

User Satisfaction with System, Decision Process, and Outcome in GDSS Based Meeting: An Experimental Investigation

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Abstract

Performance of groups using group decision support systems (GDSS) has been an issue debated over the last two decades. Yet, there is need for more focused research on subjective variables such as the satisfaction of team members with the experience of using a GDSS. This research focuses on different types of user satisfaction in GDSS based meetings: system satisfaction, process satisfaction, and outcome satisfaction; and explores interrelationships among them. The findings from a laboratory experiment demonstrate that group members' satisfaction with system impacts the satisfaction with decision process and outcome. Satisfaction with decision outcome is also influenced by satisfaction with decision making process. Another interesting set of findings is the relationships between performance of groups members engaged in GDSS based meetings and their satisfaction with system, process, and outcome. Decision time has negative effect on system satisfaction and positive effect on process satisfaction. Thoroughness of decision making has positive effect on outcome satisfaction. The findings of the research have major implications for planners and facilitators of GDSS based meetings.

1. Introduction

In attempting to respond to the rapid increase in environmental uncertainty, organizations have moved towards more flexible forms and make greater use of task-teams and groups. The increased availability and lower costs of information and communication technologies have also led to its greater use for organizational decision support, especially for group decision making activities. Group decision support

systems (GDSS) and group support systems (GSS) combine communication, computer, and decision support technologies to facilitate the formulation and solution of unstructured problems by a group of people.

Performance of groups using GDSS and other collaborative technologies has been an important area of research in information systems (IS). Studies have examined performance through efficiency and effectiveness variables and have attempted to understand how better structuring of group processes through the use of computer support can enhance team performance. Fjermestad and Hiltz [10] reviewed about 200 published papers on GDSS/GSS and found that among the outcome factors, 'subjective satisfaction' was the second most studied, next only to group effectiveness. Subjective satisfaction included process satisfaction, decision satisfaction, and general satisfaction.

Reinig, Briggs, Shepherd, Yen, and Nunamaker [32] argue that GSS-supported meetings may sometimes leave the member dissatisfied due to the loss of "affective reward" which is often associated with a challenging meeting. The low richness of the media is another important factor in influencing the satisfaction of the members in GSS-supported groups. Continued use of a particular IS depends considerably on the satisfaction of the individuals using the system. In the context of GSS, the infusion of the system in an organization depends greatly on the satisfaction obtained by its users. It is thus imperative on IS researchers to conduct in-depth study on member satisfaction in GSS-supported meetings. This paper is an attempt in that direction.

The following section reviews literature on GSS supported group work, performance of groups using GSS, and satisfaction as a measure of performance in groups. Next, we discuss our theoretical framework

and present our research questions. We then describe the research methodology, present the results, and discuss the implications of this research.

2. Literature Review

2.1 GSS Supported Group Work and Group Performance

Organizations use groups for decision making as they can provide more sophisticated input to an individual decision maker and also bring with them the diversity of knowledge and skills. GSS, researchers believe, is instrumental in assisting groups, particularly policy makers in solving nebulous or ill-defined problems. IS researchers have shown keen interest in GSS supported group work and a large number of published work exists on various research issues involving GSS [see [10] and [11] for a detailed review]. A major focus of GSS research is to assess the impact of the use of the technology on the performance of groups.

Group performance has been assessed through efficiency measures (e.g., decision time), effectiveness measures (e.g., decision quality), satisfaction measures (e.g., satisfaction with decision process and outcome), participation and consensus. Using more than 200 published papers, Fjermestad and Hiltz [10] found that group effectiveness measured in terms of decision quality, creativity, etc. was the dependent variable given the most attention, followed by satisfaction.

Studies have compared the performance of face-to-face (FtF) and GSS-supported teams ([4] [12] [24] [26] [35]). Among other variables, these studies have measured communication effectiveness, quality of the decision process, number of alternatives generated [4]; decision speed, confidence, process satisfaction [12]; satisfaction with group performance, comfort with communication mode, satisfaction with other member's participation [24]; idea quality, decision quality, time to consensus [26]; participation, information sharing, task satisfaction [35]. Although satisfaction has been examined in many GSS studies, with the exception of very few works ([2] [31]), there is a dearth of research on what causes various types of satisfaction in GSS supported group work. The next sub-section of the paper discusses satisfaction in GSS context.

2.2 Satisfaction

Fjermestad and Hiltz [10] found that around 25% of the studies analyzed subjective satisfaction which included process satisfaction, decision satisfaction,

general satisfaction, and so on. Satisfaction of users with an information system is an effective measure of the success of the system [16]. It is a surrogate measure of system effectiveness ([23] [28]). Bailey and Pearson [1] state that "satisfaction in a given situation is the sum of one's feelings or attitudes toward a variety of factors affecting that situation" (page 531). Hiltz and Johnson [13] examined satisfaction in the context of computer mediated communication system (CMCS) and found that satisfaction has four major dimensions which are satisfaction with the system interface, with system performance, with inexpressiveness of the system, and with the mode of communication.

The two most widely examined dimensions of satisfaction are decision satisfaction and process satisfaction. Decision satisfaction measures "the contentment of the group with its decision and affects the commitment of the group to its decision" ([29], page 164), while process satisfaction measures the contentment of the group with the method and manner in which the group arrived at the said decision. Additionally, in this research we explore satisfaction with system which refers to the contentment of the group with the particular GSS application used.

Some studies have examined these variables in the non-GDSS context. Rao [30] found that there are differences between listener satisfaction and speaker satisfaction in a teleconferencing situation. Cass, Heintz, and Kaiser [3] compared non-GSS groups and GSS-groups and found that non-GSS groups expressed greater satisfaction in both process and outcomes. But the authors reasoned out that unfamiliarity with technology could have negatively influenced user satisfaction.

Reinig [31] has proposed and tested a causal model of subjective satisfaction in which 'perceived net goal attainment' determines the satisfaction with meeting outcome and satisfaction with meeting process. This model was based on goal setting theory. Although the research supported the general model and the influence of satisfaction of meeting decision on satisfaction of meeting process, it did not fully support the relationship between relative individual goal attainment and satisfaction with meeting process except through satisfaction with decision outcome.

Briggs, Vreede, and Reinig [2] have modified the above mentioned causal models of satisfaction to include the influence of perceived net value of goal attainment on satisfaction with meeting outcome (SO) and satisfaction with meeting process (SP) along with the impact of SO on SP, thus calling it a 'satisfaction attainment theory'.

These causal models focus predominantly on the influence of perceived goal attainment on satisfaction.

It can be argued though, that the performance in group work influences group members' perception of goal attainment and hence impacts their satisfaction. Secondly, the existing work on satisfaction usually precludes the importance of satisfaction with the system per se. The hardware, software, and the specific setting of GSS play an important role in making the user feel satisfied (or dissatisfied) with the system, especially in an 'end-user' context.

3. Theory Development and Research Hypotheses

In this research we explore how the performance of GDSS supported groups influences various dimensions of satisfaction. We focus on three indicators of group performance, namely decision time, thoroughness of decision making, and number of iterations in group decision process.

GSS-supported groups have often been criticized for taking more time than other groups, though studies have proved either ways. Researchers have compared decision time in GSS and other conditions ([9] [12] [13] [17]) and some of them have concluded that GSS groups take more time to reach a final decision than non-GSS groups. Unfamiliarity with task and system may contribute to the increase in decision time for GSS supported groups. When GSS interface is not understandable and easy to use, member are less likely to participate in the group process spontaneously and decision time may increase. A GDSS application in which members take more time to reach decisions is likely to be perceived as unproductive and time wasting, thereby lowering their satisfaction with the system [13]. However, because of the paucity of non-verbal cues in GSS meetings, members may need more time to understand the preferences of their partners. A speedy decision may be perceived as rushing through the decision process, thereby forcing some members to compromise with inadequate evaluation of decision situation. We, therefore, expect that decision time will have a negative impact on satisfaction with system and a positive impact on satisfaction with decision making process. Hence:

H1a: In a GDSS-supported group decision, higher the decision time, the lower is the satisfaction of a group with the system used by its members.

H1b: In a GDSS-supported group decision, higher the decision time, the higher is the satisfaction of a group with the decision making process.

Although Simon [34] conceptualized decision making predominantly as a linear process, other models of decision making (such as garbage can

model) suggest iterations in decision-making process ([6] [8] [22] [27]). Sengupta and Te-eni [33] argue that "the number of iterations indicates the extent to which a subject formulated and revised his or her own decision strategy." In the context of GDSS supported meetings, it is expected that group members would prefer to get engaged in a decision process that involves few revisions decision strategies. Few studies have examined the number of iterations in GSS supported groups ([17] [36]). Number of iterations that a group takes to arrive at the final decision is a reflection of the effort spent to reach group's final decision and we expect that it influences satisfaction of the group with system and decision process. Iterations in decision process may suggest that the group members are not in harmony with the group decision. In the context of GDSS supported decisions, the members may also perceive that iterations had to be undertaken because the system functions could not be understood easily. We, thus, expect that increase in iterations will have negative impact on the satisfaction of group members with the decision process and system. Thus,

H2a: In a GDSS-supported group decision, higher the number of iterations, the lower is the satisfaction of a group with the system used by its members.

H2b: In a GDSS-supported group decision, higher the number of iterations, the lower is the satisfaction of a group with the decision-making process.

Thoroughness or comprehensiveness of decision making is a measure of group decision effectiveness [10]. When group members evaluate wide range of issues before making the final decision, they are likely to perceive that the decision outcome is comprehensive and relevant to majority of the members. As a consequence, group members' confidence on the decision outcome is expected to improve. We, therefore, expect that thoroughness of decision making has positive influence on group members' satisfaction with decision outcome. Hence:

H3: In a GDSS-supported group decision, greater the thoroughness of decision making, the higher is the satisfaction of a group with the decision outcome.

Ives, Olson, and Baroudi [16] indicated the existence of a logical structure involving satisfaction with "user's understanding of systems," "training provided users," and "user's participation." However, in the context of GDSS supported meetings, these three scales can be associated with two types of satisfaction: satisfaction with system and satisfaction with decision making process. Training provided to decision makers to use the GDSS and the decision makers'

understanding of the system are the indicators of satisfaction with the system; and the participation of the group members in the decision making process is an indicator of satisfaction with decision making process. We expect that group members' understanding of the GDSS and the ease of use of the GDSS application are the predictors of GDSS users' participation with the decision making process. Hence:
H4: In a GDSS-supported group decision, higher the satisfaction with the system, the higher is the satisfaction with decision making process.

Ives, Olson, and Baroudi [16] found that confidence in system was an important dimension of user's satisfaction with information product. In a similar manner, we present that group members who are more satisfied with the GDSS application are likely to be more satisfied with the decision outcome. Hence:
H5: In a GDSS-supported group decision, higher the satisfaction with the system, the higher is the satisfaction with decision outcome.

When members of a group are satisfied with the decision making process, they are more likely to be satisfied with the decision. Studies have examined process satisfaction and have found various contexts in which members are more satisfied with the group decision process ([7] [9] [12] [14] [19]). Reinig [31] views satisfaction with GSS meeting outcome as a goal of GSS meeting and demonstrated that individuals with higher satisfaction with outcome had higher satisfaction with meeting process. However, we propose an alternate explanation for the relationship between satisfaction with decision process and outcome. When GSS users perceive that the participation in the meeting is extensive, they are likely to expect that the decision outcome is a collective choice and are more likely to be satisfied with the decision. Additionally, when the group decision makers perceive that the meeting process did not prompt them to rush through decision making activities and the group members were able to assess diverse issues before reaching the final decision, their perception of the decision quality is likely to be high. In other words, we propose that in GDSS meetings, satisfaction with decision making process is a predictor of the satisfaction with the decision outcome. Hence:
H6: In a GDSS-supported group decision, higher the satisfaction with the decision making process, the higher is the satisfaction with decision outcome.

The research model based on the above hypotheses is shown in figure 1.

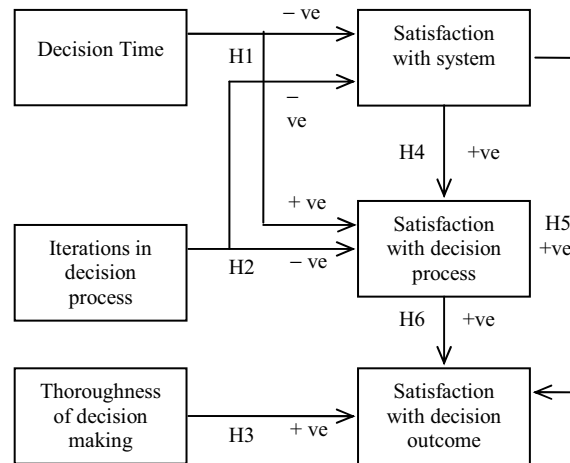


Figure 1: Research Model

4. Research Method

This section of the paper discusses the following: research design and subjects, task identification, variable identification, and a description of an experiment.

4.1 Research Design and Subjects

We conducted a laboratory experiment to test our hypotheses. The subjects in the experiment were undergraduate business students of a large state university in the mid-western part of the U.S. A total of 270 students participated in the experiments resulting in 54 teams of 5 members each; such a large number of groups have been quite infrequent in previous GSS research [10]. Each study participant received a waiver for one assignment in a mandatory introductory course in information systems. Participation was voluntary, and the subjects could withdraw at any time during the experiment. Subject to the time constraints indicated by the students, participants were randomly assigned to the groups in the experiment. All subjects were experienced with information technology, including basic office-type skills as well as internet/Web skills as measured by a questionnaire completed by them.

4.2 Task Identification and Description

A number of different tasks were discussed by the researchers. However, given that the participants were students, it was felt that the involvement of the students would be stronger if the task was one to which they would easily relate. Accordingly, the task chosen

in this research was the development of a group level judgment policy on the attributes of MBA admission. Each participant identified and prioritized a fixed set of attributes of MBA programs that a typical undergraduate student is likely to consider while evaluating various MBA admission options. Each participant expressed his/her judgment policy by allocating 100 points among the attributes. The participants received feedback on their own judgment policy (i.e. attribute weights) and that of the group as a whole. Each individual in the group could then revise his/her judgment policy until a jointly decided judgment policy is reached. Based on the attribute weights allocated by a group, a rank-ordered list of schools was generated following the principle of the "simple additive weighting" method ([5] [15] [20]). The rank ordered list of schools produced in this approach was, thus, a consequence of the decision made on the selection of attributes and allocation of their weights. By examining the combination of attribute weights and rank-ordered list of schools, group members could develop an idea about how schools are rated on various attributes. If a group was satisfied with the combination of attribute weights and rank-ordered list of schools, the decision-making process could come to an end; otherwise, attribute weights had to be revised and a new rank-ordered list of schools generated. This would result in iterations in decision making process. The decision task chosen for this research has significant similarity with the techniques followed in social judgment theory (SJT) paradigm [21].

4.3 Variable Identification

This study examined the influence of three independent variables on three dependent measures. The first independent variable was decision time which was measured as the elapsed time between the start and end of decision-making activities of a group. The number of iterations in decision making was the second independent variable. In this experiment, a group could iterate through the decision making process for a maximum of seven times. The thoroughness of decision making was measured as the number of attributes selected by the group. As noted, a fixed set of 18 attributes was presented to the participants. Group members allocated weights to one or more attributes in the list. The selection of larger number of attributes by group members from this set can be viewed as an attempt to analyze the MBA programs from various perspectives. The more the number of attributes considered by the participants, the greater is the breadth of decision making being sought.

Three different satisfactions with GSS meetings were measured and they are identified in details in Appendix A. Satisfaction with the decision making process was assessed by taking the average of the first 5 items (items 6 and 7 were used to assess predictive validity which is discussed later) using a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). A second dependent variable was satisfaction with system. This was measured by 5 items (item 6 was used to assess predictive validity) using a Likert-type scale ranging from 1 (almost never) to 5 (almost always). The third dependent variable was satisfaction with decision outcome. It was assessed by the taking the average of the first 6 items (item 7 was used to assess predictive validity), using a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree).

4.4 Experimental Procedures

The experimental sessions were carried out over a ten-day period. The group members were engaged in VisionQuest based electronic meetings and were subjected to a structured task (discussed in points # 1 through # 9 later on). Each group had a coordinating workstation. The participant using the coordinating workstation had to do some additional tasks (discussed in points # 4 and # 5 a little later). Face-to-face communication among the group members was discouraged. However, communication between the coordinator (i.e. the participant with coordinating workstation) and other members of the group was allowed but only at some specific steps to indicate transition from one activity to another (such as, end of browsing the Intranet web pages, end of allocation of weights, beginning next iteration and ending of experiment). Each experiment session could last up to two hours, and a maximum of four groups could participate in a session. Three sessions were scheduled on each day.

Pilot sessions were held before conducting the actual experiment sessions. The participants in the pilot sessions did not have any difficulty in working with the system. Based on the performance of the participants in the pilot sessions, it was decided that a two-hour session would be adequate for conducting the study. Most of the participating groups in the pilot tests as well as in the actual experiments completed their task well within two hours.

A systems specialist was present to clarify any questions about the system and/or the task. In the event of any malfunctioning of the system, the systems specialist would attend to the problem. However, no

major malfunctioning of system occurred during any session. The experimental procedure was as follows:

1. Participants completed a consent form. They could withdraw from the study even now.
2. Participants were shown a video presentation about the experiment.
3. With the help of Netscape, each participant browsed the Intranet on MBA programs and attributes for school selection. Additionally, half of the groups had access to an additional information page on the typical judgment policy of some prior groups on the attributes of MBA program.
4. With the help of the "allocating tool" within VisionQuest software, each participant assigned 100 points among one or more attributes. Once all team members had allocated weights, the coordinator instructed the system to display group results. Each member could view both individual and group weights. The system also displayed the dispersion in weights submitted by group members. After viewing the dispersion and mean weights for each attribute, the member(s) could change their allocation of weights. This process of readjustment of weights would go on till group members agreed upon the group level weights that could be submitted to the system.
5. At this point, the coordinator exported these average weights to a database in Microsoft Access and instructed the database program to compute rankings of the schools. Finally, the rank ordered list of schools was imported back to VisionQuest from the database.
6. Participants viewed the rankings of the schools.
7. Participants electronically voted using VisionQuest to confirm that the judgment policy expressed in terms of selected attributes and their weights was final.
8. If four or more group members voted in favor of the judgment policy, Step 9 was performed, otherwise Steps 3 through 8 were repeated. A maximum of seven iterations was allowed.
9. Each participant browsed the web page titled "End of Experiment" and completed the questionnaire. The questionnaire completed by each participant provided data on his or her satisfaction with the decision making process, decision outcome, and system. In addition, some demographic data such as age, gender, GPA, and computer skill were also collected with the help of the questionnaire.

The participants were not allowed to take the instruction sheet with them after the experiment and were advised not to discuss about the experiment with their classmates.

5. Results

5.1 Reliability and Validity

Reliability assessments were calculated for the self-reported variables of satisfaction with the decision-making process, satisfaction with system, and perceived decision quality. Four experts on group decision-making and attitude measurement conducted an initial review of these measures to establish their face validity. Subsequently, Cronbach Alpha coefficients were calculated. Since the measurement scales used had not been tested and validated before and in view of the exploratory nature of this research, a cut-off value 0.70 was considered acceptable [25]. An alpha of 0.823 was found for satisfaction with system, 0.715 for satisfaction with the decision making process, and 0.773 for satisfaction with decision.

The content validity is the "representativeness or sampling adequacy" of the content of an instrument. Each item of each instrument was carefully examined to ensure its relevance to the property of the construct being measured. In addition, the evidence of content validity was established by examining the correlation matrix of the indicator variables for a construct [25]. For the satisfaction with system scale the coefficients were 0.298 or better (p values were less than 0.0001). For the satisfaction with the decision-making process scale, with the exception of one case, all the inter-item correlation coefficients were 0.20 or better (p values were 0.002 or better). For satisfaction with decision scale, all coefficients were 0.20 or better (p values were 0.001 or better).

In order to establish construct validity of the measures, we followed two widely used methods suggested by Kerlinger [18]. We examined the correlations between the corrected total score and each item score and conducted factor analyses. We subtracted each item score from the total of the scores of each measure. The corrected total score, thus obtained, was correlated with individual item scores. The correlations of the five individual items measuring system satisfaction with the corrected total score of the instrument ranged from 0.46 to 0.74 with significance levels better than 0.0001. The correlations of the five items representing process satisfaction with the corrected total score of the instrument ranged between 0.40 and 0.54 with significance levels better than 0.0001. For the six items representing satisfaction with decision, the corresponding correlations ranged between 0.47 and 0.57 with significance levels better than 0.0001. The correlations of individual items with corrected total scores of the measures support the construct validity of the measures. However, the

underlying assumption was that the total score of each instrument was valid.

One of the most powerful methods of construct validation is factor analysis. We conducted factor analysis employing VARIMAX orthogonal rotation for each instrument. The factor analysis of five items representing satisfaction with system loaded on a single factor and resulted in factor loadings ranging from 0.609 to 0.860. The factor analysis of five items representing satisfaction with the decision-making process scale produced two factors representing satisfaction with participation and pace of the process respectively. The factor loadings for the satisfaction with participation ranged from 0.766 to 0.778, while those for satisfaction with pace of the process ranged from 0.821 to 0.895. Both these factors contribute to the satisfaction with decision making process. The factor analysis of six items representing satisfaction with decision also resulted in two factors representing satisfaction with decision quality and satisfaction with usability of decision. The factor loadings for satisfaction with decision quality ranged between 0.810 and 0.828, while those for satisfaction with usability of decision ranged between 0.810 and 0.813. Both decision quality and usability of decision contribute to the satisfaction with decision outcome. Based on these analyses, it was determined that all of the self-reported scales possessed sufficient construct validity.

Predictive validity was evaluated by examining the correlation between the pre-defined/emergent multi-item scale (measuring the construct) and a second overall measure of the construct. For satisfaction with system item 6 measured the overall satisfaction with system. The correlation between the 5-item scale and the overall satisfaction with system item was 0.516 ($p < 0.0001$) indicating quite a reasonable level of predictive validity. The five-item satisfaction with the decision making process scale correlated with a second measure (items #6 and 7); satisfactory predictive validity was achieved ($r = 0.570$ with #6 and 0.596 with #7, $p < 0.0001$ for each). For satisfaction with decision outcome, the corresponding correlation with the overall satisfaction with decision item (#7) was 0.521 ($p < 0.0001$) indicating the reasonable predictive validity of the scale.

To examine discriminant validity, the five indicator items measuring satisfaction with system were combined with the five indicator items of satisfaction with decision process and six indicator items measuring satisfaction with the decision. A joint factor analysis with VARIMAX rotation involving this combined set of 16 indicator items produced four

different factors that could be identified as “satisfaction with the system,” “satisfaction with the decision making process,” “satisfaction with decision quality,” and “satisfaction with usability of decision.” No indicator variable cross-loaded strongly on more than one factor. As noted, both “satisfaction with decision quality” and “satisfaction with usability of decision” contribute to the satisfaction with decision outcome. The results, thus, demonstrate reasonable discriminant validity for three different dimensions of satisfaction.

5.2 Hypothesis Testing

Regression analyses were employed to test the hypotheses using a level of significance of 0.05. The general linear model (GLM) procedures of SAS were used to analyze the data from two different group types (27 groups using the normal system and 27 groups using additional information pages on top seven attributes selected by prior students) in this study. We carried out statistical test to ensure that the dependent variables (i.e. satisfaction with system, process and outcome) did not vary significantly across the two group types. The results of hypotheses test are presented in Table 1. Although our regression model did not include group type as a control variable, in a separate set of regression analyses, we tested our hypotheses using group type as a control variable. We did not find any major difference between the findings of these two sets of regression analyses.

The analyses demonstrate statistically significant relationships between decision time and satisfactions with system and decision process lending support to hypotheses 1a and 1b respectively. Thoroughness of decision making has statistically significant relationship with satisfaction with decision outcome, thus validating hypothesis 3. We also found a weak support ($p=0.062$) for the relationship between number of iterations and satisfaction with decision making process (hypothesis 2b). However, we did not find any support for the proposed relationship between number of iterations and satisfaction with system (hypothesis 2a). We found strong support for hypotheses 4 through 6. The results demonstrate that satisfaction with system impacts satisfaction with decision process (hypothesis 4); and satisfaction with decision outcome is influenced by both satisfaction with system (hypothesis 5) and satisfaction with decision process (hypothesis 6).

Table 1: Regression Results [Hypotheses Test 1-6]

Dependent Regressor	Satisfaction with system		Satisfaction with decision making process			Satisfaction with decision outcome		
	Decision Time	-0.015 ^{****} (0.0055)		0.010 ^{**} (0.0039)				
Number of iterations		0.028 (0.0524)		-0.065 [*] (0.0343)				
Thoroughness of decision making						0.030 ^{**} (0.0136)		
Satisfaction with system					0.427 ^{****} (0.0914)		0.261 ^{****} (0.0950)	
Satisfaction with process								0.416 ^{****} (0.1338)
<i>R</i> ²	0.1438		0.3270			0.4832		
<i>F</i>	4.28		8.10			11.45		
<i>N</i>	54		54			54		
<i>Hypothesis Supported?</i>	<i>H1a:Yes</i>	<i>H2a:No</i>	<i>H1b:Yes</i>	<i>H2b:Yes [Weak]</i>	<i>H4:Yes</i>	<i>H3:Yes</i>	<i>H5:Yes</i>	<i>H6:Yes</i>
* p<0.10 ** p<0.05 *** p<0.01 ****p<0.001 Standard errors in parentheses								

6. Discussion

In this research we had two sets of interesting findings. First, we demonstrated that the performance of GDSS supported meetings influence the satisfaction of the group members. When decision time increases, the system appears to be unproductive and group members' satisfaction with system decreases. This reconfirms Hiltz and Johnson's [13] findings that system performance is an important factor of the satisfaction with CMCS. However, when GDSS meetings end quickly, members may perceive that they are rushed through the process and different alternatives of the decision situation are not evaluated adequately. This is evinced in the positive relationship between decision time and members' satisfaction with process.

As proposed, we found a positive relationship between thoroughness of decision making and group members' satisfaction with decision outcome. Although, thoroughness of decision making involves both breadth and depth of analysis of the decision situation, in this paper we focused only on the breadth of decision making (measured as the number of attributes). Assessment of the relationship between the depth of decision making and user satisfaction is an interesting research area that will be pursued in future.

Another interesting aspect of this research is the exploration of the major dimensions of user satisfaction in GDSS supported meetings. Prior GDSS/GSS research has predominantly focused on process and outcome satisfaction [10]. Very few GDSS research (such as, [13]) has studied satisfaction with system as a separate construct. In this research, we treated satisfaction with system, decision process,

and outcome as three separate constructs. We proposed and validated the interrelationships among these constructs.

The findings of this research imply that while analyzing GDSS based meeting data, the performance and satisfaction variables should be treated separately. In GDSS based meetings, group task, group characteristic, treatment conditions etc. impact the performance of the group members. It is the performance of the members that perhaps influences their satisfaction with system, process, and decision outcome. Another implication of this research is that setting up GDSS based meetings needs careful consideration of the system environment and process structure. The ease of use of the system, users training, and the accuracy of the system are essential in building up users' confidence in the process and outcome. In addition, while setting up the agenda or while facilitating a GDSS based meeting, it is necessary to ensure that group members do not have to rush through the decision process. The GDSS based meetings where these issues are addressed upfront, are likely to have satisfied users. Moreover, meeting planners need to be extra careful about satisfaction of the meeting participants. This research highlights the possibility of having some compound effect among the dimensions of satisfaction. Members' satisfaction (or dissatisfaction) with system seems to enhance their satisfaction (or dissatisfaction) with decision process and eventually the decision outcome.

7. Limitations

The participants in this study were undergraduate business students who had the required motivation to

participate in the experiment (they received waiver for an assignment in a course and were excited at the prospect of using electronic decision-room facility). They also had a stake in the participation and outcome of the study given that a large proportion indicated their plan to pursue graduate business education. However, as is true with most laboratory research, there was really no way to detect and ensure that they put their best effort to arrive at the decision.

In this study, we used regression analyses to test our hypotheses. The use of structural equation modeling might have been useful in dealing with the endogeneity that may exist in the theoretical model.

8. Conclusions and Future Directions

This research highlights that the performance of GDSS supported groups impacts members' satisfaction with system, process, and decision outcome. We also found the interrelationships among three different dimensions of user satisfaction in GDSS-supported meetings. The finding needs in depth investigation so that generalized conclusion can be made on these issues. In addition, there are quite a few issues that can shape the future research agenda on user satisfaction in GDSS meetings. As noted, decision time seem to have a balancing impact on satisfaction with system and process. Future research may attempt to assess the decision time that results in optimal satisfaction. Another important aspect that may be explored in future is the issue of the depth of decision making and its impact on group members' satisfaction with decision outcome. Although we have found positive relationships between thoroughness of decision making and satisfaction with group decision outcome, it is not unlikely that thoroughness can have adverse impact on group members' satisfaction. In GDSS meetings that involve acquisition of information cues on the decision situation, members' tendency to acquire too many information cues may appear to contribute to thoroughness at the expense of information overload. Whether the satisfaction of GDSS-supported groups degrades as a consequence to the information overload is another interesting issue for future research.

9. References

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Appendix A

Indicator items for different instruments

Satisfaction with system

1. I couldn't understand the system I used
2. The system was easy to use
3. The system was reliable
4. I have confidence in the system I used
5. I should have had more training on the system
6. Overall, I am satisfied with the computer systems we used to arrive at the final decision

Satisfaction with decision making process

1. I participated extensively in the decision making process
2. I was able to evaluate a number of alternatives during the decision making session
3. I believe my contribution to be significant in our group arriving at the final decision
4. I did not rush to provide my solutions
5. I was not rushed by others in the session
6. Overall, as a member of our team, I am satisfied with the process I employed in arriving at the final decision
7. Overall, I am satisfied with the solution process our group employed to arrive at the final decision

Satisfaction with decision

1. The output was relevant to me
2. The output was useful for me
3. The output generated was reliable
4. The output was comprehensive
5. I have confidence in the accuracy of the output
6. I will use this output in future in making my decision if I decide to enroll into a MBA program
7. Overall, I am satisfied with the output we generated in the decision making session