

Facilitation, Systems, And Users: The Complete Socio-Technical System

Jonathan Trower

Mark A. Fuller

Information Systems Department
Hankamer School of Business
Baylor University
Waco, TX 76798 P.O. Box 98005

Abstract

This paper examines the facilitator, group member, and system roles as a complete socio-technical system. Each of these three components of the sociotechnical system is discussed in terms of the roles that they play within the context of the group meeting. This research draws from previous work on "group roles" to define how these "roles" interact to accomplish effective group per

formance. The development of a concept called the "co-facilitator", being composed of both human and information technology components, is established as a perspective for future system development. Finally, the design of a study in progress is discussed, the intent of which is to explore the roles that each component of the socio-technical system play within the context of longitudinal work groups.

1. What is facilitation.?

Group Support Systems (GSS) are one use of electronic organizational communication which truly link technology and participants into a socio-technical system [28,34], where technologies and people interact in a complex set of actions and reactions. In a GSS, users and facilitators interact through and with computerized information and communication system to do collaborative work. Research on GSS and their impact on group processes continues to grow. [4,21,29] Group outcomes such as project time and group member satisfaction [26,27], idea generation ability [9,20], and group process [37] all have been shown to improve when collaborative technology is used to support a group's activities. However, other studies have demonstrated contrasting findings regarding the outcomes of GSS use [15,35]. One variable which may account for some of these differences is the presence of a facilitator [11,22,26,35], and the roles which the facilitator assumes relative to the group.

Before turning to a discussion on facilitation within our complete socio-technical system, we first need to define facilitation. According to the American Heritage Dictionary of the English Language (1981), to facilitate is "...to free from difficulties or obstacles; make easier..." Webster (1987) simply states that to facilitate is "...to make easy or easier." Practitioner descriptions of group facilitation also establish the facilitator's role as one of strict impartiality, where the facilitator's job is one of a process monitor, and not a content contributor [13]. Recent work by Bostrom, Anson and Clawson (1993) reinforce this view, describing facilitation as a "...set of functions or activities carried out before, during, and after a meeting to help the group achieve its own outcomes. The essential characteristic of facilitation is to help make an outcome easier to achieve."

While agreeing with the spirit of this perspective, the authors feel that a clearer picture of facilitation needs to be established before prescriptive guidelines for facilitation can be made. In order to attain this clarity, the difference between meeting process and meeting content, and what they mean in terms of facilitator action, must be established. This difference is difficult to distinguish in some cases. It can easily be argued that whenever a facilitator changes the process by which a group performs a given task, he is indirectly affecting the content of that task. In this sense, the delineation between process and content is blurred.

Greater clarity in relation to process versus content activities can be achieved by examining facilitation from the perspective of "group roles." A number of classifications on group roles have been developed in the group process literature [1,2,6,32]. This paper will use a classification developed by Benne and Sheats (1948), shown in Table 1.

While this classification scheme was developed in 1948, it is chosen as the basis for this research for a number of reasons. First, this classification scheme is based on extensive observations of groups and the

roles that people within the group assume. Second, the classification scheme is slightly easier to understand and visualize than the more complex three dimensional scheme advocated by Bales, et al. (1979). Third, this particular role scheme is consistent with

the delineation of roles into two primary functions, task and socio-emotional advocated by other authors [23,17]. Finally, this same role classification scheme is being used by current research in the area [36].

Table 1

<i>Task Roles</i>	<i>Description</i>
Initiator Contributor	Recommends novel ideas about the problem at hand, new ways to approach the problem, or possible solutions not yet considered.
Information Seeker	Emphasizes "getting the facts" by calling for background information from others.
Opinion Seeker	Asks for more qualitative types of data, such as attitudes, values, and feelings.
Information giver	Provides data for forming decisions, including facts that derive from expertise.
Elaborator	Gives additional information - examples, rephrasings, implication, - points made by others.
Coordinator	Shows the relevance of each idea and its relationship to the overall problem.
Orienter	Refocuses discussion on the topic whenever necessary.
Evaluator/Critic	Appraises the quality of the group's efforts in terms of logic, practicality, or method.
Energizer	Stimulates the group to continue working when discussion flags.
Procedural Technician	Cares for operational details, such as the materials, machinery, and so on.
Recorder	Provides a secretarial function.
<i>Socio-Emotional Roles</i>	
Encourager	Rewards others through agreement, warmth, and praise.
Harmonizer	Mediates conflict among group members.
Compromiser	Shifts his or her own position on an issue in order to reduce conflict in the group.
Gatekeeper/Expediter	Smooths communication by setting up procedures and ensuring equal participation from members.
Standard Setter	Expresses, or calls for discussion of, standards for evaluating the quality of the group processes. .
Group Observer/Commenter	Informally points out the positive and negative aspects of the group's dynamics and calls for change if necessary.
Follower	Accepts the ideas offered by others and serves as an audience for the &

As indicated in Table 1, a number of different roles exist for group members. If we return to our discussion of meeting process versus meeting content, one possible mapping of Benne and Sheats' group roles to Process and content categories is illustrated in Table 2.

Table 2

<i>Task Roles</i>	<i>Process</i>	<i>Content</i>
Initiator Contributor	X	X
Information Seeker	X	
Opinion Seeker	X.	
Information giver		X
Elaborator		X
Coordinator	X	X
Orienter	X	
Evaluator/Critic	X	X
Energizer	X	X
Procedural Technician	X	
Recorder	X	
<i>Socio-Emotional Roles</i>		
Encourager	X	
Harmonizer	X	
Compromiser	X	
Gatekeeper/Expediter	X	
Standard Setter	X	
Group Observer/Commenter	X	
Follower	X	

It should be noted that the assignment of these role activities to process and content categories is a subjective categorization at the authors' discretion. A variety of other viewpoints in relation to this mapping undoubtedly exist, but that is precisely the point. The process and content labels are too ill-defined and broad to form a basis for studying the facilitator-group interaction. This same point could be made in relation to the activities that the GSS is used to support. In many instances we refer to the impacts of a particular GSS as though those impacts will be constant across different GSS implementations, when in fact each implementation, because of feature differences, may have a significantly different impact on group outcomes. This research examines what roles an active, real group believes a facilitator and GSS to be engaged in. We now turn to an examination of group performance in order to provide a background for understanding the relationship between the facilitator's roles and their impact on group performance.

2. What affects group performance?

Researchers from fields as diverse as communications, social psychology, organization behavior, and management have long investigated what is required for an effective meeting, in other

words, a meeting that meets the objectives of those who convened it. Steiner (1972) noted that a group's potential productivity hinged on the match between the task undertaken by a group and the resources accessible to that group; if that match is poor or the group resources are not taken advantage of, then a group may not perform well. Steiner proposed the following "law" to help explain the poor performance of many groups:

$$\text{Actual Productivity} = \text{Potential Productivity} - \text{Process Losses}$$

Process losses¹ are factors that inhibit group performance [261; for example, by preventing the effective use of group resources. Limited air time, production blocking, incomplete task analysis, excessive socializing, domination, conformity pressure, evaluation apprehension, and coordination problems are all examples of process losses which are discussed by Nunamaker.

I It should be noted that the term process as used in process losses is different from the word process as used in the discussion of process versus content. The former usage refers to factors which inhibit group performance, and is thus a generic term for problems encountered when individuals act in concert. The latter usage (process versus content) refers to the role a facilitator can play, the boundaries of this role being not clearly defined in the literature.

Steiner's (1972) "law" ignores the many benefits which are the driving force behind meetings. Shaw's (1976) modification to Steiner's equation, which does account for possible benefits from groups, states:

Actual	Potential -	Process +	Process
Productivity	Productivity	Losses	Gains

Process gains, or factors that enhance group performance [26], include a group's ability to identify errors, the possibility that the information represented in a group may exceed that of any single group member, the opportunity for synergy to boost the efforts of the group, and the likelihood of gaining group member commitment to a decision that may grow out of their participation in the decision making process. While some research into the dynamics of meetings has involved designing techniques and technology to support efforts to promote process gains and to reduce process losses, little research has been done examining the direct impact of facilitation on meeting effectiveness.

3. Facilitator roles and group performance

Group performance depends on the roles assumed by group members. The exact roles that are necessary for high performance depend on the task in which the group is involved. In general, group performance depends both on individuals assuming roles that are oriented towards accomplishing the group's task (task roles) and on individuals oriented towards maintaining cohesion among the 'group members (socio-emotional roles) [12].

As an example, a problem-solving group without an initiator/contributor may become preoccupied with conventional solutions, solutions which may not be the most effective resolution to their problem. As another example, a problem-solving group composed of many initiators/contributors and no harmonizers, while perhaps generating innovative ideas, may become so locked in conflict that it will never reach its objectives.

Many groups recognize process losses. One attempt groups make to avoid process losses is to employ a facilitator. However, some process losses, like those resulting from limited air time and production blocking, are a consequence of the sequential nature of verbal communication, and neither of these process losses are addressable by a facilitator alone. Attempts to deal with these types of process losses include the application of technologies like GSS. The sections that follow discuss how these process losses can be impacted by facilitator roles, and GSS roles.

3.1 Facilitator roles and incomplete task analysis

Incomplete task analysis results from difficulty in understanding the point being made, or the assumptions and opinions of the group members. As an elaborator, a facilitator serves as a reflective listener who gives additional information in the form of examples and rephrasing, -while also pointing out the implications of points made' by others. In this manner, the elaboration role can serve to counteract misunderstandings of points, assumptions, and opinions. An energizer role can also serve the group in this capacity. By keeping 'the level of group attention high there is less chance that participants will drift away from the discussion, causing problems in remembering and understanding what was said later in the meeting. A coordinator can show the relevance of each idea and its relationship to the overall problem, thus assisting 'the group in understanding; the "big" picture. Finally, the group observer/commentator role, by pointing out the positive and negative aspects of the group's dynamics, can assist the group in analyzing a given problem.

3.1 Facilitator roles and excessive -socializing

Excessive socializing may be dealt with by both the group observer/commentator role, used to point out positive and negative aspects of current -group behaviors, and the **orienter role, that refocuses the group back on track after the problem has been identified.**

3.3 Facilitator roles and domination

Domination of a group by an individual makes the contribution of other group members less likely- to be heard. This' problem, as are other process losses, is recognized by the group observer/commentator role. The information and opinion seeking roles (by seeking more participation from all individuals), in combination with a gatekeeper/expediter role (responsible for setting up procedures, such -as nominal group, technique, to ensure the equal participation of -group members) will help all group members to share their ideas and lesson the impact of any one dominant individual.

3.4 Facilitator roles and conformity pressure

If we view conformity as a group member's reluctance to disclose information based on some internal agenda (e.g. maintaining group harmony by always agreeing), an encourage role assumed by the facilitator can help by providing positive feedback for different viewpoints, while at the same time a harmonizer role can relieve the reluctant group member from the role responsibility of maintaining group harmony. Stated another way, group member conformity (resulting from conflict avoidance) is resolved by the facilitator taking on the conflict resolution duties which would normally be required of other group members for efficient group activity.

3.5 Facilitator roles and evaluation apprehension

A group member seeking to avoid being evaluated by other group members on the basis of his or her statements may be unlikely to submit ideas. Problems of this nature are identified by the group observer/commentator. After identification, the information and opinion seeking roles are used in conjunction with the encourage role to facilitate free exchange.

3.6 Facilitator roles and coordination problems

Coordination problems include difficulty in deciding on a strategy to reach a goal, getting maximum individual performance, and combining individual outputs without wasting time on redundancy. These problems can be dealt through a variety of roles. A combination of evaluator/critic, standard setter, and initiator/contributor roles are responsible for setting the general strategy or agenda of the session. The evaluator/critic and the coordinator roles serve to divide and coordinate tasks so that each group member performs maximally and with no redundancy. The orienter serves to keep the group focused.

If the goal of a facilitator is to reduce process losses, what roles must the facilitator assume to accomplish this? As mentioned earlier, one view of facilitation is that of monitoring process functions only (as opposed to content). Unfortunately, the actual roles from Table I which are cataloged as "process" versus "content" are subjective classifications, and thus normative statements regarding facilitator focus on "process only" roles

become troublesome. This research attempts to look at how groups adopt the facilitator and the technology to enhance performance. It is expected that high performing groups (that eliminate more process losses) will appropriate the facilitator and technology in different ways than low performing groups. It is our intent to identify how this appropriation is different.

4. Facilitation, GSS, and Group Process Losses

Instead of viewing a GSS facilitator as a facilitator operating in a computer supported environment, an alternative (and perhaps more useful) way to think of this is the facilitator and the GSS operating in concert as a "co-facilitator". This co-facilitator accomplishes the same goal as that specified in our facilitator definition, i.e. "to fulfill a set of roles which the group believes will not be adequately addressed during the normal course of group activity."

Both components, human and information technology, can take on group roles. The value added by the information technology derives from its ability to enhance the human facilitator's efforts to take on group roles or from expanding the roles the cofacilitator can perform. From this point on, we will refer to the human component of co-facilitation as the "facilitator," the information technology component as the "system", and the combination human and information

technology as the "co-facilitator." Specific role contributions from the system include:

4.1 Information seeker

The system can store prompts outlined before a meeting or established during a meeting, and display them to meeting participants to indicate the nature of the information they should provide. In addition, the system enhances the human facilitator's capability as an information seeker by allowing more information to be collected in a shorter amount of time. Information technology implemented so that all meeting participants can provide input at the same time supports human parallel processing [11]. This effectively neutralizes group process losses from limited air time and production blocking, sources of process losses which a human facilitator alone is unable to influence.

4.2 Opinion seeker

As an opinion seeker, the human facilitator strives to gather qualitative information which may be difficult to collect in traditional meeting contexts. Even if a human facilitator succeeds in establishing a supportive meeting environment, he cannot completely neutralize process losses from some sources, e.g. domination, conformity pressures, and evaluation apprehension, which may impede candid disclosure. These process losses are avoided through system features such as anonymity and equal participation. In addition, the system component of co-facilitation allows the collection of these qualitative opinions in the form of textual comments, voting results, or stakeholder analyses.

4.3 Information giver

Many meetings see participants using background information that they have prepared in advance and carried with them. A system which provides dynamic access to such resources during a meeting can effectively serve in the role of information giver. Using information technology to access documents electronically eliminates the requirement to bring and distribute a separate copy of the information to each participant; one document can be stored at a site remote from the meeting-place and it can be accessed by all group members. This type of ability can help reduce process losses associated with incomplete task analysis.

4.4 Energizer

GSS are a relatively new implementation of information technology, and as such, meeting participants may perceive them to be leading-edge innovations. Their status as a novel environment for meetings alone often works - to motivate group members. In this manner, the energizing capacity of the system may help reduce process losses like excessive socializing by making task participation more interesting.

4.5 Procedural technician

Many systems incorporate mathematical models to support decision making or provide statistics to describe meeting activities (e.g. voting tools giving a measure of group convergence). This type of activity frees the facilitator from deciding upon, and tracking such details. This type of support can thus impact coordination losses and incomplete task analysis.

4.6 Recorder

By capturing all text based input from a meeting, a system can support the refinement of organizational memory [25] and the integration of information from one meeting to the next. In this context, the system acts to reduce coordination problems associated with groups, especially if the groups meet over time regarding a single project.

4.7 Harmonizer

Many systems provide meeting participants with an additional communication channel that enables them to communicate with the group anonymously [25]. This feature, in addition to simultaneous access, i.e. parallel processing, can work to equalize participation (decreasing domination and conformity pressures) among meeting participants. With this level of support provided by the system, a facilitator can often be a more effective mediator of conflict situations.

4.8 Gatekeeper/Expediter

Some systems can be operated in various modes, each one emphasizing different channels of communication, e.g. verbal or electronic input [25]. Operating a system in the electronic communication mode can completely take over the

gatekeeper/expediter's responsibilities of establishing usage procedures and providing equal access for communication channels.

Simultaneous access to the electronic communication channel can give each meeting participant the opportunity to participate equally. The use of GSS software tools to support various group efforts and the user interface design of each tool effectively establish the communication procedures for the electronic channel. The smooth and equal participation that can result may influence meeting participants to remain supportive of their meeting's outcomes.

5. A study of the socio-technical system

The study discussed in this section attempts to answer some of the issues raised above. Specifically, what types of roles do the three components of the socio-technical system play within the context of group meetings and how do these roles impact the

effectiveness of the group interaction? To answer these questions, it is beneficial to study groups involved in real tasks which meet repeatedly over time to provide increased generalizability to the results. The following sections present the details of the research, including a discussion of the basic framework, method, and expected contributions. The study is planned for execution in the Fall of 1993, and should be completed by December of 1993.

5.1 Basic frameworks

Recent work by Beise, Niederman, and Beranek (1992) outlines several major framework categories within which to study facilitation and technology. Two of these frameworks are discussed in terms of their appropriateness for the study of our complete socio-technical system. The first framework treats aspects of the socio-technical system as input variables, and examines the impact of these input variables on group interactions/processes and outcomes. For the purposes of this discussion we will term these frameworks as Class I. Examples of this framework include Dennis, et al. (1988), Pinsonneault and Kraemer (1989) and McGrath (1984). One example, McGrath, identifies four main classes of variables which influence the "Group Interaction Processes". These variables include the biological, social, and psychological properties of the individuals in the group; the standing group; the physical, sociocultural, technological properties of the environment; and the task/situation. The Dennis model does likewise, although with a slightly different group of input variables. In both of these models, group interaction depends on the each group member's individual characteristics, the group members relationships with one another, the physical and cultural environment, and the task.

A second framework used to discuss the socio-technical system involves looking at a group's unique adoption of technology, and is termed Adaptive Structuration Theory [30]. Adaptive Structuration Theory (AST) involves examining group interactions and outcomes from the perspective not of the intended impacts of exogenous variables (as in Class I), but on adaptive impacts. In essence, the questions we ask using this framework involves not so much what are the impacts of x on y, but how does the group appropriate the group supporting technology for its own personal use? For the purposes of this discussion, we will term AST, and other frameworks which explore interactions from this perspective, as Class II. Implicit in the Class II framework is that appropriation by different groups may result in different group interactions and outcomes. The current research design involves an examination of the socio-technical system from the Class II perspective, i.e. looking at how the group appropriates the technology and facilitator into their structure and function.

5.2 Methodology

The methodology involved in this research is that of a natural experiment. We will define a natural experiment as a situation where subjects are involved in a real task, and the experimenter has the ability to observe the subject's activities under different conditions. In this instance, the subjects are in one of a number of small groups formed within the context of a university classroom environment. Each group is involved in a series of real tasks where the outcome determines part of their course grade. The tasks involved are a series of cases which relate to the course content.

5.3 Research questions

The research questions explored in this research include:

1. What roles do facilitating and non-facilitating group members take on within the meeting context?
2. Do these roles differ across time?
3. How do the facilitator roles, the system roles, and the group member roles influence group satisfaction, group performance, and facilitator influence?

5.4 Subjects

One hundred and fifty undergraduate students will participate in this study (50 subjects per class). All subjects are taking a junior/senior level course in Management Information Systems. Subjects will be organized into five person groups (10 groups per class). Each group will use a GS S to analyze a total of five different cases on the course subject matter during the semester. The results from these cases will be graded based on quality of analysis, and will contribute fifteen percent of the course grade. To reiterate, for the students involved in this exercise, the cases (tasks) are relevant and the results from their analysis will carry real consequences.

5.5 Design

As discussed above, this study uses Adaptive Structuration Theory as its basic research perspective. For this research, no direct manipulation of independent variables (such as group size, etc.) is used, thus the study does not fall into a classical dimensional design (e.g. 3x2 or 4x3). Instead, data analysis will be accomplished by examining group member perceptions on the roles assumed by the three components of our socio-technical system (group members, facilitators, and computer technology), and by treating these variables as independent variables within the study. The relationship between these roles' and a number of dependent variables (e.g. group satisfaction with the process, group satisfaction with facilitation, social influence in the group context, and overall group performance) will then be explored. An additional analysis on the impact of time (since the groups meet for five different tasks over a period of three months) will also be done.

For each group, one member will be trained as the group's facilitator. Training will consist only of instruction on technical facilitation skills (i.e. those skills associated with the technology). This technical facilitation training will consist of a group meeting among the selected facilitators, where the purpose and use of the technology was explained. A brief walk through by a seasoned facilitator will be done on a sample task where the selected facilitating group members participate as regular group members. Following this, each of the facilitating group members will be given time to set up and, run the software themselves and practice their role with the other facilitators as group members. Technical Facilitators will be taught basically four categories of GSS tools: Idea Generation, Issue Consolidation, Issue Prioritization, and Issue Exploration. While the training is brief, recent research [8] indicates a short training period may be adequate for enabling functional group support.

5.6 Environment

This study will be undertaken using GroupSystems, a GSS developed at the University of Arizona. GroupSystems is a PC-DOS based GSS which runs on several Personal Computers (PC's) networked over Novell Netware. The laboratory to be used contains 7 PCs imbedded in a U-shaped configuration. No front screen or group oriented audio visual support will be turned on for this study. Three separate computer

programs from the GroupSystems toolbox will be used in this study:

EBS: Electronic Brainstorming (EBS) is an interactive GSS Media which allows users to read comments from the other group members and add comments of their own. Its primary purpose is Idea Generation. When a comment is added, the participant returns the file to the group and is given a new file with new comments to read. Multiple files are passed among the group members. This Media (although using a different setting) will also be used for the Issue Consolidation aspects of the study, allowing major issues to be of the categorized under several keywords.

GO: Group Outliner (GO) is an interactive GSS Media which allows users to read comments from the other group members and add comments of their own. When a comment is added, the participant will see his comment added to the group list. One file is accessed by all group members simultaneously. The purpose of GO is primarily for Issue Exploration.

Vote: The Voting modules in the GSS used allow for users to interactively prioritize things using a variety of techniques, including, but not limited to, rank order voting, multi-criteria voting, and Likert scale voting. After all members have cast

their ballot, result for the vote can be shown on a front screen or on the facilitator screen.

For this research the teams will be self managed. Each team will decide when they are going to meet, the meeting duration, how they will handle the task, and what tools out of the GSS (if within a computer supported condition) they will use. Usage of the GSS will be mandatory for the computer supported conditions.

5.7 Materials

Five different cases will be analyzed by the groups (it was the same series of cases for all groups). The order that each group does the cases will be randomized across groups. The cases used are those which are normally used at various times within the class to illustrate different principles, and to familiarize the class with the advantages and disadvantages of group work.

Questionnaires will be administered to the groups following each of the case analysis. The post-session questionnaire includes a manipulation check for the role of the Facilitator(s) and the Perceived Experience of the Facilitator(s). For the Role manipulations

subjects were asked to name each participant and indicate who performed the Technical and Group Process facilitation roles.

The post-session questionnaires also includes the following measures: Participant Influence - a 100 point distribution measure used to create a deviation score (where deviation is measured from the expected value based on each group member receiving an equal percentage of the total possible influence points). Facilitator Power - based on the French and Raven (1959) five bases of power (the ten items are adapted from Hinken & Schriesheim, 1989 - higher numbers indicating more power); Facilitator Role Overload (single 7-point Likert-style item adapted from Neterneyer, Johnston, & Burton, 1990 - higher score indicating overload); Perceived Percentage of Comments (this 100-point distribution measure is then used to construct the Facilitator Perceived Percentage of Comments measure); and Outcome and Process Satisfaction (both measured by single 7-point Likert-style items - higher scores indicating greater satisfaction), and Role Assumption for each member of the work group [5].

5.8 Procedure

Since the teams will be self managed, and since we are interested in examining how the various teams adopt the technology (following AST), no precise agenda will be followed by each team. Each group's facilitator will be given a number of faculty endorsed room reservation signs which allow a group to reserve a room (where the GSS software was housed) for flexible time periods. All that is **necessary for the** room reservation is the posting of the sign on the door to the lab. At other times, the room is open for general use. Groups will be instructed to reserve the room for their meetings one day in advance of the scheduled time.

6.0 Conclusion

Facilitation of groups within the context of computer supported technology environment is a complex interaction dependent upon a number of factors. This paper attempts to explain how components of this complete socio-technical system (composed of the facilitator, the group members, and the technology) interact in terms of social influence, from an established group roles perspective. The goal of this research is to answer the challenge put forth by Bostrom. et al. (1991), which calls for research in the domain of identifying what aspects of a facilitator

make him/her successful within the group context. We extend this question, and ask what interaction between the components of the complete sociotechnical system dictates group success. Hopefully this research is a step in that direction.

References

- [1] Bales, R.F. (1958). Task roles and social roles in problem-solving groups. In E. E. Maccoby, T.M. Newcomb, & E. L. Hartley (Eds.), *Readings in social psychology*. New York: Holt, Rinehart, & Winston.
- [2] Bales, R.F., Cohen, S.P., & Williamson, S.A. (1979). *SYMLOG: A system for the multiple level observation* of groups. New York: Free Press.
- [3] Beise, C. M. Niederman, F., & Beranek, P. M. (1992). Facilitating technology - supported group work: A new category of IS personnel. *Computer Personnel: ACM Press*, 149 6-15.
- [4] Benbasat, I., DeSanctis, G. and Nault, B. R. (1992). Empirical research in managerial support systems: A review and assessment. In A. Whinston's (Ed.) (forthcoming).
- [5] Berne, K.D., & Sheats, P. (1948). Functional roles of group members. *Journal of Social Issues*, 4(2), 41-49.
- [6] Borman, E. G. (1975). *Discussion and Group Methods: Theory and Practice* (2nd ed.). New York: Harper & Row.
- [7] Bostrom, R., Anson, R., & Clawson, V. (1993). Group facilitation and group support systems. In L. Jessup and J. Valacich (Eds.), *Group Support Systems: New Perspectives* (pp. 146-168). New York: Macmillan Publishing Company.
- [8] Chudoba, K. (1993). *Use of an Electronic Meeting System Over Time: An Empirical Investigation*. Unpublished doctoral dissertation. University of Arizona.
- [9] Connolly, T., Jessup L. M., & Valacich, J. S. (1990). Effects of anonymity and evaluative tone on idea generation in computer-mediated groups. *Management Science*, 36, 689-703.
- [10] Dennis, A. R., George, J. F., Jessup, L. M., Nunamaker, J. F. Jr., & Vogel, D. R. (1988). Information technology to support group work. *Management Information System Quarterly*, 4, 591-624.
- [11] Dennis, A. R., Nunamaker, J. F. Jr., & Vogel, D. R. (1991). A comparison of laboratory and field research in the study of electronic meeting systems. *Journal of Management Information Systems*, 7(3), 107-135.
- [12] DeSanctis, G. L. & Gallupe, R. B. (1987). A foundation for the study of group decision support systems. *Management Science*, 33, 589-609.
- [13] Doyle, M. & Straus, D. (1982). *How to Make Meetings Work*. New York: Jove.
- [14] French, J. R. P., & Raven, B. (1959). The bases of social power. In D. Cartwright & A. Zander (Eds.),

Group dynamics. (pp. 150-167). New York: Harper & Row.

[151] George, J. F., Easton, G.K., Nunamaker, J.F. & Northcraft, G.B. (1990). A study of collaborative group work with and without computer-based support. *Information Systems Research*, 1(4), 394-415.

[16] Guralnik, David B. (1987). *Webster's New World Dictionary of the American Language*. New York: Warner Books Inc.

[17] Gustafson, D. P. & Harrell, T. W. (1970). A comparison of role differentiation in several situations. *Organizational Behavior and Human Performance*, (5), 299-312.

[18] Hinkin, T. R., & Schriesheim, C. A. (1989) Development and application of new scales to measure French and Raven (1959) bases of social power. *Journal of Applied Psychology*, (74), 561-567.

[191] Hirokawa, R. Y. & Pace, R. A. (1983). A descriptive investigation of the possible communication-based reasons for effective and ineffective group decision making. *Communication Monographs*, 50, 363-379.

[20] Jessup, L. M. & Tansik, D. A. (1991). Decision making in an automated environment: The effects of anonymity and proximity with a group decision support system. *Decision Sciences*, 22, 266-279.

[211] Jessup, L. M. & Valacich, J. S. (1993). *Group Support Systems*. New York: MacMillan.

[221] McGoff, C.J., & Ambrose, L. (1991). Empirical information from the field: A practitioners' view of using GDSS in business. In J.R. Nunamaker, Jr (Ed.), *Proceedings of the Twenty-Fourth Annual Hawaii International Conference on System Sciences*, Vol. 3 (pp. 805-811). Los Alamitos, CA: IEEE Computer Society Press.

[231] McGrath, J. E. (1984). *Groups - Interaction and Performance*. Englewood Cliffs, N.J. Prentice-Hall.

[24] Morris, W. (1981). *The American Heritage Dictionary of the English Language*. Boston: Houghton Mifflin Company.

[25] Neterneyer, R. G., Johnston, M. W., & Burton, S. (1990). Analysis of role conflict and role ambiguity in a structural equations framework. *Journal of Applied Psychology*, (75), 148-157.

[26] Nunamaker, J. F. Jr., Dennis, A. R., Valacich, J. S., Vogel, D. R., & George, J. F. (1990). Electronic meeting systems to support group work: Theory and practice at Arizona. Working Paper, University of Arizona.

[27] Nunamaker Jr., J. F., Vogel, D., Heminger, A., Martz, B., Grohowski, R., & McGoff, C. (1989) "Experiences with IBM with Group Support Systems: A Field Study," *Decision Support Systems*, 5, 2 (1989), 183-196.

[28] Pasmore, W. A. (1988). *Designing effective organizations: The social technical system perspective*. New York: John Wiley & Sons.

I Pimonneault, A. and K. L. Kraemer, "The Impact of Technological Support on Groups: An Assessment of the Empirical Research," *Decision Support Systems*, 5:2, 1989.

III

[30] Poole, M. S., & DeSanctis, G. (1990). Understanding the use of group decision support systems: The theory of adaptive structuration. In C. Steinfield and J. Fulk (Eds.), *Organizations and communication technology* (pp. 173-193). Beverly Hills: Sage Publications.

[31] Shaw, M. E. (1976). *Group Dynamics: The Psychology of Small Group Behavior* (2nd ed.). New York, McGraw-Hill.

[32] Slater, P.E. (1955). Role differentiation in small groups. *American Sociological Review*, 20, pp. 300-310.

[331] Steiner, I. D. (1972). *Group Process and Productivity*. New York: Academic Press.

[34] Trist, E. L., and K. W. Bamforth (1951). Some social and psychological consequences of the long-wall method of coal-getting. *Human Relations*, 4, 3-38.

[35] Watson, R., DeSanctis, G., & Poole, M. S. (1988). Using a GDSS to facilitate group consensus: Some intended and unintended consequences. *MIS Quarterly*, 3, 463-478.

[36] Zigers, I. and K. A. Kozar (1992), "An Exploratory Study of Roles in Computer-Supported Groups", Working Paper, University of Colorado, Boulder.

[37] Zigers, I. M. S. Poole and G. L. DeSanctis, "A Study of Influence in Computer Mediated Communication," *MIS Quarterly*, 12,4 (1988), 625-644.

91

Filename: facilitation systems users complete socio tech
Directory: C:\Documents and Settings\Administrator\My Documents\ETM 5221
Virtual Teaming Class\Week 3 Facil Skills
Template: C:\Documents and Settings\Administrator\Application
Data\Microsoft\Templates\Normal.dot
Title:
Subject:
Author:
Keywords:
Comments:
Creation Date: 4/11/2002 2:04 PM
Change Number: 2
Last Saved On: 4/11/2002 2:49 PM
Last Saved By: Paul E Rossler
Total Editing Time: 45 Minutes
Last Printed On: 4/11/2002 2:49 PM
As of Last Complete Printing
Number of Pages: 10
Number of Words: 5,905 (approx.)
Number of Characters: 33,664 (approx.)