than student groups. For example, the 'meetings' tool of groove is often touted as very valuable for business users, but we observed that our two student groups preferred not to use it, even after we asked them to do so for our study. This caused us to alter our project focus from meeting planning and management to the comparison between chat and face-to-face meetings. We believe that if we had had typical Groove users for our project, we could have more successfully pursued our original focus and had more significant findings about how Groove supports meeting planning.

Language barriers

Since all of the members of the groups we observed spoke English as a second language, team members' language barriers impacted our findings. The language barrier affected team members to different degrees, depending on their verbal or written English ability. One Chinese member mentioned that he did not like chat meeting because he typed English too slowly, while we observed that another Chinese student in the other group spoke up more in the chat meetings than in the face-to-face meeting. We also observed a "small circle" phenomenon where, in a face-to-face meeting, three international students formed their own small circle and spoke in their own language. The other two international students, who come from another country and could not understand them, were excluded from the conversation. These types of side conversations could not happen in the group's chat meetings because everyone had to type in English. While our findings related to language issues may be specific to international groups, we believe these findings are relevant to Groove's base user group because Groove is intended for distributed teams, and business teams are increasingly comprised of international members.

7. Conclusion

Through the course of our observations, we saw that using Groove to conduct meetings was generally more cumbersome than conducting meetings in-person. But using Groove offered team members some surprising benefits, such as allowing more egalitarian team participation during chat meetings.
This study suggests that while Groove is not an ideal student group meeting tool, its features allow groups communicate through more channels than chat alone. If Groove were to implement our key awareness, chat and meeting tool recommendations, we believe that Groove could become a more widely-used collaboration tool among student groups.

8. References

1. Clark, H. and Brennan, S. (1991) *Grounding in Communication.* In L.B. Resnick, J. Levine & S. Teasley, Eds. *Perspectives on socially shared cognition.* Washington DC.: APA Pr ss.

2. Handel, M. and Herbsleb, J. D. (2002) *What is Chat Doing in the Workplace?* Computer Supported Cooperative Work, 1-9

3. Hollan, J. and Stornetta, S. (1992) *Beyond Being There.* Association for Computing Machinery, 119-125

4. Mark, G., Grudin, J., and Poltrock, S. E. (1999) *Meeting at the Desktop: An Empirical Study of Virtually Collocated Teams.* European Conference on Computer Supported Cooperative Work.

5. McDaniel, S. E., Olson, G. M. and Magee, J. C. (1996) *Identifying and Analyzing Multiple Threads in Computer-Mediated and Face-to-Face Conversations.* Computer Supported Cooperative Work, 39-47

6. Whittaker, S., Frohlich, D., Daly-Jones, O. (1994) *Informal Workplace Communication: What is it like and How Might We Support It?* Computer-Human Interaction, 131-136

Appendix A: Comparative Analysis

To help us understand the available options for web-based meeting tools, we completed a comparative analysis of Microsoft Groove compared to three other similar products. Through research and prior experience we identified three products to compare with Groove.

- **Dimdim** is a web-based meeting tool that allows provides desktop sharing, PowerPoint presentations, chat, broadcast via webcam with no download required for attendees. Dimdim is free for the base account, and a paid Pro account is available. Only the meeting creator must have an account – participants can join without registering or logging in.

- **Vyew** is a hosted collaboration and web conferencing service. Vyew is organized around 'Vyewbooks,' which are sequential collections of pages that serve as the basis for web meetings and group collaboration. Meetings can be conducted in real time using a shared workspace, webcam, voice over IP (VoIP), free teleconferencing, text chat and desktop sharing.

- **WebEx** is a web-based communication tool designed for collaborative meetings. The website describes WebEx is software that helps you to "easily create and deliver customized multimedia online demos and presentations. Present secure, high performance, rich media content for impressive and engaging communication. Make online presentations in any format, including multimedia objects such as Flash, streaming audio and video, and 3D graphics."

Dimdim, Vyew and WebEx were chosen to compare and contrast the features of Microsoft Groove, in particular the features from the "meetings" tab of Groove. Because we are focusing on the "meetings" tab, we chose freely available products that also specialize in collaborative meetings. For each comparative product, actual meetings were set up, and features were tested to better understand how they relate to the features in Groove.

A product chart comparing features of all four meeting tools can be found in Figure 1.

Features	Groove	Vyew	Dimdim	WebEx
Set Up				
Cost	$229 for full product, or $79.95 for 1 year.	Varied cost structure, from free to $19.95/mo (~$240/year)	Free / $99 per year / $1998 per year	$708/year
Free version available		X	X	X
Easy to start and maintain an account		X		
System Requirements				
Hosted/browser-based version		X	X	X
Support for all major browsers		X	X	X
Enterprise/on-premise version	X	X	X	
Installation/download required	X			
Conferencing Features				
Desktop sharing		X	X	X
Instantly change presenters		X	X	X
Application sharing (remote control)			X	X
Screen capturing		X		
Session recording			X	X
Supports up to 100 participants in a meeting		X	with pro / enterprise version	up to 25
Telephone conferencing		X	X	X
Built-in voice over IP (VoIP)	X	X	X	X
Webcam		X	X	X
Meeting Management				
Easy to create a new meeting	X	X	X	X
Specific meeting agenda feature	X		X	
Action Items list	X			
Meeting minutes	X			
Meeting profile	X		X	X
Meeting attendees	X	X	X	X
Collaboration Features				
Persistent collaboration - asynchronous, anytime	X	X		X
Public text chat	X	X	X	X
Private text chat		X	X	X
Whiteboarding and annotation tools	X	X	X	X
Commenting - in document or media		X		
Voice notes	X	X		
Hand raising, slow down, away from meeting buttons		X	X	X
Exam and poll creation		X		X
Presence - see who is in tool/workspace	X	X	X	X
Presence - see who is online	X			
Content Management Features				
Document management system	X			
Flexible authoring to bring different content types together (like powerpoint)		X		
Broad file-type support (including audio and video)		X		X
Real-time document editing				
Native upload of documents (no prior conversion required)	X	X		
Printing content is well-supported		X		
Export or emailing of content		X		
Administration				
Detailed participant permission settings	X	X	X	X
Logging of participant usage statistics		X		X
Easy to invite meeting participants	X	X	X	X
Session management dashboard		X		X
Customization				
Custom session URLs		X		X
Custom branding		X	X	X
Custom color themes		X		X

Figure 1: Features of Microsoft Groove and competitors

A-1. Dimdim

Dimdim (http://www.dimdim.com/) provides web-based meetings to a number of participants. Their website describes the service as "a free web conferencing service where you can share your desktop, show slides, collaborate, chat, talk and broadcast via webcam with absolutely no download required for attendees." The site offers a free account, as well as a paid Pro account that can support up to 100 participants at once. Only the meeting creator must have an account – participants can join without registering or logging in.
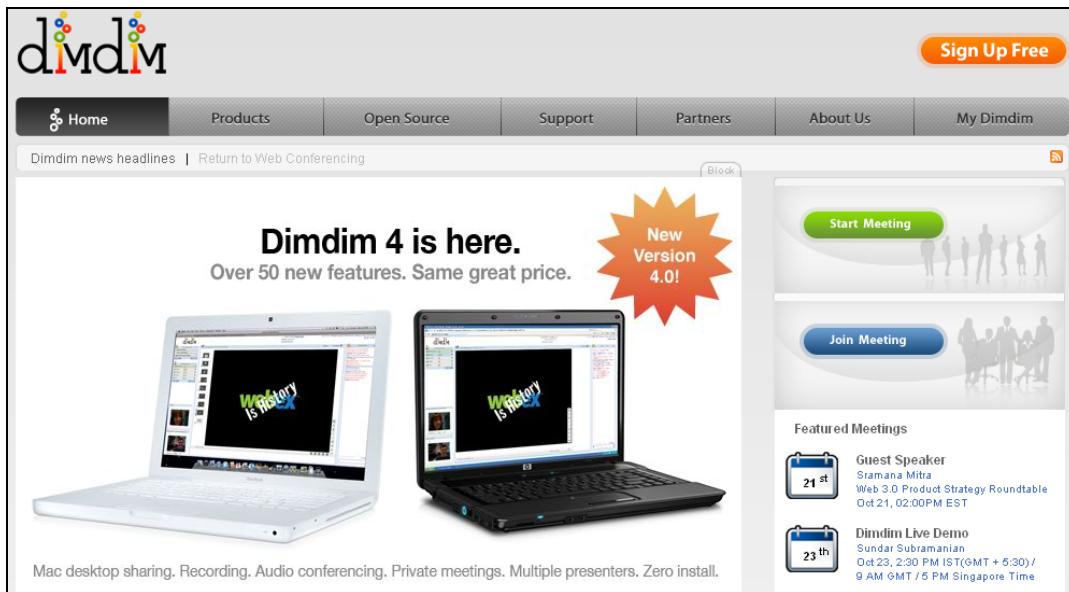
Figure 2: Dimdim home page
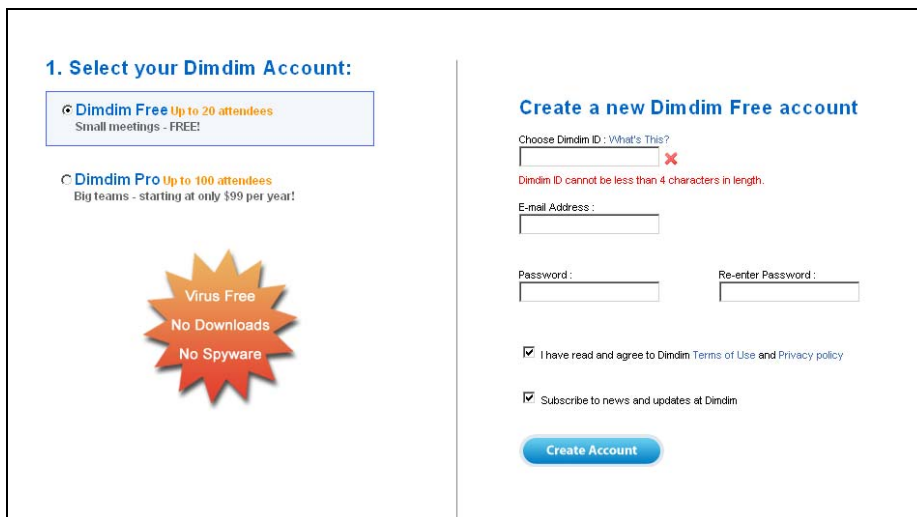
Figure 3: Dimdim registration page

After registering and logging in, the user is taken to the central control screen, called My Dimdim. This screen allows the user to edit their account, see any upcoming meetings that have been scheduled, and host or join a meeting.
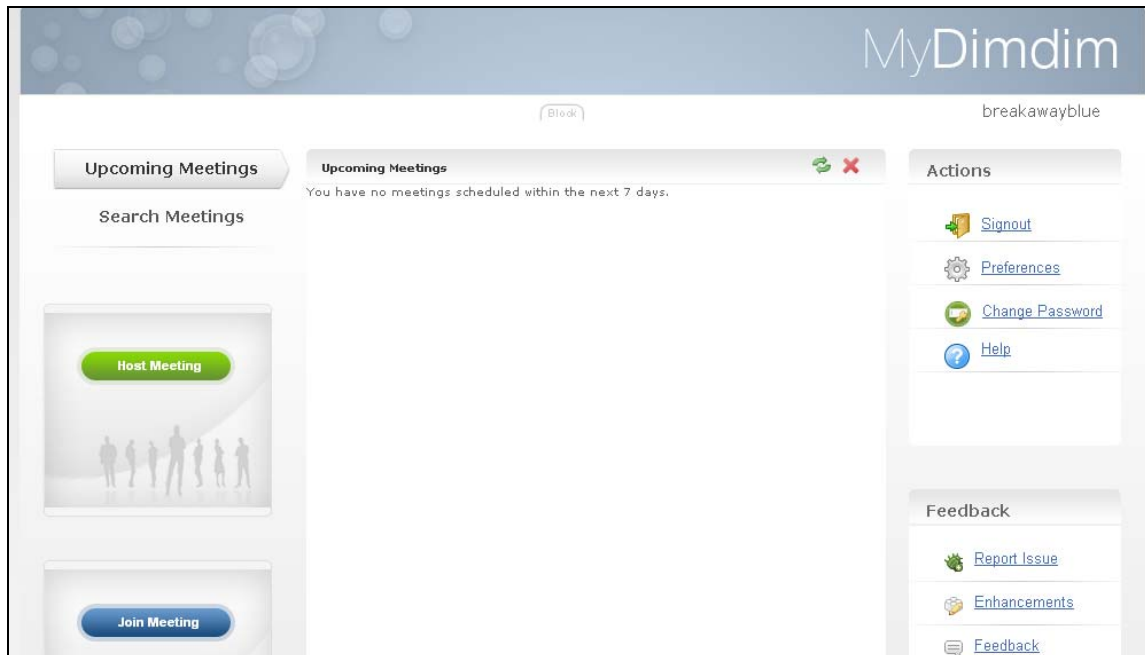
Figure 4: My Dimdim page

Meeting Setup

Starting a meeting in Dimdim is a relatively simple process. The "Host Meeting" button on the left side is used to bring up the multi-functional host meeting dialog box. This allows the meeting creator to specify basic information about the meeting such as the name, agenda and attendees, activate or deactivate more advanced features, and include a phone number to call into the meeting. Other participants can be invited by email when the meeting begins, or while the meeting is in progress.
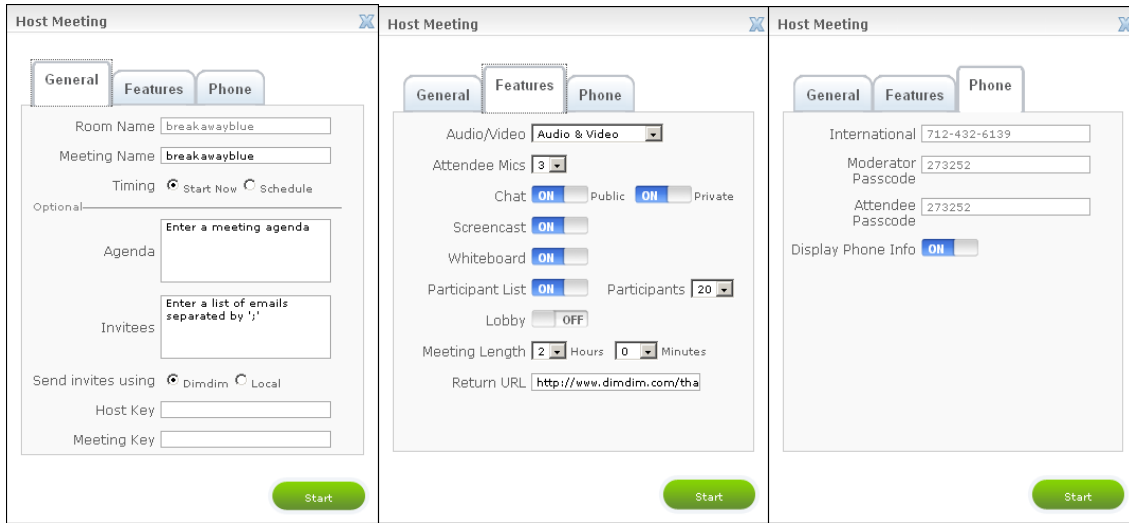
Figure 5: The meeting dialog

The user also has the option of scheduling the meeting for the future, rather than having it begin immediately, as shown below.
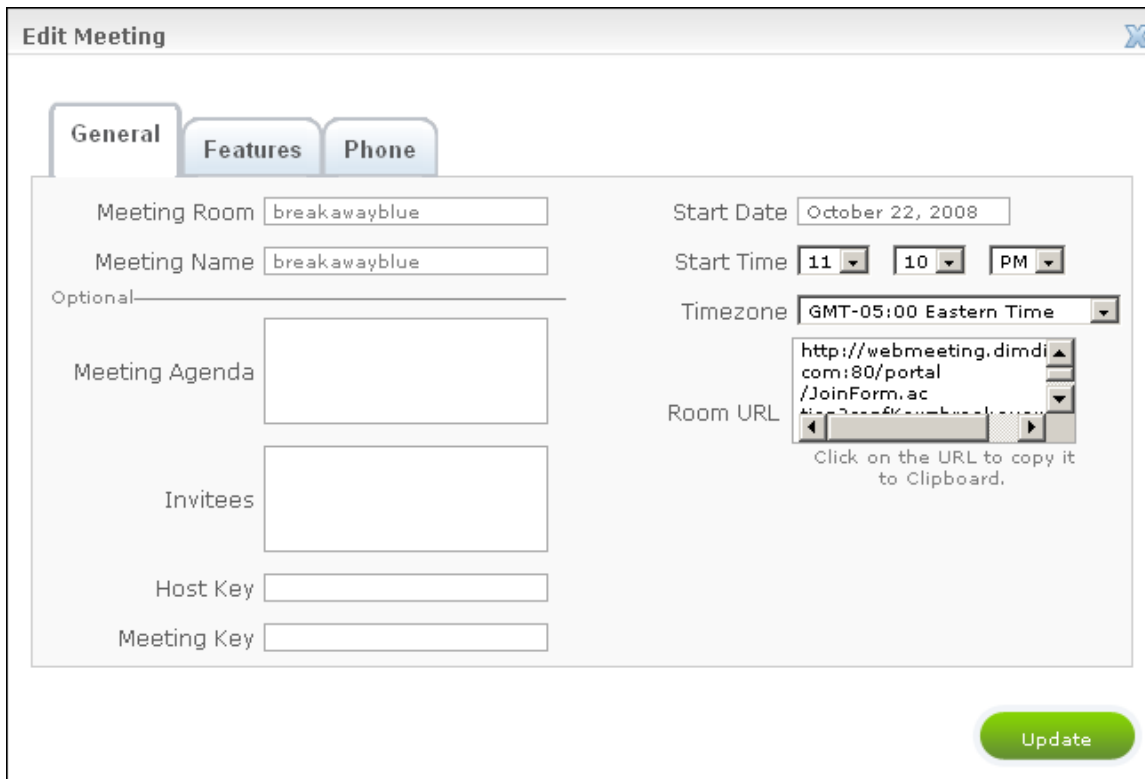
Figure 6: Meeting dialog with optional "schedule" functionality

Inside the Meeting

Dimdim meetings are held on a single page that handles all of the functionality. Communication options include audio and video channels, public chat, and private chat. A list of all the current participants is shown on the left side, along with tools for the presenter to share their desktop, what they have drawn on the public whiteboard, or an optional PowerPoint or PDF presentation. A central window serves as the presentation space; this is where presenter's materials such as the whiteboard or desktop are displayed. The meeting can be saved for posterity with the red record button.
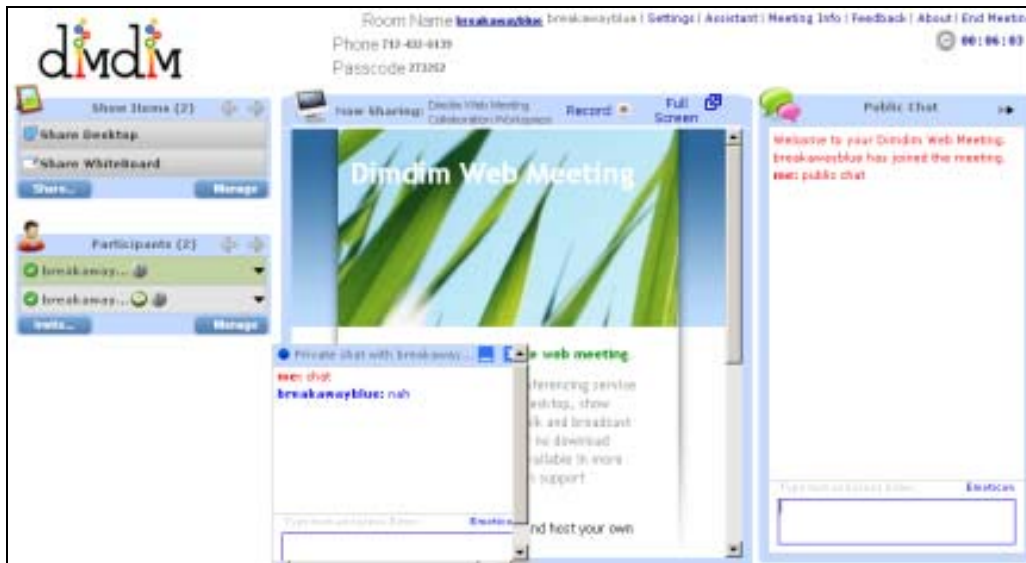
Figure 7: Screenshot of Dimdim meeting

Figure 8: Presenting a PDF using Dimdim
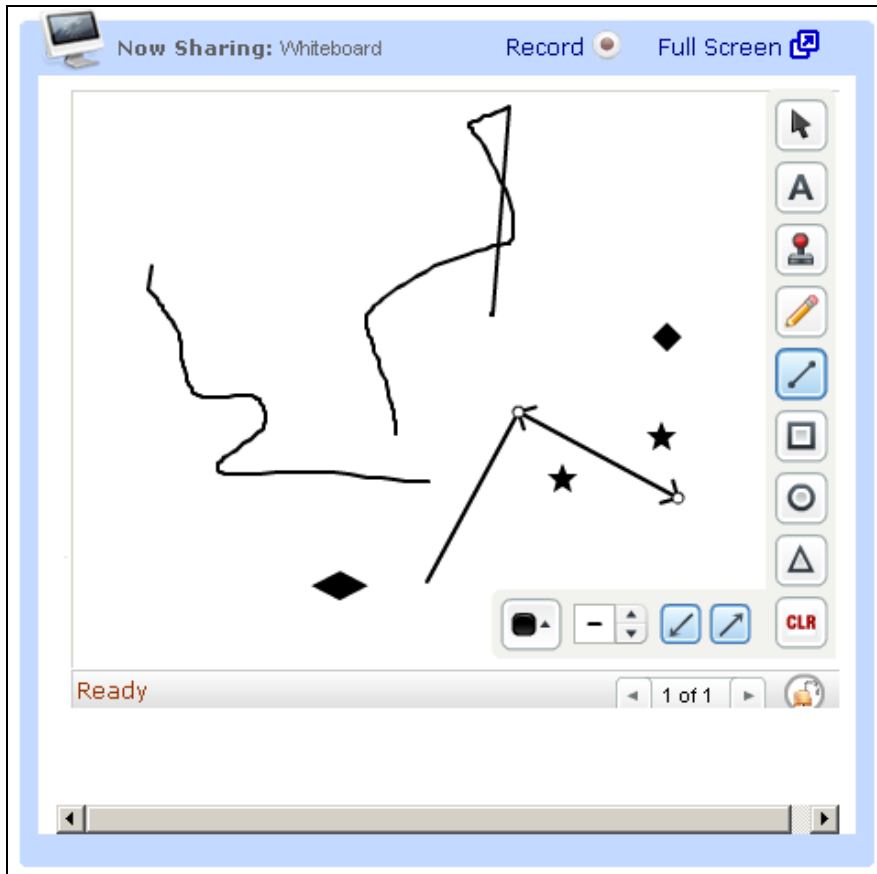
Figure 9: Dimdim's whiteboard tool

Dimdim has a "mood" feature that participants can use to indicate their status, such as if they are busy or if they have to step out. Dimdim also provides "agree" and "disagree" moods, which can facilitate group voting. Each participant's current mood is shown to the left of their name in the user list.
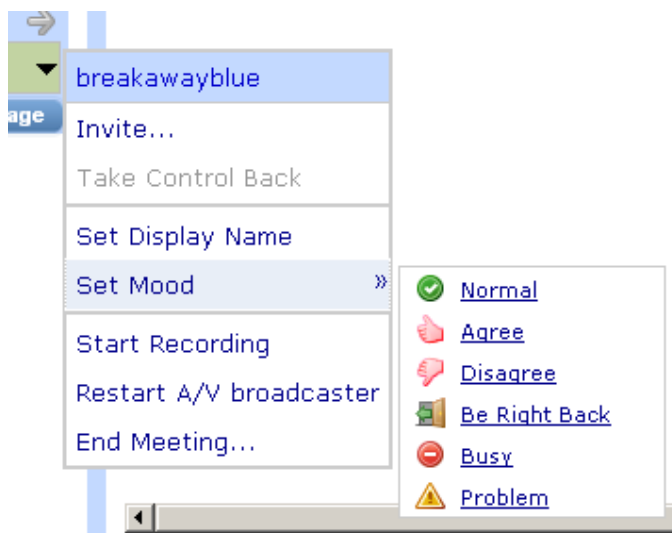
Figure 10: Dimdim's user menu, with "moods"

A-2. Vyew

Vyew (http://Vyew.com/site/) is a hosted collaboration and web conferencing service. According to Vyew's website:

> With Vyew you can conduct meetings in real time using a shared workspace, webcam, voice over IP (VoIP), free teleconferencing, text chat and desktop sharing. In addition to uploading, sharing and presenting content you can invite participants to annotate and collaborate on content during the meeting. Participants can be allowed to navigate the workspace independently to collaborate on different portions of the content. You can also record the meeting for playback.
>
> Vyew goes beyond real-time web conferencing by providing an always-on workspace that participants can access at their convenience. The meeting room and content are always available for review and collaboration until the moderator removes access.

Vyew is organized around 'Vyewbooks,' which are sequential collections of pages that serve as the basis for web meetings and group collaboration.

Getting Started

Registering for Vyew through the website takes approximately 10 minutes. A free account is available, but it includes advertising and has limited space and participants; paid accounts do not have advertising and have greater storage and participants. During registration, users are presented with a cost/feature matrix to help decide if the free version will suit their needs, or if they should upgrade to a cost-per-month account. The hosted version of Vyew appears to be intended for groups of between 5 and 20 people, based on its pricing structure. Additional participants, uploads, and customization can be obtained at any time through paid add-ons. An enterprise Vyew application is available, but we focused on the free, hosted version.

Figure 11: Vyew registration and cost structure

At this point, although Vyew advertises cross-browser support, it was necessary to switch from Firefox to Internet Explorer in order to proceed to Vyew's homepage.
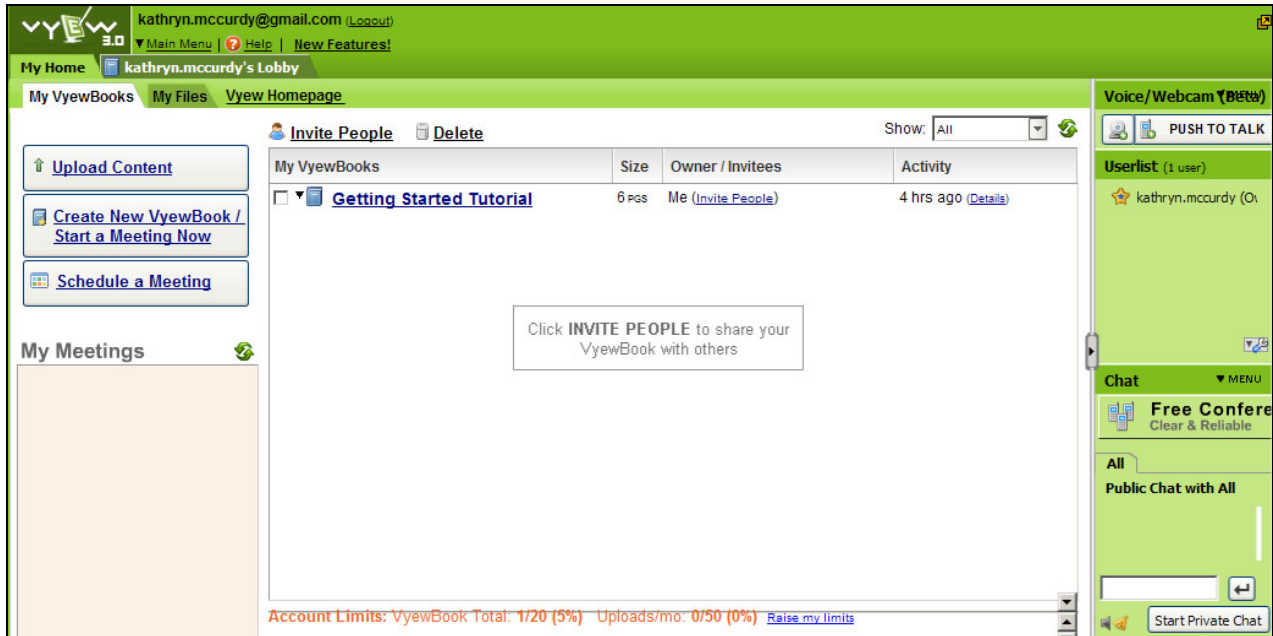
Figure 12: Vyew 'lobby', or home page

Meetings

Scheduling a meeting in Vyew is relatively straightforward; Vyew's meeting wizard leads users through three screens that display meeting preferences.
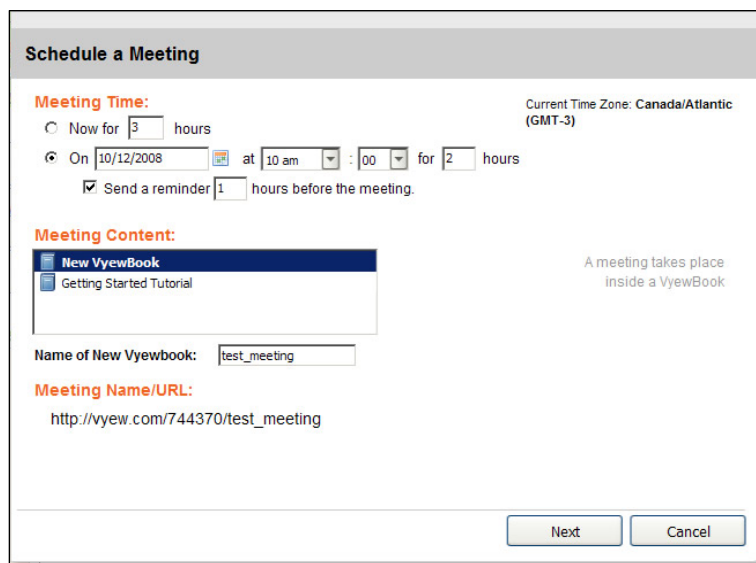
Figure 13: The first screen of Vyew's meeting scheduling interface

Vyew offers meeting schedulers the option to either invite specific people to the meeting, or to allow anyone with the meeting URL to attend the meeting (which allows meeting invitees to easily forward the meeting invitation to others.)

A meeting's 'SYNC MODE' is a way for the meeting organizer to decide if she will lead participants through a set of screens in a presentation-like approach, or allow participants to navigate the meeting pages freely. This supports both online presentations as well as more collaborative online work.

Vyewbooks

Once the meeting details are created, the organizer can begin to create a 'Vyewbook.' The Vyewbook is a set of pages that will serve as the structure of the meeting, so the book could be used as an agenda of sorts. The Vyewbook format is very flexible; pages can include text, images, shapes, imported PowerPoint files, and many other formats. The screen below demonstrates Vyew's 'whiteboarding' capabilities.
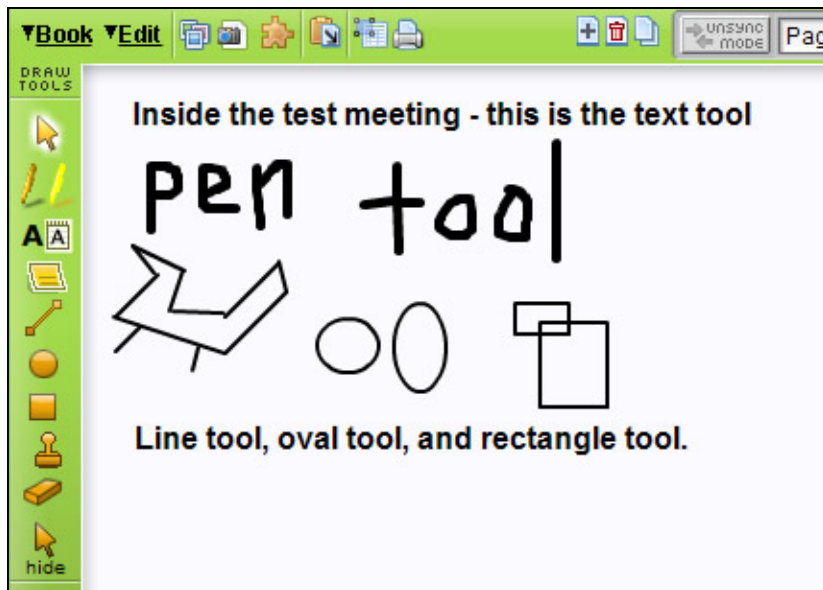
Figure 14: The whiteboarding menu allows users to mark up pages with text, shapes, lines, highlighting, and 'stamps'.

Supported File Types

Vyew also allows users to upload many different types of files using the 'Import' tool:
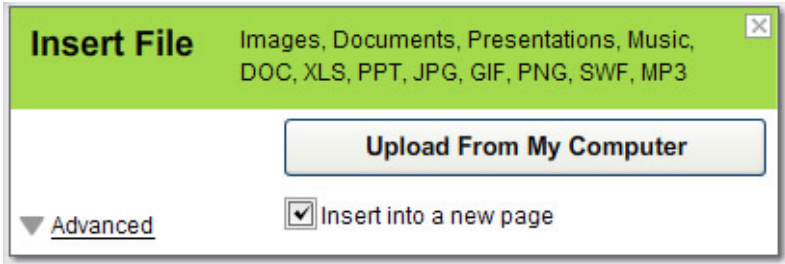
Figure 15: The file upload tool
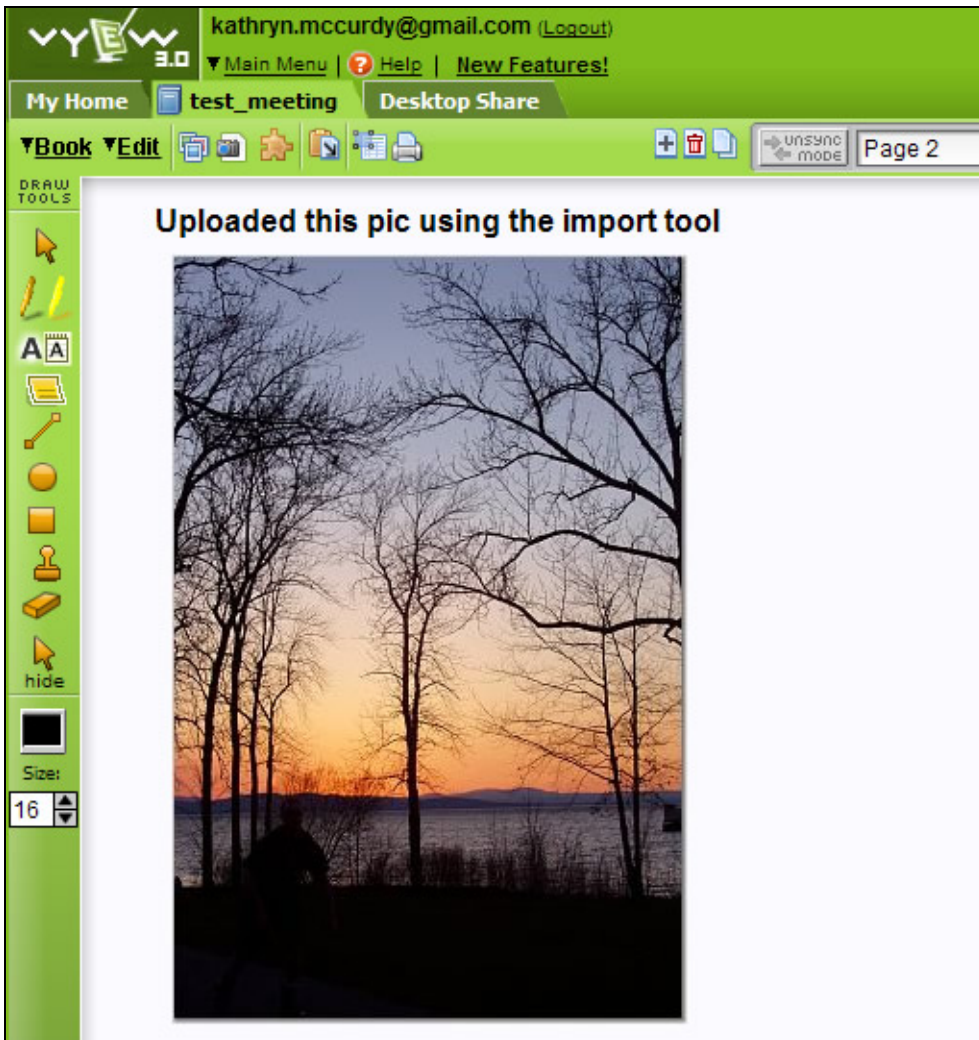
Figure 16: An uploaded image in a Vyewbook

Sidebar Commenting

Users can add comments to any Vyewbook page within the sidebar (at right below), and then drag and drop a 'sticky note' into the document to indicate the exact place to which their comment is referring. Like the comments feature in MS Word, this is an asynchronous way for people to express opinions and collaborate on a document
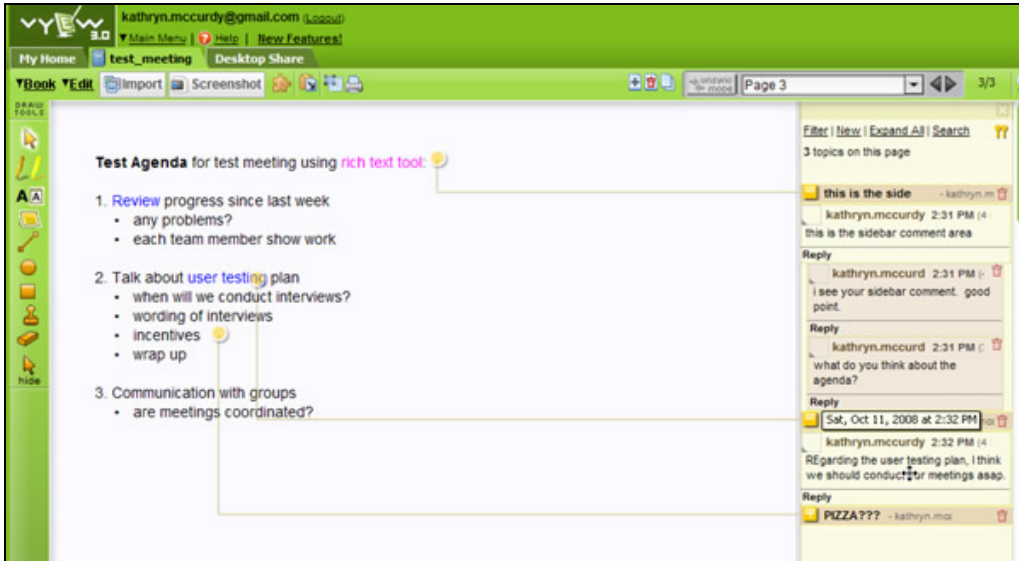
Figure 17: Sidebar commenting tool

Because users need to access information in different ways, Vyew offers the option to print Vyewbooks or publish them to the web:
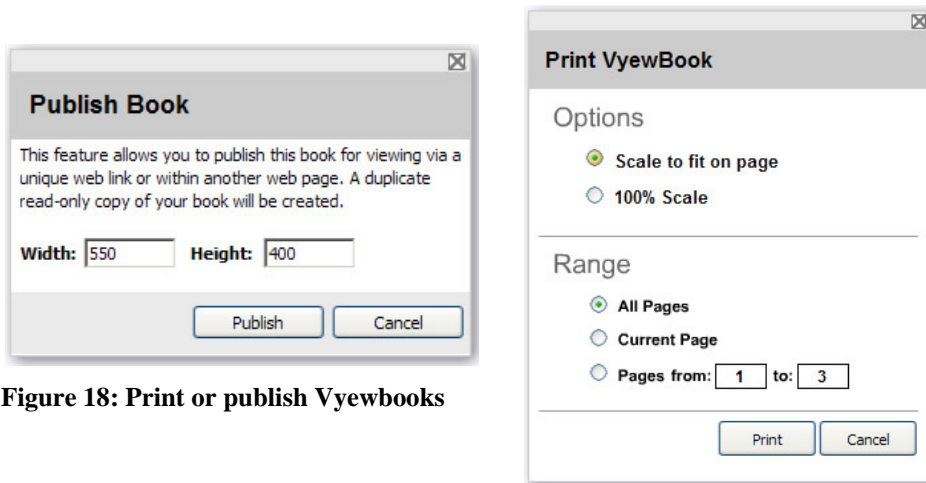
Figure 18: Print or publish Vyewbooks

Additional communication tools

Vyew also offers public and private chat sessions, desktop sharing, VoIP/webcam, and help with setting up regular conference calls (Vyew will set up the call number and access code or a conference call, but long-distance charges apply.)

A-3. WebEx

WebEx (www.webex.com) is a web-based communication tool designed for collaborative distance meetings. The website describes WebEx as software that helps you to "easily create and deliver customized multimedia online demos and presentations. Present secure, high performance, rich media content for impressive and engaging communication. Make online presentations in any format, including multimedia objects such as Flash, streaming audio and video, and 3D graphics."

Most Popular Uses of WebEx:

- Sales presentations
- Marketing events
- Team meetings
- Training sessions
- Remote support
- Project status meetings

Getting Started

The WebEx website offers a free trial account for 14 days. After the free trial is over, the customer can purchase a business solution from WebEx - "individual", "small-medium" or "large business". For this analysis, we will focus on the "small-medium" targeted solution.

Figure 19: WebEx homepage

Figure 20: WebEx Registration Page

The WebEx control center is called the "Meeting Center". This is the dashboard where a user can attend a meeting, host a meeting, set up their profile and preferences, and get meeting support.
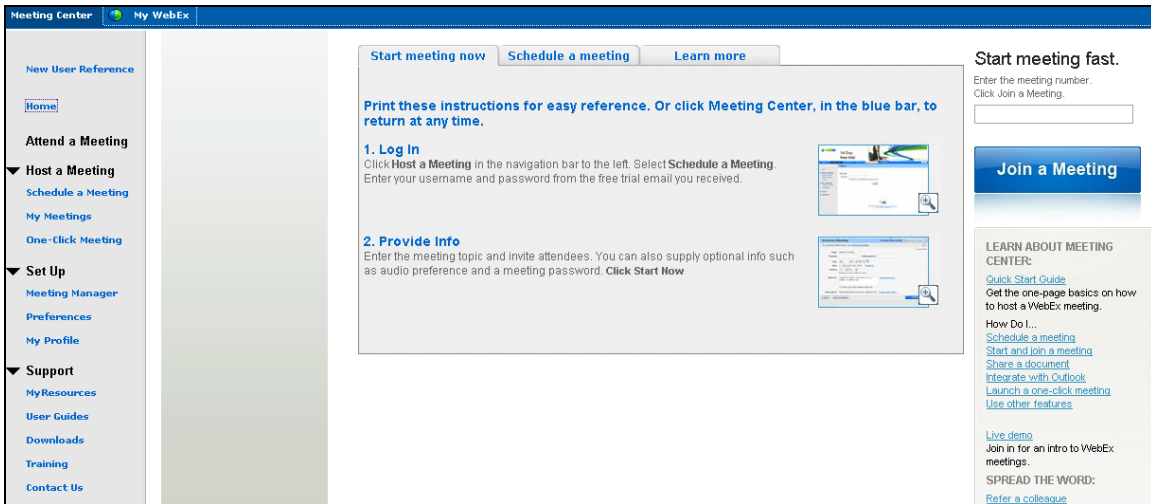
Figure 21: WebEx Meeting Manager

Pictured below are the basic steps to starting a WebEx meeting using the 14 day free trial. Starting a meeting is a relatively simple process. First, you login to your account from the Meeting Manager tool:
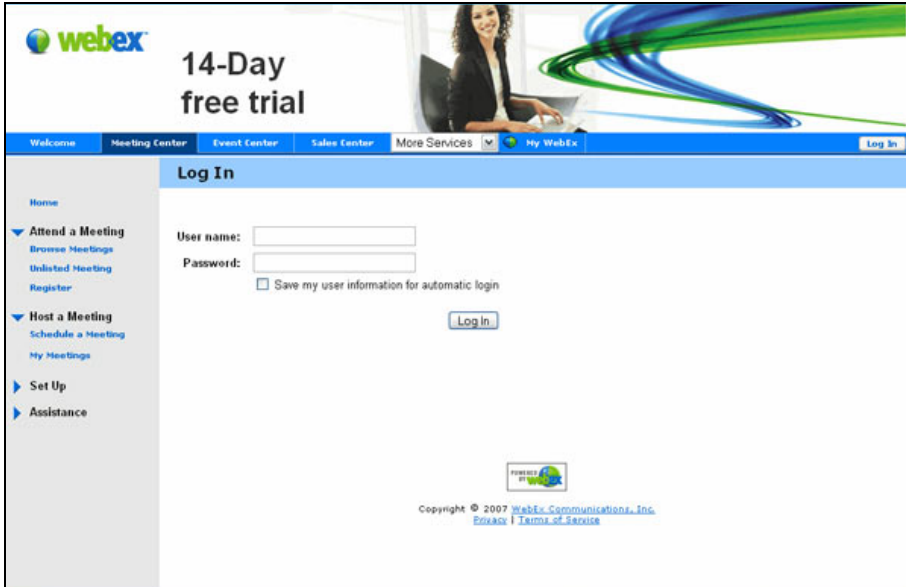
Figure 22: Login to WebEx

Under the "Host a Meeting" option on the leftside navigation, you can "Schedule a Meeting". A meeting can start immediately, or at a scheduled time in the future. Attendees can be found using the address book, and the appropriate audio options can be chosen for the meeting.
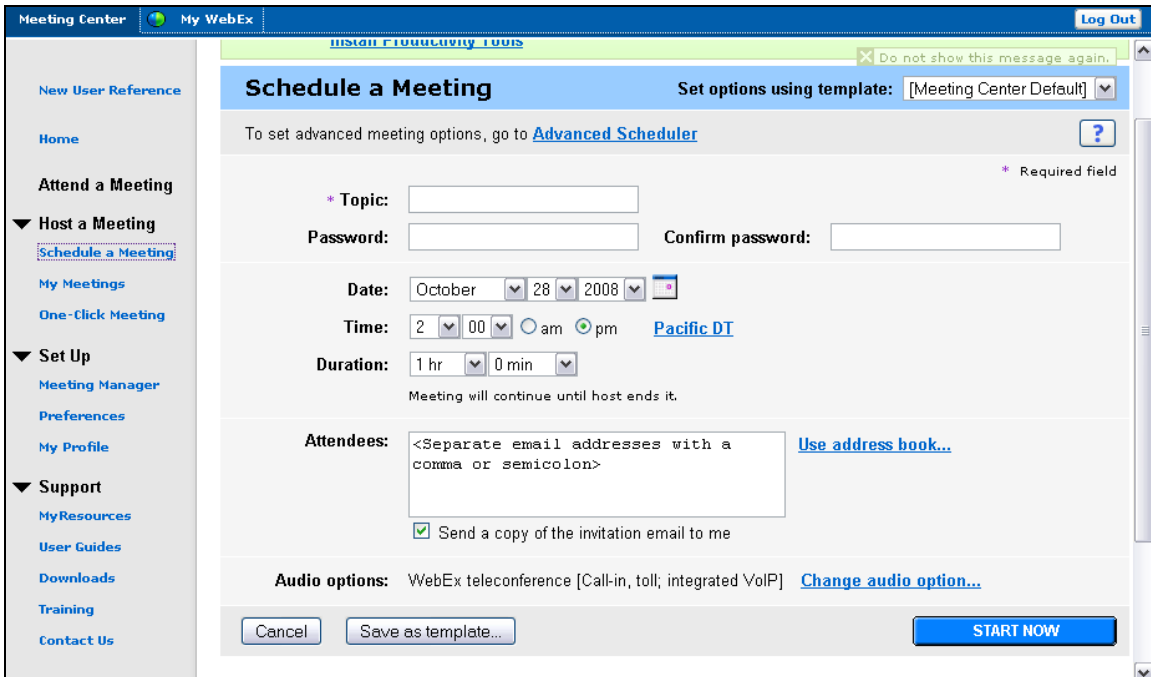
Figure 23: Schedule a Meeting

The user can view their upcoming and past meeting schedule using "My WebEx Meetings".
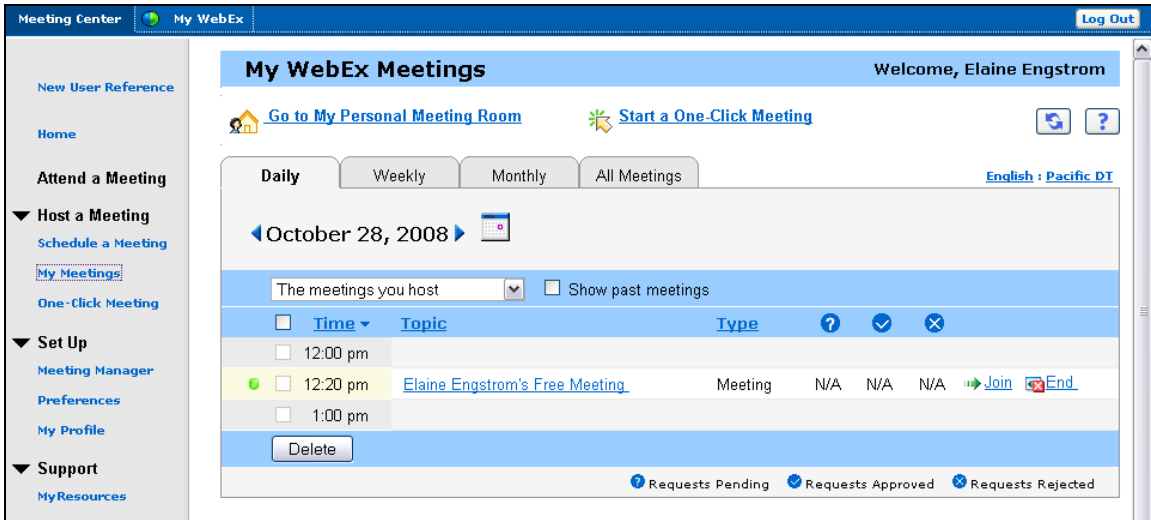
Figure 24: My WebEx Meetings

With One-Click Meeting, you can instantly start a meeting from your desktop, from Microsoft Office, or from your browser. This screen takes you to the setup page for One-Click Meeting.
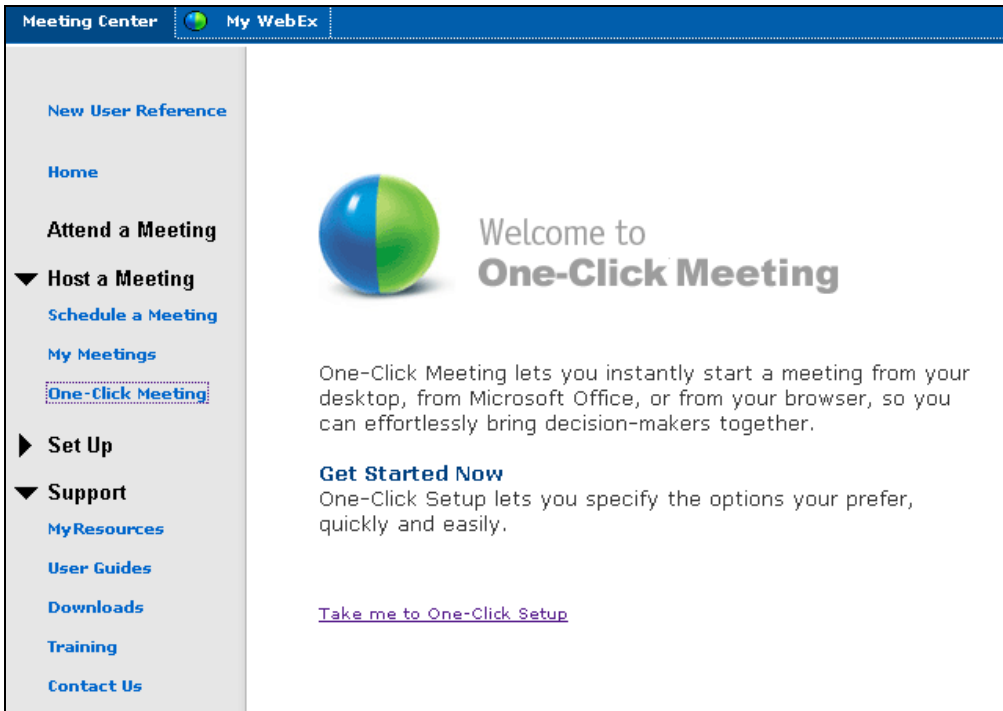
Figure 25: WebEx One-Click meeting Start page

This welcome screen will take you to the "My WebEx" tab, where you can configure your settings for the One-Click feature. The tools available to configure are:

- My Computers: Setup remote computers
- My Contacts: Import your contacts from Microsoft Office or a comma delimited file (.csv)
- My Profile – User Information, Partner Integration, Personal Meetings Room, Productivity Tools, Session Options and Web Page Preferences
- My Reports – This screen gives the Usage Report (statistics) for your meetings within a chosen time frame and/or topic.
- Training – Options for training through WebEx University, the training section of their support webpage, and information to contact WebEx directly for consulting services.
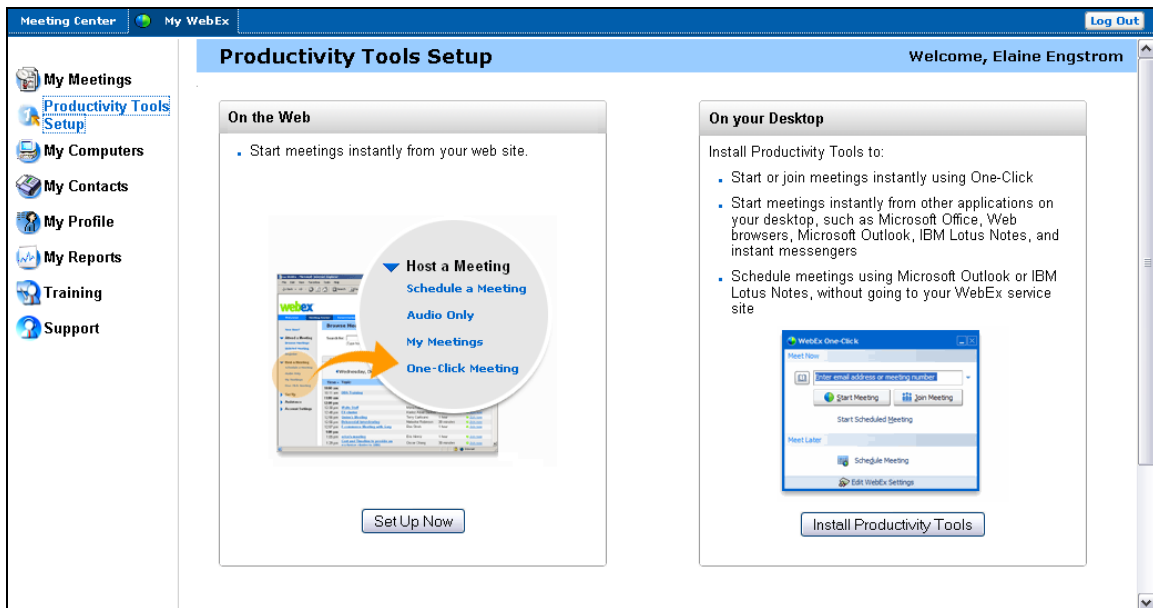
Figure 26: WebEx One-Click Productivity Tools Setup

WebEx meetings are held on a single page that handles all of the meeting functionality. Communication options include audio and video channels, public chat and private chat. A list of all the current participants is shown on the right side. The main window serves as the presentation space; this is where the presenter's materials such as the whiteboard or desktop are displayed. A presenter can also remotely control another's desktop, for viewing or debugging of computer problems. The meeting can be saved for future viewing with the red "Record This Meeting" button.

From the Quick Start screen below, you can present documents, presentations and rich media; share or demonstrate an application; share your desktop; invite participants by e-mail, IM or phone; and remind participants by e-mail or chat.
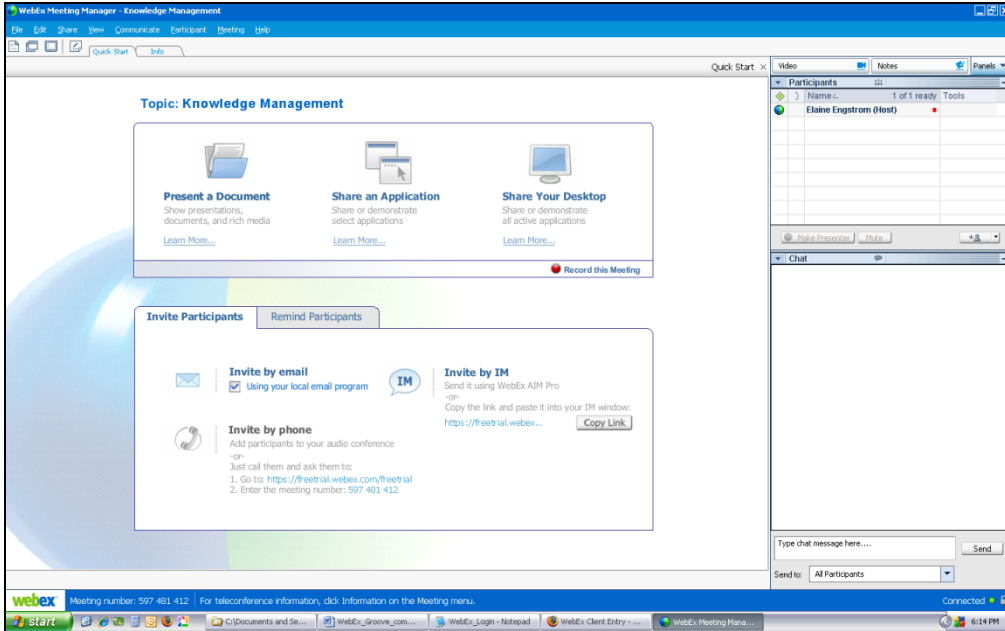
Figure 27: Meeting Quick Start Screen

Following is the Meeting Home screen. On the right side, there is a participant list and chat window. Other panes such as "notes" and "video" can be added as needed. The roles of participants can be changed to "Host", "Presenter" or "Participant". Users in the meeting can be muted or unmuted. There is also a Toolbar alert that lets you know when there's activity in chat, in addition to an option to poll the participants.
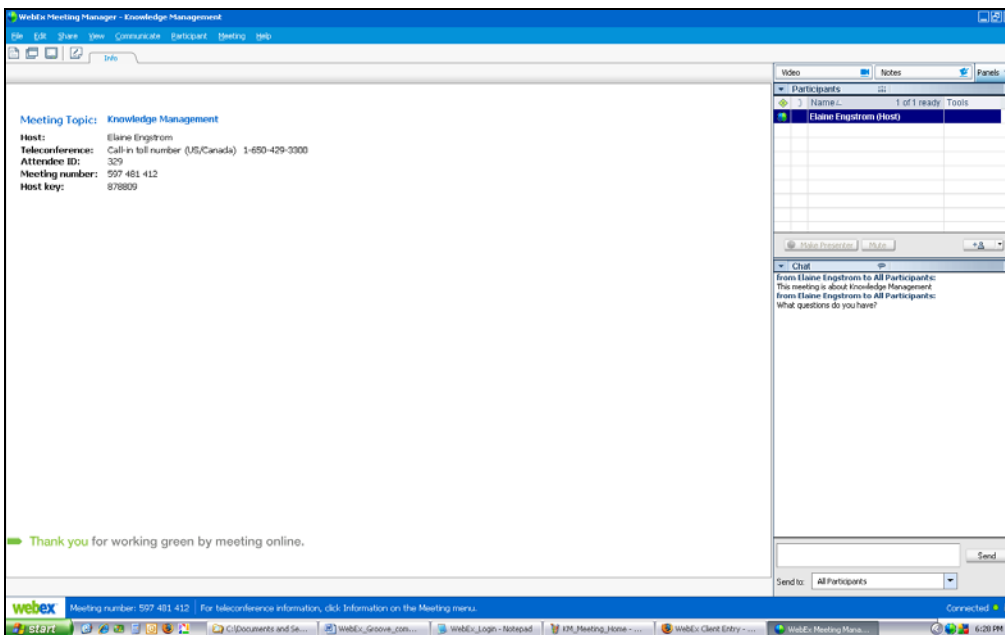
Figure 28: Meeting Home Screen

A whiteboard is also available for sketching.
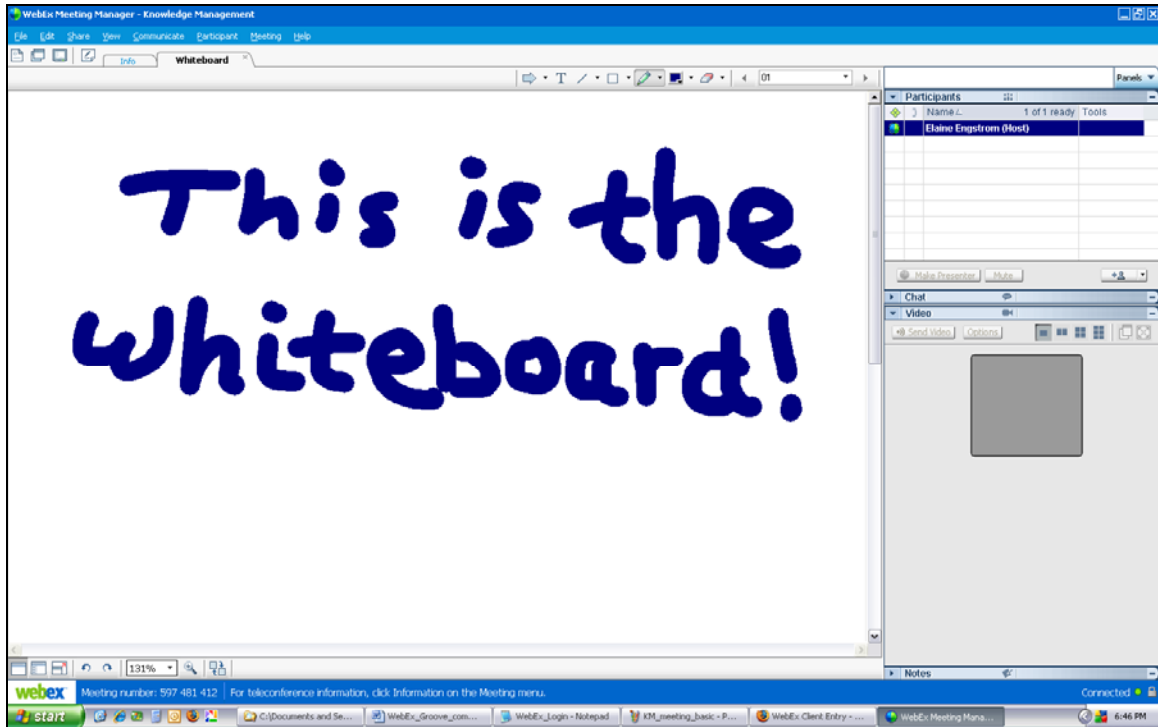
Figure 29: Whiteboard Tool

A-4. Conclusions

In order to assess the advantages and disadvantages of these three tools based on the typical needs of a long-running student group with frequent meetings, our group divided our feedback into four categories: communication, collaboration, meeting structure, and persistence.

Communication

Groove's communication modules are set up as optional 'tools' that can be added in an 'a la carte' manner to a shared workspace. Groove communication tools include a shared calendar, a discussion, file-sharing, issue tracking, meetings, notepad, pictures, SharePoint files, and a sketchpad.

Figure 30: Groove's tabbed interface displays the workspace's tools

We found that the three meeting tools we reviewed all had richer communication channels than Groove. Groove does have some features that are present in the three tools, such as public chat, audio channels, a discussion forum, and a public whiteboard. However, the meeting tools all feature several additional communication channels that Groove does not, including private chat outside the meeting, live video, telephone connections, and desktop sharing. The video and desktop sharing features were felt to be the most critical, as they allow participants to share information that cannot be described with text or voice alone. Additionally, each tool has its own particular area of expertise – WebEx allows for recorded video and remote desktop control, Vyew's 'Vyewbooks' allow simultaneous presentation of various types of content, and Dimdim supports PowerPoint and PDF presentations.

Groove's discussion tool is another interesting topic. While none of the other three tools feature a similar discussion form, Groove's discussion tool is not of very good quality. It does not publish names of participants, which can make for confusion for users following the conversation in regards to who said what. Overall, our group concluded that Groove's lack of communication features compared to its competitors detracts from its overall usefulness as a meeting tool.

Meeting Structure

Groove's meeting planning tool supports a very formal, traditional type of meeting. The meetings tool provides tabs for the meeting profile, attendees, agenda, minutes, and actions. The meeting organizer can complete information on each of these tabs.
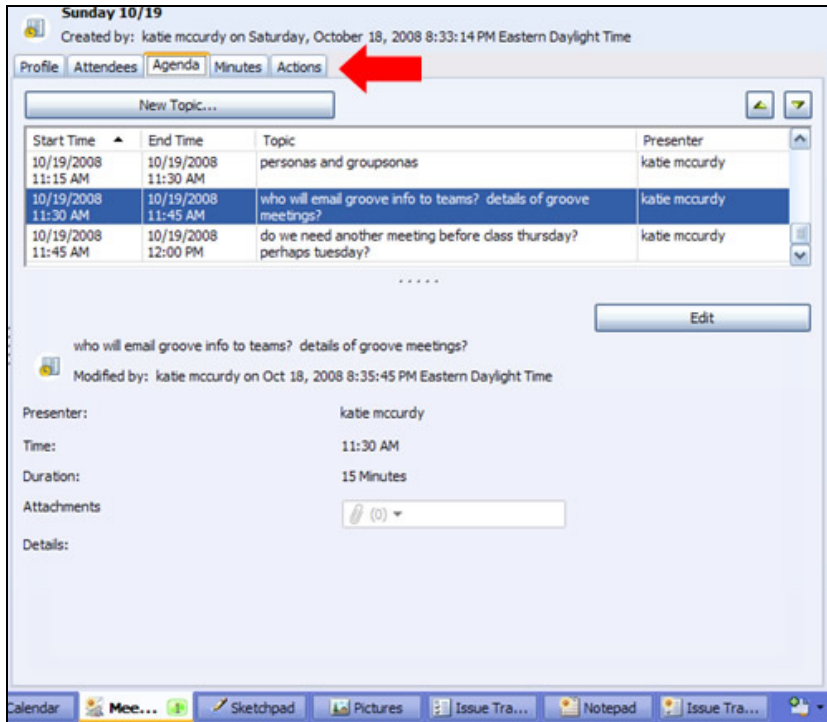
Figure 31: Groove's meeting interface, with arrow pointing to meeting information tabs

In order to use Groove as a presentation tool, the presentation file would need to be stored within the 'Files' tool; likewise, in order to use the whiteboarding feature during a meeting, users would need to switch back and forth between the meeting tab and the whiteboarding tab.

Groove has three designated roles for its workspaces: "manager", "participant" and "guest". The "manager" has all available permissions, the "participant" can participate, invite new members and add new tools, and the "guest" permissions are restricted to read-only activities.

Compared to Groove, WebEx and Dimdim both have a very formalized meeting structure. Both tools enforce meeting structure through roles. Each service requires that one participant serve as the "presenter"; only the presenter is allowed to control the displayed slides, share their desktop, and update the whiteboard. Dimdim meetings are even more structured; only the meeting creator has the power to select the current presenter, and participants can only use the audio channel if the presenter has given them one of a limited number of microphones. The total number of microphones is configurable in the meeting setup, and it can range from one to four. WebEx makes no such limit on the audio channel, and gives the presenter the ability to select the next presenter. Groove's approach to roles is much looser; the manager doesn't necessarily run the meeting, and everyone can participate in the discussion equally.

Vyew presentations do not use roles in the same way as Groove, making them more flexible and fluid. Since Vyew incorporates most of Groove's add-on 'tools' into its Vyewbook, users can simultaneously work with or display photos, sketches, presentations, notes, side notes, and chats. This allows more a more fluid meeting or collaboration to take shape, as users are not required to constantly toggle between screens. It is therefore stronger in the areas of online presentation and creative collaboration, while Groove's strength lies in its formal meeting management capabilities.

Groove's main strength over the three tools we compared it with is its Meeting dialog. This dialog allows meetings to be scheduled in advance more effectively than the other tools. It also keeps track of the agenda going into a meeting, and the action items that were created during the meeting. None of the tools we reviewed were able to handle all of these actions as effectively as Groove. Student groups are likely to find it essential to keep a record of their group's current status and decisions, and Groove should prove to be invaluable in that sense.

Collaboration

WebEx and Dimdim both impose a structure that does not naturally allow for substantial participant collaboration. In both cases, the meeting is primarily controlled by the presenter. However, the public chat feature allows participants to ask questions, as well as asking questions directly to the group on the audio line. The private chat can also be used for specific questions to one particular person. The whiteboard can also be used to share ideas, but presenter control has to be passed to people who wish to draw on the whiteboard. These tools are geared towards scenarios where one person is doing most of the talking, such as staff meetings, training sessions or product demonstrations.

In contrast, Vyew allows members to contribute to a Vyewbook. The owner of a Vyewbook can invite new group members and define and manage permissions of each user to update the book. As long as a member has access, he or she can fully make use of Vyew's functionality. Groove's permission settings, by default, allow limited access to everyone but the group 'manager.' The manager can make other users into managers so that they can have unlimited access; in that way, Groove is similar to Vyew.

Another aspect that is important to collaborative tools is presence; users want to know what other users are present in the tool. Both Groove and Vyew handle this gracefully by indicating in the upper right corner which users are present. Groove takes the extra step of indicating which users are online; this is because it is possible to send messages to users through Groove that they will receive even if they are online but not active within Groove. Vyew does not make this 'online' vs. 'in Vyew' distinction.

Groove's looser role mechanism can allow people to collaborate more effectively than in Dimdim and WebEx. The sketchpad, discussion and meeting data can be edited by more than one person at once. Additionally, Groove provides support for more collaborative features, such as the issue tracker and file repository. This creates an atmosphere in which all participants can contribute, leading to increased productivity. Groove is much closer in functionality to Vyew in terms of collaboration, and it is difficult to assess which of the two tools is better suited to a student group.

Persistence

To maintain a sense of organizational memory, a very important feature is the ability to record meetings and the decisions resulting from those meetings. Groove provides a very persistent experience. The workspaces more closely resemble public office spaces, especially when considering that the "location" of each member in the workspace is always displayed. The minutes and action items from any meeting held in Groove are immediately visible. Any files or sketches made during the meeting are also available. A calendar of events also allows future meetings to be publicized. Additionally, the public chat transcript is always available, so that if some group members miss an informal meeting, they can see what happened.

WebEx and Dimdim attempt to provide organizational memory through recording meetings. These records can be retrieved later and viewed on demand. Although this does provide some ability for group members to go back and review the progress of their group, it is far from an ideal situation, since it requires group members to go through the entire recording in order to find the exact points they are looking for.

Vyew provides for greater persistence than WebEx and Dimdim. All Vyew meeting content is auto-saved in real-time, and it is indefinitely available within Vyew to authorized users. Vyewbooks can be created and collaborated upon before, during, and after meetings; the Vyewbook content will persist independently of an actual meeting. Users collaborate on content asynchronously – according to Vyew's website, collaborating on Vyew "becomes an efficient cycle of authoring, reviewing, managing and publishing." Users can also publish read-only access to Vyewbook content via a direct URL or embed Vyewbook contents in a webpage or blog.

Groove and Vyew share a similar degree of persistence in terms of the way that the individual applications work. However, a few external factors make Vyew a better choice for persistence. While Vyew is an entirely free tool, Groove is only available as a free 60-day trial. Once the trial expires, the information in the associated workspace is unreachable. On the contrary, data entered into Vyew will always be available.   Additionally, Vyew's web-based nature allows participants to log in and view their content from anywhere, whereas participants can only access Groove workspaces through a computer that has Groove installed.

Conclusions

Overall, Groove performs quite well against Dimdim, WebEx and Vyew. Groove does not quite have the richness of communication of its competitors, which is a disadvantage for individual meetings. Groove's lack of PowerPoint integration, video channels, and private chat detract from its value as a communication tool. However, it serves much better as a persistent collaborative tool for a semester-long project. Its workspaces are a key component to storing the entirety of a project, from meetings and decisions to discussions to final deliverables, and neither Dimdim nor WebEx can compete with Groove in this area.

Vyew's features make it much more competitive with Groove. However, there are subtle differences between the two tools. Vyew is intended more for online presentations and close collaboration, due to its web-based application and fluid meeting structure. On the other hand, Groove makes the assumption that it will be used by a group who is working together for long periods and will use Groove frequently. Groove's status as a desktop application with no ability to publish the material in its workspace supports this. Overall, we feel that a tight-knit student group similar to the ones we have studied will benefit more from Groove than from Vyew.

Appendix B:

Personas/Groupsona/Scenario

Through observing the two School of Information project teams, we witnessed the different ways in which individual team members function as part of each team, as well as the group roles and dynamics of each team. Based on the individual attitudes and roles observed, we created three distinct and representative personas. We developed a groupsona that represents the different contribution styles and group interactions witnessed. Finally we made two scenarios that build upon the observations and represent the types of student group work scenarios that Groove should support.

B-1. Personas

Personas1

Paul O'Keefe

"I want to be efficient with my time, and I want to produce high-quality project deliverables."

Demographics:

- Age: 33 years
- Gender: Male
- Occupation: Graduate Student
- Profession: Information Policy
- Background: Undergraduate degree in business, 4 years experience working in finance in Boston, 5 years experience working for Massachusetts state government.
- Marital Status: Married, 1 six year old son.
- Cultural/Ethnicity: American of Irish heritage.

Technology Use

Paul has used the internet and e-mail for about 10 years. He has done extensive research using web-based research tools from his experience at the Massachusetts state government. Paul is comfortable with using the web to perform searches, check e-mail, maintain a blog, and limited

social networking.

Typical tasks

Paul uses Yahoo e-mail, Flickr photo sharing, Linkedin, maintains the family blog, and just started using Facebook a few months ago to keep up with old friends.

Knowledge of Collaborative Technologies and Usage Trends

Paul has not extensively used collaborative tools in the past. He used a knowledge management system at his prior job, but the system was managed by only a few content managers. He is comfortable using CTools and does not require any training to use this tool; he also has begun using Google Docs and is very comfortable using this technology. Paul requires little training, but since he has used collaborative technology less than other members of his group he might need a little help.

Lifestyle

Paul gave up a lot to come back to graduate school; his wife and child had to leave the Boston area, after they were very settled. Paul is very serious about school and works hard on every assignment and project. Paul expects the same commitment from his group members. Paul has a very structured lifestyle and gets up a 5am every morning to do homework. He wants to be sure he has time each day to spend quality time with his wife, Jackie, and his daughter, Alyssa. Jackie is currently working and Paul is not working, so their budget is tight. Paul is a great communicator; he prefers to use the phone for more urgent issues, and he prefers to communicate via e-mail for less urgent and group coordination issues. Paul has not used chat much in the past, but has participated in group chats that were organized by other members of his group.

Activities

Paul plays basketball on Thursday nights at the YMCA, enjoys going out for a nice dinner with his wife when they can find a babysitter, watches West Wing, and plays with his daughter.

Factors influencing adoption of new applications

Paul prefers to not maintain different group projects in different tools. He would like to access project management tools from different locations and different computers, so he prefers an online solution instead of a downloaded solution. The tool needs to be logical and easy to use, and definitely increase productivity. In addition, the tool should be inexpensive or free, due to Paul's financial constraints.

Environment for using Collaborative Technologies

If Paul used Groove for all his group projects, he would spend about 3 hours per day in Groove. He would often be working in Groove in the early morning when he does much of his work. He also logs in at night so he could be in Groove at the same time as his younger teammates. Paul primarily works in Groove from home. The primary competing tools to Groove are CTools and Google Docs. Paul currently has 2 group projects. Paul believes that in-person group work is more efficient, but he likes to work from home for convenience.

Roles

Paul is a very responsible member of the team; he manages documents, sets up meeting agendas, keeps group on track, and contributes extensively to group work. Since Paul is very persuasive, he often convinces group to go along with his ideas.

Paul is seen as different from the other team members due to his age and situation. Other group members respect his experience and take his advice, but they don't joke around with him in the same way that they joke with one another.

Goals

In the short term, Paul wants to have successful collaboration with his team; but he hopes that he alone does not have to carry the weight of the team project. Not all projects meet his standards, so he ends up putting more work in than the rest of his group. He wants to increase the overall quality of his team projects, and he expects high performance and accountability from every team member.

In the long term, Paul wants to work on high-quality project that are relevant to his professional interests. Paul's ultimate goal is to move to Washington DC and work with policy professionals and lawmakers on copyright law.

Needs

Paul needs a team calendar, and prefers to have an agenda for meetings. He needs to know who is in Groove at any given time. He wants to feel that his project experiences will be valuable and give him the perspective he'll need in his future work. He wants to have solid examples for his resume, and would like other members to contribute so that he does not have to carry the weight of the projects.

Desires

Paul needs to be sure his time is spent well and wants the group to work together well. He does not want the meetings to go on too long, and does not want to spend a lot of time socializing. He would like others to respect his opinions, and wants everyone to do their work.

Tasks

- Manage his own time
- Keep track of due dates and deliverables
- Organize documents
- Plan meetings effectively

Personas2

Elizabeth Scheneider

"I want to do projects successfully to the best of my knowledge and expertise."

Demographics:

- Age: 27 Years
- Profession and Major: Second year MSI, Specializing in archives and records management
- Background: History undergraduate major, from Wisconsin and has also worked for 4 years in a special collections library in Chicago.
- Marital Status: Single
- Gender: Female
- Cultural / Ethnicity: American of German descent

Technology Use

Liz has 8 years of experience using technology. She uses e-mail frequently and reads news and articles online; she often reads about research in archives and records managements, and explores online digital archives. Liz has used collaboration tools in the past. She has used Basecamp, Sharepoint, Google Docs, VoIP, and Skype. Liz is self training and needs minimal assistance for being able to comfortably use a new technology.

Factors influencing adoption of new applications

Liz does not want to have to maintain group projects in too many different tools. She wants to be able to access the project management tool from different locations and computers, so she would prefer an online solution instead of a desktop solution. The tool needs to be logical and easy to use and needs to obviously help the group increase productivity.

Environment for using Collaborative Technology

Liz uses collaborative technology both at home and school, for usually 2 to 4 hours a day. She prefers to work with others in person, but hates wasting the time for transportation to meetings and waiting for others to arrive at meetings. Liz usually has 3-4 group projects going on through the semester. The teams use collaborative technology to share documents, plan meetings, and conduct meetings. The teams use Google Docs, CTools, Basecamp, and GTalk (group chat and 1 on 1 discussion). The tools Liz uses are her laptop and school computers – she can get access to online collaborative technology anywhere on campus.

Lifestyle

Liz likes to stay on schedule, but she is open to changes. She likes to work on interesting projects and finish planned tasks. Liz would take complete charge if required. If necessary, she would call up a team member on urgent needs. For rapid responses, she would use the chat to discuss ideas with a single person.

Activities

Liz enjoys talking, physical fitness, reading novels, participating in extracurricular events and working at her part time job.

Team Traits

Liz often acts as the project leader, notetaker, reasearcher, and contributor during team meetings. She contributes to the best of her ability for noteworthy projects, plans meetings, and motivates everyone to contribute. Liz has influence over team decisions, and she can influence the choice of technology and the functionalities to be used. Her relationships with group members tend to be semi-formal.

Goals

In the short term, Liz wants to get assignments and readings completed as planned, to learn and make use of scholastic opportunites. In the long term, she'd like to work on noteworthy projects to add to resume.

Ultimately, she'd like to aspire to be a leading and influential practitioner in the industry. As far as team performance goes, Liz is an equal contributor. She wants to do polished work, but does not want to spend excessive amounts of time on tasks. Liz expects team members to come to meetings on time and complete work on time, and wants members to understand the learning potential of meaningful projects.

Needs

Liz likes having calendars of team members to plan meetings, phone numbers for immediate issues and email for non-immediate issues, and a team communication covenant. She wishes to be viewed as hardworking, knowledgeable, and as a leader.

Desires

Liz wants to do all projects very successfully to the best of her knowledge and expertise. She is partial to projects of higher interest and projects with committed team members

Tasks

- Manage schedule
- Keep track of due dates and deliverables

- Organize documents
- Plan meetings
- Brainstorm concepts
- Write documents
- Conduct meetings

Personas3

Sameer Reddy

"I know! Let me do it."

Demographics:

- Age: 22 Years
- Profession and Major: HCI
- Background: Computer Science
- Marital Status: Single
- Gender: Male
- Cultural / Ethnicity: Asian Indian

Technology Use

Sameer has 7 years of experience with technology. On a typical day, Sameer uses Facebook, Gmail, and he chats on Gtalk. He also reads tech news online, and looks up tutorials for programming languages; he generally uses the web as a reference. Sameer has used CVS and Google Docs to collaborate with other and share files in the past. Sameer has had 4 years of experience with collaborative tools; he commonly uses Google Docs, Google Sites, Flickr, and Source Forge discussion forums. He learns new technology very quickly, and even enjoys looking around a new piece of software just to learn it.

Factors influencing adoption of new applications

Sameer makes up his mind very quickly about new applications. If he finds that the application is useful, he is likely to learn about it and tell his friends about it. However, if he doesn't like it, he will uninstall it without a second thought. He is always interested in hearing about the latest thing.

Environment for using Collaborative Technology

Collaborative technology is used both at home and at school, for about 3 hours per day in his home study area or another area with a lot of privacy. His most used collaborative technology is Google Docs.

Lifestyle

Sameer enjoys creating and building, and applying what he learned in undergrad. He values intelligence and competence, and is going for his HCI degree to increase his knowledge about a subject that interests him. He really likes to hear about the newest and latest things going on in his field. He also likes to play Sudoku, Scrabble, video games. Sameer prefers to use chat and e-mail whenever possible, since he can communicate while doing other things at the same time. He only uses his phone when he needs a fast response.

Roles

Sameer often serves as the webmaster in his group projects. His responsibility is to create the project website and keep it up to date.

Power

Put final project deliverables up on the website, and select the look and feel of the website.

Relationships

His relationships with his group members tend to be formal and professional, although he is friendly and sociable with them outside of group meetings. His group members sometimes wish he would contribute more to the direction of the group, but they really appreciate the work he does.

Goals

In the short term, Sameer wants to complete the project goals. In the long term, he wants to get a good grade in his class. His motivation of using collaborative systems is that he would prefer to get work done from home. Sameer usually does quite well with his individual work, but struggles a bit more with group work. He expects that meetings can stay on track and the team will be able to get everything done.

Needs

Sameer wants a list of the group's files, and individual assignments. He also wants to be viewed as an expert in his domain, and use his technical skills to make an impact on the world as a whole.

Desires

Sameer would like group meetings to be productive and lead towards a successful project. He also wants group meetings to be fast so he can get to his individual work.

Knowledge

Sameer is proficient in programming using ASP.NET / Visual Basic, JavaScript, PHP, and Perl. He took project management and web development courses during his undergraduate education. He has used SourceForge and CVS repositories for file sharing.

Tasks

- Obtain final project deliverables and upload them to the website.
- Keep track of what his individual duties are.

B-2. Groupsona - Student Design Project Group

Five students at the University of Michigan's School of Information are taking a course together this term: SI682 Interface and Interaction Design. On the first day of class, all of the students decided whom they wanted to work with and formed into groups. The five students, Anshul, Janavi, Cheng, Prateek, and Sylvia, chose to work together for a few reasons: some of them had worked together in the past, some lived in the same building, and some had met during school orientation activities.

The group knows that this class is work-intensive. Their semester-long project will involve planning the interaction design for a mobile interface functionality using interaction design methodology. There are a series of milestones through the class that the group will need to reach: they will conduct a contextual inquiry and interview users, they will hold interpretation sessions and produce affinity diagrams, they'll create personas, they'll produce low-fidelity prototypes, and they'll create scenarios; they'll then create high-fidelity prototypes and perform user tests. For their project, the group will be communicating with a client who is based in Germany.

Because of the nature of the project at hand, the group knows they will need to work together closely to collaborate on conceptual ideas and design work. The group plans a regular meeting each Friday evening, but they don't usually plan a formal meeting agenda. Instead, the group uses telephone, chat, and their team blog to discuss general ideas about where they are in the project and what they will need to accomplish in the next meeting.

Anshul Patel

Anshul is the team's quiet leader. During team meetings, he tends to do most of the conceptualization work while the team watches and makes comments. While working, Anshul does not talk very much; for instance during low-fidelity prototype development, he sketches and makes quiet comments here and there while other team members comment and ask questions. Anshul has an extensive background in the field of Interaction Design; he worked for four years at a respected Interaction Design firm in India prior to coming to the University of Michigan. He does not consider himself to be a good teacher, and he doesn't enjoy having to take time to teach others what

he knows; he would prefer to just do the work himself and get feedback from the group. Since he ends up doing a fair amount of the conceptualization work, he also is the one who takes care of a lot of the team's document management. He usually stores the documents in google docs, or the team's CTools site. Although Anshul is laid-back about the project, he does tend to call or email other team members to coordinate what they will do in the next meeting.

Anshul cares about this project in the context of the class, but he is not extremely concerned about having a beautiful portfolio piece at the end of the class. Since he has so much prior experience, his portfolio is already strong; he is confident he will get a good job after he graduates. However, Anshul does want their project to succeed and make sure his team gets a good grade, because he knows some of the other team members are counting on this project to be a primary portfolio piece. Anshul prefers to do work when he has time - he is generally a bit disorganized, and he is not very good at estimating when he will have time available to work on something. However, he is able to meet deadlines.

Janavi Doshi

Janavi tends to act as the group's sounding board - she helps the group make decisions when the group gets is at a decision point, and she helps settle conflicts. This is more a matter of politics than a matter of expertise; Janavi studied Computer Science in India, and she hasn't had much experience with Interaction Design. But she has sound judgement, and she tends to carry herself with an assurance that perhaps gives her opinions more weight than they would have if her personality was different. Janavi is the only girl on the team, and she is the most friendly and outgoing member in the group; so other group members feel comfortable with her and tend to interact with her more often. Because of her lack of explicit experience in the Interaction Design field, Janavi does not usually do a lot of tangible work during group meetings. Instead, she makes comments and raises concerns and questions during meetings. Other group members appreciate the way her contributions help guide the project in a positive direction.

In order to reach her goal of working in the Interaction Design field, Janavi knows that she must be able to include this project work in her online portfolio. In fact, this project will be the 'centerpiece' of her portfolio, so she is very dedicated to working hard on this project. She always does the work that's assigned to her, and she always completes it on time. She enjoys the team's meetings, but sometimes she worries that they waste too much time; but overall, because of the other team members' level of expertise, she's confident their team will produce quality final deliverables.
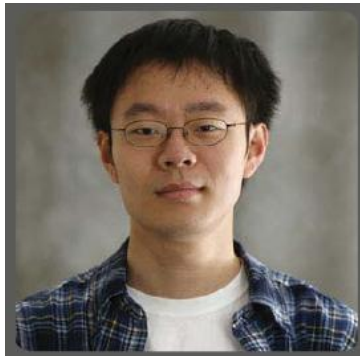
Cheng Wong

With a background in Graphic Design, Cheng brings a valuable perspective to the team's design work. His schooling in China was focused mostly on print design, and he has a few years work experience in print and logo design. Cheng is therefore a very good resource and advises the group on visual aspects of the team's design work; however he has not before gone through the Interaction Design process, so he tends to defer to Anshul on

anything related to the process or deliverables. Cheng is often quiet in meetings, but when he speaks up he often has insightful comments.

Cheng sometimes gets frustrated when the team's three Indian members speak their own language. Sometimes they joke around in their own language, but sometimes they discuss important matters related to the project. Cheng doesn't like feeling 'out of the loop' when the others speak in their own language, but he doesn't usually speak up about his concerns.

Cheng is very organized in his personal life, and so he prefers a more organized meeting structure than some of the others. Cheng likes to have an agenda, and he likes meetings that are efficient; so sometimes the group's lack of efficiency and planning bothers him. But he tries to adapt to the group's style. Overall, Cheng is very excited about working on this project; like some of the other team members, he is planning to use this piece in his design portfolio. He is hoping to make the transition from graphic design to user experience design, and he knows that a good portfolio is central to that transition. Sometimes the other members of the group make fun of Cheng because he usually gets his assigned work done early.

Other group members:

Prateek Goel
Prateek's background is in Website Development. He studied this in India and worked for a year in Boston prior to returning to school.

Sylvia Hamilton
Sylvia is from Michigan, and she studied Cognitive Psychology at Michigan State.

B-3. Scenarios

Background:

At the beginning of their Interface and Interaction Design class, Sameer, Elizabeth and Paul were assigned to the same group, called "the team." They were very satisfied with their team because they all had a different background, had different professional skills, and, most importantly, each one had a strong motivation to do the best job on their project that they could.

However, by the middle of the semester, the team had fallen behind schedule on their project. Because of this, they had been trying to pursue a good way to improve their team and project efficiency. They were still confident in their team and hoped they would be able to get the project back on track. As the major technologist in the team, Sameer decided to look for good collaboration software on Google. Fortunately, he quickly found an article on a Microsoft engineer's blog that described the features of a product called Groove. After Sameer shared the article with his teammates, they decided to use Groove and create a workspace for their project.

Scenario 1: Chat Room Meeting

"Not again!" said Elizabeth, who just spent almost an hour waiting for and riding the bus to the campus; it seemed that the team could not find a place to meet again. Every group study room in the library had been reserved in advance, probably because of
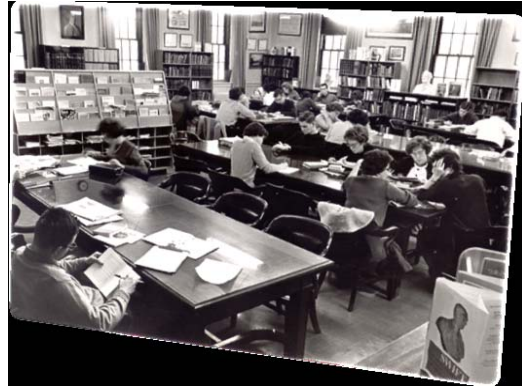
midterms. They had expected to have just a brief meeting where they discussed their group's direction and assign work, so they had not tried to reserve a room for this meeting. Eventually, they decided to conduct the meeting in the lobby of the library, though they hated to meet in a public space because of the noise. Elizabeth really disliked this situation because she always had to spend more transportation time than the other two members in the team, especially this time—the meeting lasted for just 45 minutes. In fact, this meeting actually took them more than two days to schedule because every member in the team was very busy with their other assignments and exams; they could not find a time when everyone was on campus. This wasn't the first time this had happened, either; they frequently had the problem of scheduling and finding a meeting place.

Sameer thought of a potential solution to this problem and asked "How about next time we need a short meeting, we just meet through the chat room of our workspace in Groove for this kind of short meeting?" Although Elizabeth was worried and uncertain about whether meeting through the chat room could be efficient, she was willing to give the chat room a chance because she was tired of looking all around the library for a meeting space. Paul agreed as well, because he also preferred staying at home with his wife and daughter. Therefore, they decided to use the chat room for their next meeting—they would meet at 10:00 AM on Sunday and hold an important meeting in Groove.

On Sunday, each of them just stayed at home and waited for the meeting to start. At 10:00 AM, everyone was at his or her laptop or PC. Sameer started the greeting first, followed by Elizabeth, who was happy to be staying at home. Paul, who had not yet become familiar with Groove, was still confused how to enlarge the chat room window. Finally, he found and clicked the small icon with an arrow on the right corner of the small window, and the chat room popped out into the center of the screen. At the beginning, the meeting went well except the window-enlarging problem caused Paul to initally fall behind in the conversation. About ten minutes later, Paul asked, "Hey, are you two having trouble following the conversation? I can't tell which sentence comes next, and I'm kind of confused," Paul said. "I don't." Sameer said. "Well, I do, too." said Elizabeth, who kept dragging the slide bar up and down to check the previous conversations because she was always looking at the keyboard when she was typing.

In order to ensure that the team was headed in the right direction toward the milestone, Sameer pasted a web address of a project website from previous year into the chat room. Paul clicked the URL and his default browser opened the website automatically. "This is convenient," said Paul. After confirming the right direction, they distributed the work to each member and determined the next meeting time. At the end of the meeting, Elizabeth, always responsible for taking notes for their meetings, clicked the "File" button on the tool bar, trying to save their conversations as a separate file in her folder for the team's project; however, it didn't work. "Okay now, we can only check our conversations in Groove," she said. After she finished, Sameer dragged a PDF file into the chat room and said "I just right clicked and select 'print transcript.' Take it and save it." The meeting was over, and the team had confirmed the direction and assigned the work to each member. However, they weren't very satisfied with the efficiency of their meeting, because they found that they had to wait longer for other people's responses than they would in person.

Scenario 2: Manage Meeting

The team had been concerned for a while with team responsibility and meeting efficiency issues, but they hadn't actually solved these problems yet. In each of their meetings, they would set the agenda and goals for the next meeting and assign work to each team member; however, they usually had trouble recalling their decisions, because they seldom wrote follow-up summary e-mails or set reminders, unless the following meeting was very important. Elizabeth, who was responsible for taking notes, had a hard time with team communication. She did not want to e-mail the team after every meeting, and she hoped that someone in the team could help her once in a while, So she never sent her her notes to Sameer or Paul. Neither Sameer nor Paul ever realized that Elizabeth was uncomfortable with sending out notes, even if they did not get the follow-up e-mail after a meeting; in fact, they did not really care if there were notes or not. If Elizabeth would have sent e-mails, it would just add to the time they'd need to spend reading e-mails; their inboxes were already crowded enough. So, Sameer and Paul had to note their assigned tasks down on their own lists or calendars according to their memory.

Unfortunately, sometimes their notes were inaccurate or inconsistent with the other two members' notes. As a result, once in awhile the team members were not able to finish their tasks on time due to these types of misunderstandings. One day after class, the team was discussing their meeting for their next milestone. Although they had been experienced the benefits of using the chat room to meet, they decided to meet in a group study room so that they could use the black board to brainstorm and structure their meeting. "I think we should set the agenda in advance, and then put it on the black board," Paul said. "I think we should try the meeting management tool in Groove; it seems very convenient," Sameer said. "Sure, can you do that for us?" Elizabeth said. "Definitely, and you two can use the messenger in Groove to remind me if you find something missing," Sameer said.

That night, Sameer logged into Groove, and added the "Meetings" tool in their workspace. He clicked the "New Meeting" button on the top left of the tool bar and entered the subject, date, start and end time, and location of the meeting. After "the meeting" popped out onto the screen, he clicked the "Agenda" tab on the top and then created several topics with duration time of each topic. "I think our meeting should just last for one hour," he said to himself.
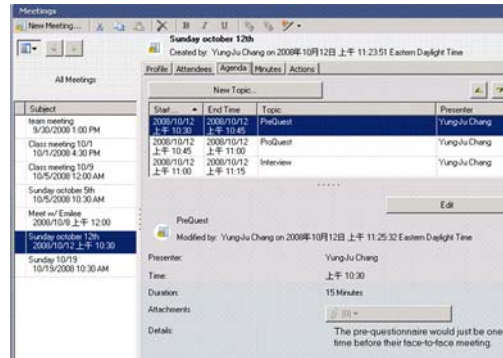
On the following Sunday, which was their regular meeting time, they met in a group study room in the library. "Ok, it seems that all of us have read the agenda in advance; I saw the notifications from Groove that you both revised it a little bit. This is great. Now let's follow our agenda on Groove." Sameer said. "Can you also write the agenda on the black board? And I will be responsible for the 'Minutes,' and 'Actions' of our meeting," Elizabeth said. "Thanks, then I will organize them as soon as I get home; hopefully you can check it out tonight." Paul said. This time, every member knew well the position they were at in the meeting, and the meeting almost perfectly followed the agenda they set. "I think we are really productive and on time today," Sameer said. "I agree, and the 'Minutes' really make my notes structural," Elizabeth said. "And finally, I don't have to endure the poor network connectivity to upload the pictures on the web space. I will attach the pictures I took and all the materials we used today to the attachment in the 'Minutes,'" Paul said. "Great! We are really back on track now," said Elizabeth and Sameer.

Appendix C

Observation/Debriefing

C-1. FTF Observation – Group1

Layout of people

U05 was absent during this meeting.

    U01   U02

window   wall

    U03   U04

Group Dynamics

__15 mins Informal Meeting__   __3 min Agenda__   __20 min professional Meeting__ __3 min casual__   __25 min professional Meeting__ __45 sec casual__   __15 min professional Meeting__ __1 min

semi formal__   __25 min professional Meeting__ __1 min casual__   __5 min professional__ __10-15 min casual__

Group Memory

Paper - 2 sheets - Demonstrate, Not stored
Paper - 7 sheets - Idea generation, Brainstorming, explain ideas - Camera Shots - Most of it will be stored

No work on computer

Debriefing

Did you think that this meeting was productive? Why or why not?

Not that productive - about a 2/5. usually more like a 3 or 4 out of 5.
This time 2 of the groupmembers have more responsibility for the deliverable...(at least I think that's what they were saying)

What was your agenda for this meeting? Did you accomplish everything that you wanted to?

No agenda. Usually would post it on their blog, but this time they weren't even sure if they were going to meet.

How typical would you say this meeting was?

Not too typical. Usually they either meet to distribute tasks, or they meet to do the actual work.

Would you say this meeting was more formal or less formal than average?

Less energy than normal, but more formal because of the cameras.

Did you run into any sources of conflict during this meeting? How did you resolve them?

No

Who did you feel led this meeting?

U06?

Did anyone else have any formalized roles?

No, they usually don't.

How will you follow up between now and your next meeting?

Some of group live in the same building, and they will use telephone and chat.

Did you feel that the environment affected your productivity?

No

Did you feel that everyone had an opportunity to contribute? How did you make sure that everyone had a chance to speak?

Notes:

They noted a problem - 3 of group members are Indian so they speak their own language, others are Chinese and they don't know what's going on.

One person was missing, he will catch up on own. They store info in a repository on website. Sketches will go on blog. They also use Gchat, Gcal, Gsites, Gdocs.

Follow-up - we will email them with instructions on setting up a free trial of Groove and instructions for next meeting. Everyone will be back in action by next Wednesday.

C-2. FTF Observation – Group2

Layout of people:

wall

U06

U08   U07

wall   wall

Group Dynamics

__6 mins Informal Meeting__ __2 mins professional Meeting__ __1 min technology problem__ __5 mins informal meeting__ __51 mins professional Meeting__ __4 mins Informal Meeting__ __15mins professional Meeting__ __30 sec casual__ __12 mins professional Meeting__ __1 min Informal Meeting__ __8 mins professional Meeting__ __5 Informal Meeting__ __18mins professional Meeting__ __1min casual__ 14mins professional Meeting__ __30sec Informal Meeting__ __6mins professional Meeting__ __2mins Informal Meeting__ __10mins professional Meeting__ __1min technology problem__ __2min professional Meeting__ __4mins Informal Meeting__ __16mins professional Meeting__ __1min Informal Meeting__ __20 sec casual__ __16mins professional Meeting__ __5mins professional Meeting__ __30sec Casual__ __ 4mins professional Meeting__ __5mins Informal Meeting__ __10mins professional Meeting__ __1min20sec Casual__ __30sec professional Meeting__ __30 sec Causal__ __4min Informal Meeting__ __1min professional Meeting__ __2mins Casual__ __1min professional Meeting__ __2mins Causal__ __1min professional Meeting__ __ 8mins professional Meeting__ __20sec Casual__ __3min 30sec professional Meeting__ __10 sec Casual__ __2min 30sec professional Meeting__ __4mins Casual__ __1min Informal Meeting__ __1min Casual__ __ 2min Informal Meeting__

Group Memory

Paper – Around 8 large and several small sheets for storing work
Rubber – Correction
computer is for 1. Retrieving data from previous meetings

2. U07 and U08 to find examples on the Internet and show to the other team members

Debriefing

Did you think that this meeting was productive? Why or why not?

U06: Yes, because the goal is very clear today. Once our goal is not clear, we are not productive at all.

U07: Yes, we are productive. Before, sometimes we were busy, so we would distribute the work ASAP, which was not productive at all. Our productive meetings always take more time than unproductive meetings.

U08: We usually are productive, including today because our goal is clear. I think today probably everyone is tired, so we spent more time than before. Also, today we have very clear goal, we do our work very detailed. I think this is another reason for the long time.

What was your agenda for this meeting? Did you accomplish everything that you wanted to?

U06: No, we don't have agenda. We will discuss the topic at the beginning of every meeting.

U07:No, we don't have agenda. We would decide what to do in the previous meeting. And we basically have a schedule, knowing what task should be done on what days.

But before U06 will e-mail everyone what should be done before the next meeting and what the topic is in the next meeting.

U08: No agenda. We usually have theme, knowing what to do in every meeting, but we never have agenda

How typical would you say this meeting was?

U06: Not typical, because the goal is clear this time. We usually have three meeting every week. The first and third meeting we usually just discuss, but we always do things in the second meeting. This is our second meeting this week

U07: Not typical. This meeting is especially long because this time the work is undividable; we have to finish it together.

U08: At the beginning we are not used to the recording, but we get used to it then. It is about half an hour that we really focus on our meeting, pretending that you are not there

Would you say this meeting was more formal or less formal than average?

U06: More formal. I think that's because of the recorder and someone watching you. Before, we would just chat at the very beginning. But I think it is also because that we have clear goal this time.

U07: This meeting is more formal because someone is watching us. I don't feel any difference if there is a recorder or not.

U08: nothing special this time. There is no difference.

Did you run into any sources of conflict during this meeting? How did you resolve them?

U06: Yes, when two people cannot understand the third person, or the third person cannot understand the two people. We just explain and analyze the pros and cons to the person. Usually he or she will accept.

U07: Yes, we have a lot of conflicts, but you cannot avoid that. We only have 3 people, there must be some situations of 2 vs 1. If two people have different opinions, we ask the third person. We all have learned how to give up our own opinion

U08: We have difference points of view about how to draw something on the paper. When this happens, we just explain. I think they are all very good conflicts; we all hope our result is good, we all want the best product. No personal at all!

Who did you feel led this meeting?

U06: me, I think, because I am the project manager, and I am the milestone leader this time. But basically we will not decide anything because someone insists in his thing.

U07: Me, because U06 hold the pen. Usually we take turns to lead the meeting according to whose turn to be the milestone leader.

U08: Although U07 talks more, I think it is U06 leading the meeting because she is the milestone leader this time

Did anyone else have any formalized roles?

U06: No. But usually U08 will do something technology. She will show people what she has seen on the Internet. She is the one updating the website as well. U07 likes to take pictures. As for me, I am just like a reminder and keeps everything on track

U07:No, but U06 would take notes before because she is the project manager

U08: No, we are very informal

How will you follow up between now and your next meeting?

U06: I would finalize the meeting and prepare for the next one

U07: If someone was absent, we would e-mail. We do not do that now, because our fourth member is not in our team now.

U08: Before U06 would take notes and e-mail to everyone. But usually we just communicate through MSN messenger. We just ask if we found something unclear.

Did you feel that the environment affected your productivity?

U06: Yes, I can focus more in a confined space. Before we held our meeting in a open space because of convenience.

U07: Confined room can make you not so easily be distracted, but it takes you more time. The other is that: before when we were in the open space, we could notice that someone is around us or someone is leaving. If we found most people has gone, we know that it was late, we'd better accelerate our meeting.

U08: I don't like the confined room, the air is not good. I think the environment does affect me.

Did you feel that everyone had an opportunity to contribute? How did you make sure that everyone had a chance to speak?

U06: Yes, Everyone is talkative, and we all would ask "how do you think"

U07: Yes, because we have only three people. It is obvious that someone is working and someone is not. We will ask the person who has not talked for a long time for the opinion

U08: Yes. We talk a lot. But I think that's also because that we are familiar with each other very much.

Notes:

They just lose one Indian member. But they all regard it as a good news. They think this can accelerate their meeting.

They use the paper and pencil over the all meeting. Once in a while U08 will take her computer to the other two members to show something on the Internet

Follow-up – they usually have three meetings, and they decide to have face-to-face meeting on Wed. They agree to use Groove to meet on this Saturday.

C-3. Groove1 Debriefing – Group1

Did you think that this meeting was productive? (scale of 1 to 5) Why or why not?

U01: ~2.5. At least we made some small decisions, but no control over the meeting - it was wild. everyone was trying to type and things got out of order. trying to cover many different topics.
-also they ended up with fewer details than in a usual meeting - ended up with bullet points instead of detailed info.

U02: 2 It was good because we actually decided on the features.
 -ve because many times people couldn't understand the context and tone. Flaming behavior was seen. Doubts led to more doubts. 2 people understanding - 2 not kind of interaction.

U03: 1 - not very productive, crucial milestone. thought they would do something like finalize features, will be set on Friday. I didn't really get to conclusion, people were having differences of opinion. big fonts were distracting.

U04: not productive (4) Outcome is okay but it took so much longer

U05: 2 - having to type slows it down. sometimes conversation goes too fast - and chat is not as good as MSN chat.

What is the productivity level of a regular in-person meeting? (1 to 5)

U01: depends, it's not consistent. sometimes 1.5 or 2, sometimes 4 if we know what to do.

U02: Face to face takes less time. doubts take a lot of time. rephrasing costs are very high

U03: 3

U04: 5

U05: 3

How was your contribution different during this Groove meeting as opposed to an in-person meeting? (both positive & negative)

U01: didn't type as much, since it adds to the confusion. let others lead the meeting.

U02: Spoke more and also coordinated more.

U03:Had to explain more to chinese members than face to face. language barrier.

U04: same "I just say it"

U05: talked less than usual

What was your agenda for this meeting? Did you accomplish everything that you wanted to?

U01: put agenda in Groove (discussion area) - covered 4 out of 6 agenda items.

U03: did not accomplish everything that we wanted.

U04: create a detailed plan for Hi-Fi prototype. Decided on features but it was not so much required. No backup plan was formulated.

U05: yes, accomplished everything

Would you say this meeting was more formal or less formal than average?

U01: less joking around, so more formal - can't always tell if people are joking or not. one time thought someone was joking, but they weren't. the meeting was less structured than usual.

U02: more formal - in other meetings we use different languages (e.g. hindi)

U03: average formality

U05: more formal - more related to the project, fewer off-topic conversations. fewer jokes.

Did you run into any sources of conflict during this meeting? How did you resolve them?

U01: Not really.

U02: yeah sometimes people did not understand. rephrase rephrase

U03: no conflict, just irritations like font, people trying to focus on other htings. No flow. links, then scenario, etc. [cut the crap?]

U04: Yes

U05: no

Who did you feel led this meeting?

U01: U02 - he took control and made sure they stayed on track.

U02: Myself

U03: U02

U04: U02

U05: no one specifically, everyone was equal.

Did anyone else have any formalized roles?

U01: No. U01 and U03 were more quiet than usual though, waiting for others to speak, while U04 contributed a little bit more than usual.

U02: No

U03: No

U04: No

U05: no

Did you feel that the environment affected your productivity?

U01: if he was at home would be more informal, wouldn't worry about the tool.

U02: No

U03: No

U05: no

Did you feel that everyone had an opportunity to contribute? How did you make sure that everyone had a chance to speak?

U01: yes

U02: contribution was same. writing is easier and everyone wrote. They tried to make sense in whatever they wrote.

U03: yes. Easier for everyone to understand because they used English.

U04: yes same. face to face one cannot hide

U05: yes but can only talk to the whole team at once - no way to just talk to one or two people.

Usually your team takes periodic short breaks (to joke around or otherwise do something not related to work) during an in-person meeting - in the Groove meeting, we saw that you took (more or fewer) breaks. Why do you think this was?   Which meeting style do you think is more efficient, and why?

U02: got bored (checked emails...unusual to face to face meetings). face to face is better.

U04: more direct interaction. Gestures....easier to repeat.

U05: partly because they are being observed. they know we're watching what they're saying. also stuck at computer, have to get work done.

How would you change Groove to make it better as a group meeting tool?

U01: add something to chat to make it more informal. Using the microphone would be good. The blinking is annoying.

U02: video conference

U03: didn't find it user-friendly. Team is used to google groups. Reminded her of visual studio - simple = better. Might have been different if they weren't actually together.

U04: video/VR. shortcut to send screenshots. present my slides to other members. mouse to navigate. camera and voice. reminder to keep reminding to follow the agenda. format of agenda / not just plain text. system should remind agenda.

U05: break chat into different parts - ability to have side conversations, choose who you want to talk to. usually team does this in F2F meetings but not supported in groove.

Anything positive about using Groove?

U01: liked whiteboard, liked ability to have things in different windows.

U05: liked posting stuff in discussion tool. file sharing looks useful.

C-4. Groove1 Debriefing – Group2

Did you think that this meeting was productive? Why or why not?

U06: Totally not

U07: No

U08: Kind of, we started a strategy to complete our assignment.

What was your agenda for this meeting? Did you accomplish everything that you wanted to?

U06: No agenda

U07: No agenda

U08: No agenda

Would you say this meeting was more formal or less formal than average?

U06: It's formal. But I think that's because you're there

U07: Yes, it's more formal. Since you know this thing (groove) is not efficient already, you will not want to chat or waste time at all.

U08: More formal than average. We had to type in English, we knew we were being observed.

Did you run into any sources of conflict during this meeting? How did you resolve them?

U06: Yes, we have different opinion about scenario. I've tried to explain, but it seems that it does not work out. So, we decide to explain it later in person (face-to-face).

U07: Yes, U06 and U08 had it. They did not resolve it. They want to talk in person.

U08: It was hard to tell which point I was answering. There were time lags. There were several threads going throughout, but two at most. It was sometimes confusing.

Who did you feel led this meeting?

U06: Me, maybe, but not formally

U07: U06, I think. She would try to say what we are supposed to do now

U08: Equal, just like face to face.

Did anyone else have any formalized roles?

U06: No

U07: No

U08: U06 is team manager. She keeps structure and plan.

Did you feel that the environment affected your productivity?

U06: Yes, answering MSN and email

U07: Yes, I am distracted when someone just message me on MSN

U08: A little, but not much.

Did you feel that everyone had an opportunity to contribute? How did you make sure that everyone had a chance to speak?

U06: Yes, they all had.

U07: Yes. Although my English typing is slow, but because the other members are also Chinese and do not type as fast as American. So I don't really have the problem of not being able to catch up.

U08: Yes.

C-5. Groove2 Debriefing – Group1

Did you think that this meeting was productive? (scale of 1 to 5) Why or why not?

U04 / U01: 4, 2.5

What is the productivity level of a regular in-person meeting? (1 to 5)

3.5

How was your contribution different during this Groove meeting as opposed to an in-person meeting? (both positive & negative)

Turnaround time is longer than in-person. We needed to re-sketch everything.

What was your agenda for this meeting? Did you accomplish everything that you wanted to?

Discussing hi-fi and clarifying changes to the low-fidelity. We didn't really accomplish everything.

Would you say this meeting was more formal or less formal than average?

It felt more formal

Did you run into any sources of conflict during this meeting? How did you resolve them?

No real sources of conflict. U04 was expecting more feedback and didn't get enough responses.

Who did you feel led this meeting?

U04 did. We planned to go through everyone's sketches, but because of time, only U04 got to present his sketches

Did anyone else have any formalized roles?

No

Did you feel that the environment affected your productivity?

Yes, it's different when you're in a meeting room. People can hide behind the screen in Groove.

Did you feel that everyone had an opportunity to contribute? How did you make sure that everyone had a chance to speak?

Yes. No effort was needed to make sure everyone could speak - this is a good thing about chat.

We noticed that Manaswi / Janani stepped out for coffee. Did this come as a distraction?

Not really - we were trying to compare it to face-to-face, but we usually don't take breaks face-to-face.

How would you change Groove to make it better as a group meeting tool?

Sketchpad wasn't too useful. It's harder to draw than on a whiteboard.
It needs a more sophisticated input method, perhaps a tablet / stylus
Can it remind you of where you are in the agenda?

How did you learn about the sketchpad?

U01 knew it was somewhere in tools.
They recognized that it was similar to Visio and understood how it would work.
U01 didn't think it was intuitive that there is more than one "page" to a sketchpad; U04 figured it out
They suggested moving page arrows to either side of the sketchpad

U01didn't realize that the chat could be resized. They want to see other people's pointers

C-6. Groove2 Debriefing – Group2

Did you think that this meeting was productive? (scale of 1 to 5) Why or why not?

U06 - 2. we don't really have any conclusion

U07 - easier to meet face to face. Time delay was difficult, hard to keep up. hard to keep threads straight.

U08 - still have a lot to do, at least we set the next meeting during this meeting. this was more of a planning meeting but we still have a lot to do in our next meeting. meeting was inefficient due to language (English), confusion in conversation threads.

What is the productivity level of a regular in-person meeting? (1 to 5)

U06: 4

U07: 4.5

U08: 4.5

How was your contribution different during this Groove meeting as opposed to an in-person meeting? (both positive & negative)

U06: It's similar, not much difference

U07: Not very different, still make the same points i would otherwise.

U08: Can contribute more in face to face meetings. In the chat today, had to keep looking back at the conversation threads - and Groove does not automatically scroll down when a new message comes in, so sometimes did not know that a new one had arrived. Do not always know context of messages as they get mixed up.

What was your agenda for this meeting? Did you accomplish everything that you wanted to?

U06: No agenda, as usual

U07: No agenda, just planning for next milestone.

U08: No agenda. Accomplished part of what need to do today, but will accomplish the rest in face to face meeting.

Would you say this meeting was more formal or less formal than average?

U06: less formal. Last time I feel different when you were watching our conversations, but today I feel nothing.

U07: More formal - face to face meetings are more casual, they talk about lots of other non-project related things. Because they know Groove is not a productive way to meet, they have to focus more on making sure they're talking about the project the whole time.

U08: less formal than the last one in Groove, but overall thinks is about the same - people say whatever they want, they are very comfortable with each other.

Did you run into any sources of conflict during this meeting? How did you resolve them?

U06: We just discuss. I don't think there was a conflict

U07: Yes - scheduling meeting times. They had some time conflicts, lots of misunderstandings due to chatting. If in person, he would know what they mean and would be more efficient. Still may be some misunderstandings about next meeting that were not fully resolved.

U08: yes - people being late. U07 brought up the fact that people are late, others said they'd try to be on time.

Who did you feel led this meeting?

U06: No one in particular.

U07: Maybe U01

U08: no one in particular - everyone was in charge.

Did anyone else have any formalized roles?

U06: No

U07:NO

U08: U06 is project manager so usually she tends to make decisions if they need - but she did not do that today.

Did you feel that the environment affected your productivity?

U06: No

U07: Not the environment, just being split up.

U08: No, just groove affected productivity.

Did you feel that everyone had an opportunity to contribute? How did you make sure that everyone had a chance to speak?

U06: Yes, as usual.

U07: Yes, only 3 people so it's not hard.

U08: Yes, as always.

Usually your team takes periodic short breaks (to joke around or otherwise do something not related to work) during an in-person meeting - in the Groove meeting, we saw that you took (more or fewer) breaks. Why do you think this was? Which meeting style do you think is more efficient, and why?

U06: U07 & U08 usually chat a lot in FTF meeting, so we have a lot of breaks. In Groove we won't chat.

U07: Because they know Groove is not a productive way to meet, they have to focus more on making sure they're talking about the project the whole time.

U08: typing takes so much time, usually they speak in their own language - easier to joke around, and faster

How would you change Groove to make it better as a group meeting tool?

U06: Maybe...texts not appear in sequence: it's really hard to follow who say what

U07: use microphone function to talk, it's a barrier for him to type in English and keep up - that's his own personal problem. Also he did not open MSN this time, so he was less distracted than last time. (note these are not groove changes, but just ideas on how he would personally use groove differently)

U08: it will never be like face to face. the hardest thing is that it doesn't auto-scroll down when a new message comes in.

Agenda - they didn't use in Groove...how do they manage?

U07: The agenda is really kind of part of the class syllabus, so they just refer to the syllabus to figure out what they should be doing.

U08: The team usually talks after class, chats on MSN, calls, emails, discusses in person. Have a clear idea of what needs to happen next, as class is structured...then they just get together and figure it out.

C-7. Pre-Test Questionnaire

Demographics

Age:

- U01: 23
- U02: 27
- U03: 22
- U04: 23
- U06: 22
- U07: 24
- U08: 25

Education (undergrad degree):

- U01: B-Tech [Information Technology]
- U02: Bachelor's in Design
- U03: Design
- U04: Computer Science
- U06: B.A. in Library and Information Science
- U07: Computer Science
- U08: Engineering

Hometown:

- U01: Coimbatore, India
- U02: Lucknow, India
- U03: Ranchi, India
- U04: Beijing, China
- U06: Taiwan
- U07: Taiwan
- U08: Xian, China

Technology questions:

1. How many years have you used the internet?

- U01: 12 years (close to)
- U02: 6-7 years
- U03: 8 years
- U04: 7 years
- U06: 15 years
- U07: almost 10 years
- U08: 8 years

2. How many hours/minutes do you use the internet in a day?

- U01: Most of my time
- U02: Around 8 hours
- U03: More than 8 hours
- U04: 3 hours
- U06: More than 5 hours
- U07: 6 hours
- U08: More than 8 hours

3. What operating system do you use?

- U01-4, & U06-8: Windows. U03 also Mac

4. Have you ever used any of the following services?

   a. File repositories for project documentation:

- U01: Once per week; Star team -> work, google docs
- U02: Once per week; Google sites, CTools
- U03: Daily; Google Sites
- U04: never
- U06: Daily; CTools
- U07: Once per week; Google Docs & CTools
- U08: Several times a day; CTools

   b. Instant messaging (IM):

- U01: Several times a day; Gtalk, MSN, Yahoo, AOL
- U02: Several times a day; Y!, Google Talk
- U03: Several times a day; Gtalk, Yahoo
- U04: Several times a day; MSN, Tecent QQ
- U06: Several times a day; MSN
- U07: Daily; MSN
- U08: Several times a day; MSN

   c. Online Meeting Tool (with Video):

- U01: Daily; Skype, Voodoo -> [work]
- U02: never
- U03: once per week; Skype
- U04: never
- U06: never
- U07: never
- U08: once a month; Skype

d. Online meeting Tool (without video):

- U01: never
- U02: never
- U03: once per week; Net Calling
- U04: never
- U06: never
- U07: CTools, Chat room, MSN
- U08: never

e. Online text-based chat room:

- U01: never
- U02: never
- U03: never
- U04: once per week; CTools
- U06: never
- U07: once a month; CTools
- U08: never

5. Rate your comfort level with learning a new software application? For example, learning the new Microsoft Word or using the new facebook application.

Not Comfortable   **Extremely Comfortable**

0   1   2   3   4   5

- U01: 4
- U02: 4
- U03: 5
- U04: 3
- U06: 4
- U07: 2
- U07: 4

6. Rate your overall comfort with technology?

Not Comfortable   **Extremely Comfortable**

0   1   2   3   4   5

- U01: 4
- U02: 3
- U03: 4
- U04: 4
- U06: 5
- U07: 3
- U08: 4

7. Have you heard of Microsoft Groove before?   Yes / No

   If yes, how did you hear about it? _____

- U01: No
- U02: No
- U03: Yes; Pre-Installed with office
- U04: No
- U06: Yes; From friends
- U07: No
- U08: Yes; MS online

8. Have you used Microsoft Groove before? Yes / No

   If yes, what did you like about it? _____

     what did you dislike about it? _____

U01-4 & U06-8: No

[U03: I don't want to use an extra application]

9. How many group project meetings (including all classes) do you have every week?

U01: 2 or 3

- U02: Twice
- U03: 3
- U04:3 - 5 Hours
- U06: 2 to 4
- U07: 2
- U08: 2 to 3

10. How long do your meetings usually last?

- o **1-2HRS   2-3HRS   3-4HRS   >4HRS**

- U01: 3-4 hrs
- U02: 1-2 hrs
- U03: 2-3 hrs
- U04: 2-3HRS (682) 3-4HRS (501)
- U06: 2-3 hrs
- U07: 2-3 hrs
- U08: 1-2 hrs

11. Do you like using an agenda?   Yes / No

- U01: yes
- U02: no Roughly
- U03: yes
- U04:yes
- U06: no
- U07: yes
- U08: yes

12. If yes, which of the following agenda types do you prefer? (Check all that apply)

U02,U03, U04, U08_____Loosely-Structured

U01, U07_____Very Structured

U06: no response

13. How do you personally prefer to plan the meeting agenda? (Check all that apply)

_U01, U08____ In multiple team emails during the preceding week?
_U01, U02, U03, U04, U07, U08____ Plan agenda in prior meeting
__ U04, U07___ At the beginning of the meeting
_U01_ U02 U06___ Not plan at all
_____ Other? Please elaborate

14. During a 3 hour meeting, what non-meeting-related activities do you usually do? For how long?

_U01, U02, U03, U06, U08____ Check email
_ U01,_U02____ Check social networking sites
_ U01, U03____ Use chat
_ U01, U02, U04____ Eat food
_U01, U03, U06, U07, U08____ Go to the restroom
_U01, U02, U04, U06, U07____ Off-topic discussions
_ U01[sometimes I work], U04[break every 1 hour]____ Others, please elaborate

15. Have you conducted meetings via phone, chat, video, or other electronic medium?

U01: Yes, Phone, VOIP, Video conferencing

U02: Not for this group .

U03: Yes, but mostly personal conference

U04: Yes, used online conference room - just once

U06: Yes, Microsoft Messenger

U07: We've used chat rooms and IM to do the meetings.

U08: No

16. What is the agenda for your meeting today?

U01: LO-FI Prototype, Discuss the scenarios & allocate the work and plan to meet before the next   milestone!

U02: Low fidelity prototypes – what next? Discuss on U04's concept

U03: Discuss, Milestone 4. Lo Fi prototype for SI 682

U04: Don't know Discuss, Milestone 4. Lo Fi prototype for SI 682

U06: Draw out our lo-fi prototypes

U07: Draw the lo-fi prototype of every detailed parts.

U08: Sketch out lo-fi prototypes for our project. Roughly takes one and a half hours.

C-8. Post-Test Questionnaire

1. How comfortable do you feel about using the chat room of Groove for meeting ?

Uncomfortable   3   2   1   0   1   2   3   comfortable

Indicate what features do like and dislike _____

U01: -1 like: conference, dislike: difficult to maintain meetings

U02: 1 Personal IM's should be thr.

U03: -1 File sharing & the central repository

U04: 2 I don't like it because it's too simple. Difficult to include pictures in the chat window

U05: 2 I like the number to indicate how many people are in that section

U06: 0 Like: faster access to information when someone give you a URL   Dislike: Not really a real-time conversation, where sending and receiving should take place simultaneously.

U07: -2 Like: This is convenient that you can directly click the URL sent by other people. Dislike: You have to wait others' response, kind of slow and inefficient.

U08:-2 Like: Looks familiar (like MSN messenger). Easy to carry on Groove meeting.   Dislike: Not convienent to send files.

2. Do you think using the chat room for meeting is efficient?

Disagree   3   2   1   0   1   2   3   Agree

Explain why

U01: -2 No face to face contact. Lack of physical presence.

U02: -1 People don't understand context & tone

U03: -1 I really wanted to discuss the hi-fi in person! It's diff. to express over chat & we were all diverting our topics

U04: -3   Text only, slow

U05: -2   Speaking is faster than typing

U06: -1 The words just keep moving, so you have to get back to check what people is talking about. Then, you also have to wait others' response.

U07: -2 the conversation is asynchronous, you just have to wait for others' response. When you ask a question, you cannot obtain the answer right away.

U08: 0 Not as effective as face to face. Perhaps better than other software.

3. What there a positive aspect of using the chat room for your meeting?

U01: Gave a chance for everyone to speak…something

U02: Sharing info was easy

U03: could communicate with others [not really]

U04: Can meet remotely, it's good for short not important meetings

U05: When discussing, I can do other things and check the record later

U06: NO

U07: 1. No space limit, you dont have to decide where to meet.   2. you can directly click the url

U08: More efficient than IM alone.

4. What was a negative of aspect of using the chat room for your meeting?

U01: No control on the meeting flow

U02: Rephrasings took time

U03: Time

U04: Can't encourage people to participate actively. They just hide behind the screen

U05: slower than face-to-face meeting

U06: 1. Not efficient 2. Hard to just focus on one topic. When you are typing a sentence, someone is typing,too. But you don;t know what he is typing about, so sometimes it turns out that our sentences are really about different things.

U07: 1. Not efficient 2. Hard to get the one's point, then so you just have to ask for clarification all the time

U08: Not as efficient as face to face.

5. How comfortable do you feel about using Groove to manage your agendas of meeting ?

Uncomfortable 3   2   1   0   1   2   3 comfortable

Indicate what features do like and dislike _____

U01: -1 Not used many.

U02: 2 Discussion to post things

U03: 1

U04: -2   Can't edit by everyone - dislike

U05: 2

For Group2, they don't use groove to manage agendas

6. Do you think using Groove to manage our team's meeting is efficient?

   Disagree   3   2   1   0   1   2   3   Agree

Explain why

U01: -2 Same as above. No one knows what's going on and who should speak next

U02: 0 He did a few good things but explaining was pain

U03: 0 I am a first time user, I really prefer Google calendar & "PHONE"

U04: 0 It encourages us to develop an agenda, but doesn't help us to follow the agenda / keep on track

U05: 0   I think we can finish our meeting in one hour, but turn out to be two hours

For Group2, they don't use groove to manage meetings

7. What was a positive aspect of using Groove to manage your team's meeting?

U01: Discussion topics were good. Can retrieve it later.

U02: Info exchange was easy, writing is easier than talking :D

U03: Nothing

U04: Give us a feeling that we're organized

U05: It's convenient to record the conclusion

For Group2, they don't use groove to manage meetings

8. What was a negative aspect of using Groove to manage your team's meeting?

U01:

U02: Common ground was hard to find

U03: Kinda wasted time

U04: But in fact we're not

U05:

For Group2, they don't use groove to manage meetings

9. Would you use Groove as an ongoing meeting management tool? If yes, why? If no, why not ?

U01: No, I think I will use it when the team is separated by distance. Then it will be a good tiil.

U02: People are not very used to it. Also it lacks features like wiki, which is req for chat based meetings to share notes

U03: May be not. This is our crucial milestone and I don't wanna waste time

U04: No. Because of the above reasons

U05: no, it seems not as efficient as before

U06: For other features such as file sharing, yes. Use chat room for meeting, no

U07: No

U08: No, just for this week. We are all online all the time, already use MSN.

10. Using the rating sheet below, please circle the number nearest the term that most closely matches your feelings about Groove.

Scale : Simple -3 -2 -1 0 1 2 3 Complex

11. What other tools did you use in the groove meeting

U01: No, I think I will use it when the team is separated by distance. Then it will be a good tiil.

U02: team website, blog to see video (common), individual chat

U03: May Google Doc, Google Calendar

U04: I copy / paste the agenda in Groove to my notepad in my PC as my record

U05: I used my website to refer few things. GOOGLE!

U06: MSN messenger, because you have to respond when someone is messeging you after all. And e-mail when waiting for response.

U07: MSN, because someone will message me; web browser for checking website, and email when I have to wait for someone else's response

(Note: It's good for multi-task, I think ,but I prefer focusing just on one thing. I just want to finish the meeting asap)

U08: MSN

	U01	U02	U03	U04	U05	U06	U07	U08
Simple / Complex	1	2	1	3	-1	-1	0	-2
High tech / Low Tech	0	1	-2	0	-2	-1	-1	-1
Reliable / Unreliable		2	0	2		0	0	0
Easy to use / Complex to use	1	2	2	2	-1	1	-1	-1
Friendly / Unfamiliar	1	1	0	2	0	1	1	-1
Professional / Unprofessional	1	0	-1	1	-1	-1	-2	-2
Safe / Unsafe		2	2	2		-2	-1	0
Durable / Fragile	1	2	0	2		0	-1	-1
Attractive / Unattractive	0	0	-2	-1	-1	2	1	-1
High quality / Low quality		0	-2	0		-1	0	-1
I like / I dislike	0	0	-2	1	-1	1	1	0
Clear / Confusing	1	2	1	3	0	1	0	-2

Appendix D

Observation Sheets

D-1. Repetitions/Clarifications

Repetitions/ Clarifications	1	2	3	4	5
Who					
Reason	language barrier/ missing common knowledge/ usual repetition/other?	language barrier/ missing common knowledge/usual repetition/other?	language barrier/ missing common knowledge/usual repetition/other?	language barrier/ missing common knowledge/usual repetition/other?	language barrier/ missing common knowledge/usual repetition/other?
How many sentences					

D-2. Group Dynamics

Group Dynamic				
Interaction style x-axis				
example:| _15min SemiFormal |____1hr Professional_____ 10min Break ____25mins Casual___ _____]	Definitions & Scoring: Professional(2), Break (0), Casual(0) and semiformal(1) (number indicates weighted productivity)	SemiFormal - warm-up, similar project discussion, others	Casual - joking, storytelling	Break - team dissolves/leaves room

D-3. Group Memory

Group Memory/ virtual war room concepts	# of Sheets	Purpose	What was stored	How?	Other comments
Paper					
black/whiteboard					
computers which software					

	Yes/No	Purpose	Individual or Group	Other/notes
Physical tools				
Paper				
Pen/pencil				
Color pencils/markers				
Cell phone				
Planner/calendar				
Whiteboard/chalkboard				
Textbook (reference book)				
Sketchbook/sketchpad				
Digital camera				
Online tools				
Calendar				
Agenda				
E-mail				
Document management				
Sketchpad				
Issue tracking				
Internet surfing				
CTools site				
Other				
Extra note - how many people are on computers during the meeting?				

D-4. Discussion

	Discussion 1	Discussion 2	Discussion 3
# of sentences			
Reason			
How long was discussion			
Conflicts			
# of sentences			
Reason			
How resolved?			
How long until resolved?			
Decisions			
# of sentences			
How many alternatives explored			
Politics			
General Discussions			
# of sentences			

Appendix E

Major Themes for Analysis

Major Themes Considered for Analysis of School Teams

- **Facial & Movement Expressions (check Olson's paper)**
  - Expressions
    - Facial
      - positive
      - negative
      - Eye-rolling
      - Intense
      - Worried
      - Smiling
      - Frowning
      - Confusion
      - Skeptical
      - other
    - Movements
      - hand movements
      - leg movements
      - hand & leg movements
      - standing up
      - sitting down
      - other
  - Tone of voice
    - negative
    - positive
    - laughter
    - passionately involved
    - discussing
    - orating
    - joking
    - upset
    - strong
    - other
  - Reason
    - influence decision
    - ego
    - other
  - Influence
    - recording only for instances when decisions are being made

5. **Meeting structure/Communication efficiency**
- Agenda
  - what kind of agenda?
    - 0=loosely planned 5= strictly planned

      0   1   2   3   4   5

    - strictly planned
    - loosely planned
    - not planned
  - planned agenda
  - actual agenda
- Communication Efficiency
  - repetitions in conversation? who, how many times?
    - language barrier?
    - missing common knowledge
    - usual repetition in conversation to help others understand

- **Group dynamics**
  - interaction style x- axis timeline
    - [example : _15min SemiFormal ____1hr Professional_____ 10min Break ____25mins Casual___ _____] Attributes: Formal, Break, Casual and Informal
    - interaction style xy- axis timeline
      - [example : | _15min SemiFormal |____1hr Professional_____ 10min Break ____25mins Casual___ _____] Attributes & Scoring: Professional(2), Break (0), Casual(0) and semiformal(1) (number indicates weighted productivity)

      - SemiFormal - warm-up, similar project discussion, others
      - Casual - joking, storytelling
      - Break - team dissolves/leaves room

  - Number of conflicts?
    - how was it resolved?
      - mediated by one person on the team
      - consensus
      - 'tabled' or put aside until later
      - other
    - how long did it take to resolve it?
  - Number of decisions
    - # of members involved in the decision
    - # of conversations in the decision
      - how many alternatives were explored/discussed
    - politics in the decision
      - persuasion/1 person
      - power
        - 2 people
        - other/elaborate

- how long did it take to come to the decision
  - assigned roles   U1   U2   U3   U4   U5
    - note all the roles
  - actual roles   U1   U2   U3   U4   U5
    - note all the roles
  - freeriders?
  - production blocking (from Olson paper)
  -

- **group memory/virtual war room concepts (Teasley paper)**
  - work done:
    - paper [# of sheets, purpose, what was stored, how is it stored]

    - black/whiteboard [# times, purpose, what was stored, how is it stored]

    - computers
      - which software/how much? purpose, what was stored, how is it stored

- **Tools - collaboration - planning, brainstorming, writing a report**
  - Tools - individual vs group
  - Physical tools
    - paper
    - pen/pencil
    - color pencils/markers
    - cell phone
    - planner/calendar
    - whiteboard/chalkboard
    - textbook (reference book)
    - Sketchbook/sketchpad
    - Digital camera
  - Online tools - as much as we can observe...
    - calendar
    - agenda
    - email
    - document management
    - sketchpad
    - Issue tracking
    - internet surfing
      - CTools site
      - other

- **Individual Attention/Contribution and Distraction**
  - how many times does each person people leave the
    room?   U1   U2   U3   U4   U5
    - why did the person leave?
      - restroom?
      - phone call?

- supplies?
- food?
- other/elaborate
  - how did the person communicate that he/she needed to leave the room?
    - formally?
    - informally/casually?
  - how did the team dynamics change while that person was away?
  - how long were they gone?
  - how did the person catch up?
    - asked one member?
    - asked the group?
    - just pay attention to what's going on?
    - other? elaborate
- how many times did the team get 'off-topic'? (casual, formal, professional, personal?)
  - why did the team go off track?
    - someone told an anecdote/story
    - technology problems
    - random thought
    - parallel thought
    - others?
  - why did the team get back on track?
    - person
    - running out of time
    - others?
  - how long did it take to get back on topic?
- do we observe each person multi-tasking w/websites/email/etc?
  - how many times
  - how long did the period last?
  - what was the person doing?
    - email
    - chat
    - browsing web
    - phone call
  - how did the person get back on task?
- attention/distraction - waveform observation (can we observe this for individuals?)
  - [meeting time - distractions = attention]
- Individual Contribution while paying attention/engaged(x5)
  - roles x- axis timeline
    - [example U01 : _15min note taker__ __1hr discussion_____ 5 min orator ____25mins researcher___ _____] Attributes: Listener, discussion, orator, note taker, report generator, researcher, others/elaborate

Other Themes considered:

- **Formal Roles - Descriptions**

- **Discussion Style**

Methodology Planning:

In person meeting:

- Consent Form
- Pretest
  - demographics
  - personal preference (technology, meetings, etc)
- Observations
- Interview (debriefing): groups of 2/3
  - 682 Group Dynamics
  - **Observation Follow up questions**
    - Do you think this meeting is typical? why or why not ?
    - Do you think this meeting is more formal or less formal
    - Do you think this meeting is productive ?
    - Do you find any conflict in this meeting ?
    - Who would you say the leader is?
    - Does your team have any formalized roles?
    - Do you think your environment is productive ?
    - Have you set any rules about your group's interaction (covenant)?
    - What is the goal of your this meeting ? Do you think you accomplish it ?
    - Do you have agenda for this meeting? Or, how do you structure your this meeting?
    - Do you feel you have enough opportunities to make your opinion?
    - What tools do you use to coordinate outside the meeting ?
    - Are you trying to make some expressions if you are or are not satisfied with the decision being made.
    - Do you think someone of you's expression play an important role in your decision making?

The rest depends on the observation.

- Quick Training/ Installation of Software (Morae?)
- After "in person" meeting, just use Groove to plan and conduct next meeting (in Groove)

Groove 1 Meeting:

- Observation
- Groove Post-test
- Interview (debriefing): 1 to 1

Groove 2 meeting

- Observation
- Interview debriefing: 2/3

Appendix F

Groove Chat Logs

F-1. 2nd Groove Chat log – Group2

2nd Groove Chat Log – Group2
U07: 11/3/2008 10:16 AM Hello guys
U08: 11/3/2008 10:17 AM Hello~~
U07: 11/3/2008 10:17 AM We will wait for [U06]
U08: 11/3/2008 10:18 AM Alright~~
U07: 11/3/2008 10:18 AM So do you know when is next milestone deadline?
U08: 11/3/2008 10:18 AM it's due in two weeks
U07: 11/3/2008 10:18 AM ok
U07: 11/3/2008 10:18 AM so that will be next week , right?
U08: 11/3/2008 10:19 AM well I think so... but I didn't double check.
U07: 11/3/2008 10:19 AM alright
U07: 11/3/2008 10:20 AM [U06] .....
U07: 11/3/2008 10:21 AM Where is she doing?
U08: 11/3/2008 10:21 AM I checked the syllabus. It's due next week.
U07: 11/3/2008 10:21 AM ok so is that hi-fi prototype?
U07: 11/3/2008 10:21 AM I think we should hurry up
U08: 11/3/2008 10:22 AM I think we'll have to spend many hours on this...
U07: 11/3/2008 10:22 AM because that will cost us much time on that
U08: 11/3/2008 10:22 AM Yep. the hi-fi is due next Thursday.
U07: 11/3/2008 10:22 AM OMG
U08: 11/3/2008 10:23 AM Hi ~[U06]
U06: 11/3/2008 10:23 AM Here

U07: 11/3/2008 10:23 AM
So how do you want to start the milestone this time

U07: 11/3/2008 10:23 AM
It is 10:23, [U08] have to leave before 11:30

U08: 11/3/2008 10:24 AM
I checked out the hi-fi of previous projects. they don't seem to have a decent interactive prototype!!!

U07: 11/3/2008 10:24 AM
let's me see

U06: 11/3/2008 10:24 AM
but i want a decent interactive prototype

U06: 11/3/2008 10:24 AM
i think we'll just go with axure

U08: 11/3/2008 10:25 AM
haha~~ me2

U07: 11/3/2008 10:24 AM
ok

U06: 11/3/2008 10:25 AM
the problem is that we haven't figure out how to simultaneously build our prototype using axure

U08: 11/3/2008 10:25 AM
yep.

U06: 11/3/2008 10:25 AM
have you guys play with axure a little bit?

U08: 11/3/2008 10:25 AM
we have to split the task somehow.

U08: 11/3/2008 10:26 AM
for me, not yet.

U07: 11/3/2008 10:25 AM
yes I agree with [U08]

U08: 11/3/2008 10:26 AM
so how do you want to split the task?

U06: 11/3/2008 10:26 AM
it's hard to split though

U06: 11/3/2008 10:26 AM
'cause the theme should be the same, so as colors and linkings

U07: 11/3/2008 10:26 AM
[U08] could you come upstair after this meeting and give me the axure?

U06: 11/3/2008 10:27 AM
we can try to build on our hi-fi based on our lo-fi

U08: 11/3/2008 10:27 AM
yep sure

U07: 11/3/2008 10:27 AM
thanks

U08: 11/3/2008 10:28 AM
sure~

U06: 11/3/2008 10:28 AM
only that part consists lots of work

U08: 11/3/2008 10:28 AM
perhaps we could try our hands at Axure first? then we might have a better idea of which parts each people want to do?

U07: 11/3/2008 10:28 AM
Yes, because we did try this software

U06: 11/3/2008 10:29 AM
i have used it, you two can have a glance

U07: 11/3/2008 10:29 AM
We should try that first and then decide how to seperate the work

U08: 11/3/2008 10:29 AM
I'd say we spend a whole day on it in the weekend, sitting together.
U07: 11/3/2008 10:29 AM
ok
U08: 11/3/2008 10:30 AM
perhaps it doesn't have to take that long, but just in case
U06: 11/3/2008 10:30 AM
Yes
U07: 11/3/2008 10:30 AM
How about this Sunday?
U06: 11/3/2008 10:31 AM
i'm good
U07: 11/3/2008 10:30 AM
Saturday afternoon I have other schedule
U08: 11/3/2008 10:31 AM
and before that weekend meeting, we can practice Axure a little bit. Maybe we could finish some of the prototype individually.
U07: 11/3/2008 10:31 AM
Right
U08: 11/3/2008 10:31 AM
I'm OK with Sunday before 7pm
U07: 11/3/2008 10:31 AM
I agree
U06: 11/3/2008 10:31 AM
i really mean that it's hard to do it individually
U07: 11/3/2008 10:31 AM
I think [U08]'s meaning is we can practice thay
U06: 11/3/2008 10:32 AM
but we can try to build our dashboard together
U07: 11/3/2008 10:31 AM
not really build the real one
U06: 11/3/2008 10:32 AM
and then build separate page individually
U06: 11/3/2008 10:32 AM
alright
U08: 11/3/2008 10:33 AM
yep. even we figure out we can split the task, we could still sit together and do it.
U07: 11/3/2008 10:32 AM
yes
U08: 11/3/2008 10:33 AM
I think that's better~~
U06: 11/3/2008 10:33 AM
yes, btw i had a meeting on sun. 1-3 i think
U08: 11/3/2008 10:33 AM
so... how about sat evening and sun morning?
U07: 11/3/2008 10:33 AM
No
U06: 11/3/2008 10:34 AM
do you have class on fri?
U08: 11/3/2008 10:34 AM
[U07] do you have appoitments on sat evening?
U07: 11/3/2008 10:33 AM
Sunday morningwill be fine by me
U06: 11/3/2008 10:34 AM
i don't this week!

U08: 11/3/2008 10:34 AM
Fri morning is cool.

U08: 11/3/2008 10:35 AM
so... Fri morning and Sunday morning?

U07: 11/3/2008 10:34 AM
I do not, but that will be hard for me to go back home

U07: 11/3/2008 10:34 AM
Friday morning I have class

U07: 11/3/2008 10:35 AM
We never meet on Friday!

U06: 11/3/2008 10:36 AM
alright, but will it be to late to meet on sun?

U08: 11/3/2008 10:36 AM
ok. so [U07] I can go home together with you on Sat night.

U07: 11/3/2008 10:36 AM
Meet on North campus?

U06: 11/3/2008 10:36 AM
i think today we can try first to think of how to reponse to our critiques

U07: 11/3/2008 10:36 AM
Sat night?

U08: 11/3/2008 10:37 AM
yep I mean sat night. I think we live quite near.

U07: 11/3/2008 10:36 AM
alright

U07: 11/3/2008 10:37 AM
I think the critiques this week are all about the long presentation

U08: 11/3/2008 10:37 AM
I agree with [U06]. we can think about the critiques. and I can form some written stuff to put on website.

U06: 11/3/2008 10:37 AM
or sun after 3? we can meet 3-7

U07: 11/3/2008 10:37 AM
there are few other critiques

U08: 11/3/2008 10:38 AM
yep... they really don't have anything else to say, don't they? == ^ ^

U07: 11/3/2008 10:37 AM
.....

U06: 11/3/2008 10:38 AM
it's ok [U08]...

U07: 11/3/2008 10:38 AM
She said Sat evening

U07: 11/3/2008 10:38 AM
not afternoon

U06: 11/3/2008 10:38 AM
i mean sun afternoon

U07: 11/3/2008 10:38 AM
Sun day morning

U08: 11/3/2008 10:38 AM
I'm confused...

U07: 11/3/2008 10:38 AM
That is what [U08] suggest

U07: 11/3/2008 10:38 AM
It is sun day morning

U06: 11/3/2008 10:39 AM

it bad for me to meet sat night though, that's what i'm trying to say

U08: 11/3/2008 10:40 AM
so we already have Sunday morning. the question is when else?

U07: 11/3/2008 10:39 AM
in north campus?

U06: 11/3/2008 10:40 AM
monday morning if we cannot finish?

U07: 11/3/2008 10:40 AM
because the library will open until 10

U07: 11/3/2008 10:40 AM
fine, Modday morning is fine by me

U08: 11/3/2008 10:41 AM
we could use Shapiro in the weekends.

U08: 11/3/2008 10:41 AM
I'm fine with Monday morning too.

U07: 11/3/2008 10:40 AM
Shapiro will not open until 10

U07: 11/3/2008 10:41 AM
Hatcher will not open until 1 on Sun

U06: 11/3/2008 10:41 AM
let's meet at shapiro on sun at 10

U07: 11/3/2008 10:41 AM
I do not think so

U07: 11/3/2008 10:41 AM
That will be too short

U08: 11/3/2008 10:42 AM
wow… we'll find some place don't worry.

U08: 11/3/2008 10:42 AM
Let's figure out the time first.

U07: 11/3/2008 10:42 AM
Aslo tardyness always delay our meetings

U07: 11/3/2008 10:42 AM
I think everyone should notice that

U08: 11/3/2008 10:43 AM
OK. ==

U06: 11/3/2008 10:44 AM
i though we had michigan time...

U07: 11/3/2008 10:43 AM
If we meet at 10 on Sunday, I think we will really start to discuss at 10:25

U08: 11/3/2008 10:44 AM
haha

U07: 11/3/2008 10:43 AM
No, not for meeting

U06: 11/3/2008 10:44 AM
no

U07: 11/3/2008 10:44 AM
it is only for class

U06: 11/3/2008 10:44 AM
we'll start promply at 10

U07: 11/3/2008 10:44 AM
...

U08: 11/3/2008 10:45 AM
so... we'll meet on Sunday at 10:00? I'll stay there whole day and try to finish hi-fi.

U06: 11/3/2008 10:45 AM
i can go back when i finish another meeting

U07: 11/3/2008 10:45 AM
I will probably stay there whole day too

U08: 11/3/2008 10:46 AM
[U07] you can [U08]in me if you have no meeting to go.

U07: 11/3/2008 10:45 AM
I can work with [U08] if [U06] is not availible

U07: 11/3/2008 10:45 AM
Yes

U08: 11/3/2008 10:46 AM
ok. and [U06] you can [U08]in us after you meeting from 1~3pm

U06: 11/3/2008 10:46 AM
thanks a lot

U07: 11/3/2008 10:46 AM
I think [U06] should come back after 3:00

U06: 11/3/2008 10:46 AM
i will

U07: 11/3/2008 10:46 AM
that will be fine

U08: 11/3/2008 10:47 AM
I'll stay there from 10am~7pm. I think we'll have sth by then!

U07: 11/3/2008 10:46 AM
OK

U06: 11/3/2008 10:47 AM
so we can try to make some write-up today

U07: 11/3/2008 10:47 AM
so what we are going to do until next meeting on Sun morning is only using the axure?

U08: 11/3/2008 10:48 AM
yep we can write sth today.

U07: 11/3/2008 10:47 AM
lke what

U06: 11/3/2008 10:48 AM
we can try to find who will be our user testing people

U07: 11/3/2008 10:48 AM
Critiques are very limited

U08: 11/3/2008 10:48 AM
and for sunday, we'll try to finish hi-fi and words to put on website.

U07: 11/3/2008 10:48 AM
I think that's what I will think about in the next milestone

U07: 11/3/2008 10:49 AM
I mean who will be our testing people

U08: 11/3/2008 10:49 AM
yep user testing is in next milestone

U07: 11/3/2008 10:49 AM
that is not for this milestone

U07: 11/3/2008 10:49 AM
Yap

U06: 11/3/2008 10:49 AM
yes, but as long as we have time, we can find people first and try to make an appointment with them

U08: 11/3/2008 10:49 AM
it's after hi-fi.

U06: 11/3/2008 10:49 AM
i know

U06: 11/3/2008 10:50 AM
i mean tell them first

U06: 11/3/2008 10:50 AM

it's hard to schedule in a short notice

U08: 11/3/2008 10:50 AM
I'm thinking about putting up the hi-fi online, and send out invitations and surveys.

U07: 11/3/2008 10:49 AM
We have not finished our HI-Fi, how ccan we make an appointment with thew?

U07: 11/3/2008 10:50 AM
them?

U06: 11/3/2008 10:51 AM
alrighty

U08: 11/3/2008 10:51 AM
finding users won't be way too difficult. at least we have our interviewees for the CI. and our friends can help too!

U07: 11/3/2008 10:51 AM
I thik so ,too

U07: 11/3/2008 10:51 AM
I do not think it will be too hard to find users to do the testing

U07: 11/3/2008 10:52 AM
in this time

U08: 11/3/2008 10:53 AM
OK

U06: 11/3/2008 10:53 AM
ok

U07: 11/3/2008 10:53 AM
OK what are we going to do now

U08: 11/3/2008 10:54 AM
I'm looking at the critiques. we'll just finish that today.

U08: 11/3/2008 10:54 AM
can I see you upstairs?

U08: 11/3/2008 10:54 AM
ok. we're coming up.~~

U07: 11/3/2008 10:54 AM
I think you can

katie mccurdy: 11/3/2008 10:55 AM
if you guys are done with your online meeting, we can do the follow-up questions and you can be on your way!

katie mccurdy: 11/3/2008 10:55 AM
we'll be right up.

U07: 11/3/2008 10:54 AM
Thanks

Yung-Ju Chang: 11/3/2008 10:56 AM
thank you all

F-2. Excerpt Displaying Large Font (From Group1's 1st Groove Chat)

1st Groove Chat Log – Group1

U02: 11/4/2008 8:16 PM
a) finger for menu

U02: 11/4/2008 8:16 PM
b) transparent bg for menu

U04: 11/4/2008 8:16 PM
what

U04: 11/4/2008 8:16 PM
is

U04: 11/4/2008 8:16 PM
bg

U03: 11/4/2008 8:16 PM
background

U02: 11/4/2008 8:16 PM
reduce font size

U01: 11/4/2008 8:16 PM
C) less features exposed at once

U02: 11/4/2008 8:16 PM
ok

U03: 11/4/2008 8:17 PM
firstlt we need to decide on the features

U01: 11/4/2008 8:17 PM
i guess figure out the most common feature

U02: 11/4/2008 8:17 PM
hmmm

U01: 11/4/2008 8:17 PM
keep the product around that core

U03: 11/4/2008 8:17 PM
then update our personas and scenarios accordinglly

U01: 11/4/2008 8:17 PM
yes

U05: 11/4/2008 8:17 PM
yes! feature!

U02: 11/4/2008 8:17 PM
do we need to update ?

U05: 11/4/2008 8:18 PM
no~~

U04: 11/4/2008 8:18 PM
we don't

U03: 11/4/2008 8:18 PM
n our spelling mistakes

U01: 11/4/2008 8:18 PM
why are you shouting?

U02: 11/4/2008 8:18 PM
cause we'll pick a feature from among there

U05: 11/4/2008 8:18 PM
it's not enough time

U04: 11/4/2008 8:18 PM
we update after HiFi

U04: 11/4/2008 8:18 PM
before final presentation

U03: 11/4/2008 8:18 PM
n take out un necessary data from the website

U02: 11/4/2008 8:18 PM
whats the use then

U02: 11/4/2008 8:18 PM
:P

U03: 11/4/2008 8:18 PM
guys chill

U02: 11/4/2008 8:18 PM
i think a big font seems they are too emotional

U02: 11/4/2008 8:18 PM
:P

U01: 11/4/2008 8:19 PM
I think we can decide the changes in persona and stuff

U02: 11/4/2008 8:19 PM
why is everyone using such a big font

U02: 11/4/2008 8:19 PM
!!

U03: 11/4/2008 8:19 PM
now??

U01: 11/4/2008 8:19 PM
making changes on site is different

U04: 11/4/2008 8:19 PM
it's not emotional, it's important information

U05: 11/4/2008 8:19 PM
I think we can remove the multiple calendar function

U02: 11/4/2008 8:19 PM
use 10 point font please

U04: 11/4/2008 8:19 PM
what i say is important

U04: 11/4/2008 8:20 PM
why?

U04: 11/4/2008 8:20 PM
that's blackberry

U04: 11/4/2008 8:20 PM
s

U04: 11/4/2008 8:20 PM
biggest adv

U02: 11/4/2008 8:20 PM
ya exactly

U02: 11/4/2008 8:20 PM
just beacuse there is a philosophy we cant change what people are actually doing

U04: 11/4/2008 8:20 PM
so don't remove multiple calendar