

# Understanding the Socio-Technical Gap: A case of GDSS Facilitation

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## Abstract

This study describes a GDSS facilitation of an information design system meeting and pays special attention to moments where the intervention appears to breakdown. The breakdowns suggest a clash over how the interaction should proceed and how doubts, objections, and disagreements should be expressed and managed. The breakdowns also reveal two layers of work performed by the GDSS facilitators: (1) the facilitator sets up the technology to be useable and useful and (2) the facilitator uses words and deeds to persuade participants about the essence of their interaction. It is the second layer that is primarily involved in repairing intervention breakdowns. This study points out the importance of the negotiation of the moral order of interaction in understanding the socio-technical gap.

**Keywords:** GDSS, facilitation, argumentation, interaction order, socio-technical gap

## 1 Introduction

Meeting facilitation that incorporates group decision support systems (GDSS) has been used to support a wide variety of problem-solving and decision-making events. Such events include the creation of mission statements, information systems design, and the development of policies and rules. Typically GDSS facilitators are hired to expand participation in decision-making and to handle the difficulties that arise when involving multiple parties in a decision-making process. It is not their role to make the decisions faced by the client but instead to provide process support for the client's decision-making. GDSS facilitators plan, convene, and run meetings for groups and organizations to help the group cooperatively arrive at the best possible outcome. Group decision support systems are technologies that expand the capacity of GDSS facilitators to do their work (e.g., Nunamaker, Dennis, George, Valacich, & Vogel, 1991) or for groups to achieve the facilitation function on their own (Poole & DeSanctis, 1992). Either way, these technologies are designed to aid common decision-making tasks such as brainstorming, list building, idea organization, and idea evaluation.

The actions of facilitators are exemplary of work that often remains invisible in technologically mediated interaction—bridging the gap between what is required socially and what can be done technically (Ackerman, 2000, p. 198). As Orlikowski, Yates, Okamura, Fujimoto (1995) point out, much of what is important in bridging the gap between technology design and use is assumed to take place in the way “end users” of the technology use the technology rather than in the ways technology is set up and interpreted for users. The work performed by GDSS facilitators can illuminate the latter.

There is a puzzle, however, in understanding GDSS facilitation that may have broader implications for understanding how the gap between the social and the technical is bridged. When appropriately implemented, GDSS use leads to higher levels of consensus and decision satisfaction than might otherwise be achieved (Anson, Bostrom, Wynne, 1995; Connelly, Jessup, Valacich, 1990; Dickson, 1993, 1996; Ngwenyama, 1996). GDSS, however, appear most well suited for small, cooperative groups working on well defined problems (Allen, 1993; Grudin, 1994; Kraemer & King, 1988; Lyytinen, Maaranen, Knuuttila, 1994; Weick & Meader, 1993). Many groups and many of the important choices, problems, and conflicts calling for intervention do not fit what is presumed about decision-making in the GDSS design.

Despite the apparent mismatch between GDSS as designed and the demands of complex decision events, GDSS have been implemented with success (Bikson, 1996; Vreede & Bruijn, 1999; Nunamaker et al., 1991). This is often attributed to the quality of the facilitation that renders the GDSS usable and useful for the end users of the GDSS (Bikson, 1996; Bostrom & Anson, 1992; Bostrom, Anson, & Clawson, 1993; Johansen, 1989; Nunamaker, Briggs, & Mittleman, 1994; Nunamaker et al., 1991; Poole, DeSanctis, Kirsch, & Jackson, 1995).

The puzzle is that the influence of GDSS facilitators on the success of GDSS interventions is well acknowledged but the nature of that influence, especially as it is found in the situated actions performed by GDSS facilitators, is not well documented nor understood. The purpose here is to examine the work of GDSS facilitators to better understand the role the facilitator plays bringing together the technological system and the social system into coordinated, collective activity aimed at producing decisions.

What is known about GDSS facilitators is generally framed and studied as rational planning and instrumental action in the service of client goals. According to Bostrom et al. (1993, p. 147), GDSS facilitators perform a “set of functions or activities carried out before, during, and after a meeting to help the group achieve its own outcomes.” A GDSS facilitator “works with the group leader (and participants) to establish meeting outcomes. The facilitator then designs the meeting by picking relevant roles, rules, procedures, and techniques to accomplish desired outcomes” (p. 160). Three domains of action are important to what facilitators do: running the computer technology, shaping the communication that takes place outside of the computer technology, and assisting in meeting design (Bostrom et al., 1993; Clawson et al., 1993). Recent research suggests, however, that GDSS facilitators orient toward the legitimacy of the interaction they create and their trustworthiness in creating it (Aakhus, 2001; Neiderman, Biese & Beranick, 1996). The influence in designing meetings may involve more than technical expertise in rationally planning and running meetings.

To begin to understand the influence of GDSS facilitators, a GDSS facilitation of an information system design meeting is examined. Particular attention is given to two moments where it appears that the plan for the meeting breaks down. While the meeting ultimately succeeds, the breakdown reveals the situated actions of the meeting facilitator to repair the direction of the meeting content. What the analysis means for understanding GDSS facilitation and the socio-technical gap is discussed.

## **2 A GDSS facilitation of an Information System Design Meeting**

The case is drawn from a corpus of ethnographic observations that took place over a three year period at a primary field site called – “The Center.” The Center offered GDSS facilitation services. It was affiliated with a department of management information systems located in a business school and a private GDSS software development firm. The clients included multinational firms, government agencies, non-profit organizations, university groups, and professors. The major contract work at the center, at the time, involved facilitation of information system design meetings and strategic planning. There were, at the time, 14 facilitators associated with the center. While the corpus consists of over 200 hours of observations of 11 different GDSS facilitations, the purpose here is not to comprehensively discuss those observations. Instead, this analysis focuses on some moments from one part of one facilitated intervention. These moments, however, are typical of the types of practical problems facilitators face and are relevant to the broader issues discussed above.

### **2.1 The event**

The GDSS facilitation discussed here involves an information systems and design facilitation. The facilitation involved 5 day-long meetings conducted over the course of one week. There were 31 meeting participants from eight different organizations. The official purpose of the event was to produce a model of how the eight organizations could conduct their respective business processes so that all the organizations could effectively share the same information system and information. The aim of the facilitated intervention was to collect user requirements for the data needed to successfully accomplish the common business of their respective organizations. The user requirements would be used to create a strategic plan for an information system that would be shared and used by the eight different organizations represented at the meetings. It was hoped that this would improve business efficiency and cooperation among the organizations.

#### *2.1.1 The participants*

The participants were generally unknown to each other even if they were from the same organization because they often came from different parts of the world where the organizations were located. They varied in their hierarchical status and domains of expertise. The primary participants in the meeting were referred to as “functionals” by the facilitation team members. This meant that these participants had some type of functional expertise in the operation of their organization. There were at least 5 different types of functional expertise represented among these participants. There were “management types” who primarily observed the meetings and did not directly participate other than to clarify the general purpose of the meetings. The facilitation team consisted of a lead facilitator, a second facilitator, a technician, and 2 data modelers. The technician provided network and software support. The data modelers had the task of transforming the functionals input into a data model of the basic business processes shared by the eight organizations.

#### *2.1.2 The setting*

The meetings took place in a meeting room outfitted with GDSS software on 30 networked participant workstations and two facilitator workstations. The room

incorporated 4 rows of legislative style seating oriented toward the front of the room and three very large display screens. The participants tended to sit with people from their same organization. The facilitator would use the large display screen primarily to show a common view of the GDSS supported activity.

The lead facilitator was usually located in the facilitator “pit” in lowest level of the meeting room. He had two workstations, other multi-media equipment, and all the control panels for running the technology in the room. The “functionals” were located in the legislative style seats. The “management types” primarily stood in the back of the room and in the wings of the room. They often meandered in and out of the meeting room as they tended to business other than the meeting.

## **2.2 The intervention plan**

The overall meeting design was set up to accomplish multiple purposes. Chief among these was the creation of business activities and data requirements model of the business activities common to all eight organizations. The model needed to be comprehensive, realistic, and understandable so that the model could be turned into a testable information system prototype. Other groups, in subsequent weeklong meetings, would test and refine the prototype and model. Eventually, a group would be convened for a final analysis of the system. A second primary purpose was to create a sense of “buy-in” among the participants so that they would become change agents in their respective organizations. As such, it was expected that the participants would leave believing in the efficacy of the model they created and would be willing to say so to others.

### *2.2.1 Making a model.*

The intervention plan was for the participants to build a general representation of the data requirements across their organizations. The week would begin with a convening session outlining the goals and methods to be used during the week and where participants would be introduced to each other. At this time, a preliminary business activity model created by a consultant for the management group was introduced. The early part of the week involved capturing participants’ reactions to that preliminary activity model. The participants would then reconcile their reactions to the model in a revised activity model. Each activity and subactivity was then reviewed for its data requirements. This involved the participants in further rounds of capturing opinions and reconciling points of view about the relationship between business activities and data management. The primary deliverable at the end of the week was a business activity model with complete data requirements.

### *2.2.2 Drafting a document.*

To build the model, the intervention plan incorporated a series of GDSS supported decision-making activities. There were two primary activities: gathering participant opinions and reconciling the opinions. The first was primarily conducted through the use of a topic commenting application. The application functioned like a series of note-cards each with one topic on which people could contribute their comments. The application helped the group keep a wide-variety of topics open for commenting simultaneously. During the early part of the week, the topics were the different business activities described in the preliminary model. Comments about the model were captured and then

organized into a working document in the other group outlining application used by the facilitator. The group outlining tool enabled the group to share one working document and to let different participants simultaneously work on different parts of the document. The facilitator could break the large group of participants into smaller working groups and thus break up the large task of reviewing the model. The group outliner was also used to coordinate a focused discussion among all the participants aimed at reconciling differences of opinion about the model. Since the document was an outline the participants could agree to expand or contract the model in anyway agreeable to the group.

### *2.2.3 Building buy-in.*

In the course of making the model by drafting a common document, the facilitation aimed to instill a sense of possibility for improved business processes and commitment to changing their respective organizations in the participants. Toward this end, the facilitation was designed to enable people to express their doubts, objections, and differences while avoiding problems that might arise from latent conflict among the participants due to different beliefs about effective business processes and practices and different organizational and functional affiliations. The plan is evident in the sequencing of GDSS applications described above (see also Aakhus, 1999 for a discussion of the logic of buy-in).

What is evident in the overall meeting plan is an intervention aimed at producing the best possible representation of these organizations' common business activities and the data required to accomplish these business activities. Central to the plan is the form of interaction through which the intervention will be achieved.

## **3 Articulating cooperation at conflict in an information system design meeting**

A key challenge for the facilitation team involved encouraging the expression of doubts, objections, and disagreements about the model and data requirements. The aim being the improvement of the group's collective reasoning and individual member's thinking about common business processes and data requirements. Yet, the expression of these differences also risked the escalation of disagreements into intractable controversies among the participants. Such controversy could create impasse in the decision-making process. The key form of interaction would be cooperative argumentation where in the process of having arguments and being oppositional the participants would make arguments in an effort to resolve their differences on the merits (e.g., van Eemeren, Grootendorst, Jackson, and Jacobs, 1993). This stands in contrast to argument that is simply contradictory and oppositional.

While the facilitated intervention was extensively planned, it still had to be achieved. This situation, like many others GDSS facilitators face, highlights a practical dilemma in their work: while the GDSS technology may be designed to support cooperative argumentation, it is only one of many possible forms of interaction a group might achieve. The participants might also collaboratively achieve interactions such as quarrels, show-downs, and coalition building. Cooperative argumentation is taken here to be a belief and a quality of participation that is independent of the technology intended to

inspire it. It is the facilitator's job to articulate interaction as cooperative argumentation in the setting.

The GDSS facilitator's dilemma is a version of what Ackerman (2000) calls the socio-technical gap—"the fundamental mismatch between what is required socially and what we can do technically" (p. 198). Clearly, technologies can substantially vary in terms of the computer support provided to coordinate their work. Some technologies provide explicit functionalities aimed at regulating how people coordinate their interaction, while other technologies leave the regulation of interaction to be coordinated in an ad hoc fashion (Schmidt & Simone, 2000). In the case of GDSS and facilitators, the GDSS provides significant functions for decision-support while at the same time the facilitator aids the ad hoc coordination of decision-making task. The facilitator is a bridge between the design for decision support and the social circumstances of the decision. GDSS facilitators shape other users' use of the technology. This influence – or "metastructuring" – is important to understanding how the gap between technology design and use is bridged (Orlikowski, Yates, Okamura, Fujimoto, 1995).

The issue at hand is not so much the intervention plan as it is the situated actions facilitators take to navigate the murky waters of the social, intellectual, and political differences of the group. To understand this, two breakdowns, or potential breakdowns, in the intervention are examined. Breakdowns help reveal aspects of human action that might otherwise go unnoticed (e.g., Winograd & Flores, 1986). Of particular interest, are the actions the facilitator takes to repair the apparent breakdown.

### **3.1 Scene #1**

About one-half hour into the first meeting on the first day of the information system design meetings, the facilitator set up a topic commenting activity. The participants were asked to make comments about the meeting and any concerns the participants might have.

The facilitator thoroughly explained and illustrated the details about making contributions through the GDSS and how to read others' contributions. He then reminded the participants about the goal of the activity by saying "enter any comments or concerns about the meeting or meeting objective." He paused and there was almost no audible keyboard taps as a general silence overtook the room. He repeated, "any comments or questions." The participants were looking at their monitors seemingly investigating what to do. Finally, one of the participants asked, "does it show who the comments come from?" The facilitator replied, "No." Suddenly keyboard taps became audible as people began to type. Another participant jokes, "okay, now people will type." The facilitator states that "one of the beauties of this technology is that it's anonymous. No one knows who's said it. It helps us be frank." He mentions research conducted to test whether people can accurately guess who typed what. He adds, "people think they can guess but they are wrong." He pauses and then continues, "we don't want to get mean spirited. We should not belittle or criticize. We want to figure out how to improve our process."

In this scene, the slow start by the participants in entering comments about the purpose of the overall meeting seems to suggest to the facilitator an unwillingness to express their

doubts. This appear to be confirmed by the question about identifiability that suggests some apprehension, if not fear, about whether saying something will lead to retribution or punishment. The facilitator's response to this situation is to make an appeal to the form of interaction that is possible and preferable in the setting. His warning further suggests that what is supposed to happen is cooperative argumentation where opinions about business processes are tested and improved.

### 3.2 Scene #2

Following the lunch break on the second day of meetings, the participants were engaged in a general discussion about the participants' comments on the data requirements for the primary business activities model. The facilitator guided and supported this discussion using the group outlining tool. The outline was displayed on the large screens at the front of the room. Each primary node on the outline represented a primary activity in conducting business, such as "distribute materials" and "receive materials." The facilitator would open up that section of the outline to reveal a set of comments made by some of the participants. He would then ask them to identify what data requirements were necessary for this activity and whether that activity required redefinition. The purpose of the activity was to synthesize comments and create common definitions for business activities and data requirements.

The discussion began to fragment into many simultaneous discussions in the meeting room about item 4.1 "receive materials." Multiple side discussions would form, disband, and reform around shared identities people have with their organizational membership (e.g., ground or water transportation) or their professional specialization (e.g., engineer or logistics). The general discussion grew to reflect deeper political conflicts and professional differences of opinion. The participants were aligning themselves with the particular claims consistent with their sub-group identity in the meeting room.

After about five minutes of this, only 3-5 people actively engaged in synthesizing the comments while another 10 participants appeared to actively listen to that discussion. Five people never said anything to the whole group but instead whispered and commented to others near them. The remaining 10-13 people were engaged in running commentary about how one group was attempting to gain advantage over another group by the way the business process was being defined. The talk amongst the participants was taking on a life of its own in direct contrast to the goal of the intervention. The cooperative decision-making was essentially at an impasse and the intervention was breaking down.

At this point, the facilitator suggests making another node 4.2 on the outline. In doing so, he is attempting to resolve the differences of opinion being expressed. Then the leader of the *ground transport* sub-group said, "The people in *boating* never fill in the form." (The italicized words used in parenthesis are used to protect identities.) The *boating* leader countered, "This form is not done industry wide." The *ground transport* leader begins to make a point, "You are all into a different set of issues not," but is cut off by the *boating leader's* counter-claim that, "A lot of the sites have tracking from the past." Before he can continue his assertion, however, the facilitator interjects, "Let's talk about it. I think it is related," says the facilitator in an attempt to show the relevance of their disagreement

to creating a new node (4.2) representing a yet to be defined business activity. The facilitator says, “I’m less concerned about,” as he tries to hold the floor and prevent disagreements from escalating but the testy exchange of opinions between the two leaders grows more heated.

The facilitator talks loudly while the fragmented discussion continues. He restates the overall goal of the weeklong meeting by saying, “Okay, listen up. Our defined purpose is to work (*the current format*) into a package that goes to (*each business organization*). These (*the new information format*) items should come with other items. If I have a local system, I should be able to download the information I need. Currently what I’m hearing some of you say.” The facilitator is interrupted by a number of exchanges spawned by the leaders’ disagreement. “Maybe it is a requirement,” the facilitator says and turns his attention to his workstation.

While the discussion escalates toward impasse, the facilitator continues typing at his workstation. The facilitator’s primary attention appears to be on rewriting the contents of the outline item 4.2. He changes the definition of the outline item by adding words like “can include” to the business activity definition, which relaxes the design requirement assumptions. His editing actions are visible to anyone looking at the large public screen. Most of the participants are, however, caught up in the escalating disagreement between the two sub-group leaders. There appear to be only four participants attending to the facilitator’s actions at this point. The facilitator says, “I really think there is an area there for process improvement. Four-point-three, Stores Materials.”

In this scene, the problem is that people are readily expressing doubts and disagreements with the consequence that the intervention itself is breaking down. They appear to be losing, at least momentarily, the collective ability to cooperatively argue and shifting into argumentation as simple contrariness. The facilitator does not use an explicit appeal as in the first scene to remedy the situation. Instead, the facilitator’s words and deeds close down a discussion while framing it as keeping it open. This action displays an orientation toward the preferred form of interaction by glossing over the participants’ and the facilitator’s violations of that preferred form. The facilitator first creates a new node for the model in an attempt to reign in the disagreement. When this fails, he attempts to engage the two sub-group leaders by showing the relevance of their disagreement to improving the model. He then reasserts the basic goals for the entire event but this too is interrupted. Finally, the facilitator ignores the ongoing disagreement and edits the content for the node. Up to this point, the facilitator would not change any contribution without rereading the edits and inviting comments and further discussion before finalizing a definition. In this scene, he does not do that. While he does not ask for comments he continuously displays his actions on the public screens. When he is done he emphasizes the opportunity that exists in that node for the group to discover some business process improvement. He then quickly introduces the next node.

#### **4 Discussion**

The present analysis is not an exhaustive analysis of the entire intervention nor of the entire corpus of ethnographic observations from which this case was drawn. It focuses instead on a few moments from a facilitated intervention that provide useful grounds for



reflecting on how GDSS facilitators bridge the gap between technology design and use. While a technology, such as a GDSS, may be designed to support a particular form of activity, the preferred activity is only one of many possible forms of activity that could be accomplished in a social setting. The influence of the GDSS facilitator is found in the attempts to bring about a preferred form of activity while downplaying the other possible forms of activity. This appears to involve two layers of work. First, the facilitator sets up the technology up so that it is useful and useable in the work activity. Second, the facilitator through words and deeds attempts to persuade the participants about the essence of what they are doing in the situation. These layers become apparent in the intervention breakdowns and the facilitator's response to these breakdowns.

The breakdowns discussed above suggest that there is a clash between the participants' approach to handling their differences and the facilitator's approach. At stake in the intervention is what will count as the most rational way to proceed in the face of participant differences and conflict.

The facilitator handles differences amongst the participants by fashioning-a-record. The record collects different points of view and reflects reconciled points of view as a model of business activities and data management. The facilitator attempts to shape their contributions as cooperative argumentation where differences are opportunities to discover new ways to synthesize perspectives. The participants, on the other hand, appear to be more oriented to adversarial interaction where differences reflect deeper social, intellectual, and political differences among the participants. The record is a sign of these differences and an arena for opposing and resisting the interests of others. Their contributions seem more tuned to the possibility of bargaining and creating coalitions *moreso* than seeking discovery and synthesis of perspectives.

Because there are ample opportunities for the expression of doubts, objections, and disagreements, the facilitator is constantly dealing with how to keep the event from falling apart, from the perspective of the planned intervention, and keeping the participants moving toward the fulfillment of the intervention plan. The facilitator addresses this through words and deeds that persuade the participants about the essence of what they are doing—what constitutes normal interaction.

In the first breakdown, the participants were asked to contribute comments and concerns. They did not begin fully contributing until they were assured by the facilitator that their contributions could not be tracked. Part of the repair of this momentary breakdown was the facilitator's appeal to the anonymity of the technology that enables people to be "frank." This was an explicit attempt to frame what would count as normal activity and how the GDSS would help the participants achieve that activity.

In the second breakdown, it becomes clear that the record is extending opportunities for the participants to engage in adversarial, non-cooperative interaction rather than cooperative decision-making. The facilitator uses the record to gloss over their differences and display progress by moving the discussion around the impasse. Moreover, the facilitator describes what might otherwise be seen as combativeness

amongst the participants as an opportunity to improve the business process. These actions frame what counts as normal activity.

## 5 Conclusion

What GDSS facilitators do goes beyond the rational planning and instrumental action identified in the conventional account of their work. Their situated actions are similar to what some have called “metastructuring,” which is the way technology is set up and interpreted for end-users’s use (Orlikowski et al., 1995). Their situated actions also relate to what others call “articulation work,” which ranges from *ad hoc* alignment of actions through mutual awareness to explicit workflow organization (Schmidt & Simone, 2000). What appears to be new here, at least in the case of GDSS facilitation, is the identification of influence aimed at establishing and sustaining the moral order of interaction. That is, the negotiation of what constitutes normal, rational action (e.g., Heritage, 1984, p. 75-102). Understanding the gap between social and technical systems, from the perspective of GDSS facilitators work, suggests that the gap is bridged (or not) as people negotiate the moral order of interaction as technology is incorporated into human activities. To further understand the influence of GDSS facilitators, and others in positions to setup and interpret technologies for others, it is worth investigating how the struggle for the moral order of the interaction shapes the content and direction of technologically mediated interaction.

## References

- Aakhus, M. (2001) Technocratic and design stances toward communication expertise: How GDSS facilitators understand their work, *Journal of Applied Communication Research*, 29(4), 341-371.
- Aakhus, M. (2000) Constituting deliberation as “buy-in” through GDSS design and implementation. *The Electronic Journal of Communication/La Revue Electronique de Communication* [Online], 10(1). Available: <http://www.cios.org/www/ejcrec2.htm>.
- Allen, J. (1993) Groupware and social reality, *Computers and Society*, 22, 24-28.
- Anson, R., Bostrom, R. & Wynne, B. (1995) An experiment assessing group support system and facilitator effects on meeting outcomes, *Management Science*, 41(2), 189-208.
- Bikson, T. (1996) Groupware at the world bank, in C. Ciborra (ed.), *Groupware and teamwork: Invisible aid or technical hindrance?* (pp. 145-184), New York, Jon Wiley and Sons.
- Bostrom, R. and Anson, R. (1992) The face-to-face electronic meeting: A tutorial, in R. Bostrom, R. Watson, & S. Kinney (eds.), *Computer Augmented Teamwork: A guided tour* (pp. 16-33), New York, Van Nostrand and Rheinhold.
- Bostrom, R., Anson, R., & Clawson, V. (1993) Group facilitation and group support systems, in Jessup J. Valacich (eds.), *Group Support Systems: New Perspectives* (pp. 146-168), New York, MacMillan.
- Clawson, V. & Bostrom, R. (1996) Research-driven facilitation training for computer-supported environments, *Group Decision and Negotiation*, 5(1), 7-30.
- Clawson, V., Bostrom, R., & Anson, R.. (1993) The role of the facilitator in computer-supported meetings, *Small Group Research*, 24(4), 547-565.
- Connelly, T., Jessup, L., & Valacich, J. (1990) Effects of anonymity and evaluative tone on idea generation in computer-mediated groups, *Management Science*, 36(6), 689-703.
- Dickson, G., Lee-Partridge, J., Limayem, M., & DeSanctis, G. (1996) Facilitating computer-supported meetings: A cumulative analysis in a multiple-criteria task environment, *Group Decision and Negotiation*, 5(1), 51-72.

- Eemeren, F. van, Grootendorst, R., Jackson, S. & Jacobs, S. (1993) *Reconstructing argumentative discourse*, Tuscaloosa, AL, University of Alabama Press.
- Grudin, J. (1994). Groupware and social dynamics: Eight challenges for developers, *Communications of the ACM*, 37(1), 71-92.
- Heritage, J. (1984) *Garfinkel and ethnomethodology*, Cambridge, Polity Press.
- Johansen, R. (1989) *Groupware: Computer support for business teams*, New York, Free Press.
- Kraemer, K. & King, J. (1988) Computer-based systems for cooperative work and group decision making. *ACM Computing Surveys*, 20(2), 115-146.
- Lyytinen, K., Maaranen, P., & Knuutila, J. (1994) Groups are not always the same: An analysis of group behaviors in electronic meeting systems, *Computer Supported Cooperative Work (CSCW)*, 2, 261-284.
- Niederman, F., Biese, C., & Beranek, P. (1996) Issues and concerns about computer-supported meetings: The facilitator's perspective, *MIS Quarterly*, [Online] 20(1), 1-22: Available: Lexis/Nexus.
- Ngewenyama, O., Bryson, N., & Moboluren, A. (1996) Supporting facilitation in group support systems: Techniques for analyzing consensus relevant data, *Decision Support Systems*, 16, 155-168.
- Nunamaker, J., Briggs, B., & Mittleman, D. (1994) Electronic meeting systems: Ten years of lessons learned, in D. Coleman & R. Khanna (eds.), *Groupware: Technologies Applications* (pp. 149-193), Upper Saddle River, NJ, Prentice Hall.
- Nunamaker, J., Dennis, A., Valacich, J., Vogel, D., & George, J. (1991) Electronic meetings to support group work, *Communications of the ACM*, 34(7), 40-61.
- Orlikowski, W., Yates, J., Okamura, K., & Fujimoto, M. (1995) Shaping electronic communication: The metastructuring of technology in the context of use, *Organization Science*, 6(4), 423-444.
- Poole, M. & DeSanctis, G. (1992) Microlevel structuration in computer-supported group decision making, *Human Communication Research*, 19, 5-49.
- Poole, M., DeSanctis, G., Kirsch, & Jackson, M. (1995) Group Decision Support Systems as facilitators of quality team efforts, in L. Frey (ed.), *Innovations in Group Facilitation* (pp. 299-322), Cresskill, NJ, Hampton Press.
- Vreede, G. de, & Bruijn, H. de. (1999) Exploring the Boundaries of Successful GSS Application: Supporting Inter-Organizational Policy Networks. *Database*, 30, (3&4), 111-130.