

집단요인이 GDSS활용의 효과에 미치는 영향에 관한 연구*

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The Impact of Group Member Characteristics on the Use of GDSS*

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■ Abstract ■

While one main stream of research in GDSS (Group Decision Support System) is to investigate how GDSS affects decision-making performances of groups according to task types, support features, meeting facilitation modes and meeting environments, little study has been done about how group characteristics affect group decision processes and outcomes depending upon GDSS is provided or not. So far, most GDSS research has considered group characteristics (e.g. personality homogeneity) as given and did not include it as control variables in experiments. Therefore, the objective of this study is to investigate how members of two different groups perceive the use of GDSS in group meetings through lab experiments. The two groups are homogeneous and heterogeneous groups in terms of members' personality mix.

This research found that the effect of GDSS is a function of groups' personality homogeneity in regards of the satisfaction on decision process and the communication thoroughness. The support of GDSS and the group homogeneity are proved to influence participant's perception about some dependent variables such as satisfaction on decision process.

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1. Introduction

Rapidly changing business environment and escalating demand for quick and sound decision-makings have driven managers to consider the effectiveness of group decision seriously. "Groupthink" has been widely reported, and therefore, numerous group theories and decision aids have been developed to improve group performances [11, 14, 19, 22]. Recent advanced technology in teleconferencing, LAN (local area network) and various group support softwares have uncovered many innovative ways to improve the effectiveness of group collaborations. Group decision support systems (GDSS) is an evolving technology that combines communication, computer and decision technology to support problem formulation and solving in group meetings [7].

Numerous GDSS studies have been conducted to date, and reviewing all the works is beyond the scope of this research. The trend, issue and future direction of GDSS research are well documented in DeSanctis and Gallupe [7] and Rao and Jarvenpaa [24]. One main stream of the GDSS research is investigating how differently the GDSS technology affects group decision-making performances according to task types [10, 15], support features [5, 15], facilitation modes [6], and meeting environments [4]. However, the benefits of using GDSS are inconsistent across different studies; many researchers found an increase in satisfaction (e.g. [16]), while others a decrease (e.g., [10]). The implication is that there are some other variables that can affect the effectiveness of GDSS, but have not received a proper attention yet. We believe that they would be group characteristics.

This study investigated effects of the group homogeneity in terms of personality indicators on the use of GDSS. Since extrovert and introvert tendency determines the degree to which individuals are inhibited to participate in the group process, the mixture of the introverts and extroverts can affect the perceived benefits about the GDSS. However, little study has been done on how group characteristics affect the group decision processes and outcomes according to whether GDSS is provided or not [30]. Most GDSS research has viewed the group homogeneity in terms of personality as given and has not attempted to control the variable in experiments. Therefore, this study investigated how differently members of two groups of different personality mix (homogeneous or heterogeneous) perceive the decision processes and outcomes depending upon whether a GDSS is provided or not.

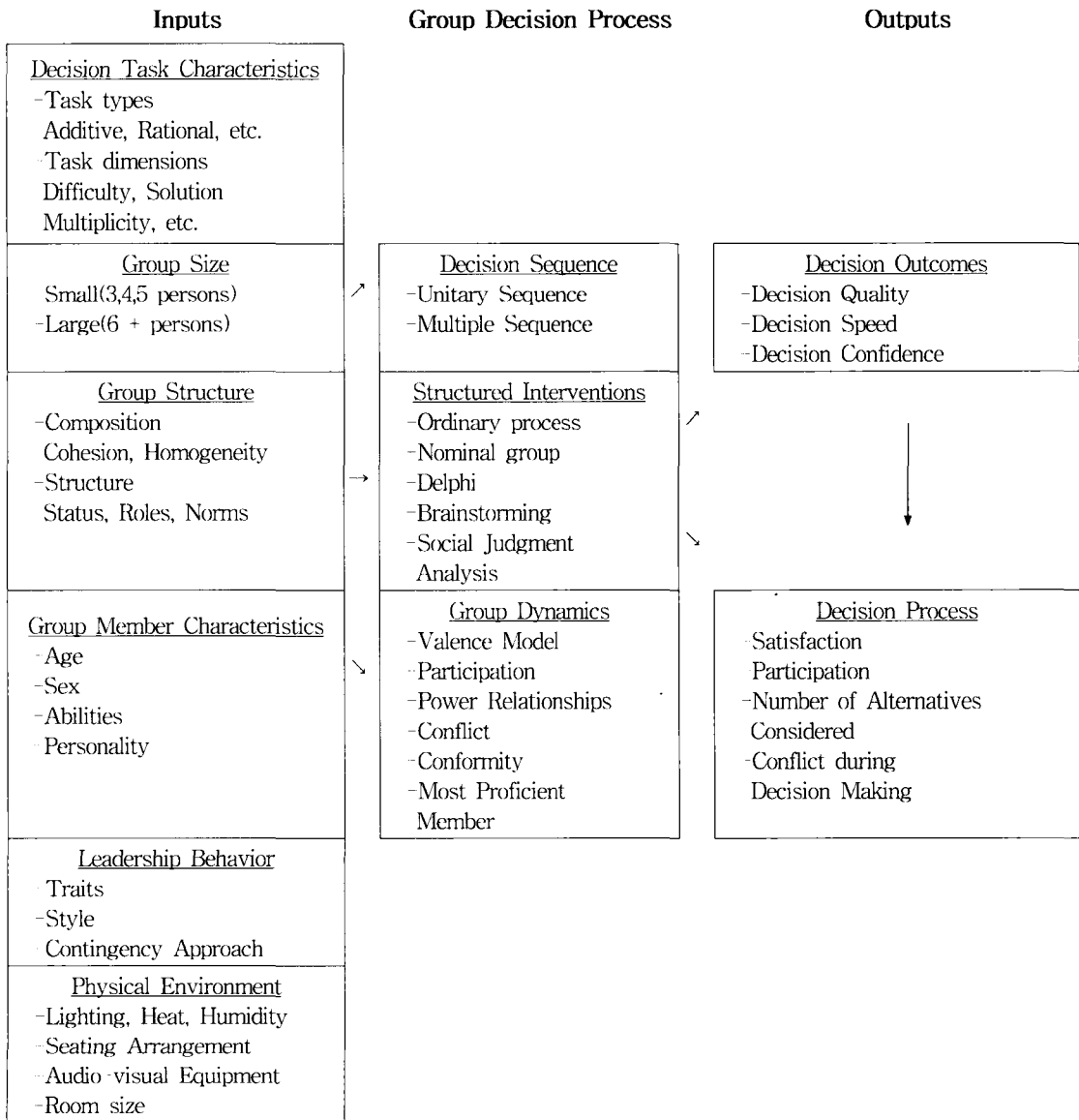
2. Review of Research

Many studies [8, 12, 13, 19] have reported that factors affecting group decision making can be divided into seven categories: decision task characteristics, group decision process variables, group size, group structure, group member characteristics, leadership behavior and physical environment. These variables are summarized in Figure 1 (adopted from [9]). Since reviewing all literature pertinent to these factors is beyond the scope of this study, this section focuses on group member characteristics and structure only.

The homogeneity of groups, one aspect of group structure, characterized by their composition, can be described by many group characteristics including age, sex, abilities,

personality, occupations, social classes, etc. Son and Choi [1] examined how group size (4 vs. 5) and group homogeneity in terms of intellectual capability affect decision times according to 4 types of group communication pattern (wheel, chain, circle, and common). Major findings were

i) the most efficient group communication pattern is the chain pattern regardless of the group size and characteristics, and ii) when one superior member is present in a group, the decision making accelerates. However, group structure in terms of its homogeneity have been little



<Figure 1> Important Variables in the Study of Group Decision Making (adopted from Gallupe (1985))

considered in GDSS research.

The impact of group member characteristics on group decision making has been widely mentioned. Four major individual's characteristics are age, sex, ability (intelligence, skills, etc) and personality [9]. The personality trait is usually defined as a tendency or a predisposition to behave in certain ways in certain situation [25] so that in the group meeting, behavior is mediated by personality [9]. Mann [20] suggests five facets of personality that affect group interactions: interpersonal orientation, emotional stability, ascendent tendencies, social sensitivity, and dependability. However, interpersonal orientation and social sensitivity are related to the interactive group process.

An individual's typical behavior toward others in a group situation is referred to as interpersonal orientation. For example, members that have authoritarian tendency are usually more autocratic and demanding which leads to a low conformity in the group context. Non-authoritarian people tend to be more conforming and more willing to go with the norms of the group. This implies that a group composed of authoritarian persons is expected to have more difficulty in the group process and hence in the group decision making process.

Social sensitivity is the extent to which group members perceive and respond to the needs, emotions and ideas of other members. Studies have shown that the degree of social sensitivity exhibited by individual group members has a positive correlation with group performances and satisfaction with the group decision process [3, 23]. In other words, the more group members empathize with other group members and attempt to see the points of view of the other

group members, the more satisfied the group members will be with the functioning of the group and the more effective the group will be.

In short, the group homogeneity, characterized by the mixture of extroverts and introverts, can affect the degree to which group members inhibit to participate and interact, and hence their perceived benefits of GDSS. But the homogeneity in terms of the personality mix has not received a proper attention in the GDSS experiments to date, and therefore subjects are randomly assigned to groups so that the impact of group homogeneity on the group performances could not be alienated from other variables. Therefore, this study focuses on the impact of group homogeneity in terms of the personality mix on the group decision processes and outcomes that have been little considered in the previous GDSS literature.

3. Hypotheses

The main question addressed by this research is "how differently homeogenous groups and heterogeneous groups in terms of personality mix perceive the meeting processes and outcomes depending upon whether a GDSS is provided or not." Therefore, the hypotheses can be organized into two categories: perceptions on decision outcomes (H1 and H2) and perceptions on decision processes (H3-H7).

H1: Satisfaction on Decision Outcomes

H1a: For the homogeneous groups, members supported by a GDSS will perceive different levels of satisfaction on decision outcomes from the members not supported by a GDSS.

H1b: For the heterogeneous groups, members supported by a GDSS will perceive different level of satisfaction on decision outcomes from the members not supported by a GDSS.

H1c: The homeogenous groups and heterogeneous groups will perceive different levels of satisfaction on decision outcomes.

H2: Agreement on Decision Outcomes

H2a: For the homogeneous groups, members supported by a GDSS will perceive different levels of agreement on the decision outcomes from the members not supported by a GDSS.

H2b: For the heterogeneous groups, members supported by a GDSS will perceive different levels of agreement on the decision outcomes from the members not supported by a GDSS.

H2c: The homeogenous groups and heterogeneous groups will perceive different levels of agreement on decision outcomes.

H3: Satisfaction on Decision Processes

H3a: For the homogeneous groups, members supported by a GDSS will perceive different levels of satisfaction on the decision processes from the members not supported by a GDSS.

H3b: For the heterogeneous groups, members supported by a GDSS will perceive different levels of satisfaction on the decision processes from the members not supported by a GDSS.

H3c: The homogeneous groups and heterogeneous groups will perceive different levels of satisfaction on decision processes.

H4: Communication Thoroughness

H4a: For the homogeneous groups, members supported by a GDSS will perceive different levels of communication thoroughness from the members not supported by a GDSS.

H4b: For the heterogeneous groups, members supported by a GDSS will perceive different levels of communication thoroughness from the members not supported by a GDSS.

H4c: The homogeneous groups and heterogeneous groups will perceive different levels of satisfaction on communication thoroughness.

H5: Group Familiarity

H5a: For the homogeneous groups, members supported by a GDSS will perceive different levels of familiarity toward other members from the members not supported by a GDSS.

H5b: For the heterogeneous groups, members supported by a GDSS will perceive different levels of familiarity toward other members from the members not supported by a GDSS.

H5c: The homogeneous groups and heterogeneous groups will perceive different levels of group familiarity toward other members.

H6: Group Attractiveness

H6a: For the homogeneous groups, members supported by a GDSS will perceive different levels of attractiveness from the members not supported by a GDSS.

H6b: For the heterogeneous groups, members

supported by a GDSS will perceive different levels of attractiveness from the members not supported by a GDSS.

H6c: The homogeneous groups and heterogeneous groups will perceive different levels of group attractiveness.

H7: Degree of Influence

H7a: For the homogeneous groups, members supported by a GDSS will perceive different degrees of influence over group members from the members not supported by a GDSS.

H7b: For the heterogeneous groups, members supported by a GDSS will perceive different degrees of influence over group members from the members not supported by a GDSS.

H7c: The homogeneous groups and heterogeneous groups will perceive different degrees of influence.

4. Research Methods

4.1 Experimental Task

McGrath [21] suggested a comprehensive, circumflex model of group task types. The group task circumflex model describes 8 types of task: planning tasks, creativity tasks, intellectual tasks, decision-making tasks, cognitive conflict tasks, mixed-motive tasks, contests/battles/competitive tasks, and performance/psycho-motor tasks.

For this experiment, a general, comprehensive type of task requiring participants' creativity, intelligence and choice was developed. Specifically the participants were asked i) to discuss issues and topics related to the development of

the MIS department, ii) to sort and select major issues and topics, iii) to brainstorm detail problems and solutions for each issue, and finally iv) to select and rank the top-ten list of solutions that are most important and urgent for the development of the MIS department. Both creativity and intelligence are needed to generate a variety of issues, topics, detail problems and solutions relevant to the development of the MIS department. Decision makers are also required to rank the solutions and to select a top-ten list based on selected criteria. The difficulty level of the task seems to be average, and the task is also interesting enough to invoke enthusiasm of students majoring in MIS.

4.2 Personality Test

The MBTI (Myers-Briggs Type Indicator) test was used to determine the personality types of individuals. The MBTI was based on the psychological type theory of Jung, and was further developed by Briggs and Myers from 1900 to 1975 [17]. Therefore a total of 94 questions is designed to predict 4 preference indicators of individuals: direction of energy (extroversion vs. introversion), information processing style (sensing vs. intuition), judgement style (thinking vs. feeling) and life style (judging vs. perceiving). <Table 1> summarizes 4 preference indicators. The personality of individuals can be expressed by the combinations of 4 preference indicators. For example, ISTJ means i) introversion, ii) sensing, iii) thinking and iv) judging. Therefore there is a total of 16 combinations of personality type. However, only Extroversion(E) - Introversion(I) indicator was considered in our experiment.

At beginning, 125 students took the MBTI test administered by a certified counselor. Out of 125 students, 86 were proved to be introverts and 39 were extroverts.

<Table 1> Four Types of Preference Indicator

Indicator	Preference
Extroversions(E) - Introversion(I)	To which direction energy goes.
Sensing(S) - Intuition(N)	How to perceive.
Thinking(T) - Feeling(F)	How to judge
Judging(J) - Perceiving(P)	Life style

4.3 Experiment Design

The experimental design on which this experiment is based (Figure 2) is a randomized factorial design with 2 treatments, each with 2 levels. Treatment A is the type of information technology support with two levels: (1) GDSS, (2) no-GDSS. Treatment B is a group characteristic: (1) homogeneous group, (2) heterogeneous group. This means that there are four experimental cells.

Twelve groups were randomly assigned to either GDSS groups or no-GDSS groups while individual's personality types of each group was carefully selected to determine the group characteristic (homogeneous or heterogeneous). Individuals of an identical personality type (introverts or extroverts) were assigned to the homogeneous groups (e.g., 7 introverts), and individuals of different personality types were assigned to the heterogeneous groups (e.g., 3 introverts and 4 extroverts) out of the participants list in random. A total of 84 subjects (60 introverts and 21 extroverts) were solicited

to participate in the experiments.

		Treatment A	
		GDSS Support	No-GDSS Support
Treatment B	Homo-geneous Group	3 groups	3 groups
	Hetero-geneous Group	3 groups	3 groups

<Figure 2> Experimental Design

4.4 Setting and Subjects

Two different types of facilities were arranged for the GDSS group meetings and the no-GDSS group meetings respectively. For the GDSS-supported meetings, 8 LAN-based PCs (1 PC for a facilitator and 7 PCs for participants) and an overhead projector with a public screen were equipped, and tables were laid in U-shape. Therefore the setting was a "decision room" that was designed to accommodate face-to-face group meetings. For the traditional (no-GDSS) group meetings, each group was provided with pencils, papers and a large whiteboard. The tables were also laid to have participants see each other in close proximity (1.5 meters).

The GDSS software used was GroupSystems V (version 1.0) developed by Ventana Corporation. GroupSystems V offers three characteristics that help meeting become more efficient and productive: anonymity, simultaneous and parallel processing and full and immediate record keeping [28]. GroupSystems V consists of 12 menus (tools): electronic brainstorming, topic commenter, group outliner, idea organization,

categorizer, vote, alternative evaluation, group matrix, questionnaire, group writer, policy formation and stakeholder identification. For the GDSS group meetings, electronic brainstorming, topic commenter, categorizer, vote and alternative evaluation were most often used.

Twelve experiments for 12 groups and 7 participants per each group were planned, and therefore, 84 subjects were solicited to participate in the experiments. Since one subject was absent from the experiment without a prior notice, a total of 83 subjects participated. Each group is composed of 4(or 3) men and 3(or 4) women. Therefore the sex is equally mixed. The subjects were sophomore and junior college students majoring in MIS in one domestic university. All of them took 5 to 8 MIS and computer courses and other business courses. Since the subjects had taken the same courses, some of them had worked together before and some had not. Random assignment of individuals to groups closely simulated a practical situation where some members had worked together before but some had not, and increased the likelihood that unknown individual difference factors such as decision-making ability were spread among the groups. The suitability of student subjects for the group decision research is well documented [2, 18, 26, 27]. Besides, since the experimental task was discussing issues and topics related to the development of the MIS department, students majoring in MIS seem to be very much interested in the topics and have sufficient contextual information and experience related to the MIS department. Therefore, the suitability of the student subjects for this research can be reassured.

4.5 Dependent Measures

The dependent variables were perceived reactions of group members toward decision-making sessions. The group member's perceptions were measured by self-report ratings of the member's i) satisfaction with decision outcome, ii) agreement with decision outcome, iii) satisfaction on decision process, iv) communication thoroughness, v) group familiarity, vi) group attractiveness and vii) degree of influence over other members. These variables were measured in the post-test questionnaire using a seven-point Likert scale. The validity and reliability of the items had been sufficiently examined by Gallupe [9], Gallupe and DeSanctis [10] and Jarvenpaa, Rao and Huber [15]. In their studies, a panel of experts was set up to develop the post-test instrument in a form of forced choice during the pilot testing for the actual experiments so that a reliable instrument to measure the perceived benefits of GDSS could be developed [9].

Other objective variables such as a number of new suggestions or alternatives generated were not included in this study since the group homogeneity seems to primarily affect the perceived aspects of group performances.

4.6 Experimental Procedure

The following procedure was used for each of group meetings in this experiment:

- a. Subjects were instructed what is allowed to do and what is not during and after each experiment.

- b. Each subject was asked to briefly introduce themselves to be acquainted with other members.
 - c. Subjects were asked to fill out a pretest questionnaire that asked about attitudes towards computers and group decision making.
 - d. For the GDSS groups only, subjects had an opportunity to exercise the GDSS software before the experiment starts.
 - e. The researcher explained goals and steps of the meeting to the participants.
 - f. All groups were asked to follow a same general decision-making steps as follows:
 - (1) Discuss major issues and/or topics relevant to the development of the MIS department.
 - (2) Sort and select major issues and/or topics that need further brainstorming.
 - (3) Brainstorm detail problems and solutions that can be implemented.
 - (4) Rank and decide a list of top-ten solutions that are most important and urgent for the development of MIS department.
- These steps placed some structure on the decision-making process, but the discussion was allowed to flow freely. All GDSS groups used 3 to 4 functions of GroupSystems V upon their consensus.
- g. After each session, subjects were asked to fill out the post-test questionnaire that asked about the amount of agreement with final outcomes,

satisfaction with the group process and outcome, perceived communication thoroughness and the degree of influence over other members.

Each group was given a limited time for completing each step of group meetings. For example, 20 minutes were allowed for discussing and selecting major issues and topics, and 40 minutes for brainstorming detailed problems and solutions. But the time limit was not imposed to the stage of voting for final solutions. Most meetings lasted 100 to 120 minutes, and no-GDSS meetings usually took less time.

5. Results and Discussions

This part summarizes and interprets the results of statistical analysis. For each dependent variable, first, results were presented based on the statistics, and then discussions about related implications followed.

For the statistical analysis, a fixed-effect two-way analysis of variance (ANOVA) was applied to all 7 dependent variables respectively. Even though Hotelling's T test can be applied due to the multiple dependent variables, it was avoided because the Hotelling's T statistics can be converted to F values of ANOVA. <Table 2> shows the means and standard deviations for the dependent variables. <Table 3> shows ANOVA results (F-values) for testing the effects of GDSS support and group characteristics on 7 dependent variables.

5.1 Satisfaction on Decision Outcomes

The analysis of variance for the satisfaction on

decision outcomes (shown in <Table 3>) reveals no statistically significant interaction effect for the GDSS and the group characteristic variables. Therefore, the hypothesis H1 is not supported at $p < .05$, and therefore, the satisfaction on decision outcome is not a function of the group characteristics, GDSS supports, and both. However, <Table 2> shows that for the homogeneous groups, the mean satisfaction on decision outcomes of the GDSS groups (5.57) is slightly higher than that of the no-GDSS groups (5.15) even though not statistically significant. Therefore, the impact of the GDSS on the satisfaction about decision outcomes is higher for the homogeneous groups than for the heterogeneous ones.

5.2 Agreement with Decision Outcomes

According to <Table 3>, the GDSS and group characteristic variables do not show statistically significant interaction effects. The aid of GDSS itself does not significantly affect the agreement with decision outcome of two groups, whereas a significant relationship is found between the group characteristics and the agreement with decision outcomes at $p < 0.05$. Thus, only the group characteristics significantly affect the group members' agreement with decision outcome regardless of use of a GDSS.

According to <Table 2>, the homogeneous group members with GDSS perceived slightly higher agreement on the decision outcomes than the groups without GDSS, and vice versa for the heterogeneous groups. This finding partially explains the contradictory results of Gallupe and DeSanctis [10] and Watson et al. [29]. The former argued that groups using the GDSS had significantly lower agreement among members

on the decision outcomes than the groups without GDSS, whereas the second research found no significant relationship between the use of GDSS and the degree of post-meeting consensus. The implication is that some factors not known yet mediate the effect of the GDSS on the participants' perception about the consensus on the meeting outcomes. The group homogeneity in terms of personality traits of individuals can be one of these variables.

It is interesting to note that the two groups without GDSS show a bigger difference in the agreement with decision outcomes than the two groups with GDSS (shown in <Table 2>). The implication is that this finding is consistent with the observations made by Gallupe and DeSanctis [7] in part. The GDSS groups tend to generate more ideas, have more chances to reconcile competing views and thus dilute the effects of the group difference on the agreement. Thus, the use of group support systems can help group members to have a chance of seriously considering more alternatives and reducing emotional nuisance among group members. This implies that the GDSS is much more helpful in reducing differences in agreement with decision outcome for the homogeneous groups.

5.3 Satisfaction on Decision Process

The analysis of variance for the satisfaction on decision process overall (shown in <Table 3>) reveals statistically significant interaction effects for the GDSS and the group characteristics variables. Therefore, the hypotheses H3 are supported at $p < .05$. One possible explanation is that the effects of GDSS can vary as a function of group characteristics in terms of the satisfac-

ction on decision process.

<Table 3> also shows that each of the GDSS and the group characteristics are also significantly related to the satisfaction on decision process at $p < 0.05$ respectively.

Based on <Table 2>, it is noted that the heterogeneous group members without GDSS support are far more satisfied with the decision processes than the heterogeneous group members with GDSS. On the other hand, the homogeneous groups with an aid of GDSS are far more satisfied with the decision processes than the homogeneous groups without GDSS. The findings imply that the effects of GDSS is greater in the homogeneous groups than in the heterogeneous groups. This finding also can explain in part two contradictory findings of Gallupe and DeSanctis [10] and Steeb and Johnson [26]. The former found that the GDSS support resulted in a significantly lower level of satisfaction with the group decision process, and the second study argued that groups with a GDSS support reported higher satisfaction with the decision process. The group homogeneity in terms of personality traits would be one variable that can explain the contradiction. Another implication is that the intensive interactions among group members in traditional meetings (no-GDSS) do not always guarantee the increased level of satisfaction with the decision process.

5.4 Communication Thoroughness

The analysis of variance for the communication thoroughness (shown in <Table 3>) reveals statistically significant interaction effects for the GDSS and the group characteristics variables. Therefore, the hypotheses H4 are

supported at the $p < .05$, and, therefore, the effect of the GDSS can be a function of the group characteristics in regards of the communication thoroughness. This finding implies that the effect of GDSS can vary according to different group characteristics.

The use of GDSS is significantly related to the variable, communication thoroughness. The communication thoroughness of the groups with GDSS is higher than that of the groups without GDSS according to <Table 2>. This finding is consistent with Jarvenpaa et al. [15]: the GDSS technology significantly affected the number of thoughts captured on the notepads and the number of verbal remarks made.

Despite the effect of the group characteristics is not significant, it is interesting to note two findings: i) the effect of GDSS is much greater for the homeogenous groups than the heterogeneous groups, and ii) standard deviations of each individual's perceived communication thoroughness in the non-GDSS groups (1.55, 1.63) are greater than those of the GDSS groups (0.95, 1.19). The findings can imply that i) individuals of non-GDSS groups perceived the communication thoroughness by varying degrees, and ii) a few persons dominated the meeting whereas some participants refrained to speak their opinions freely.

5.5 Group Familiarity

The analysis of variance for the group familiarity (shown in <Table 3>) reveals no statistically significant interaction effect for the GDSS, the group characteristics, and both variables. Therefore, the hypotheses H5 are not supported at $p < .05$, and the effect of the GDSS is not a function of the group characteristics.

<Table 2> shows that both homogeneous and heterogeneous groups at the traditional meetings reported higher degree of group familiarity than the groups supported by the GDSS. This can imply that the members at the traditional meetings tend to be more acquainted with other members through more interactions than those at the electronic meeting. But groups' personality homogeneity seems not to mediate the effects of the GDSS on the group familiarity.

5.6 Group Attractiveness

The analysis of variance for the group

attractiveness (shown in <Table 3>) reveals no statistically significant interaction effect for the GDSS and the group characteristics. Therefore, the hypotheses H6 are not supported at $p < .05$, and the effect of the GDSS is not a function of the group characteristics.

According to <Table 2>, a difference in the group attractiveness between two groups without GDSS is greater than the groups with GDSS. This can imply that the effect of the group homogeneity on the group attractiveness is stronger in traditional meetings than in electronic meetings even though the differences are not statistically significant.

<Table 2> Means and Standard Deviations for the Perception on Decision Process and Outcome

	GDSS				Non-GDSS			
	Homeogenous Group		Heterogeneous Group		Homogeneous Group		Heterogeneous Group	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Perception on Decision Outcome								
Satisfaction on Decision Outcome	5.57	0.75	5.57	0.87	5.15	0.988	5.52	0.75
Agreement with Decision Outcome	5.52	0.81	5.57	0.81	5.10	0.79	5.76	0.83
Perception on Decision Process								
Satisfaction on Decision Process	5.23	0.995	5.05	1.16	4.05	1.15	5.24	1.14
Communication Thoroughness	6.00	0.95	5.29	1.19	4.1	1.55	5.19	1.63
Group Familiarity	4.05	1.396	4.14	1.11	4.5	1.57	4.67	0.966
Group Attractiveness	4.0	0.63	4.0	1.3	3.7	1.30	4.5	1.2
Degree of Influence	4.71	0.56	4.86	1.06	4.05	1.36	4.57	1.29

Note. The highest point is 7.

<Table 3> ANOVA Results (F-Values) for Testing the Effects of GDSS Support and Group Characteristics on 7 Dependent Variables

	GDSS/ Non-G DSS	Group Charact eristics	GDSS* Group Char
Perception on Decision Outcome			
Satisfaction on Decision Outcome	1.61	1.02	1.02
Agreement with Decision Outcome	0.43	3.97*	2.97
Perception on Decision Process			
Satisfaction on Decision Process	4.18*	4.18*	7.98**
Communication Thoroughness	11.22**	0.40	9.18**
Group Familiarity	3.02	0.22	0.02
Group Attractiveness	0.20	2.69	2.69
Degree of Influence	3.81*	1.86	0.61

* significant at alpha<0.05 ** significant at alpha<0.01

5.7 Degree of Influence

The analysis of variance for the degree of influence over other group members (shown in <Table 3>) reveals no statistically significant interaction effect for the GDSS, group characteristic, and both variables. Therefore, the hypotheses H7 are not supported at the p<.05.

However, a significant relationship is found between the use of GDSS and the degree of influence over group members. This finding is different from the findings of Zigurs, Poole and

DeSanctis [31]. They found no significant difference between the total amount of influence behavior expressed in the GDSS groups versus traditional meeting groups.

As shown in <Table 2>, regardless of the group characteristics, the degrees of influence perceived by the groups supported by a GDSS are higher than the groups not supported by a GDSS even though the differences are not statistically significant. This observation is contrary to a commonly accepted notion: since individuals in traditional meetings would be more interactive and more often exposed to other member's tones of speaking and physical appearance and gesture, they tend to be more influenced by others. But it also can be argued that an individual's thinking can be more stimulated and influenced by the increased number of ideas and opinions that are processed in parallel and displayed under the GDSS environment. This contradiction needs to be further investigated.

6. Conclusions

This study investigated how members of two groups of different personality mix (homogeneous vs. heterogeneous) perceive the decision processes and outcomes depending upon whether a GDSS is provided or not.

Overall, we found that the effect of GDSS can vary depending upon whether the group is homogeneous or heterogeneous on the satisfaction on decision process and communication thoroughness. Therefore, the group characteristic is a statistically significant factor that can mediate the effects of the group support technology on the users' perception about the

satisfaction on decision process and communication thoroughness.

Specifically, the use of GDSS is positively related to the participants' perception about the satisfaction on decision process, communication thoroughness and degree of influence. This finding confirms that the benefits of GDSS, that have been widely claimed by researchers in the U.S., also can be obtained in this domestic experiments [26, 15, 29]. The group characteristic also has a significant relationship with the agreement with decision outcomes and satisfaction on decision process. Therefore, the groups' personality homogeneity can affect the members' agreement with decision outcome and satisfaction on the decision process regardless of the GDSS support.

This research is the first attempt to specifically investigate the effects of group characteristics on the group performances according to whether GDSS is supported or not. We believe that the interactive relationships between the effects of the group homogeneity and the GDSS support on the group processes uncovered the possibility of another line of future research in the group support information technology. This work can help us to customize the group support technology for different types of groups based on group characteristics (e.g., group homogeneity). For instance, since the impact of GDSS on members' satisfaction on decision process and communication thoroughness is much greater in the homogeneous groups than in heterogeneous ones, the group support technology can be applied to remedy 'groupthink' that is particularly prevalent in such homogeneous groups as departmental meetings where people with similar education and experience

gather and therefore a certain degree of tension and conflict lack.

This research is not immuned from minor drawbacks. First, even though there are many dimensions that can describe group homogeneity, this research included group members' personality traits only, particularly extroversion and introversion indicator. Therefore, it is difficult to generalize the findings to different aspects of group homogeneity issue. The second drawback is originated from the MBTI test used to measure individual's personality traits in this research. To the extent that the test suffers some construct validity, the findings of this research should be interpreted with caution [16]. In our research, quantitative measures of group performances such as the number of creative ideas that have been often used in many GDSS research, are not included. Even though such quantitative variables seems to not be directly related to the group homogeneity, the exclusion can be a minor drawback. These drawbacks might result in relationships hard to interpret and findings contrary to the previous studies (e.g., effects of GDSS on the degree of influence). These inconsistent results may open another opportunities for future research.

This research can be further expanded as follows. The MBTI test can further capture three more personality preference indicators in addition to extroversion and introversion indicator that had be used in this research. They are i) information processing style (sensing vs. intuition), ii) judgement style (thinking vs. feeling) and iii) life style (judging vs. perceiving). Since the above three preference indicators can be selectively used to describe other group characteristics, effects of other dimensions of group

homogeneity and the GDSS support on users' perception about group processes will be further explored. It is also possible to investigate effects of individual's personality styles (e.g., extroversion vs. introversion or thinking vs. feeling) on the use of GDSS.

Referring <Figure 1>, we can see how to broaden a research agenda in GDSS. For instance, it would be interesting to investigate how the group structure including group status (development stages) and roles (types) affect the decision outcomes and processes. This research was primarily confined to the outputs of group meetings measured by 7 perceived variables. Therefore, this study could not capture and report how differently group members of different characteristics behave and interact in the group decision processes. The future research can focus on scrutinizing and comparing group dynamics of both homogeneous and heterogeneous groups.

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