Task-related Information Sharing in Group Decision Support Systems (GDSS)

The Importance of Knowing Who Knows What

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Abstract

Group Decision Support Systems (GDSS) are among the most common software systems designed to enable and enhance group communication for collective decision-making. Members of a work group normally confer and exchange information in order to make decisions and there are three types of task-related information: common (or shared) information known by all members of a work group; unique (or unshared) information known by only one group member; and partially shared information known by more than one but not all members. To date, only a handful of studies have evaluated information exchange in GDSS groups engaged in decision-making and this study examines the effect of expertise role-assignment and the proportion of common, unique, and partially shared information available in GDSS groups. The results indicate that information distribution and expertise role-assignment can affect information sharing in GDSS groups. Increasing the proportion of unique information distribution can be used as a way to enhance the pooling of unique information in expertise role-assigned groups. Expertise role-assignment increases the amount of partially shared information during group discussions and increasing the proportion of unique information results in an increase in the retaining of partially shared information but decreases the retaining of unique information following group discussions.

Keywords: Information sharing, group decision supported system (GDSS), expertise role-assignment.

Introduction

People join groups for a number of reasons, with some group members motivated to join a group to complete a specific task, whilst others may join a group to enjoy the social benefits of communication with the other group members. Groups usually congregate to solve problems or to make decisions and each group member desires to effectively accomplish their task objectives. However, groups often have difficult problems to solve and important decisions to make and, for a group to be successful, they must find a means to improve problem solving and decision making in order to reach their goals and achieve satisfactory results (Pissarra and Jesuino, 2005; Leinonen and Bluemink, 2008).

In order to solve problems or make decisions, members of a group discuss and exchange their information resources (Shirani, 2006) and groups are potentially able to make better decisions

than individuals because group members have access to a larger pool of information than an individual does. There are three types of task-related information discussed in a work group: common or shared information that is known by all the members in the work group; unique or unshared information that is known by only one group member; and partially shared information that is only known by some group members (Dennis, Hilmer, and Taylor, 1997; Stasser and Titus, 1987; Winquist and Larson, 1998; Vathanophas and Liang, 2007). Each type of information plays a different role in group decision making. Common information helps to establish a common understanding and build consensus, whereas the advantage of access to unique information underlies the advantage of groups compared to individual decision making (Clark et al., 2002; Shirani, 2006). The proportion of common and unique information affects the role of unique information used during group discussion and also the amount of unique information retained by group members following a discussion. For example, when less common information is available group members tend to emphasize unique information to make their case stronger, consequently unique information will play a larger role in any discussion and will be remembered. However, a previous study failed to empirically support this argument (Hightower and Sayeed, 1996) and other previous research studies have shown information exchange ineffectiveness in verbal groups and that while groups concentrate their discussion on common information they fail to disseminate effectively, unique information that members individually possess (Stasser and Titus, 1985; Stasser and Titus, 1987). Furthermore, this information exchange pattern is also exhibited in Group Decision Support Systems (GDSS) (Dennis, 1996) and, as a result, the original intention behind the formation of groups to provide access to larger pools of information than is available to an individual is negated. This paper seeks to address this by identifying a means of increasing the pooling and utilization of unique information in GDSS groups.

Group Decision Support Systems (GDSS) are among the most common software systems used for collective decision-making (Ba et al., 2001) and GDSS enables and enhances group communications, which in turn aids in decision making. GDSS use is less likely to increase the overall pooling of information during discussions (unique or common information, or both) compared to face-to-face settings, due to parallelism and anonymity (Dennis, 1996). However, research has shown that less information is discussed in computer-mediated communication systems than in face-to-face groups (Hightower and Hagmann, 1995) and that more common information was also discussed compared to unique information during GDSS group discussions. Moreover, post-discussion individual written recall showed that GDSS groups pooled less unique information during a discussion than face-to-face groups (Dennis, 1996; Hightower and Sayeed, 1995). The lack of recall of unique information in GDSS groups might be ascribed to reduced information credibility, resulting from the anonymity of group members, although these results indicated overall poor information processing in GDSS groups. However, only a handful of studies have evaluated information exchange in GDSS groups engaging in decision-making tasks (Dennis, 1996; Hightower and Sayeed, 1995; Mennecke, 1997). This research study examines the effect of expertise role-assignment and the proportions of common information and unique information available in facilitating the pooling and processing of unique information, while keeping the proportion of partially shared information constant, in GDSS groups.

Various outcomes had been compared between face-to-face and GDSS groups. Some researches show better group social interaction (Huang and Wei, 2000), group satisfaction (Mennecke and Valacich, 1998), and decision quality results (Heninger, Dennis, and Hilmer, 2006) in face-to-face groups than GDSS groups. Conversely GDSS group results were superior in exchanging information within teams (Heninger, Dennis, and Hilmer, 2006), enhancing group task

(Huang and Wei, 2000), increasing the number of ideas generated and participants' satisfaction (Dennis, Wixom, and Vandenberg, 2001), and enhancing the feedback quality and learning cooperation by reducing domination and communication barriers (Waikwok, Ma, and Vogel, 2002). Different outcomes are caused by the different fitting between GDSS structures and tasks which impacts decision quality, and group support which impacts process satisfaction (Dennis, Wixom, and Vandenberg, 2001; Huang and Wei, 2000). Therefore, this research study examines the effect of expertise role-assignment information distribution in facilitating the pooling and processing of information in GDSS groups.

Literature Review

In general, group discussions are inefficient in exchanging common and unique information (Larson et al., 1998). Group members tend to discuss common information that is known to all group members and are less likely to share unique information, often leading to incorrect decision making (Worchel et al., 1992). Information exchange is usually less resourceful where there is a higher proportion of common information (Stasser and Stewart, 1992; Stasser and Titus, 1985; Stasser et al., 1989). When compared to a face-to-face setting, GDSS can enhance the exchange of unique information. This result can be caused by parallelism that lessens blocking and anonymity, which in turn, reduces reluctance to share information to most of the groups' members (Dennis, Hilmer, and Taylor, 1997). GDSS research was conducted in an attempt to enhance the discussion of unique information. Unshared information was distributed to two group members (i.e. unique information becomes partially shared), instead of one member (i.e. unique information) in a four-member group (Hightower and Sayeed, 1995). Still, the unique information in the study was not shared during group discussion.

Information Sharing in GDSS

Two attributes of GDSS affect sampling and pooling of information: parallelism and anonymity. *Parallelism* enables group members to exchange information simultaneously, since they can enter information concurrently with no interruption. Parallel communication provides members with the ability to oscillate between contributing and reading the ideas of other group members. However, engaging in parallel cognitive activities can impede the processes of information recall, evaluation and exchange (Ball et al., 1992). Alternatively, *anonymity*, is the ability of members to input information without attaching any identity to the information, which in turn overcomes social and behavioral communication barriers by allowing group members to promote equal participation and enhance information exchange (Dennis, 1996).

GDSS group members had better unique information recall and exchange than did members of face-to-face groups, since they brought unique information into discussions earlier than in the face-to-face groups (Shirani, 2006). Group memory is an intrinsic characteristic of GDSS groups that allows the group members to withdraw from the discussion at will, with the intention to refer to and think about previously discussed information, and later rejoin the discussion and continue where they left off (Nunamaker et al., 1991). As such, this should equalize the repetition of information (unique, common or partially shared) in GDSS groups, however, GDSS groups still discussed proportionately more partially shared and common information rather than unique information. Group members found it too tedious to read through long transcripts to refer to previously mentioned information and, instead, they re-keyed information that was previously mentioned to emphasize their contributed information, thereby leading to the repetition of

information, in particular common information, because more members shared access to that information prior to discussion (Vathanophas and Liang, 2007).

Expertise Role-Assigned GDSS Groups

Expertise Role-Assignment is an explicit label applied to group members to show that a specific group member possesses more information in a specific area than the other group members (Stasser et al., 2000) and this label should be indicated prior to the group discussion. Role-assigned GDSS groups were found to pool proportionately more information overall, more unique information and more partially shared information, than in non role-assigned groups (Stasser et al., 2000; Vathanophas and Liang, 2007). The results of this study were consistent with those found in verbal groups, as expertise role-assignment was also found to increase the pooling of unique information in face-to-face discussions (Stasser et al., 2000). However, there was no difference in the proportion of common information pooled during discussions between role-assigned vs. non role-assigned groups. GDSS groups, as with all groups, utilize transactive memory processes (which should increase the pooling of unique information during discussion) and social validation effects also apply (which should increase the retention and utilization of unique information) (Stewart and Stasser, 1995).

By making unshared information significant to the group member assigned that information, each group member knew what information they had that the other group members did not have, so they would therefore be more likely to mention it (Schittekatte and Hiel, 1996). The sampling advantage of common information over unique information was reduced because during a strict division of labor, members of the group are expected to mention information relevant to their area of expertise (Stasser et al., 1995; Stasser et al., 2000). When specific group members are role-assigned, GDSS groups could have subjected themselves to a cognitive division of labor, hence encoding and storing information pertaining to their area of expertise prior to discussion. During a discussion, group members retrieve and recall information pertaining to their own area of expertise and, at the same time, elicit information from the areas of expertise of other members. This possibly led to an increased pooling of unique and partially shared information in role-assigned groups (Stasser and Stewart, 1992).

Research Design

Statement of Goals and Objectives

This research study focused on information sharing in three-member GDSS groups. Three types of information were introduced, namely: unique information (information unique to only one group member); partially shared information (information shared by two group members); and common information (information shared by all three group members).

Expert role-assignment was examined for its effectiveness in increasing the use of uniquely owned information during GDSS group discussions. In addition, two different types of pre-discussion *information distribution* were introduced. When the amount of partially shared information is held constant across Information Distribution Types 1 and 2, the different proportion of common and unique information also remains constant. Information Distribution Type 1 provides equal amounts of common (33.33%), partial (33.33%) and unique (33.33%) information; while Information Distribution Type 2 provides less common (16.67%), partial (33.33%) and more unique (50.00%) information.

Three dimensions of information exchange are explored in this research study. The first dimension is the amount of information exchanged, the second dimension is the type of information

exchanged and the third dimension is the sequence of information exchange. Dependent variables were measured by type, as well as by amount of information exchanged, and were observed twice; both during and after group discussions. Based on the dimensions of information exchange, a series of hypotheses were explored as follows:

H1: In non-expertise role-assigned (X_2) GDSS groups, members will mention more common information (Y_1) than partially shared information (Y_2) and more partially shared information than unique information (Y_3) during group discussions (O_1).

H2a: In expertise role-assigned (X_1) GDSS groups, members will mention partially shared information, during group discussion (O_1), more often than in non-role-assigned (X_2) GDSS groups (when the effect of group allocated information distribution is controlled).

H2b: In expertise role-assigned (X_1) GDSS groups, members will mention unique information (Y_3), during group discussion (O_1), more often than in non-role-assigned (X_2) GDSS groups (when the effect of group allocated information distribution is controlled).

H2c: In expertise role-assigned (X_1) GDSS groups, members will mention more information overall (Y_4) during group discussions (O_1) than in non-role-assigned (X_2) GDSS groups (when the effect of group allocated information distribution is controlled).

H3a: In expertise role-assigned (X_1) GDSS groups, members will retain more partially shared information after group discussions (O_2) than in non-role-assigned (X_2) GDSS groups (when the effect of group allocated information distribution is controlled).

H3b: In expertise role-assigned (X_1) GDSS groups, members will retain more unique information (Y_3) after group discussions (O_2) than in non-role-assigned (X_2) GDSS groups (when the effect of group allocated information distribution is controlled).

H3c: In expertise role-assigned (X_1) GDSS groups, members will retain more information overall (Y_4) after group discussions (O_2) than in non-role-assigned (X_2) GDSS groups (when the effect of group allocated information distribution is controlled).

H4a: During discussions (O_1), groups allocated information using Information Distribution Type 2 (X_b) will pool more partially shared information (in absolute amounts), compared to groups allocated information using Information Distribution Type 1 (X_a) (when the effect of expertise role-assigned (X_1) GDSS groups is controlled).

H4b: During discussions (O_1), groups allocated information using Information distribution Type 2 (X_b) will pool more unique information (Y_3) (in absolute amounts), compared to groups allocated information using Information Distribution Type 1 (X_a) (when the effect of expertise role-assigned (X_1) GDSS groups is controlled).

H4c: During discussions (O_1), groups allocated information using Information Distribution Type 2 (X_b) will pool more information overall, compared to groups allocated information using Information Distribution Type 1 (X_a) (when the effect of expertise role-assigned (X_1) GDSS groups is controlled).

H5a: After discussions (O_2), groups allocated information using Information Distribution Type 2 ($X_{,b}$) will retain more partially shared information (in absolute amounts), compared to groups allocated information using Information Distribution Type 1 (X_a)(when the effect of expertise role-assigned (X_1) GDSS groups is controlled).

H5b: After discussions (O_2), groups allocated information using Information Distribution Type 2 ($X_{,b}$) will retain more unique information (Y_3) (in absolute number), compared to groups allocated information using Information Distribution Type 1 (X_a) (when the effect of expertise role-assigned (X_1) GDSS groups is controlled).

H5c: After discussions (O_2), groups allocated information using Information Distribution Type 2 (X_b) will retain more information overall, compared to groups allocated information using Information Distribution Type 1 (X_a) (when the effect of expertise role-assigned (X_1) GDSS groups is controlled).

Research Study Design

Since the research study is designed to explore the effects of role-assignment and information type on information processing, the study was designed using the 2x2 factor design outlined below in Table 1. The independent variables are categorized into two groups: expert role-assignment and information distribution.

Table1: Research Study Design

Independent Variables	**Information Distribution Type 1(X_a)**	**Information Distribution Type 2 (X_b)**
Role-Assigned (X_1)	12	12
Non Role-Assigned (X_2)	12	12

This study was conducted using respondents from the general student population at the College of Management, Mahidol University (CMMU). Three participants formed each group, and may or may not have previously known each other. Participants were also mixed into different groups. Each *unit of analysis* is a discussion group consisting of three participants.

This research study used a combination of 'hidden profiles' (Faraj and Sproull, 2000) in which each group member was provided with a different amount of information (information distribution) without prior notice, and role-assignment in which group members were made aware of their roles. The research study began with a pre-questionnaire that consisted of demographic questions and measured attitude towards working with a group and working in this discussion group. Information sheets were then distributed and group members had fifteen minutes to read and understand all the information. The information sheets were collected before the discussion began and the participants were not allowed to take notes of the information given. In the case of role-assignment, the role of each respondent was indicated clearly in the information sheets given to them.

This research study used Microsoft MSN as a GDSS communication tool, with each group member acting the role of a detective in a murder investigation team and common, partially shared, and unique information was distributed. During each thirty-five minute discussion all MSN conversations were recorded between all the participants in the same team.

Unique information is an item of information that only one of group members knows. Partially shared information or shared information is information only known by two of the group members. Information that appears in information sheets provided to each group member is categorized as common information. Each type of information item was specified in advance and

was to be kept secret. The group members did not know which type of information or the number of information items of each type they possessed.

To measure information mentioned during group discussions, each 35-minute conversation in each group discussion was recorded using the 'Message History' feature of the GDSS application. All the discussion transcripts of the 48 groups that participated in the experiment were then coded. Content analyses of all the discussion transcripts were conducted independently by two experienced coders. All coding disagreements between these coders were noted. Then the disagreements were reconciled through discussion and a final code was assigned in each case of disagreement. Each time an information item (about a particular suspect) relevant to the case was mentioned correctly, this was noted. Information that was noted did not have to be verbatim with the exact information found in the booklet issued to the group members; as long as the fundamental meaning was conveyed during the discussion it was noted. For example, evidence provided about Bernard (Suspect 2) read "Visited the victim once only, using the front gate. However, he has never seen the backyard before" and in Group 7 (role-assigned, information distribution type 1) a group member typed "He doesn't know that the house has a backyard" and this was therefore recorded. Each information item was then manually recorded and counted. Following each discussion, group participants were asked to complete a Post-Discussion Questionnaire and a Self-Reporting Questionnaire (O_2).

Data Analysis and Results

By using 2x2 factorial experimental design, statistical analysis was carried out using Two-Way ANOVA to investigate the effects of the two variables of expertise role-assignment and information distribution simultaneously. Although ANOVA assumptions are normality and equal variance, if the group sizes are equal, the statistical analysis is quite resistant to violations of normality assumption and equal variance. Two-Way ANOVA was used to investigate the effects of the two variables simultaneously and permitted investigation of both the effects of either factor alone and of the two factors together as shown in Table 2.

Pre-questionnaire testing revealed that there was no difference between the median of '*attitudes toward the group tasks*' assigned to members of the research study groups (Kruskal Wallis Test, p-value= 0.964) and no difference between the mean of '*attitude toward working with the group members*' assigned to members of the research study groups (ANOVA test, p-value = 0.079) indicating that these two extraneous variables were successfully controlled.

Discussion

Human cognitive processes are verified in this study as follows: first there is information recall and exchange (polling of information during group discussions); second there is information recall; and then evaluation and storage of this information in the memory (information retained after group discussions) (Dennis et al., 1997) and to facilitate and support these cognitive processes is an important objective for effective group communication. This research study increased the information retention of participants through Expertise Role-Assignment and Information Distribution Type 2 (containing a higher proportion of unique information) and measured the amount of unique information, partially-shared information and common information necessary for correct decision outcomes.

Table 2: Results of Hypotheses Testing Using Two-Way ANOVA

Groups	Treat-ments	Control Variables	Effect of Variables	Hypothesis Statements	Result $\alpha = 0.05$	Statistical Test	P-Value
H1							
X_2	None	None	Y_1 and Y_2 mentioned(O_1)	$Y_1>Y_2$	Not supported	ANOVA &planned contrast	0.210
X_2	None	None	Y_2 and Y_3 mentioned(O_1)	$Y_2>Y_3$	Supported	ANOVA &planned contrast	0.010
H2a							
All	X_1,X_2	Information Distribution	Y_2 mentioned(O_1)	$X_1>X_2$	Not supported	Two-way ANOVA	0.712
H2b							
All	X_1,X_2	Information Distribution	Y_3 mentioned(O_1)	$X_1>X_2$	Supported	Two-way ANOVA	0.016
H2c							
All	X_1,X_2	Information Distribution	Y_4 mentioned(O_1)	$X_1>X_2$	Not supported	Two-way ANOVA	0.332
H3a							
All	X_1,X_2	Information Distribution	Y_2 retained(O_2)	$X_1>X_2$	Not supported	Two-way ANOVA	0.299
H3b							
All	X_1,X_2	Information Distribution	Y_3 retained(O_2)	$X_1>X_2$	Not supported	Two-way ANOVA	0.406
H3c							
All	X_1,X_2	Information Distribution	Y_4 retained(O_2)	$X_1>X_2$	Not supported	Two-way ANOVA	0.270
H4a							
All	X_a,X_b	Role-assigned GDSS	Group partially shared information	$X_b>X_a$	Not supported	Two-way ANOVA mentioned(O_1)	0.295
H4b							
All	X_a,X_b	Role-assigned GDSS	Group unique information	$X_b>X_a$	Supported	Two-way ANOVA mentioned(O_1)	0.00
H4c							
All	X_a,X_b	Role-assigned GDSS	Y_4 mentioned(O_1)	$X_b>X_a$	Not supported	Two-way ANOVA	0.449
H5a							
All	X_a,X_b	Role-assigned GDSS	Y_2 retained(O_2)	$X_b>X_a$	Supported	Two-way ANOVA	0.013
H5b							
All	X_a,X_b	Role-assigned GDSS	Y_3 retained(O_2)	$X_b>X_a$	Not supported	Two-way ANOVA	1.00
H5c							
All	X_a,X_b	Role-assigned GDSS	Y_4 mentioned(O_2)	$X_b>X_a$	Not supported	Two-way ANOVA	0.186

In the first hypothesis, this research explores the nature of human information sharing when group members are not assigned an expertise role, i.e. no group members are assigned more knowledge than the other group members on a particular topic. The results indicate that in *non-expertise-assigned* GDSS groups unique information (Y_3) is mentioned less often than common information (Y_1) and partially-shared information (Y_2). The research then verified the effect of two interventions that are aimed at enhancing human cognitive processes: Expertise Role-Assignment and Information Distribution Type 2. The results are shown in the Table 3.

Role-assignment increased the amount of unique information mentioned during group discussions (*H2b is supported*). This finding supports the research findings on verbal groups in face-to-face discussions (Stasser et al., 2000) and GDSS groups (Stasser and Titus, 1987; Stasser et al., 1995; Vathanophas and Liang, 2007). The enhancing effect is due to a cognitive division of labor in which group members are expected to mention information relevant to their area of expertise (Stasser et al., 1995), so they encode and store information pertaining to their area of expertise prior to discussion. During the discussion, members retrieve and recall information pertaining to their own area of expertise and, at the same time, elicit information from the area of expertise of other group members. Increasing the proportion of unique information exposed to the group members before a discussion (Information Distribution Type 2) can enhance the discussion of unique information by group members (*H4b: is supported*), although this finding was not supported by a previous study (Hightower and Sayeed, 1995).

Table3: Effect of Role-assignment and Information Distribution on Information Mentioned and Retained

Information	**Role- Assignment**		**Information Distribution**		**Interaction Effect (Role-Assignment/Information Distribution)**
	Yes	No	Type 2	Type1	
Information mentioned during group discussion					
Partially-shared	No difference		No difference		No
Unique	Yes > No		Type 2 > Type 1		Yes
All	No difference		No difference		Yes
Information retained after group discussion					
Partially-shared	No difference		Type 2 > Type 1		No
Unique	No difference		Type 2 < Type 1		No
All	No difference		No difference		No

Alternatively, in this research study role-assignment was *not* found to enhance any type of information retained after a group discussion (*H3a, H3b, and H3c are not supported*). This result can be interpreted in two different ways: First, role-assignment is not effective in enhancing the process of evaluating and storing information in memory by group members; second, because the research study measured this process after discussions by using a Self-Reporting Questionnaires (O_2) that respondents completed individually, their expertise may be less often recalled by other participants. Even in an environment, such as an electronic network, where *anonymity* exists, *reputation* and *status* still act as positive social controls because contributions are visible to the network as a whole (Constant et al., 1996). For this reason, when the participants complete the Self-Reporting Questionnaire, which is not visible to other members, the social incentives consisting of reputation and status may be reduced using GDSS application, which can lessen the effect of role-assignment on measuring information retained after a group discussion.

If more unique information than common information is provided to group participants this can enhance the amount of partially shared information that is retained (*H5a is supported*) but can reduce retained unique information when compared to the distribution of equal proportions of unique and common information (*H5b is not supported).* These results imply that in order to enhance group members' ability to recall and store unique information in their memories by increasing the proportion of unique information distribution, we should also increase the proportion of the number of group members who have access to that information before the discussion (i.e. make that information partially shared information instead of unique information).

Conclusions and Implications

Results from this research study support past research findings (Dennis, 1996) that GDSS groups without expertise role-assignment will pool less unique information than common information during discussions. However, GDSS groups with expertise role-assignment do increase pooling of unique information, which supports the findings for both verbal groups (Stasser and Stewart, 1992; Stasser and Titus, 1985; Stasser et al., 2000) and GDSS groups (Stasser et al., 2000; Vathanophas and Liang, 2007).

This research study extends the insight of previous research on information sharing in GDSS groups in which two different types of *Information Distribution* were introduced (i.e. Information Distribution Type 1; common: partial: unique = 33.33%: 33.33%:33.33% versus Information Distribution Type 2; common: partial: unique = 16.67%:33.33%:50.00%). The results indicate that Information Distribution can have implications in information sharing in GDSS groups in two ways. First, increasing the proportion of unique information distribution among group members can be used to enhance pooling of unique information mentioned during group discussions, as well as to enhance the retention of partially shared information following group discussions. Second, because there is an interaction effect between the type of information distribution and expertise role-assignment on unique information mentioned, this research acknowledges that in order to enhance unique information mentioned, more unique information should be provided together with expertise role-assignment. In addition, the anonymity effect in GDSS shows that social control by reputation and status enhances information sharing among the group members. Role-assignment is effective in enhancing unique information mentioned during a group discussion; however, it does not prove helpful in enhancing any type of information retained after a group discussion. This argument is consistent with the environment of electronic networks where anonymity exists, although reputation and status act as positive social controls in electronic networks because contributions are visible to the network as a whole (Constant et al., 1996). The effect of social control should be examined in further research studies.

For practical implication, this research study has provided an insight for management to manage information sharing via GDSS more effectively. The importance of enhancing unique information sharing cannot be overstated, since a cross-functional team is frequently used in order to achieve various types of tasks in many organizations today. In cross-functional teams, group members possess unique information because of their diverse backgrounds, as in the research study where one of the treatments included providing more unique information and less common information (Information Distribution Type 2). These research results can guide a team leader to assign specific roles to specific group members in order to retrieve more unique information during a group discussion via GDSS. In addition, in order to retain unique information after a group discussion, more common background information is needed among group members. This can be

accomplished by providing common information as a background before a group discussion via GDSS.

Although this study provides interesting insights into information sharing in GDSS groups, it has limitations that should be noted as follows: Laboratory experiments were used to control variables in order to ensure the internal validity of the effect of variables on information sharing and retaining. Alternatively, there is a limitation of the external validity for this type of research design. Employing research studies using students might not be representative of other user groups with different profiles, the composition of the group, size of the group, facilitation in the group process, and power distance with inherent hierarchy in work, all mean that results must be interpreted with caution. Second, using Microsoft MSN as a GDSS communication tool might not be representative of other GDSS tools. Finally, the results of the study must be evaluated taking into consideration the effect of cultural differences which will affect the degree of information sharing. For instance, countries characterized as having high power distance perceive a gap between themselves and people who may be of higher status, while countries depicted as having low power distance do not. Singaporeans, portrayed as having high power distance, may perceive status being a strong determining force in their cultures. As a result, they may be more hesitant in contributing their opinions explicitly. Information distribution in group discussion may not affect the information sharing due to the cultural differences. (Quaddus and Tung, 2002). Future research should address this aspect by replicating this study with samples from multiple-profile population samples and using different GDSS tools.

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English Abstract

Task-related Information Sharing in Group Decision Support Systems (GDSS)

The Importance of Knowing Who Knows What

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Abstract

Group Decision Support Systems (GDSS) are among the most common software systems designed to enable and enhance group communication for collective decision-making. Members of a work group normally confer and exchange information in order to make decisions and there are three types of task-related information: common (or shared) information known by all members of a work group; unique (or unshared) information known by only one group member; and partially shared information known by more than one but not all members. To date, only a handful of studies have evaluated information exchange in GDSS groups engaged in decision-making and this study examines the effect of expertise role-assignment and the proportion of common, unique, and partially shared information available in GDSS groups. The results indicate that information distribution and expertise role-assignment can affect information sharing in GDSS groups. Increasing the proportion of unique information distribution can be used as a way to enhance the pooling of unique information in expertise role-assigned groups. Expertise role-assignment increases the amount of partially shared information during group discussions and increasing the proportion of unique information results in an increase in the retaining of partially shared information but decreases the retaining of unique information following group discussions.

Keywords: Information sharing, group decision supported system (GDSS), expertise role-assignment.

French Abstract*

Task-Related Information Sharing in Group Decision Support Systems (GDSS): The Importance of Knowing Who Knows What

Partage D'information Dans Les Systemes D'aide A La Decision De Groupe (SADG) : L'importance De Savoir Qui Sait Quoi

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Résumé

Les systèmes d'aide à la décision de groupe (SADG) sont des systèmes d'information très répandus et conçus pour favoriser la communication de groupe et la prise de décision collective. Afin de prendre des décisions collectives, les membres d'un groupe de travail partagent et échangent des informations. Il y a trois types d'information: l'information commune (ou partagée), connue par tous les membres d'un groupe; l'information unique (ou non-partagée), connue par un seul membre du groupe et l'information partiellement partagée, connue par plusieurs mais pas par tous les membres d'un groupe. Jusqu'ici, seulement quelques études ont étudié l'échange des informations dans des groupes de SADG engagés dans des processus de prise de décision. Cette étude examine les effets qui se produisent sur la proportion d'informations communes, uniques et partiellement partagées dans des groupes de SADG lorsqu'on assigne au préalable quelqu'un qui joue le rôle d'expert dans le groupe. Les résultats montrent que désigner un expert affecte le partage d'information dans des groupes de SADG. On peut également accroître la distribution d'informations uniques comme manière de favoriser la mise en commun des d'information dans des groupes où l'on a assigné quelqu'un jouant le rôle d'expert. Ce rôle d'expert augmente la quantité 'informations partiellement partagées pendant les discussions du groupe. Accroître la proportion d'informations uniques engendre une augmentation de la retenue d'information partiellement partagée mais diminue la retenue d'informations uniques lors de discussions de groupe.

Mots-clés : Partage d'informations, les systèmes d'aide à la décision de groupe (SADG), assigner le rôle d'un expert.

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Spanish Abstract*

Task-Related Information Sharing In Group Decision Support Systems (GDSS): The Importance of Knowing Who Knows What

Compartir la Información Relacionada con las Tareas en los Sistemas de Apoyo en la Toma de Decisión Grupal (Gdss):

La Importancia de Saber Quién Sabe Qué

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Resumen

Los Sistemas de Apoyo a la Toma de Decisiones Grupal (GDSS) se encuentran entre los sistemas de "software" más extendidos de cuantos se han diseñado para facilitar y fortalecer la comunicación grupal para la toma colectiva de decisiones. Los miembros de un equipo de trabajo normalmente intercambian información para tomar decisiones y existen tres tipos de información relacionada con las tareas: información común (o compartida) que es conocida por todos los miembros del grupo; información única (o no compartida) que es conocida por solamente un grupo de miembros; e información parcialmente compartida que es conocida por más de una persona pero no por la totalidad de los miembros. Hasta la fecha, sólo un puñado de estudios han evaluado los intercambios de información en grupos GDSS implicados en la toma de decisiones y el presente estudio examina el efecto de la asignación cualificada de roles y la proporción de información común, única, y parcialmente compartida, disponible en los grupos GDSS. Los resultados indican que la distribución de información y la asignación cualificada de roles pueden afectar a la información compartida por grupos GDSS. El incremento proporcional en la distribución de información única puede utilizarse como una manera de reforzar la concentración de información única en grupos de asignación cualificada de roles. La asignación cualificada de roles aumenta la cantidad de información parcialmente compartida durante las discusiones grupales e incrementa la proporción de resultados de información única en la retención de información parcialmente compartida, pero reduce la retención de información única que sigue a las discusiones de grupo.

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German Abstract*

Task-related Information Sharing In Group Decision Support Systems (GDSS): The Importance of Knowing Who Knows What

Die gemeinsame nutzung von aufgabenspezifischen information in group decision support systemen (gdss):

die bedeutung zu wissen, was wer weiss?

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Zusammenfassung

Group Decision Support Systeme (GDSS) gehören zu den häufig genutzten Standardsoftware-Systemen und wurden entwickelt, um die Kommunikation für eine gemeinsame Entscheidungsfindung zu ermöglichen und zu verbessern. Mitglieder einer Arbeitsgruppe teilen und tauschen Informationen normalerweise mit der Zielsetzung aus, Entscheidungen zu treffen. Es existieren drei unterschiedliche Typen von aufgabenspezifischen Informationen: Allgemeine (oder geteilte) Information die allen Mitgliedern der Gruppe bekannt sind; einzigartige, personenbezogene (oder ungeteilte) Informationen die nur von einem Gruppenmitglied gekannt werden; und partiell geteilte Informationen, die von mehr als einem Mitglied aber nicht von allen Mitgliedern gekannt werden. Bisher haben erst wenige Studien den Informationsaustausch in GDSS-Gruppen vor dem Hintergrund der Entscheidungsfindung bewertet. Diese Studie untersucht den Effekt einer rollenbezogenen Expertise und des Anteils von allgemeinen, einzigartigen und partiell geteilten Informationen in GDSS-Gruppen. Die Ergebnisse deuten darauf hin, dass die Informationsverteilung und die rollenbezogene Expertise den Informationsaustausch in GDSS Gruppen beeinflussen. Die gesteigerte Teilung von einzigartigen Informationen kann genutzt werden, um die Zusammenführung von Einzelinformationen in Gruppen mit rollenspezifischer Expertise zu verbessern. Die rollenbezogene Expertise steigert den Anteil von partiell geteilten Informationen. Gruppendiskussionen und eine Steigerung des Anteils an einzigartigen Informationen führen zu einer Erhöhung der partiell geteilten Informationen und schlussendlich zu einer Verminderung der verbleibenden einzigartigen, personenbezogenen Informationen.

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Italian Abstract*

Task-Related Information Sharing In Group Decision Support Systems (GDSS): The Importance of Knowing Who Knows What

Sistemi Di Condivisione Delle Informazioni In Grupi Di Lavoro Focalizzati Su Un Obiettivo:

L'importanza Di Sapere Chi Sa Che Cosa

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Abstract

I sistemi di condivisione delle informazioni in gruppi di lavoro focalizzati su un obiettivo (GDSS) sono fra i più comuni sistemi creati per incrementare l'efficacia del decision making collettivo. I membri del gruppo normalmente comunicano utilizzando questi sistemi per prendere decisioni; ci sono tre tipi di informazioni relativi a compiti da svolgere: comuni (o condivise) fra tutti i membri del gruppo di lavoro; informazioni particolari (o non condivise) non condivise tra tutti i membri del gruppo; informazioni parzialmente condivise fra i membri del gruppo. Fino ad oggi solo pochi studi hanno approfondito le dinamiche di condivisione delle informazioni all'interno di questi gruppi al fine di formulare decisioni. Il presente studio approfondisce l'impatto della professionalità dei ruoli e il rapporto proporzionale di informazioni condivise, particolari e parzialmente condivise all'interno del gruppo. I risultati dimostrano che la distribuzione delle informazioni e la professionalità dei ruoli hanno un impatto sulla condivisione delle informazioni. L'incremento della proporzione delle informazioni particolari condivise puo' essere utilizzato come metodo per concentrare informazioni che possono essere utilizzate da ruoli professionali qualificati. Incrementando la professionalita' di ruolo si incrementano le informazioni parzialmente condivise nelle discussioni di gruppo e l' incremento di informazioni particolari risulta in un maggior grado di ritenzione delle informazioni stesse parzialmente condivise, al tempo stesso diminuisce la capacita' di ritenzione di informazioni particolari a seguito di discussioni in gruppo.

Parole chiave: condivisione delle informazioni, sistemi di condivisione di informazioni fra gruppi di lavoro focalizzati su obiettivi (GDSS), assegnazione di ruolo in base alla professionalita'

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Arabic Abstract*

Task-related Information Sharing In Group Decision Support Systems (GDSS): The Importance of Knowing Who Knows What

تشارك المعلومات المتعلقة بالمهام في مجموعة أنظمة دعم القرار (م.ن.د.ق):

"أهمية معرفة من يعرف ماذا"

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خلاصة

تقع مجموعة أنظمة دعم القرار (م.ن.د.ق) ضمن نظم البرمجيات الأكثر شيوعا المصممة من أجل تمكين وتعزيز مجموعة الإتصالات من أجل إتخاذ القرارات الجماعية. يقوم أعضاء مجموعة العمل في العادة بمنح وتبادل المعلومات من أجل إتخاذ القرارات. هنالك ثلاثة أنواع من المعلومات ذات الصلة بالمهام: المعلومات العامة (أو المشتركة) المعترف بها من قبل جميع أفراد العمل، المعلومات الفريدة من نوعها (أو غير المشتركة) من قبل عضو واحد فقط في المجموعة، والمعلومات المعروفة جزئيا من قبل أكثر من عضو واحد و لكن ليس من قبل جميع الأعضاء. حتى الآن، لم يتم تقييم تبادل المعلومات في مجموعات أنظمة دعم القرار المشاركة في صنع القرار، وتبحث هذه الدراسة أثر إحالة دور الخبرة ونسبة المعلومات المشتركة، والفريدة من نوعها، والمشتركة جزئيا المتاحة في (م.ن.د.ق). تشير الدراسات إلى أن توزيع المعلومات وخبرة تكليف الأدوار تؤثر على مشاركة المعلومات في (م.ن.د.ق). يمكن أن يتم إستخدام زيادة نسبة توزيع المعلومات الفريدة من نوعها في مجموعات إحالة دور الخبرة المعين. تزيد خبرة إحالة الأدوار من كمية المعلومات المشتركة جزئيا من خلال النقاشات الجماعية ونسبة نتائج المعلومات الفريدة من نوعها في زيادة الحفاظ على المعلومات المشتركة جزئيا، لكنها تقلل من الإحتفاظ بالمعلومات الفريدة من نوعها عقب مناقشات المجموعة.

الكلمات الرئيسية: تشارك المعلومات؛ مجموعة نظم دعم القرار (م.ن.د.ق)؛ إحالة دور الخبرة.

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Thai version*

Task-related Information Sharing in Group Decision Support Systems (GDSS)

การแบ่งปันข้อมูลการทำงานในระบบสนับสนุนการตัดสินใจในการทำงานกลุ่ม

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Abstract

ระบบสนับสนุนการตัดสินใจในการทำงานกลุ่ม)GDSS(
เป็นหนึ่งในหลายระบบปฏิบัติการที่ช่วยเพิ่มประสิทธิภาพในการสื่อสารของกลุ่มการทำงานที่มีการตัดสินใจร่วมกัน
โดยสมาชิกในกลุ่มจะสามารถสนทนาปรึกษา และแลกเปลี่ยนข้อมูลเพื่อช่วยในการตัดสินใจกลุ่มได้
ข้อมูลสำหรับการทำงานในกลุ่มสามารถแบ่งออกเป็นสามประเภท คือ ข้อมูลทั่วไป)common information/ shared information (
) ซึ่งเป็นข้อมูลที่รับรู้โดยสมาชิกทุกคนในกลุ่มการทำงาน ข้อมูลเฉพาะunique information/ unshared information(
ซึ่งเป็นข้อมูลที่รับรู้เฉพาะบุคคลเพียงหนึ่งคนในกลุ่ม และข้อมูลบางส่วน)partially shared information(
ซึ่งเป็นข้อมูลที่รับรู้เฉพาะบางคนในกลุ่มทำงาน ในปัจจุบัน
มีเพียงไม่กี่การศึกษาวิจัยที่ให้ความเข้าใจเพิ่มเติมเกี่ยวกับผลกระทบของการแลกเปลี่ยนข้อมูลในระบบสนับสนุนการตัดสินใจในการทำงานกลุ่ม
งานศึกษาวิจัยนี้มีการประเมินผลกระทบดังกล่าว โดยมีการเพิ่มเงื่อนไขเกี่ยวกับการระบุความเชี่ยวชาญให้แก่บุคคลในกลุ่ม)Expertise-Assignment (
และการกระจายสัดส่วนลักษณะข้อมูลทั่วไป ข้อมูลเฉพาะและข้อมูลบางส่วน ซึ่งผลที่ได้รับจากงานศึกษาวิจัยนี้พบว่า
สัดส่วนของการการกระจายลักษณะข้อมูลมีผลกระทบต่อการตัดสินใจของกลุ่มการทำงาน
การเพิ่มสัดส่วนของการแบ่งข้อมูลทั่วไปให้แก่สมาชิกในทีมการทำงานเป็นการเพิ่มขีดความสามารถในการดึงข้อมูลเฉพาะของบุคคลและยังสามารถเ
พิ่มการกล่าวถึงข้อมูลบางส่วน อีกทั้งยังสามารถเพิ่มขีดความสามารถในการจดจำข้อมูลบางส่วนหลังจากการทำงานกลุ่มนั้นอีกด้วย