

Community-based Interpretive Schemes: Exploring the Use of Cyber Meetings within a Global Organization

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Abstract

This paper explores the challenges of adopting a MOO-based technology to support a virtual working environment spanning several geographically dispersed units of a global organization. We use community-based interpretive schemes as an analytic lens for identifying assumptions and expectations about technology use and genres of communication, and for examining how these shaped participants' distributed interaction over time. We found differences in interpretive schemes across sites, nationalities, languages, and roles, as well as over time. These interpretive differences help to explain the difficulties in appropriation of the technology and the limited development of shared genre norms. In addition, they offer some reasons for why the use of the virtual work environment was halted after two years.

1. Introduction

As Internet use spreads all over the world, and businesses extend their operations globally, PC-based meeting systems are becoming increasingly popular tools for facilitating dispersed business activities. Such systems have advantages in cost, user involvement and accessibility vis-a-vis video conferencing systems. Though PC-based meeting systems such as MUDs (Multi-User Dimensions) and MOOs (MUD Object-Oriented) have been used for years by online enthusiasts interested in socializing and game-playing [4], they have recently been adopted by businesses interested in using their facilities to hold distributed business meetings [e.g. 3, 6, 18]. While a growing body of empirical research has examined the influence of collaborative tools on organizational practices [9], there are few empirical studies of collaborative tools in global organizations [e.g. 16], and especially few studies in cross-national settings [10].

In this paper, we report on a case study that explored the implementation of a PC-based multi-

media synchronous meeting system in several geographically dispersed units of a global organization. In particular, we ask why the use of this collaborative tool was not sustained across the multiple units over time. We use a community-based notion of interpretive schemes as an analytic lens to examine participants' assumptions and expectations about the technology and their communication using it, and examine how such assumptions and expectations shaped use of the technology over time and across sites.

2. Theoretical lens

Our analytic lens draws on social cognitive research that has argued that people act in the world on the basis of how they make sense of it [8, 21]. Such an interpretive influence is also evident in the context of communities or organizations, where members' interpretations (or interpretive schemes) shape how they assign meaning to and take action within their communities or organizations [1, 8].

The role of interpretive schemes in shaping people's action typically operates in the background, and is rarely surfaced, discussed, or reflected on. Interpretive schemes have both enabling and constraining effects [7]. On the one hand, interpretive schemes are enabling as they guide organizational action, allow interpretation of ambiguous situations, and reduce uncertainty in conditions of complexity and change [8]. On the other hand, interpretive schemes are also constraining as they reinforce unreflective reliance on established assumptions and knowledge, limit learning, and distort information to make it fit existing assumptions and expectations, possibly even creating self-fulfilling prophecies.

Members of a community or organization transmit interpretive schemes to others—especially new members—through training and socialization [20]. Likewise, regular social interaction, working relationships, and negotiation over time create opportunities for the development and exchange of similar points of view. Thus, membership and

participation in a community influences the particular interests, beliefs, and norms to which members are exposed [20], and helps to create a shared set of assumptions, expectations, and knowledge, which we refer to as *community-based interpretive schemes*. While such shared interpretive schemes reinforce (and are reinforced by) a community, they may differ across communities and contexts. Moreover, communities may be overlapping or nested, with specific individuals belonging to multiple communities. For example, a large multi-national firm may have some interpretive schemes shared throughout the firm and characterizing the firm as a community. Within the firm, however, there may be differing national communities and local communities with shared interpretive schemes [24]. In addition, professional communities or communities of practice may cut across locations within the firm [19].

Studies of the use of technology have found that interpretive schemes powerfully shape how people interact with technologies in their work [13, 15]. This influence arises because people have to make sense of technology in order to engage with it. And in this sensemaking process, people draw on their existing assumptions, expectations, and knowledge about the technology and what counts as appropriate use of it within their community. In this way, community-based interpretive schemes serve to structure people's understandings of and interaction with technology. Studies of genre have similarly found that people have assumptions, expectations, and knowledge about the appropriate genres of communication to use in their communities [14, 24].

The research we report in this paper suggests that community-based interpretive schemes were influential in shaping people's use of a new MOO-based meeting technology. In particular, we found that community-based interpretive schemes were particularly salient in the two areas of technology and genre.

2.1. Technology

A number of researchers have focused on the assumptions, expectations, and knowledge people use to understand technology in organizations [13, 15, 22]. Such research suggests that different groups or communities within an organization may have different interpretive schemes about a particular technology. These differences tend to arise as community members have different roles, experiences, and knowledge with respect to the technology. For example, in one case where the groupware technology, *Notes*, was implemented in a large professional services firm, Orlikowski and Gash [13] found that user and technologist communities developed quite different interpretive schemes about *Notes*. These differences

were seen to reflect the communities' different work practices, social norms, and work rhythms. This incongruence in interpretive schemes across the two communities of practice within the larger firm helped to explain why the initial deployment of *Notes* did not yield the anticipated collaborative benefits.

Interpretive schemes about technology include at least the following aspects: assumptions and expectations about what the technology is; assumptions and expectations about why the technology has been adopted; and assumptions and expectations of how the technology could and should be used. As we will see below, where differences across these three aspects exist, members may have difficulty agreeing on and enacting effective ways of interacting with the technology within their communities.

2.2. Genre

Genres of organizational communication, derived from the notion of literary genres such as the novel or drama, are types of communication well recognized and enacted in a particular community—for example, the report, the proposal, and the meeting. Genres are characterized by a socially recognized purpose and common form features [23]. Recently, the notion of genre has been used as an analytic lens for examining a range of electronic communication [2, 5, 14, 24]. In this study, we were particularly interested in examining participants' interpretive schemes around genres. That is, what assumptions, expectations, and knowledge do participants have about the genres they enact within their communities, and how do these cognitive understandings influence their enactment of genres in a new meeting technology.

Researchers have found that as people begin to use new electronic media, they tend to draw initially on their knowledge of the genres they are currently using within a community and to import these genres into the new medium [24]. Once they have experienced the new medium, their newly gained knowledge of it and its use influences their assumptions and expectations of which genres may be employed and how they may be adapted to take advantage of the new medium's features. For example, participants in the Common LISP project described by Orlikowski and Yates [14] brought to their use of e-mail shared interpretive schemes about the appropriateness of various communication genres to use in their project. Such shared, community-wide interpretive schemes facilitated the distributed and collective work of the project participants. Where common, community-wide interpretive schemes about genres do not exist, misunderstandings may arise if the incongruencies are not in some way mediated or negotiated [24].

3. Research Setting and Methods

3.1. Research setting

We investigated a collaborative technology designed to host distributed electronic meetings among the geographically dispersed sites of a large, global Japanese firm, Toki Corporation (a pseudonym). The sites involved include Toki's research lab in Japan, designated Toki HQ; its research center in the US, designated Toki US; and three sites in Singapore and Australia, collectively designated as Toki APG (Asia Pacific group). Together, we refer to these sites as the Toki group. These sites used a virtual working environment called *The Palace* [17] to conduct global virtual meetings, which the group members refer to as Cyber Meetings. The Palace is a two-dimensional graphical MOO environment with the following facilities: avatars, sound, shared white board, and various chat room functions including text chat. The Palace system, like other MOOs and MUDs, has been used primarily for social chats in online network communities, but it has recently been used within business communities. The Toki group held over 20 scheduled business meetings in the virtual meeting environment over two years. These Cyber Meetings included managers and researchers from Toki HQ and Toki US, and managers from Toki APG. Two American researchers at Toki US and a Japanese researcher at Toki HQ were involved in most of the Cyber Meetings ("primary participants"), while the others more occasionally ("secondary participants").

Below, we provide a brief history of the Toki group's experience with Cyber Meetings, segmented into the three phases that characterize the primary periods of virtual meeting activity.

3.1.1. Early phase: 07/97 to 07/98. Nine months after Toki US set up a Palace server and began to use the Palace environment for collaborative activities within the lab, the first Cyber Meeting between Toki HQ and Toki US was held in July 1997. Five Americans at Toki US and 12 Japanese at Toki HQ participated in the meeting, during which they introduced themselves and tested Palace functions such as rooms and avatars. After several further Cyber Meetings between the two locations, the Japanese chairman of Toki US planned to use Palace to demonstrate the research technologies of Toki US to a directors' meeting at Toki HQ (hereafter referred to as the Research Demo Meeting). Five Japanese (some researchers and some managers) at Toki HQ cooperated with participants at Toki US to plan the demonstration. Before this demo, they rehearsed the chairman's scenario several times. An American researcher at Toki US set up rooms and scripts, and an American senior researcher presented

the research themes of Toki US using text and such distinctive features of the Palace as avatars, rooms, and links to web pages. The Research Demo Meeting occurred in July 1998, marking the end of the early phase of Palace use in the Toki group.

3.1.2. Middle phase: 10/98 to 02/99. Following the Research Demo Meeting, members at Toki HQ and Toki US wanted to continue interacting, so after a four-month hiatus in virtual meeting activity, they decided to hold regularly scheduled Cyber Meetings. They began with an exchange of current research activities in November 1998. In December 1998, participants at Toki US introduced the Palace system to participants located at Toki APG. This was followed by two research meetings among members located at Toki HQ, Toki US and Toki APG in January and February, where a Toki HQ researcher presented his research projects. In January 1999, the chairman of Toki US held a Cyber Meeting only among Japanese participants. This meeting served as a test of the technology using the Japanese language and included the chairman and a manager located at Toki US (both Japanese), as well as a researcher and two managers located at Toki HQ (all Japanese).

3.1.3. Last phase: 06/99 to 09/99. Another four-month hiatus was followed by a flurry of Palace use. As a primary participant at Toki US and the primary participant in Toki HQ planned business trips to Toki APG in July 1999, they held several Cyber Meetings among Toki HQ, Toki US and Toki APG to make arrangements for the business trips. When another primary participant planned to leave Toki US in August 1999, two researchers at Toki US and a researcher at Toki HQ held a meeting to solve an installation problem with some in-house software, and to facilitate the transition of responsibilities to another researcher at Toki US. The last Cyber Meeting was held in September 1999 to develop the agenda for a business trip to Toki HQ of a primary participant from Toki US. Two participants from Toki US and three participants from Toki HQ joined the meeting. At this meeting, all participants except the primary participant from Toki US were Japanese. No Cyber Meetings have been held since this time.

3.2. Research methods

Our data for this exploratory study are drawn from multiple sources: complete text logs of nine Cyber Meetings from all three phases (one in the early phase, five in the middle phase, and three in the last phase); e-mail archives of messages associated with these meetings; semi-structured interviews with all three

primary and seven secondary participants; and a survey conducted with the participants. One author also participated (silently) in two Cyber Meetings held during June 1999, to observe the interaction of participants directly and in real time.

The text logs include almost 3,000 utterances in nine meetings. Utterances were defined as the text entered into the system by a participant after the cursor and before the return key. Utterances typically consisted of one line of text on the screen, though they were occasionally longer (as when passages were cut and pasted from prepared text). According to the text logs, members located at Toki HQ contributed to eight meetings, members located at Toki US contributed to all nine meetings, and members located at Toki APG contributed to four meetings. With respect to cultural participation, American members at Toki US were involved in eight meetings, Japanese members at Toki HQ or Toki US were involved in all nine meetings, and Singaporean and Australian members at Toki APG were involved in four meetings.

The e-mail archives consist of over 600 English or Japanese e-mail messages exchanged during the middle and last phases of Cyber Meeting use. The semi-structured interviews were conducted by one of the authors (in English or Japanese, depending on the native language of the interviewee). Five participants located at Toki US (three Americans and two Japanese) were interviewed in March 1999, and five participants located at Toki HQ (all Japanese) were interviewed in June 1999.

Finally, an open-ended survey (in English or Japanese, depending on the native language of the respondent) was sent in March 2000 to all 25 participants of the Cyber Meetings. The survey questions focused on participants' expectations about and experiences with the Cyber Meetings. We received 19 responses: 8 from Toki HQ, 6 from Toki US, and 5 from Toki APG. With the exception of one person who left the firm and the CEO of Toki US, everyone who participated in Cyber Meetings more than three times responded to our survey. Adopting a process, not a variance, approach to the analysis, we examined the survey responses and interview transcripts, using close reading and qualitative thematic analysis.

Our analysis of community-based interpretive schemes around technology drew heavily on the data obtained from interviews and the survey. In addition, we used the text log coding (described below) to determine what technology features participants actually employed in their use of the Palace. Together, these sources of data gave us insight into participants' assumptions and expectations about the Cyber Meeting technology and their use of it.

To complete our analysis of community-based interpretive schemes around genres, we first analyzed each utterance in the text logs to determine whether we could identify common genres in members' use of the Cyber Meetings. We developed a coding scheme based on the two primary dimensions of genre: purpose and form. Purpose categories reflect the socially recognized communicative purposes of utterances (e.g., response, presentation), topical thread (e.g., research activities) (see [11] for similar coding by threads), and content type (e.g., task-related content). Form categories reflect the formatting features of the utterance (e.g., ellipses) and functional features of the Palace (e.g., sound, talking balloons). Using the coding scheme, we coded each utterance in the text logs of the nine Cyber Meetings and analyzed the results both qualitatively and quantitatively. The interview and survey data also helped us understand participants' assumptions and expectations (i.e., their interpretive schemes) about the genres of communication they were enacting.

4. Results

The Palace virtual meeting environment was used within the Toki group from July 1997 through September 1999. It has not been used for any Cyber Meetings since. Our analysis provides some explanations for why the use of this technology for global virtual meetings was not sustained over time. Participants had different (and often incompatible) assumptions and expectations about the value of the Palace technology, and about what genres should be used within the Cyber Meetings. The lack of shared community-wide interpretive schemes was particularly problematic as members communicated across various geographic sites and national cultures.

4.1. Interpretive schemes around technology

Using the interview and survey data, as well as the Cyber Meeting logs, we attempted to identify common understandings of the technology and its use within the Toki community as a whole.

4.1.1. View of technology. One of the aspects of people's understanding of technology is what they think it does and what features and functions it has. Before using the Palace, most participants, including those who joined after the early phase, either knew nothing about the system or understood it as a fancy "chat" system. For example, a primary participant at Toki US who participated from the earliest phase explained in his interview:

It was so new, I didn't know what to expect. I think Mary and I were the same way. Because it was new, we

basically found our own way, and we have no idea if other people use the Palace the same way we do.

While participants in the early phase had engaged all the functions of the Palace, participants at Toki HQ and Toki US who joined the Cyber Meetings in later phases were not aware of the Palace's novel functions. For example, one of these later participants, a Japanese manager at Toki US, explained his image of the Palace technology before his first use as "a chat system with photos of participants and talking balloons." He did not know that Palace users could, for example, create multiple rooms and change avatars. Actual use of the Palace in later phases, when participants used only a single room and displayed only their photo avatars, reinforced this narrower view of the technology. It suggests that participants in the early phase did not develop shared assumptions and expectations about the technology, either locally or across sites, and that no shared community-wide interpretive schemes about the technology were carried over into the later phases.

4.1.2. Rationale for technology. The survey and interview results indicate that participants at the various sites had multiple reasons for participating in the Cyber Meetings: learning about collaborative virtual spaces, assessing the technology, and communicating with members in the Toki group. For example, in his interview, a primary participant at Toki US explained his view of the overall rationale for using Cyber Meetings:

The objectives were twofold. ... Our project goal was centered around, can we use virtual environments for collaboration between people who are separated? So that was one goal of the meetings: just to test the technology. The second goal was just to get Toki HQ researchers and Toki US researchers discussing their work, so we could be more familiar with what we were doing, [and to see] if we could identify places where we could help each other.

In contrast, a few participants at Toki HQ saw the purpose of using the Cyber Meeting technology as a way for Toki HQ to help with projects at Toki US.

Most participants described more than one of the reasons noted above. Moreover, when we examine the text logs chronologically, we see additional differences in rationale across the sites over time. For example, when participants located at Toki APG participated in a meeting on December 7, 1998 they were focused on exploring and learning about the Palace technology. Also participating in this meeting were participants from Toki US who had already explored and evaluated the Palace technology during the first phase of use. So, members' reasons for participating in the Cyber Meetings were out of alignment across the multiple geographic sites.

The participants also had various personal motivations for using the Cyber Meetings, motivations

which reflected their different roles in the various sites. For example, the Japanese chairman at Toki US wanted to disseminate and deploy the Palace technology throughout the Toki group. He planned the July 9, 1998 Research Demo Cyber Meeting for a directors' meeting at Toki HQ, he directed Toki US participants to introduce the technology to sites within Toki APG during the December 7, 1998 Cyber Meeting, and he suggested the all-Japanese Cyber Meeting on January 27, 1999. In another example, a researcher at Toki HQ wanted to use the data from the text logs for his research, as he noted in an interview:

I expect some connection with my research, because I think chat data could be a new type of data source for my research.

Further, as we saw above, another researcher at Toki HQ was interested in using the Cyber Meetings to disseminate his research to participants at other sites, and to establish social connections with members there.

There were also role differences in participants' rationales for use of the Palace. Managers at both Toki HQ and Toki US were interested in using the Cyber Meetings as a cost-saving communication tool that would facilitate quicker decision-making among geographically-dispersed groups. For example, a Japanese manager at Toki US explained:

Communication via email, especially with Toki HQ, takes a long time, so the synchronous Cyber Meeting is good for achieving objectives quickly through frequent exchanges within a few seconds, and all taking place within an hour or one and a half hours.

Researchers, in contrast, tended not to have such efficiency motivations but preferred to use the Cyber Meetings to exchange research information with participants at other sites, and to create and build their social networks.

Examining these various reasons for using the technology across sites, time, and roles, we can see that the Toki group participants did not develop a common and community-wide reason for using the technology on a regular basis.

4.1.3. Use of technology. In their actual participation in the Cyber Meetings, participants encountered many obstacles to effective interaction as they attempted to use the real-time chat technology. These obstacles included: interweaving threads, the unfamiliarity of keyboard typing for some participants, and the temporal asymmetry of the different geographic sites.

Threads of conversation in a Cyber Meeting would often become interwoven because contributors composed their sentences offline and then submitted them to the discussion when they had finished composing each sentence rather than when it was most appropriate conversationally. As these contributions

were not coordinated, there were delays between local composition and display within the Palace system. As a result, participants became confused when there were response delays from certain participants, or when a new topical thread was begun before a previous thread had been ended, or when someone interjected into a sentence with another apparently unrelated thread. In order to solve or mitigate the problem of interweaving, some of the participants developed such techniques as writing short sentences, using ellipses when they wanted to continue a sentence, and inserting the intended recipient's name at the beginning of a sentence. The participants also developed personal conventions such as waiting patiently and performing other tasks (e.g., reading e-mail) during the delay, and reading through the text log to get back into the Cyber Meeting conversation.

At the meeting in which members of Toki US introduced the Palace technology to members located at Toki APG, the question of using the text log during a Cyber Meeting was raised:

- APG1:** This software is interesting but seems to require 100% attention. So if I take my eyes off for a while, events took place and I'm left behind. I found the log but that's hard to track.
- US2:** You can open up a log window that captures the discussion.
- US1:** Actually, I use the log a lot when I use this system.
- US2:** Open the "Options" menu (at the top), then select "Log Window" (towards bottom of the menu).
- US1:** You can make the log window larger, if it is not giving you enough context.
- US3:** The log is an important record of the meeting
- US1:** (I have been known to run for a Coke and then scroll through the log to catch up on the conversation!)
- US1:** Going back to the question of delay . . .
- US2:** It is also convenient if you get interrupted by someone who stops by your office, not realizing you are in an on-line meeting!

Participation in the Cyber Meetings was also influenced by the need for participants to use a keyboard to submit their comments. This interface created barriers for individuals who were not fast typists and who were non-native speakers of English. In the latter case, Japanese participants used a keyboard that included both Roman and Hiragana characters. When composing English language messages, as they did in all but one of the Cyber Meetings, they had to use the less familiar QWERTY keyboard layout. Even in the one meeting conducted in the Japanese language, they faced some keyboard problems. Typing Kanji characters in most cases required typing two Roman characters to get to Hiragana, and then converting Hiragana into Kanji by choosing among possible candidates.

Participants who typed slowly encountered delays because it took longer for them to compose a sentence. At the all-Japanese Cyber Meeting, one Japanese participant suggested that they might compose important sentences in advance of a Cyber Meeting, and then at suitable moments during the actual meeting they could copy and paste these prepared sentences into the conversation window of the Palace. One researcher at Toki HQ adopted this approach and used it in his next Cyber Meeting.

Though many of the participants who experienced typing and composition difficulties attempted to develop techniques and workarounds to cope with the difficulties, some participants felt that this aspect of the technology use was insurmountable. For example, a Toki US researcher pointed to these difficulties in his response to a survey question about why there had been no Cyber Meetings since September 1999:

There is definitely a problem with anyone who does not like typing. I have never had a problem with typing, so my participation has always been pretty energetic. ... It seems to be the more senior people who are not comfortable with the typing interface and, as a result, have not really endorsed the activity. As a result, the system seems to have fallen into disuse.

As a synchronous medium, the Palace technology requires users to participate at the same time. Because of time differences across the different geographic sites, the Cyber Meetings were all held when it was morning at Toki HQ and Toki APG, and evening at Toki US. This difference in timing made it difficult for participants to share a common context, because participants at Toki HQ and Toki APS had just started their work day, while participants at Toki US were about to end their work day. Thus, participants at the different sites had different moods around work, and different orientations to their day. For example, at the start of a meeting, one participant located at Toki HQ said "Good morning" as a greeting, while others said "Good afternoon." Similarly, at the end of a meeting, participants at Toki HQ and Toki APG heard "Good night" from participants at Toki US, even as their clocks showed it to be morning.

An additional timing problem was caused by the shift in clocks at certain times of the year. The United States adopts Daylight Savings Time in the summer, but since Japan does not, the Japanese participants tended to forget about the change in time difference between the sites. In one Cyber Meeting, participants at Toki HQ and Toki US joined the meeting at different times because a primary participant at Toki HQ did not know that the US had shifted its clocks.

Differing national cultures at the level of language and interactivity, along with different geographical cultures at the level of time zones all created clashing interpretive schemes in the larger community of the

Toki group. While popular rhetoric proclaims that technology can transcend time as well as space, the temporal asymmetry among the sites was a clear source of difference and difficulty for the Toki participants' use of the Palace technology.

Thus, no community-wide interpretive scheme around the Palace technology emerged among the participants. Instead, we see that participants' view of the technology, their rationale for using it, and their actual use of it, varied considerably across their particular geographic locations, specific national cultures, and individual keyboard and linguistic skills.

4.2. Interpretive schemes around genre

All Toki participants referred to their use of the Palace as participating in "Cyber Meetings." Although this designation suggests a common interpretation of the appropriate genre to use in communicating via the Palace technology (i.e., the meeting genre), we found little agreement among participants about genre norms, either as revealed in their actual use of the Palace or in their stated expectations and assumptions about what communication they were engaging in within it.

4.2.1. Genre purpose and form. We analyzed all nine Cyber Meetings for which we had logs, searching for patterns in purpose and form, the primary factors identifying genres. Our coding results show that the nine Cyber Meetings were used for a variety of purposes ranging from research presentations to setting the agenda for a business trip (see Table 1).

In the early phase, the Cyber Meetings were used to demonstrate the Palace technology and to showcase research projects at the Toki HQ and Toki US research labs. During the middle phase, two purposes dominated: research presentations, and discussion of the technology and its potential uses. Meetings in the last phase had trip planning and technology diagnosis as their primary purposes. In addition, whatever the overall purpose of the meeting, multiple topics were covered. Even in the meetings primarily focused on research presentations, a variety of other topics were addressed. For example, in the meeting on February 25, 1999 which was primarily intended as a research presentation, the participants also briefly discussed network problems, arrangements for a business trip by participants from Toki US to Toki HQ, and the development of a new technology. Not surprisingly, discussions involving troubleshooting of the network and Palace occurred in all the meetings, as new sites adopted the technology sequentially rather than simultaneously. It appears that the opportunity to bring together people from so many different locations

offered a great temptation to discuss all the topics involving any participants. As a result, the Cyber Meetings were less focused than they might have been.

The responses to a survey question on the appropriate purpose for using the Palace system indicated that participants within and across the various sites had a range of different views:

Planning agendas that involve setting many details among many people (**Toki US researcher**)

Problem solving and discussions of mutual interests (**Toki US researcher**)

Daily short informal chat (**Toki HQ manager**)

Presentation or English communication (**Toki HQ researcher**)

Questioning period – interactive (**Toki APG manager**)

These responses show wide divergence in assumptions about what communicative purpose is best suited to the Cyber Meetings. Together, the survey and usage data suggest that no shared assumptions and expectations emerged among the participants around communicative purpose, the key component of genre.

In addition to this lack of a shared interpretive scheme around genre purpose across the participants, we also found limited agreement about the form features of the meeting genre as realized in the Cyber Meetings. On the most basic level, choice of language (in this case Japanese or English) is a form feature of these meetings. Of the nine Cyber Meetings listed in Table 1, eight were conducted in English, the only common language across the three sites. Only one meeting, in January 1999, was conducted entirely in Japanese. This language choice put the non-native speakers of English (especially the Japanese participants) at a disadvantage. The coding results show that the average number of utterances contributed by Japanese participants was less than that of the American participants at every meeting. The survey and interview results demonstrate clearly that, to a lesser or greater extent, every Japanese participant felt a language barrier in using the Cyber Meetings. For example, a researcher at Toki HQ described his first impression of a Cyber Meeting:

Before using the Cyber Meetings, I hesitated and was on guard, because it seemed very hard to do everything in English.. But, once I participated, ... what I expected happened. I could not follow the pace of participants at Toki US. They asked many questions in real time, and I delayed while I answered, one by one, in a chat space.

Even more problematic than the linguistic difference was the related difference in interaction style. Another Japanese member pointed out that in order to participate effectively, Japanese members needed to reorient their typical patterns of interaction to match those of the American participants:

Table 1. Purpose of Cyber Meetings

Date	Primary Purpose	Toki Participants		
		HQ	US	APG
07/09/98	Rehearsal of Cyber Meeting Research Demo Meeting	2	4	0
11/11/98	Discussion of research activities between Toki HQ and Toki US	3	4	0
12/07/98	Introduction of the Palace to Toki APG	0	4	3
01/25/99	Research presentation by a researcher at Toki HQ	2	2	2
01/27/99	Discussion of how to use the Palace for business	3	2	0
02/25/99	Research presentation by a researcher at Toki HQ	1	2	2
06/23/99	Planning business trip for participants at Toki HQ and Toki US	1	1	3
08/12/99	Diagnosis of prototype software installation problems	1	2	0
09/01/99	Planning business trip for a participant at Toki US	3	2	0

We need to discuss in English style. We need to type Yes or No, ..., and type to whom and then why. ... Unless participants obey this style thoroughly, they frequently become confused.

There were thus clear differences in abilities as well as assumptions about the linguistic aspects of form among the various Toki participants.

Other aspects of form related to the Palace system itself. As a two-dimensional MOO, the Palace includes such novel functions as multiple rooms, changeable avatars, and talking balloons. Explicit expectations were created around the use of one of these functions—avatars. At the beginning of the early phase, a few key people at Toki HQ and Toki US developed a rule that participants should use color photographs of their faces as avatars when they participated in the Cyber Meetings to allow everyone to see who was participating, thus mimicking the opportunity of participants within face-to-face meetings to see each other. During the early phase, some of the participants further decided that when participants became inactive their avatars should be changed to black and white versions of the same image. Following these early decisions, every participant in the Cyber Meetings has used a color photograph as his/her primary avatar. However, the rule about switching to black and white format when inactive was never communicated to participants who only joined the Cyber Meetings in later phases. Thus, the one explicit attempt to set norms and expectations about technology use was only partially implemented.

Other technology features were tried out in the early phase but their use faded out relatively quickly. For example at the Research Demo Rehearsal Meeting (July 9, 1998), participants moved among multiple chat rooms within each of which a researcher introduced a particular technology under development in his/her lab.

However, beginning in the middle phase and persisting through the last phase, the participants no longer used multiple rooms. Also, while sound and cartoon-like talking balloons were used experimentally in the meetings preceding the Research Demo Rehearsal Meeting, participants from Toki US and HQ did not use them after the first phase. Participants from Toki APG, who joined the meetings only in the middle phase, tried out these features then abandoned them when participants from Toki US and HQ did not use them. In one meeting, a researcher from Toki US attempted to use another special feature, the whisper mode, to communicate with a Toki HQ researcher, but the latter clearly did not share an understanding of how to use this mode, and responded publicly to the whisper. Thus to the extent that norms emerged around genre form, they tended towards the lowest common denominator of a single room and text-only chat.

In general, then, only limited community-wide interpretive schemes around the purpose and form of Cyber Meetings were evident across the three phases.

4.2.2. Importation and adaptation of existing genres. When we examine each meeting individually, we see a pattern of importation and adaptation of existing genres into the new medium, a pattern found in other genre studies of new technology [2, 14]. Each of the meetings reflected an individual attempt to import and adapt specific face-to-face meeting genres. For example, the Research Demo Meeting was based on the research open house where executives walk from one laboratory to another under the guidance of a senior researcher who explains the technologies on display. The chairman of Toki US was clearly trying to adapt this genre to the Palace. In the Cyber Meeting version, each demonstration was held in its own Cyber Room, and a senior researcher at Toki US guided the

participants through the rooms and used text to describe the technologies.

The research presentation meeting genre was also introduced into the Cyber Meetings. Twice in early 1999, a Japanese researcher used the Cyber Meetings to give a presentation about his research to participants located at Toki US and Toki APG. In advance of the meetings, the researcher sent his presentation visuals (PowerPoint slides) to participants by e-mail, so they could see the visuals (either on the screen or on paper, but not in a shared space) during the Cyber Meeting. In the first of his presentations, the researcher tried to deliver his talk slide by slide, accepting only short questions during his presentation. This presentation style is very common at Toki HQ, especially when participants in the meeting span hierarchical levels, as the researcher explained in an interview:¹

I tried to adopt a common research presentation style among Toki HQ research labs such that brainstorming and questions and answers are mostly done after the presentation with slides.

In contrast, American participants at Toki US tried to import their own meeting style, which involves frequent interaction, clarification, and elaboration. Thus, they interrupted the Japanese researcher's presentation repeatedly to ask questions or make comments, as in the following example, where one American participant (US1) interrupted the Japanese presenter (HQ1):

US1: Before we go to the next slide . . .

US1: let me mention that providing new services to adapt to new customer needs . . .

US1: seems to be a very big item at Toki these days.

US1: I think there is a close connection between coevolution . . .

US1: and the Toki motto to "keep the conversation going."

HQ1: I agree.

HQ1: May I continue ?

Sometimes the American participants even deviated from the Japanese presenter's topics for extended discussions. This disparity in style expectations across the two cultures caused some discomfort for the Japanese presenter who did not feel he conveyed his research well. At his second presentation, he attempted to modify his presentation style, as he noted in his introductory remarks:

Today, I have a script for presentation, so I think I might be able to present my slides better than last time.

He had prepared a script of what he wanted to say in the meeting in order to better control the flow, and he proceeded to copy paragraphs from his script and paste

them into his Palace window. Though one American researcher at Toki US tried to engage him in a discussion during his presentation, the Japanese researcher ignored most of these interruptions and eventually the American reduced his interruptions. This incompatibility in genre expectations and norms across national cultures is not unusual in organizations such as Toki which are both diverse and distributed.

Thus, existing genre norms in the various local communities were reinforced, while only limited community-wide genre norms emerged.

5. Conclusion

In this study, we tried to understand why the use of the Palace collaborative tool was not sustained across multiple units over time. To do so, we have explored the assumptions and expectations that participants of the Cyber Meetings had about technology and communication genres. In both these areas, we found differences in interpretive schemes across sites, nationalities, languages, and roles, as well as over time. These differences help explain the difficulties in use of Cyber Meetings, the limited development of persistent norms, and the fall into disuse of the Palace technology at the Toki group after the third phase. The different (and often incompatible) expectations and assumptions of the participants, together with the absence of a common, compelling motivation among the sites and participants to use the Palace technology, contributed to making it difficult for the new technology to become an established and routinely-used communication medium in this global and diverse organization.

Even though this study only examined one organization's use of collaborative technology, these insights support earlier findings of organizational difficulties in adopting new collaborative technologies [9, 13, 24]. In addition, they extend these findings in two ways: by considering the technology in the context of a global, cross-national organization, and by examining a particular collaborative technology—a synchronous, multi-media virtual meeting system. This study reinforces the importance of such factors as cultural barriers and differences in understandings of and motivations to use a technology. In addition, this study highlights the particular importance of such issues as temporal asymmetries afforded by the time zone differences of geographically-dispersed locations, and the interaction difficulties created by different linguistic capabilities, communication styles, and facilities with the keyboard interface. Finally, this study suggests that a critical aspect of the effective use of collaborative technology across distance and diversity is a set of common assumptions and expectations about the genres to be used in the new

¹ One author also directly observed this presentation style in several face-to-face research presentations held at Toki HQ.

electronic medium. Absent such shared genre norms, individual participants rely on their own or local views of what communication genres are appropriate. The result tends to be communicative incompatibility, interaction disruption, and participant frustration.

We turn now to some implications for practice emerging from these findings. Awareness fostered by paying explicit attention to assumptions about technology and communication norms can help reduce such differences. This awareness, however, is difficult to maintain. In an earlier study we noted the useful role of technology-use mediation in facilitating the organizational adoption and use of a collaborative technology and in aiding the development of effective genre use within it [12, 24]. Based on this prior study, we propose here that mediation of the various difference in cultures—including nationality, temporal orientation, language, and professional status—may be especially important in global organizations such as Toki. People who have knowledge about the different cultures as well as the various understandings of technology and assumptions about appropriate communication genres [24] may help participants avoid cultural misunderstandings, facilitate productive interactions, and, where necessary, assist the negotiation of common communication norms.

While such mediation should be able to address interpretive differences likely to be encountered in global organizations, it cannot fully eliminate barriers such as language and technology interface. Over time, it is possible that these barriers may gradually be reduced as more people become familiar with the Internet at a younger age and develop skills in navigating different cultural, linguistic, and technological environments. Meanwhile, awareness and explicit mediation may be the best available means for managing interpretive and technical differences.²

6. References

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