Beyond face-to-face: a field study of electronic meetings in different time and place modes

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Abstract

This paper presents a field study of using an Electronic Meeting System (EMS) to support actual meetings in four different time and place modes within a large company. The meeting descriptions provide concrete case illustrations of how different meeting modes can work, what types of effects can occur, and factors which contribute to success. Analysis of these meetings focuses on three main areas. First, commonalities and differences between these cases are examined to provide insights into how electronic meetings may be affected by the time-place mode in which they occur. Positive findings from previous field studies of EMS use in face-to-face meetings are found to extend to distributed meeting environments. This includes increased productivity, more active participation and increased buy in and ownership of the meeting results. The distributed meeting modes are also found to impose new challenges related to facilitation and maintaining participation and engagement in the meetings. Among these cases are examples of meetings that use multiple time-place modes to accommodate different components of the overall meeting process. These multi-mode meetings represent a major trend in group work and provide new options for meeting design.

Keywords: Electronic Meeting Support Systems, Group Support Systems, Group Decision Support Systems, Computer Mediated Communication, Meeting Modes, Distributed Meetings, Facilitation, Case Studies
I. Introduction

Group meeting interactions are evolving as organizations become more dynamic, as they spread geographically, as the pace of change and decision-making quickens, and as new technologies with new possibilities emerge. Assembling people face-to-face is usually difficult and often impossible, so they seek ways to interact from different locations, contributing synchronously or asynchronously, using different forms of technology support [1]. The trend towards technology supported interaction is also closely linked to the emergence of eBusiness and the growth of the Internet economy. For example, Gartner Group predicts 'Collaborative Commerce' to be the next evolution in eBusiness applications, creating collaborative supply chains that support dynamic interaction among employees, business partners and customers [2]. This type of collaborative environment integrates technologies through a Web-based architecture to support asynchronous and real-time interaction, among participants at few or many locations [3].

These different forms of time and place interactions are commonly referred to as modes [4]. A task-oriented meeting is often completed within a single mode, though it may include multiple modes tied together to support a complete agenda of meeting activities. For example, participants working on a planning task might start brainstorming ideas from their separate offices, then come together face-to-face to finish prioritizing and deciding on a course of further action, before finally completing the action plan in an asynchronous mode.

Beyond face-to-face, little is known about how collaboration in different modes affects the process and outcomes of teamwork. Unfortunately, the body of existing research is difficult to apply to this question. Most published research on the use of electronic meeting systems (EMS) or group support systems (GSS) has focused on Same Time/Same Place electronic meetings in controlled settings [5]. Among the existing field studies that do address distributed, technology-supported meetings, there is so much variation among the organizational and technological meeting contexts that separating the effects of the mode from everything else is difficult. Furthermore, there is little to no research on using EMS to support meetings that involve multiple modes. This study can be regarded as a response to the general call for more field-based research on the appropriation and use of EMS in organizations [6, 7, 8].

This paper examines the processes, outcomes and support of four actual meetings supported by GroupSystems™, an EMS, and experienced facilitators. The meetings involved generally comparable conditions, in terms of decision-making tasks, and groups formed for a
specific task rather than intact work groups. However, each meeting was in a different time and place mode, and two of the meetings included additional, secondary modes.

The circumstances for these meetings were fairly optimal. All four meetings took place within Statoil, a large Norwegian oil company. Statoil might be considered an exemplar in the electronic meetings arena, given their extensive use of various collaborative technologies, including Lotus Notes™, GroupSystems™, video-conferencing, and Microsoft NetMeeting™ (trademark is implied when referring to these products in the rest of the paper). Statoil also has a set of trained and experienced facilitators supporting each of the meeting processes.

This paper will focus on the effects of mode and how mode can be drawn into the design of electronic meetings. The central question concerns how mode might have differently affected these four cases. How did mode affect task accomplishment, group dynamics, and the process support that a facilitator and/or EMS technology supplies?

Second, if mode did affect task accomplishment and group dynamics, or if it affected the facilitator’s or technology’s ability to influence task and group outcomes, then one would expect experienced facilitators to factor mode into their meeting design considerations. In particular, what criteria would recommend using one mode versus another for a given meeting? How do experienced facilitators select mode when designing meetings?

The third question follows from the second. One way to consider mode is on the meeting activity level, instead of simply the overall meeting. That is, different modes could be used for different parts of the meeting in which they were best suited. In essence, one meeting process is extended across multiple modes. How can multiple modes be used in meetings?

This paper will first describe the different meeting modes and their related infrastructures. This is followed by an overview of research related to particular electronic meeting modes. Give the extensive research completed in the face-to-face electronic meeting mode, and relative paucity of work on the other modes, an important question is to what extent face-to-face research findings might be applied to other modes. After discussing our methodological approach, we then present the four meeting case studies. This is followed by observations of commonalities and differences across these meetings and the use of multiple modes and/or technologies to compensate for limitations related to each individual time/place mode.
II. Definitions

Meeting modes

Bostrom et al. define a meeting as "a goal- or outcome-directed interaction between two or more people (teams, groups) that can take place in any of four environments (same time/same place, same time/different place, different time/same place, and different time/different place)" [9, p. 148]. Based on the time and space typology developed by DeSanctis and Gallupe [10], shown in Figure 1, this definition illustrates how meetings may occur in alternative settings or modes with participants co-located or dispersed, interacting synchronously or asynchronously.

TIME

<table>
<thead>
<tr>
<th>TIME</th>
<th>Same Time</th>
<th>Different Time</th>
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<tr>
<td>Place</td>
<td>Same Place</td>
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<tr>
<td></td>
<td>Face-to-face</td>
<td>Interspersed, co-located interaction</td>
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<td></td>
<td>interaction</td>
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<td></td>
<td>Synchronous, dispersed interaction</td>
<td>Asynchronous, distributed interaction</td>
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Figure 1. Time/Space Typology (Adapted from Johansen et al. [19])

Same Time/Same Place (ST/SP) meetings take place in a meeting room with or without technology support. The face to face setting places severe constraints on the meeting logistics, but makes it possible to provide the widest variety of process formats to the meeting.

The Different Place modes are often referred to as distributed meetings [12] or virtual meetings [13]. Different Place configurations could include group members participating from separate offices all over the world to members co-located in two or more face-to-face meeting rooms, or any combination thereof. Since these meetings include participants at different geographical locations, they need at a minimum some form of technology support for communication. The Same Time/Different Place (ST/DP) mode supports synchronous interactions from multiple locations, where real time give and take, exchanging information,
feedback, and/or process guidance are integral parts of the meeting process. The Different Time/Different Place (DT/DP) mode involves group members participating asynchronously, or at least not necessarily at the same time such that the opportunity for real time interaction is uncertain. Thus, recording and storage are required features of the communications media applied.

The fourth cell in Figure 1, the Different Time/Same Place (DT/SP) mode, is difficult to characterize given its two very different possible configurations. This mode is often associated with a “Kiosk” configuration, where participants use a common meeting room or workstation one by one, drawing from or adding to the pool of information. However, an alternative is the “Multi-Session” configuration, where a group takes multiple, interconnected sessions to work through a large task, as a whole or in sub-groups. The wide differences between these configurations cast doubt on the efficacy of placing them in a single cell. The asynchronous Kiosk configuration may have more in common with the DT/DP mode, given the relative unimportance of whether one or ten different workstations terminals are actually used. The multi-session configuration, with face to face sessions, may be more like a string of ST/SP sessions. For this paper we will retain the DT/SP classification, but reexamine its appropriateness in the conclusion.

A meeting as well may incorporate multiple modes necessitated by practical logistics, or in order to take advantage of the strengths of different modes to accomplish different types of interaction. The modes may be sequentially integrated into a complete process; in effect, an agenda where different activities take place in different modes. Or the modes may be used more in parallel, with different modes being pieced together to support one specific interaction. For example, some members could be meeting face-to-face, while a couple more are synchronously connected via videoconferencing from other locations, and a handful of others were asynchronously connected and entered their input before the meeting. In general, this type of multi-mode meeting places heavy demands on the electronic meeting infrastructure.

**Anytime/Anyplace meeting infrastructure**

The term 'Anytime/Anyplace' is often used to describe requirements for seamless interaction across all four meetings modes [14]. We will here adopt this term by referring to the technologies supporting multi-mode meetings as an *Anytime/Anyplace infrastructure*. This architecture incorporates both Level 1 and Level 2 technologies, according to the typology developed by DeSanctis and Gallupe [10].
Level 1 technologies provide an electronic communication channel supporting information exchange. Examples of this category are e-mail, bulletin boards and desktop conferencing, combining audio-, video- and data-conferencing. Recording, storing, and reporting exchanged information can add further utility as a group memory. The term Computer Mediated Communication (CMC) is often used for this type of technologies [15].

Level 2 technologies add support to structure group decision and interaction processes [10]. We will use the common term electronic meeting systems (EMS) to represent Level 2 technology. Examples of Level 2 capabilities are agenda specification, procedural guidance, structured electronic brainstorming, idea organization, and analyzing alternatives. Without Level 2 technology, this process structuring would ordinarily be performed by a human facilitator or meeting leader role. Process facilitators are still required in electronic meetings, however the Level 2 technology accomplishes some of the structuring and so shifts responsibilities for the person facilitating.

Several commercial EMS exist today, with GroupSystems from GroupSystems.com being the most widely diffused. So far these systems have most commonly supported ST/SP meetings in dedicated rooms, although this is changing. Over the last few years, GroupSystems Online™ has joined a growing number of web-based EMS, such as Facilitate.com™ and Meetingworks™, which provide Level 2 support for distributed synchronous or asynchronous participation via a web browser. However, integration of a comprehensive range of synchronous/asynchronous, and Level 1&2 capabilities in a single package to comprise a true Anytime/Anyplace infrastructure is still at an early stage. Instead, multi-mode meetings today must use multiple, not fully integrated technologies to obtain support for the different modes.

III. Prior empirical research on EMS use

Research on Group Support Systems (GSS) has been conducted extensively over the last two decades, and recent reviews include nearly 300 published studies [16, 5, 17, 8, 18]. The majority of this research has been of face-to-face ST/SP meetings, conducted using artificial conditions--controlled experiments, ad hoc student groups, and passive, scripted facilitation or no facilitator at all [5]. Fjermestad and Hiltz [17] have noted a recent increase in case and field studies-- 54 case and field studies published through mid-2000—although 83% of these were conducted in a decision room setting. The remaining nine studies undertaken for non-ST/SP meetings involved dispersed settings mainly supported by Level 1
(or CMC) technologies (e-mail, etc.). Three of these also took place in academic settings. Most of the empirical research on distributed meetings is still experimental studies using Level 1 technologies.

In the following we provide a brief summary of findings from empirical research in each of the four meeting modes, as relevant to our study.

**Same Time/Same Place (ST/SP):** The majority of field studies in this category apply Level 2 technologies [17]. Positive effects have been reported on a number of outcome factors related to both meeting process and outcome. Some examples here include [19, 18, 20, 21]:

- Group productivity gains from EMS use--such as 50% reductions in labor costs and 90% reductions in elapsed project time --were found in studies at IBM and Boeing
- Broader and more active participation has been widely substantiated in both lab and field research
- Anonymity embedded in the EMS helps encourage more objective and constructive evaluation that improves the quality of ideas generated
- Buy-in and ownership of the meeting results is often increased by EMS use
- EMS use may lead to improved decision quality, through increasing the number of creative ideas put forth, and stimulating more thorough problem analysis.

Various factors have been found to influence the EMS effectiveness. Active facilitation is found to constitute a key factor in electronic meeting success [22, 23, 16]. Task-technology fit likewise is a critical success factor [16]. For example, divergent tasks have been found to benefit from EMS use more than convergent tasks in several studies [24, 23]. In general, electronic media are used more to generate ideas, while verbal and mixed channels are used to discuss issues [21].

**Different Time/Same Place (DT/SP):** The literature has placed little emphasis on either configuration of the DT/SP mode. We were unable to find any studies of a ‘Kiosk’ configured DT/SP meeting. Also, most ‘Multi-Session’ meetings are simply categorized as ST/SP, without examining the effects of multiple sessions. Fjermstad and Hiltz [17] found that 29 out of 33 field study meetings reported holding multiple sessions, and 32 of 42 reported that the meeting lasted more than one day. Thus, while multi-session meetings are very common, the literature does not shed much light here.

In one experimental study that did examine multiple sessions, Chidambaram [25] found that in initial sessions the groups using EMS had less relational intimacy than non-EMS groups. However, repeated EMS use reduced and eliminated this difference.
Nunamaker [1] noted anecdotally that a serious challenge with single group, multi-event meetings is getting members to maintain their engagement over time.

**Same Time/Different Place (ST/DP):** Most research on EMS use in this mode consists of controlled laboratory experiments with student subjects, using synchronous Level 1 technologies such as audio- and videoconferencing. Few studies have applied Level 2 tools such as GroupSystems in distributed settings, given their recent introduction in this environment. For example, a field study conducted by Mark et al. [26] focused on distributed meetings in the Boeing Company, supported by Level 1 desktop conferencing and application sharing. The study illustrates how technology has opened meetings to remote workers and thus taps into the organization's competence base regardless of geographic location. It also demonstrated the importance of a dedicated meeting facilitator to help guide remote users and the meeting process. Chidambaram and Jones [27] conducted a 2x2 experiment in which they found that EMS use improved perceptions for dispersed groups, but had little impact in the richer face-to-face setting. EMS use did not impact the quality of the final decision in either setting.

**Different Time/Different Place (DT/DP):** Most studies on this meeting mode involve distributed groups of students working together on various project assignments, supported by different Level 1 (CMC) technologies such as e-mail and computer conferencing. Only three of the nine field studies identified in this category used Level 2 technology support [17]. However, these three studies focused more on "on-line expert communities" than organizational project groups.

Several experiments have studied the effects of GSS on group process and outcome for distributed, asynchronous groups. These studies suggest that distributed groups do not experience a loss of productivity or quality of product outcome. For example, students applying CMC (e-mail and computer conferencing) for group writing were able to adapt to restricted communication channels, and communication modality was not found to affect project performance [28]. Similarly, student teams using asynchronous computer conferencing produced more creative requirements definitions and designs than face-to-face groups [29]. However, these studies also indicate a heightened need for process structure among asynchronous groups. For example, Level 1 technologies used by distributed groups resulted in increased difficulty to complete writing tasks and diminished satisfaction [28], and work that was more confusing and difficult due to the lack of a reference context for messages and the time lag between questions and replies [30]. Similarly, distributed groups experienced less effective leadership and coordination over time than face-to-face groups [4].
In conclusion of this brief review, very little field-based research on EMS use has been conducted in non-ST/SP meeting environments. Most research on distributed meetings is experimental or Level 1-based studies. Some of the positive effects found in ST/SP field studies have also been identified in experimental, distributed studies. The studies in distributed settings tend to indicate that group members are able to adapt to the restrictions in communication channels implied by available technology support, and are able to produce results of equal (and sometimes even better) quality than face-to-face groups.

Neither our literature search nor the nearly 300 studies reviewed by Fjermestad and Hiltz [5, 17] were able to find any published field studies that emphasized multi-mode meetings and/or combined use of different forms of technology support. Furthermore, there were no field studies that included all four modes in a comparable manner. In general, due to the lack of distributed field studies it is still an open question which effects from EMS in meeting rooms are also valid in distributed environments, as well as the priorities placed on different types of effects in different environments. The research presented in this paper contributes to fill these knowledge gaps by presenting a comparative analysis of meetings in all four modes, conducted within a single organization.

IV. Method

The empirical basis for this research was a field study of the use of an EMS (GroupSystems) and complementary technologies for supporting meetings in different modes within Statoil, a Norwegian oil company. The company was selected on the basis of it being a major user of GroupSystems, and because of its relatively advanced stage of deploying the technology in different meeting modes and in combination with other technologies.

A qualitative, semi-structured interview approach was chosen for data collection, to be able to collect rich, in-depth data. Evaluative data was collected for four electronic meetings in Statoil selected in collaboration with the leader of the GroupSystems facilitators in the Statoil IT department. The selected meetings were recent and substantial, and applied GroupSystems in one (or more) modes in the time/space typology. The interview guide addressed the following elements:

- Meeting logistics (purpose, roles, group composition, preparations, technology, meeting process)
- Meeting accomplishments
• Group interactions (productivity, participation, consensus, group dynamics, information quality, expression)

• Post-meeting effects on group and use of meeting outputs

• Overall assessment of the meeting (degree of success, what worked and what didn't, suggested changes, comparisons with experiences from other electronic meetings)

Interview respondents were the meeting owners, i.e. the person who initiated the meeting and who depended on its outcomes for accomplishing a certain task. Each meeting owner worked with a separate facilitator to initiate, plan, and conduct the meeting. In the DT/DP case, the main respondent was both the facilitator and a joint owner of the meeting. While most previous research on EMS has defined success and failure from the group members' perspective, the meeting owner's perception of the meeting has seldom been addressed. By focusing on the meeting owner's perspective, we wanted to get an overall picture of why the meeting was designed as it was and how that meeting fit in the larger task and organizational context, as well as perceptions of how the group as a whole performed.

Each interview lasted approximately one hour. Two were conducted in person, one was over the telephone and the other in a videoconference. All interviews were taped and transcribed. The initial drafts of the case write-ups and follow-up questions were distributed by e-mail to the respondents and the facilitators for clarification. In addition, meeting agendas were collected. Data were coded and categorized according to the themes in the interview guide in order to analyze each meeting separately and to make comparisons across all four meetings.

V. Description of Case Studies

In this section we first give a brief presentation of the case company, followed by summaries of the four meetings studied.

The case organization - Statoil

Statoil is a Norwegian state-owned oil company with 17,000 employees and a 2000 operating revenue of over US $ 21,7 billions. The organization comprises 40-50 different sites, including offshore platforms and operations in more than 20 countries. The geographic distribution makes Statoil’s operations coordination-intensive, and the company is an advanced user of different IT applications for supporting communication and collaboration. With a full company license, Statoil is one of the world's largest users of Lotus Notes,
applying this for workflow and document management support. The company also deploys IT for supporting meetings. Through combined use of GroupSystems, Microsoft NetMeeting and audio- and videoconferencing, they have today established the basis of an Anytime/Anyplace meeting infrastructure [31]. A study focusing on the adoption and diffusion of GroupSystems in Statoil is reported in [32].

Statoil IT is the organization's central IT unit, responsible for delivering IT services to internal customers in the company. The unit has about 450 employees and is represented at all major Statoil sites. GroupSystems was purchased in 1996 and Statoil IT has now established three permanent electronic meeting rooms at the major office locations in Stavanger, Bergen and Trondheim. Each room has a capacity of 12-15 participants, and is equipped with laptop PCs as workstations, audio- and video-conferencing equipment, and public screen projection. Statoil has a pool of around 10 GroupSystems facilitators, comprising both employees in Statoil IT and other units in the company. The company runs internal courses in facilitation with GroupSystems, based on the vendor's training methodology. Statoil IT rents the electronic meeting rooms and facilitators to other units in the company on an hourly basis.

In September 1999, GroupSystems was made available over the company network, and there is increasing use of distributed meetings involving two or more linked meeting rooms as well as participants using GroupSystems from their office. These distributed meetings are usually also supported by audio, video and Microsoft NetMeeting in different combinations. A total of about 500 employees have access to GroupSystems today, and Statoil IT estimates that the company has conducted more than 300 meetings supported by GroupSystems since installation in 1996.

Meetings Overview

The following sections will provide brief illustrations of four electronic meetings at Statoil. (Unless stated otherwise, all quoted remarks are excerpts from the meeting owner interview statements.) Table 1 provides a brief overview of these meetings. Each meeting took place primarily in one of the four time and place modes. Two of the meetings also involved interaction in an additional mode (shown in parentheses in the table), thus representing examples of multi-mode meeting processes. All four meetings involved ad hoc groups, formed for the specific task or project.
### Table 1. Summary of Meetings Studied

<table>
<thead>
<tr>
<th>Mode(s)</th>
<th>Task</th>
<th>Group</th>
<th>Duration</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST/SP</td>
<td>Design Lotus Notes database structure</td>
<td>10 people representing different users, managers, and developers forming an ad hoc group</td>
<td>One session, 3 hours in length</td>
<td>GroupSystems (Group Outliner, Topic Commenter)</td>
</tr>
<tr>
<td>DT/SP</td>
<td>Develop functional requirements for protecting confidential information in Lotus Notes</td>
<td>10 IT and security experts from Statoil and Norsk Hydro (another Norwegian energy company) forming a single project group</td>
<td>Four sessions, each 5-6 hours in length</td>
<td>GroupSystems (Categorizer, Vote, Topic Commenter, Group Outliner)</td>
</tr>
<tr>
<td>ST/DP  (DT/DP)</td>
<td>Determine vendor recommendation and rationale</td>
<td>12 IT staff forming an ad hoc group, meeting from three locations</td>
<td>One session, 4 1/2 hours in length (plus prior 2-day DT/DP session)</td>
<td>GroupSystems (Categorizer, Vote) MS NetMeeting (chat, application sharing) Video-conference</td>
</tr>
<tr>
<td>DT/DP  (ST/SP)</td>
<td>Conduct post-project review</td>
<td>20-25 staff who had worked on and off the project over the last four years forming an ad hoc group</td>
<td>Two open sessions, 1 1/2 and 2 weeks in length (plus 2 ST/SP meetings)</td>
<td>GroupSystems (Topic Commenter, Group Outliner) Lotus Notes</td>
</tr>
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</table>

### Same Time/Same Place Meeting: Designing a Lotus Notes Database Structure

Statoil makes extensive use of Lotus Notes databases developed for specialized purposes. The objective for this meeting was to develop the folder structure for a new Notes database for bibliographic resources. The ten participants represented a cross-section of potential users with different information needs, including librarians, directors, people from IT and other users.

This meeting attempted a new approach to Notes database design at Statoil. Here, a combination of GroupSystems tools and manual facilitation techniques were used in a single three-hour session, instead of the normal two-month process using a Notes discussion. The meeting owner expressed frustration with the usual method: "Someone has a suggestion, they put it out for others to respond to, and then they don't agree so they go back and make another. They can continue to do this week after week until everybody is bored... then they say 'do whatever you want' so one person just does it." Difficulties using the resulting database structure would often arise with use.

The meeting process was structured using a combination of GroupSystems tools (primarily Group Outliner) and manual techniques. The process was designed to help
participants shift perspectives from their individual needs to an understandable organization of case folders that addressed the wide variety of needs. In the first round activity, participants were asked to come up with categories and sub-categories for case folders using Group Outliner. "Everyone started to put all of theirs on the top level. They were thinking only of what am I working with and that I have to show the group that this was important."

Next, to break this pattern, the facilitator sent everyone into the hallway for a break. When they returned, he donned a different hat and said, pointing to their earlier work, "'Here is your new database. Please start to work with your work folders. Where would you put something?' They started to argue verbally that the database would be impossible to use." The participants were again sent out and brought back in to "'make something that you can work in.'" The facilitator reworked the structure on the public screen as participants verbally discussed changes. After agreement quickly formed around the new structure, participants were asked to write definitions for each category assuming other users' perspective. Verbal discussions were used to address specific disagreements.

During entry periods, the facilitator encouraged participants to form a shared group understanding by instructing them to alternatively type then read entries. The participants would begin very focused on their own thoughts, then "what the technology allowed us to do is to say 'stop, take a time out and just read. What do you see from everyone else?' They could see that, and had to think of the group as well."

The system's anonymity appeared to make it easier for participants to change their positions, to save face and evolve as the group worked. "If people first put a lot of energy and pressure into presenting an idea... then it is very difficult for them to say 'ok, I made a mistake'. It is much easier when no one knows who put it there in the first place."

Anonymity also helped to equalize influence. Input from all participants, as "experts" of the areas they represented, was needed for a successful design, thus it was important that no one person dominate the decision. One IT 'expert' in particular had extensive experience maintaining Notes databases and had influenced similar groups in the past. "He didn't have the chance to come in and say 'I know this'. He couldn't hide behind 'expert' and 'do what I say'. He would have had more influence if it was all verbal, especially over the two older people and managers; they would have gone along with him."

The meeting owner was very satisfied with the outcome of their process overall. "The consensus we got was very solid. It went from individually 'this is my stuff', to how we as a group will get this working and how others would use this. It was important for them to go through this process so they would have time to do the mistakes."
The electronic recording capability helped to keep a "clean and final" looking product in the midst of all the changes. Perhaps it also helped participants feel more empowered. "It makes visible every change immediately--you could rearrange your thoughts when you see things change just in front of your eyes. That can influence you to think 'wow, maybe I can try this?' On paper every time you make a change it gets messier."

Productivity and product quality were very high. The structure developed in the meeting was added to a database prepared earlier, and it was up and running for users on the following day. Documentation, created in GroupSystems during the session, was placed in Lotus Notes for use. In addition to the fast turnaround, with far fewer person-hours required, the quality was especially high. After one month, "the database has less problems with finding case folders because the structure is so well known. You don't have the 'is this belonging to this product or this product?' or things put in the wrong level. It is a very simple structure."

Since our interview, they have built a number of other databases using a similar meeting format. Participants generally "have been pleased that the meetings have been more productive and efficient than traditional meetings." However, there have been some designs that have been less successful due to the mix of users involved in the meetings. "In some cases, the meeting owner has been so determined to involve management that there have been too few case workers and end users involved.... Where the participants have reflected the breadth of users, the structure has proven more 'durable' after the meeting."

**Different Time/Same Place Meeting: Developing Functional Requirements for Protecting Confidential Information in Lotus Notes**

This DT/SP meeting involved one group that met in four face-to-face GroupSystems sessions. The goal was to develop a common functional requirements specification between Statoil and Norsk Hydro "for protecting confidential information related to electronic administration." Both companies work closely with one another as collaborators, but are also competitors in the oil business. This project was to make it possible to freely exchange as much information as possible, while still protecting information that needs to remain secure. Both companies use Lotus Notes environments.

Each of the four sessions lasted 5-6 hours, spaced across a six-month period. A mix of ten participants from the two organizations was involved across these sessions, with an average of eight attending each session. Various GroupSystems tools were used to support
the sessions--Categorizer, Vote, Topic Commenter and Group Outliner (in chauffeured mode on the public screen).

Interaction time was approximately 70% verbal and 30% electronic, but these were tightly interlinked. In the first two sessions, the process would involve generating problems or requirements and prioritizing them within GroupSystems, then move to verbally discussing and structuring results on the public screen. The latter two sessions involved mostly verbal plenary interaction supported by the Group Outliner tool. "You follow the pattern in GroupSystems, or that way of doing it, so I think the conclusions that are drawn from this are more well founded."

In the electronic interaction, anonymity was especially important in problem analysis activities to encourage involvement and openness, identify disagreements, and develop consensus. The anonymity helped to shift the focus from individuals to the task, even if this shifted back somewhat during verbal discussion. Nevertheless, the large proportion of time for verbal discussion was felt to be important for debating and building consensus around the ideas entered into the system.

Participation was active and spirited. "The group was so small, that I felt that everyone participated very actively -- we had some strong viewpoints." The small group size and expertise brought by all of the members certainly contributed. The GroupSystems tools were believed to enhance the ability of members to participate in contrast to traditional meetings.

During the (on average) one and a half month periods between meetings, "internal hearings" with a broader audience were held within each organization, based on GroupSystems report printouts. These evaluation discussions enabled the group to "get a form of corrective on whether we should choose another direction or way for doing this, and the scope. We felt that we had to have some of our own organization behind this."

The first face-to-face GroupSystems session created a lengthy, comprehensive document that was reworked from session to session, refining it down to a usable set of the key requirements. "This was a force of the tool, that you were able to work against a slimmer and slimmer product." The Voting tool helped the group focus on the essentials by forcing people to prioritize. "... even if you would have liked to change your opinion after a while, you were still forced through the system to give your priorities there and then." The role of GroupSystems was crucial in the group's success. "I do not think we would have managed to develop this 'modest' document [without GroupSystems]. Often these documents get extremely voluminous. I have not seen any other systems that contribute in this way."
GroupSystems and the facilitator contributed to a guided process that was effective and efficient. This process took approximately six months of work through four meetings. In comparison, a group within Statoil took nearly a year to develop a similar specification related to internal IT security. "I think we would have been much more effective by having this type of steered way of doing this--but you need to have the right people, and an extremely good facilitator."

Same Time/Different Place Meeting: Determining Vendor Recommendation and Rationale

This meeting was part of a process to decide among vendor proposals for developing the next generation IT infrastructure for Statoil. In the first phase, individual Statoil staff members met with one or more vendors to review their proposals. This case is about the second phase, where staff met together in an electronic meeting to develop a recommendation and its rationale to advise the Steering Committee who would make the final decision. It was all on a tight time schedule: the last vendor review was on Thursday, the Phase 2 recommendation meeting took most of Friday, and the Steering Committee met the following Monday.

A distributed meeting was needed because the experts were under a tight time frame and were located in different cities. The 12 IT staff, who knew one another well although they had not worked as a group before, assembled in electronic meeting rooms in Trondheim and Stavanger. These rooms were connected via GroupSystems, video-conferencing, and NetMeeting Chat (to queue up for making verbal comments). The meeting owner participated separately from his home office, using NetMeeting to remotely access GroupSystems, plus a telephone to participate verbally. The main process facilitator managed the overall meeting from the Trondheim facility, and a co-facilitator helped with the technology and group process at Stavanger.

The decision to use GroupSystems, instead of audio- and/or videoconferencing alone, was made for a couple of reasons. First, it was important to fully involve participants to encourage a high degree of ownership in the recommendation. GroupSystems helped to "... enable full participation. When you discuss something verbally, you get four to five people talking. But when you switch to GroupSystems, then everybody gets involved." Second, the meeting had to cover a substantial amount of information then decide upon its recommendation that day with the reasoning behind it. GroupSystems helped to make this possible by tightly structuring the meeting, steering the process, and recording the
deliberations. At the end of the meeting, a report was quickly produced and distributed to the Steering Committee members before the weekend.

A distributed (DT/DP) GroupSystems session gathered initial input from the participants "... to have something to work on when we started the meeting. That produced some refined information for the group." This input was summarized at the start of the Friday meeting to allow the group to focus more on decision-making than idea generation. "When you do more preparation you get better meetings and can get further into it. If you let people generate a lot that's often all you get. We needed to make a decision."

Achieving strong consensus was an important objective that was accomplished. Some participants had worked closely with just one vendor, while others had worked with several vendors. "So it was important to involve them in (reviewing) the whole group of vendors so they could have ownership with the final decision of the meeting." This consensus was achieved by using the GroupSystems Categorizer tool to enter points and comment on one another, then to verbally discuss results from the electronic discussion. When a Vote was taken, there was strong agreement on the top three vendors. The last part of the meeting was used to comment using the system on why the recommendation was justified. Overall the meeting was about half and half electronic and verbal, interspersing 15 to 30 minute sessions of each.

GroupSystems helped to enhance broad participation, which was vital given the differences between staff knowledge of different vendors. The parallel entry ability allowed everyone to have more time to talk. It also neutralized the tendency of some people to dominate the decision-making, via their special expertise or personality. "We are suppressing people trying to dominate the meetings by using GroupSystems. But when it [dominating behaviors] comes back during verbal discussion, then we have the written record that we can go back on and breakdown some of this arguing."

One concern was to balance individuals' own thoughts, opinions, and interests with those of the group as a whole--individual insight with group consensus. This individual/group balancing was accomplished in three steps. First, participants were asked to generate their own thoughts for 15 minutes or so. Then the system was set to allow only comments, and participants were asked to read and comment on what others had written for another 15 minutes. Finally, some verbal discussion then followed to establish a common understanding. "When people go to typing, they go into their own world... their own interests, talking between their head and their fingers. When we are discussing in common verbally, it
seems they are participating more toward the common goals for the meeting ... more in tune with what others are thinking and saying."

The owner noted that there was more interaction between people at different sites than among those within a site. That is, geographic separation did not induce subgroup formation. This was largely due to the relationships and shared interests and experiences that had developed between individuals over time on other projects.

Overall, the meeting was very successful, "maybe more so than most." There was good commitment, ownership and buy-in, with a clear consensus achieved based on broad participation.

**Different Time/Different Place Meeting: Conducting Post-Project Review**

This distributed meeting came at the end of a four-year R&D project to evaluate a new technology. The meeting was conducted in two major parts, first to record the history of what occurred during the project, then to assess what worked and what didn't. (Later work would focus on developing procedures for future projects.) The two meeting sessions lasted 1 1/2 and 2 weeks. During those timeframes, the 20-25 participants could input their information and reflections into GroupSystems working from their offices as their schedules allowed. "We wanted to get the experience from all these people" who had come in and out of the project across the years, from their different disciplines, roles, and locations.

There were two main reasons for conducting the full group meeting in a distributed, asynchronous mode. First, the participants were in three different cities and all had moved on to different projects. "We would not be able to find a specific time where we could meet altogether, so this was the best we could do." A second reason was that participants needed ready access to project documents in their offices. "[Without access to their offices] we could not have done the first part with as much quality."

The complete meeting process also included three-person planning team sessions, with the original and current project leaders plus the research lab manager. Their initial planning session outlined project milestones, which were entered into Topic Commenter to prepare for the first participant input round. Between the first and second rounds, the planning team met in a ST/SP mode to reorganize the input using the Group Outliner tool. They posted the report on Lotus Notes for reference during the review phase. Within two days, the review phase began.
GroupSystems was preferred over Lotus Notes for its ability to easily and flexibly organize information. "It's a good tool to structure things, and you can easily put in things afterwards. If we found we had missed out a question, we could just put it in and continue."

In addition, they noted a limitation with Lotus Notes--if two or more people work at the same document at the same time "there would be produced as many new documents as there were people working at the same time."

Many of the positive effects on group dynamics that have been found among face-to-face electronic meetings were also present in this case. For example, there was equality of participation. Compared to a traditional meeting, no one could dominate and "people that normally don't say much in an ordinary meeting will give their comments more easily."

Anonymity seemed to be helpful in that "we got honest answers from the participants." However, at least one participant wanted his comments to be identified and so included his name on comments. In addition, the quality of input was quite high. Comments were perceived to be longer and more detailed than in face-to-face electronic meetings, given that people had access to their materials and more time to think about it.

On the other hand, the fully distributed nature of the meeting posed some challenges. First, clarification was more difficult online without the opportunity to raise questions verbally. Instead the tool's annotation feature was used, but it was a weaker substitute to accomplish the give and take needed.

Second, participants still wanted to talk. Verbal interactions spilled over outside of GroupSystems into the lunchroom and offices. "People started to eagerly discuss the project everywhere." In response, the meeting owner encouraged people to type summaries of these informal meetings into GroupSystems. "I think the most important information was included the next time these persons were writing into GroupSystems."

The greatest challenge, however, was encouraging people to get online to participate. "You don't have the same control over people. They will say 'I could not find time to do it' and you have to push them." They tried a few strategies to encourage participation. The meeting owner personally knocked on participants' doors, "asking 'Have you read the latest comments in GroupSystems?' and trying to get them on. I think that helped quite a lot."

During the second meeting they tried coordinating two or three special time blocks for people to log in, but there was only a meager increase in traffic. In the end, both sessions were lengthened by a few days to provide more time for input. Overall, "I think most of the people participated; there were one or two that did not log into GroupSystems who should have been
there." Unfortunately, anonymity made it difficult to tell exactly who had and who had not provided input.

Since the meeting "many have expressed that this was a very effective way of collaborating. They could decide for themselves when they should work with the material, and could work from their office where they had their notes and manuals." The meeting owner also felt that "perhaps the quality is even better in a distributed meeting" given that people have more time to think, and have their material at hand.

VI. Analysis and Discussion

The analysis compares the different effects identified in the four meetings related to task accomplishment, group dynamics and facilitator and technology process support. The main findings are discussed below and summarized in Table 2. Those effects which were relatively unaffected by mode are identified as MI (Mode Independent); those which were affected by mode are shown as MD (Mode Dependent). In addition, we also discuss the examples of meeting process extensions identified related to two of the meetings.

Effects on Task Accomplishment

Productivity

Mode was not found to affect the positive effects of EMS support on meeting productivity. All four meetings were believed to be very productive based on efficiency and quality criteria relevant to that meeting. The ST/SP meeting took only 3 hours, compared to a typical elapsed time of two months for the same task. The DT/SP meeting took six months for what had taken a year for a similar task. Only travel time was eliminated for the ST/DP meeting, but that made it possible to meet tight deadlines. In the DT/DP meeting, participant involvement may not have been possible at all without the distributed technology. In addition, both of the Same Time meetings were successfully applied to urgent tasks with tight deadlines. It appears that synchronous interaction conveys a sense of urgency while it permits greater facilitator control over the pace and direction of interaction.

Likewise, all four cases in this study were perceived as very productive in terms of the quality of the meeting products. Each case sought to develop a detailed product: a Lotus Notes database structure and definitions, a functional requirements specification, a vendor recommendation and supporting rationale, a project history and analysis. The electronic
### Effects on Task Accomplishment

<table>
<thead>
<tr>
<th>Effect</th>
<th>Mode</th>
<th>ST/SP</th>
<th>DT/SP</th>
<th>ST/DP</th>
<th>DT/DP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productivity</strong></td>
<td>MI</td>
<td>No effect—All enhanced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Access to participants</strong></td>
<td>MD²</td>
<td>No improvement</td>
<td></td>
<td></td>
<td>Improved access</td>
</tr>
<tr>
<td><strong>Access to ext. info. Sources</strong></td>
<td>MD²</td>
<td>No improvement</td>
<td>Improved access</td>
<td>No improvement</td>
<td>Improved access</td>
</tr>
</tbody>
</table>

### Effects on Group Dynamics

<table>
<thead>
<tr>
<th>Effect</th>
<th>Mode</th>
<th>ST/SP</th>
<th>DT/SP</th>
<th>ST/DP</th>
<th>DT/DP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participation</strong></td>
<td>MI</td>
<td>No effect—All enhanced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Engagement</strong></td>
<td>MD²</td>
<td>Enhanced</td>
<td>Some difficulty</td>
<td>No problem</td>
<td>Difficult</td>
</tr>
<tr>
<td><strong>Ownership &amp; commitment</strong></td>
<td>MI</td>
<td>No effect—All enhanced</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Effects on Process Support

<table>
<thead>
<tr>
<th>Effect</th>
<th>Mode</th>
<th>ST/SP</th>
<th>DT/SP</th>
<th>ST/DP</th>
<th>DT/DP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facilitator role</strong></td>
<td>MI</td>
<td>No effect—All require active, comprehensive role</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ability to monitor &amp; intervene</strong></td>
<td>MD²</td>
<td>Effective given face-to-face presence</td>
<td>Effective given face-to-face presence</td>
<td>Effective given face-to-face &amp; video presence</td>
<td>Difficult in electronic-only interaction</td>
</tr>
<tr>
<td><strong>EMS Tool Selection</strong></td>
<td>MD²</td>
<td>Simple toolset</td>
<td>Allow expanded toolset</td>
<td>Simple toolset</td>
<td>Require simplest toolset</td>
</tr>
<tr>
<td><strong>Level 1 support</strong></td>
<td>MI</td>
<td>No effect—All used anonymity, parallel entry and recording support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 2 support</strong></td>
<td>MI</td>
<td>No effect—All used process guidance, information structuring and decision support. Need some verbal for convergence.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Mode Effects in Electronic Meetings Studied

1 MI = 'Mode Independent', MD = 'Mode Dependent
2 Dependent on time and place
3 Time dependent
4 Time dependent, in the form of the duration of the meeting

Recording feature of the EMS, regardless of the mode, was an important consideration in its use. It could dramatically reduce the time to capture more information from more people into a single document. In all of the cases, the tools supported efficiently editing and reorganizing the inputs to produce a final product. In addition, reports could be immediately compiled and distributed, which was important in time sensitive situations or when follow-up work was required.

These positive findings are consistent with prior research results in the ST/SP mode.

### Access to Participants

The Different Place modes improved access to participants compared to ST/SP. Overcoming logistics hurdles was a primary rationale for selecting the Different Place,
enabling the right people to be included. This was especially important in the DT/DP meeting, where participants had moved on to other projects, and the ST/DP meeting where group members were in different locations.

**Access to External Information Sources**

The Different Time mode improved access to external information sources, including people from outside the formal group. In the DT/SP meeting, group members met with others in their organizations between sessions to build broader support within each organization, and presumably to bring that information back into subsequent joint meeting sessions. An important reason to hold the DT/DP meeting was allowing participants to access documents in their offices to help reconstruct events of the four-year long project. In addition, unanticipated but useful off-line discussions were generated. Members were asked to summarize and enter the results of these into GroupSystems to include them in the record.

**Effects on Group Dynamics**

**Participation**

One consistent finding across these cases, as well as in the ST/SP literature, is that EMS use effectively enhances more, and more equal, participation across group members regardless of mode. The parallel entry capability effectively enabled more equal access to the "discussion" by preventing individuals from holding the floor, and removing production blocks. "... everybody had more time to talk and was able to participate."

Anonymity also helped to equalize participation in all four cases by reducing the socially inhibiting effects that some participants, especially designated "experts" or superiors, may have on others. "If it had been verbal, some wouldn't have bothered to say what they were thinking because those three that usually decided everything had already said their piece so there was no other way of looking at it." The ST/SP meeting owner made another case for anonymity, to make it easier for people to change their minds by removing the social pressure to stand consistently for one's points. Also, the ST/DP meeting owner noted that domination resurfaced from certain individuals during verbal interactions, but the electronic record helped to address it.

**Engagement**

Engagement was clearly dependent on mode. It was not a problem for the Same Time meetings; in fact those meeting owners felt it was improved over non-EMS supported
meetings. It was more of an obstacle, however, for the Different Time meetings. In the multi-

session DT/SP meeting, the meeting owner expressed some problems with maintaining 

participants' commitment over the long gaps between sessions, which was to be expected. 

Maintaining engagement was even more difficult in the DT/DP meeting for a couple 
of reasons. First, these participants had moved on to other projects so the meeting held less 

immediacy for them. Second, the EMS tool used was more passive. Participants had to take 

more initiative--to log on, follow instructions, and input--without face-to-face prompting 

from others. In this case, the meeting owner found that knocking on doors was necessary, 

although lengthening the time was still required. It did not help that the system's anonymity 
made it difficult to know who had not participated, and hence needed to be reminded. For 

future meetings of this kind, the meeting owner suggested holding a ST/SP meeting at the 

start to motivate and instruct participants. 

Engagement is an issue that needs to be dealt with in the Different Time meetings that 

would not have been identified from the ST/SP research. 

Ownership and Commitment

Some previous studies have found that EMS use can improve commitment and 

ownership of the group product in ST/SP meetings, although the record is somewhat mixed. 
All of these cases noted higher levels of commitment and ownership, usually developed 

through the increased participation. In the DT/SP case, formalizing the products of 

discussion was also raised as a factor. "This is very committing because the output here, a 

piece of paper, is committing and everyone is able to 'sign their name' on this and say 'this is 

what we mean'."

Effects on Process Support

Facilitator Role

Mode did not appear to affect the perceived importance of the facilitator role; it was 

highly valued and similarly defined in all four modes. Statoil generally has given importance 
to high quality, active facilitation where a cadre of electronic meeting facilitators has been 

trained in both electronic tools and group dynamics. Facilitators are involved in all aspects 
of the meeting: planning, instructing participants in the process and tools, plus dynamically 
monitoring and intervening to keep the group on track. They facilitate both electronic as well 
as verbal interaction, and use both media intentionally to achieve desired outcomes within the
modal constraints. These facilitation role characteristics are consistent with field study findings in the literature regarding facilitation support [22, 16].

**Ability to Monitor and Intervene**

Mode, however, importantly constrains the facilitator’s ability to monitor and intervene in the meeting flow, process and dynamics. Face-to-face contact enabled facilitators in the ST/SP, ST/DP and DT/SP cases to effectively monitor and intervene in group interactions. In the DT/DP case, the lack of organized face-to-face interaction made it more difficult to manage the meeting, with no visual and audio cues for the facilitator to monitor the activity and intensity of the group and specific individuals. Therefore the meeting owner instituted direct, personal contact with members to encourage their input. As a general principle, face-to-face contact was necessary to monitor and intervene to help the group efficiently meet its goals.

**EMS Tool Selection**

Tool selection decisions appeared to be affected more by the length of the meeting and the mode-constrained opportunity for face-to-face assistance. That is, longer meetings tended to use more different, and/or more complex tools. (Table 1 listed the EMS tools applied in each meeting.) The Same Time meetings, lasting 3-4 hours each, used two tools. Simplicity was least considered for the DT/SP meeting, which used four different tools. Given that they met for a total of 20 to 24 hours together, there was more time for tool instruction and repeated use. However, simplicity was the key factor in the DT/DP meeting. Only Topic Commenter was used for group input, as the facilitator sought to make it as simple as possible given the lack of face-to-face assistance.

**Level 1 and Level 2 EMS Support**

In all four modes, the EMS provided useful support along the lines discussed for Level 1 and Level 2 GSS. The Level 1 communication support enabled and enhanced participation, especially via its parallel entry and anonymity features. The recording capability directly contributed to creating a high quality, detailed group product. Recording was also observed to have an empowering effect, maintaining a "clean and final looking" product in the midst of messy editing changes. In the ST/DP meeting, videoconferencing was useful for supporting verbal discussions and coordinating the meeting process, although the
ST/DP owner and facilitator felt that audioconferencing would have worked nearly as well
given that everyone knew each other fairly well.

Likewise, the Level 2 EMS features were found to be useful in all cases. Support for
group structuring techniques was mentioned as an important factor in all four cases. For
example, DT/SP and ST/DP owners commented that the GroupSystems structure formed the
outline for the entire meeting, both verbal and electronic interaction. The ST/SP meeting
used tools with outlining structures to model the end product structures. In the DT/DP
meeting, during the full group interaction, Level 2 features simply provided categories for
directing information to be entered in an organized fashion and maintaining a focus on a
given set of questions at one time.

Consistent with other field studies, the non-DT/DP cases still used verbal discussion
for 50% to 70% of the formal meeting time. Convergence was an important objective for
verbal interaction, especially convergence leading to the final decision. In the DT/DP case,
only divergent brainstorming was conducted in the distributed mode; convergence processes
were conducted in face-to-face sessions among the meeting leaders using verbal and
electronic interactions.

While verbal interaction was an important factor in forging consensus, the EMS was
productively applied in various ways to help the group converge:
- Use of public screen to focus verbal discussion and reorganize or refine input in
  real time (ST/SP, ST/DP, DT/SP)
- Use of electronic record to resolve verbalized differences (ST/DP)
- Use of ‘typing then reading and commenting’ strategy to create a group
  orientation (ST/SP, ST/DP)
- Use of voting tool to force prioritizing decisions (ST/DP, DT/SP)
- Use of the system's logical structure to guide the overall process (DT/SP)

Examples of Extending the Meeting Process Across Multiple Modes

The ST/DP and DT/DP meetings constituted examples of multi-mode meetings, in
which the meeting process incorporated multiple modes that were sequentially or
synchronously linked. Thus mode was a meeting design instrument. Multiple modes can
extend a meeting so that it can seamlessly integrate pre- or post-meeting activities into the
overall process, or apply the relative strengths of different modes to adapt the meeting
process to better fit specific task, activity or group needs.
The ST/DP meeting provides an excellent example of extending the meeting with a pre-meeting activity. Before the meeting, GroupSystems was used in a DT/DP mode to gather initial input about vendors. This made it easier for "people to get their thoughts in", plus this input could be condensed before the main ST/DP session started, "so that discussion could start at a more advanced stage."

Multiple modes were applied in several ways for adapting the meeting process. The DT/DP meeting used different modes for parts of the meeting process that imposed very different types of interaction. The DT/DP mode was used to accommodate divergent objective, and subjective input by a broad group of former project staff. This mode enabled many former staff to participate, and to access project documents in their offices to aid their recall. The DT/DP mode was appropriate because convergence was not a key issue. However, twice the owner/facilitator group used the ST/SP mode. Initially they used it to decide upon the input categorization for the meeting. Later, they used it again for convergence, to organize and filter the full group inputs and make decisions concerning the second full-group round of input. A further extension was the use of email, a second DT/DP technology, to push messages to participants rather than rely upon their initiative to look for new entries in GroupSystems.

**VII. Conclusion and Implications**

This study extends previous empirical research of EMS use in organizations, which largely has been limited to ST/SP meetings. It describes four successful electronic meetings in an organization that has in place a variety of collaborative technologies and facilitators. Each meeting occurred primarily in a different time/place mode, thus providing an opportunity to contrast the similarities and differences in the designs of the meetings and the effects that resulted. One interesting aspect of the meeting designs was that two of the meetings had activities that extended into multiple modes.

As groups increasingly work beyond familiar face-to-face modes, mode gains importance as a factor in designing and executing group meetings. Facilitators and group owners need to understand the relative impacts, strengths and weaknesses of different modes in order to maintain maximum group effectiveness. Mode enters in as a meeting design factor in three ways:

1. To the extent mode effects can be predicted, the facilitator can use supplemental techniques to compensate while working within a given mode.
2. When there is some flexibility, a different mode may be chosen which is better attuned to the challenges of a specific meeting situation.

3. If multiple different modes can be used, the mode best suited to a particular activity within the overall meeting process can be utilized.

The contributions of this study to each of these three types of factors are summarized in the following sections.

1. **How does mode affect task accomplishment, group dynamics, and the process support that a facilitator and/or EMS technology supplies?**

   One general finding is that mode impacted fewer than half of the task accomplishment, group dynamics and process support effects studied. Thus, many positive findings from previous ST/SP field studies in the literature may well hold in the other modes as well. For example, outcomes were viewed as very productive, of high quality, and were well ‘owned’ by the participants. There was very active participation.

   Some effects were influenced by mode however. The Different Place dimension provided improved access for participants, making it easier to involve the key people. Same Place imposed travel requirements at least, which could impact group composition. (The more flexible DT/SP setting at least made it possible for some to attend a subset of meeting sessions.) Different Time allowed easier access to external sources of information during the course of the meeting. In the DT/DP meeting, participants could access materials as needed during the course of their interaction, while the DT/SP meeting enabled between session conferences with people who were not in the meeting itself. However, Different Time made it more difficult to keep participants engaged in the meeting due to distractions and changes occurring to individuals over time. The Same Time setting has important advantages regarding engagement.

   Both Level 1 and Level 2 technology capabilities were seen as necessary and effective in all modes. This even included anonymity, although it was a bit of a double-edged sword for the facilitator trying to build engagement in the DT/DP setting.

   Regarding process support, the facilitator role was equally important and similarly defined across modes. However, the types of interventions available to a facilitator and their effectiveness were impacted by mode. Where real time, face-to-face presence was absent, the facilitator had difficulty monitoring and intervening in the pace and flow of the meeting. Mode was also an important variable when working on certain types of tasks or task activities—such as time sensitive, divergent or convergent, or those requiring a large degree of
external resource access. In particular, facilitating convergence is extremely difficult without real time give-and-take interaction and the richness of verbal media.

Early in this paper it was questioned whether or not DT/SP should be treated as a separate mode. Perhaps the question should be determined by the key dynamics contributed by that mode—the mode’s ‘active ingredients’ which will most influence the meeting task accomplishment and group dynamics effects and shape process support design. From this perspective, the ‘Kiosk’ DT/SP configuration is basically a DT/DP mode where participants use the same terminal but at different times. The Same Place characteristic really does not add any dynamic that would lead to different task, group or process effects than if it was in fact Different Place. Thus we recommend that it be classified as DT/DP.

The ‘Multi-Session’ DT/SP configuration is essentially an extended face-to-face meeting. In fact, the literature usually has classified multi-session meetings as ST/SP, with little attention to the existence of multiple sessions. In other words, they have focused on real-time, face-to-face interaction as the key dynamic, rather than the sessions. However, based on the four cases in this paper, multiple sessions that are separated in time may introduce an important secondary dynamic. The time separation enables participants to access outside sources of information and opinion to bring into subsequent sessions, and may introduce problems with engagement. Given this dynamic, we recommend that when multiple sessions are not on contiguous days, researchers should retain the DT/SP mode distinction and give greater attention to between-session activities. When the sessions are on successive days, the meeting could be simply treated as a single ST/SP.

It is important to refrain from attributing causality to mode in this four-case study. Each case in this study involved different tasks and groups, with different histories and outcomes. Extensive field research will be required to adequately separate mode effects from other factors. An array of context, infrastructure and effectiveness factors, starting with those raised in this study, need to be examined across numerous real meetings occurring in different modes, with different combinations of technologies, in different organizations, under different task and group constraints. A far broader base of such studies is required to develop a more comprehensive and relevant range of general and mode-specific moderators, beyond those identified by the Dennis et al [16] meta-analysis (which was largely based on controlled experiments). Furthermore, we suggest that future field studies include more detailed assessment of specific activities within the meetings. This will help us better understand how different modes can be applied to specific types of activities in order to find
better fits between task, group and technology. It is at the activity level, even more than the overall task level, that the potential for multi-mode interactions may be realized.

2. How do experienced facilitators select mode when designing meetings?

The relative strengths and weaknesses between the four modes translate into criteria which facilitators could use to select one mode over another as a better ‘fit’ to the needs of a given meeting or group. Table 3 summarizes the potential criteria for mode selection that may be drawn from our findings. (Note that these criteria only apply to the specific type of meeting configuration studied in each case, as listed in the table cell headings.)

<table>
<thead>
<tr>
<th>ST/SP (meeting room facility)</th>
<th>DT/SP (same group/multiple sessions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ST/SP Mode is useful if meeting requires:</strong></td>
<td><strong>DT/SP Mode is useful if meeting requires:</strong></td>
</tr>
<tr>
<td>• Participants are highly engaged &amp; focused</td>
<td>• access to external sources of information (between sessions)</td>
</tr>
<tr>
<td>• meeting tight task deadlines</td>
<td>• time frame extending a single session</td>
</tr>
<tr>
<td>• verbal interaction</td>
<td>• verbal interaction (within sessions)</td>
</tr>
<tr>
<td>• developing convergence</td>
<td>• developing convergence</td>
</tr>
<tr>
<td>• extensive use of manual facilitation techniques</td>
<td><strong>Don’t select ST/SP if meeting requires:</strong></td>
</tr>
<tr>
<td></td>
<td>• participants are highly engaged &amp; focused</td>
</tr>
<tr>
<td></td>
<td>• participation on different individual schedules</td>
</tr>
<tr>
<td></td>
<td>• meeting tight task deadlines</td>
</tr>
<tr>
<td><strong>ST/DP (small groups in separate facilities)</strong></td>
<td><strong>DT/DP (asynchronous interaction)</strong></td>
</tr>
<tr>
<td><strong>ST/DP Mode is useful if meeting requires:</strong></td>
<td><strong>DT/DP Mode is useful if meeting requires:</strong></td>
</tr>
<tr>
<td>• access to distant or mobile participants</td>
<td>• access to distant or mobile participants</td>
</tr>
<tr>
<td>• access to external sources of information</td>
<td>• access to external sources of information (during interaction)</td>
</tr>
<tr>
<td>• participants are highly engaged &amp; focused</td>
<td>• participation on different individual schedules</td>
</tr>
<tr>
<td>• meeting tight task deadlines</td>
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<tr>
<td>• verbal interaction (via communication technology support)</td>
<td><strong>Don’t select ST/DP if meeting requires:</strong></td>
</tr>
<tr>
<td>• developing convergence</td>
<td>• participants are highly engaged &amp; focused</td>
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<td></td>
<td>• variety of tools</td>
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<td></td>
<td>• meeting tight task deadlines</td>
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<td></td>
<td>• developing convergence</td>
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<td></td>
<td>• manual facilitation methods are needed</td>
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</tbody>
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<table>
<thead>
<tr>
<th>ST/SP (meeting room facility)</th>
<th>DT/SP (same group/multiple sessions)</th>
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<tbody>
<tr>
<td><strong>ST/SP Mode is useful if meeting requires:</strong></td>
<td><strong>DT/SP Mode is useful if meeting requires:</strong></td>
</tr>
<tr>
<td>• access to distant or mobile participants</td>
<td>• access to external sources of information (between sessions)</td>
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<tr>
<td>• access to external sources of information</td>
<td>• time frame extending a single session</td>
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<tr>
<td>• participants are highly engaged &amp; focused</td>
<td>• verbal interaction (within sessions)</td>
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<tr>
<td>• meeting tight task deadlines</td>
<td>• developing convergence</td>
</tr>
<tr>
<td>• verbal interaction</td>
<td><strong>Don’t select DT/SP if meeting requires:</strong></td>
</tr>
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<td></td>
<td>• meeting tight task deadlines</td>
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<tr>
<td><strong>ST/DP (small groups in separate facilities)</strong></td>
<td><strong>DT/DP (asynchronous interaction)</strong></td>
</tr>
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**Table 3. Mode Selection Criteria**

Table 3 suggests that the ST/DP mode is the most versatile single mode. It can accommodate the meeting conditions of all other modes to at least some degree, with the exception of time zone conflicts which are a growing impediment in today’s global business environment.
3. How can multiple modes be used in meetings?

The ultimate degree of meeting design flexibility occurs when it is possible to use multiple modes in parallel and/or in sequence. The Anytime/Anywhere concept has existed largely in theory for a number of years, with little application in practice. Its application requires that, first, Anytime/Anyplace infrastructure environments are in place and, second, they are sufficiently diffused and adopted.

Infrastructure was a key enabling factor in the current study. The four cases reported here, especially the two that utilized multiple modes, could be accomplished without a lot of special effort because Statoil had in place the basic technology components of an Anytime/Anyplace infrastructure, as well as facilitator support to apply the technology. There was also enough diffusion so that, in most of these meetings, the meeting owner and/or some participants had used the technology before.

Nevertheless, adoption and technology integration were and still are important issues for Statoil, as for others attempting to move in this direction. While Statoil was able to combine multiple modes, diffusion still was a limiting factor--most Statoil employees had little or no experience with GroupSystems (a study of the adoption and diffusion of GroupSystems in Statoil is reported in [32]). Thus, the DT/DP meeting facilitator was very conservative in keeping tool use extremely simple, with only one tool used to generate information. As participants gain experience with GroupSystems, it might be feasible to make more advanced, routine use similar to the ubiquity of Lotus Notes at Statoil. One might also expect that less face-to-face prompting would be required for group members to participate more aggressively in DT/DP mode. Among those who use GroupSystems extensively at Statoil, such as the DT/DP owner, frequent creative applications have been easy to implement.

A second factor limiting the use of multiple modes is the integration among complementary technologies to allow more seamless, combined use. Switching from one mode to another still usually requires changing technologies or packages. In the last few years there has been an explosion of web-based collaboration packages with useful, but narrow sets of capabilities. For example, 'push' notification capabilities, instant messaging, and desktop conferencing—even audio and video conferencing—need to be integrated with the EMS's Level 2 decision and process structuring capabilities. This could provide more effective means of engaging participation, coordinating tool appropriation and supporting other process facilitation needs. Likewise, tighter integration of organizational and meeting information in a single repository is needed to seamlessly integrate the meeting into
organizational work processes, such that one may easily draw from and contribute information to the other.

Investment in Anytime/Anyplace infrastructures can reshape the structure and dynamics of our traditional conception of a meeting. The traditional face-to-face meeting is largely time and place-bound, restricting who can participate, how timely the meeting interaction can occur, and even what information sources can be available to participants. Anytime/Anyplace infrastructures provide options to address these first-order logistical constraints.

However, Anytime/Anyplace infrastructures can do more than address logistical problems. They can provide increased degrees of freedom to facilitate the meeting process so technology is well suited to the task and group involved. In other words, mode itself becomes a meeting design factor to help achieve the task-technology fit that Dennis et al. [16] identified as a critical variable in meeting success. As a design factor, mode is usually reacted to—something that other aspects of the meeting design are adjusted to accommodate. This study, with an Anytime/Anyplace infrastructure in place, provided examples of mode used proactively. An appropriate mode was consciously chosen for each meeting to best meet the specific logistical and group/task needs. In addition, multiple modes were even applied to specially support different activities in two cases.

The core of the Anytime/Anyplace concept is that a social and technological environment is in place where multiple technology options can be easily accessed, integrated and applied. In short, this environment can be used successfully to link together those forms of support which best fit the task and group requirements for a given situation.

References


