

The Collaborative Conflict Management Style and Cultural Diversity in DGSS Supported Fuzzy Tasks: An Experimental Investigation

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Abstract

In today's global economy organizations are increasingly resorting to culturally diverse groups of individuals to cope with the challenges of a global market. Often, group decision support systems (GSS) are utilized in the process. The performance of these technology-assisted meetings might be subject to the impact of the conflict management style that group members adopt and the cultural backgrounds of the participants. This study examines the possibility that cultural diversity may have a moderating effect on the relationship between the collaborative conflict management style and group performance in a distributed GSS (DGSS) environment

1. Introduction:

A group decision support system (GDSS) combines communication, computer, and decision support technologies to facilitate the formulation and solution of unstructured problems by a group of people [6]. Today, GDSS or group support systems (GSS), as they have come to be known, continue to gain popularity as organizations are learning the potential benefits these systems can bring to group decision-making; and as a result of the continued advances in computer and information technology (IT). As a result of the growing need for groups to collaborate, groupware has been experiencing rapid growth in industry [28]. International Data Corporation (IDC) reports that 84 million users of groupware generated a business volume of \$2.1 billion in 1998, and by 2003, that figure is expected to reach \$2.6 billion [7].

In fact, the increasing use of GSS may also be related to the fact that more organizations are moving toward a structure in which more important decisions are made by

teams, or groups of employees, often with varying backgrounds, skills, and departmental affiliations. Several other factors are likely to contribute to further growth in the use of GSS in organizational decision-making. The increased prevalence of the internet and the World Wide Web (WWW) is making it possible for individuals and organizations to engage in group discussions online and in real time. Fjermestad and Hiltz [8] "suspect that the tremendous popularity of WWW and web browsers will see a new surge of interest in GSS." In deed, the availability of WWW access in a growing number of countries will make it easier for businesses to take advantage of GSS at the global level, and thus, contribute to the increased demand for such systems. In addition, the continued advances in telecommunication technologies will also help enhance the speed and quality of communications.

Innovative telecommunication technologies such as satellites, fiber-optic networks, and visual communication software will also make it more possible for GSS to improve the communication support they can provide for group meetings. Distributed group support systems (DGSS), a type of GSS, are created by combining traditional GSS features and computer-mediated communication systems [29]. The uniqueness of DGSS comes from their ability to bring together groups whose members are geographically dispersed. In contrast to the existence of numerous studies on the effectiveness of GSS, relatively, fewer studies focus on the effectiveness of DGSS.

In light of the expected growth of DGSS use, the question of whether, or not, DGSS improve the outcome of group decision-making becomes more relevant to GSS research. In assessing the impact of GSS on group decision-making, previous studies have overwhelmingly focused on the interplay of three major categories of variables: technology, group, and task. Such orientation seems to be logical since in a GSS setting, people interact with each other, and with technology, to achieve a certain

task. However, with the increasing globalization of the business world, other variables such as conflict management attitudes adopted by group members and cultural diversity may be equally important for the study of GSS.

In small work groups, conflict among members is likely to emerge for various reasons including the cultural makeup of the group. This has some degree of relevance in the context of a DGSS, which has inherent limitations regarding coordination and facilitation. Group members' willingness and ability to collaborate with each other is likely to have a bearing on the overall performance of the group. Some recent IS literature address the role conflict management styles play in group decision-making involving virtual teams ([17], [24]).

Additionally, with globalization, the cultural diversity of the workforce of an organization with a global presence would be expected to increase. Therefore, there is a possibility that the cultural diversity of a group might have an impact on the outcomes of GSS use. Nonetheless, despite that GSS research started in the late 1970s [5], only a limited number of studies have examined GSS from a cross-cultural perspective ([30], [4], [31], [10], [16], [5]) and perhaps none from a DGSS perspective. Evidently, culture has not received a sufficient amount of consideration in GSS research, which provides the motivation for this study.

Moreover, previous GSS studies that examined culture have mostly dealt with this issue from a cross-cultural perspective. Their focus revolved mainly around comparing GSS usage across different cultures. This paper assesses whether the cultural makeup of a particular group using a DGSS has any impact on the performance of that group. We address the question of whether the cultural heterogeneity of a group has any effect on DGSS outcomes by means of influencing members' adopted styles of conflict management in terms of the level of agreement among members, member participation, and perceived decision quality. The study specifically focuses on group decision-making that involves fuzzy tasks.

Fuzzy tasks describe decision-making problems that are characterized by a high degree of uncertainty regarding the potential outcomes and the means to achieve them. In an increasingly complex and global business environment groups are likely to encounter fuzzy tasks in their decision-making activities. Therefore, this paper focuses on this type of tasks for two reasons. First, the prevalent uncertainty in a task may be heightened by the different cultural dimensions that may characterize group members of different national cultures, and, hence, culture may be a source of noticeable variance in group performance measures, which would be worthy of researchers' effort. Second, as a result of globalization, it is very likely that organizations will be encountering a growing number of issues about which little information is available.

This study will hopefully lay a foundation for theory development and theory testing in relation to the links among cultural diversity, collaboration, and performance of GSS supported groups.

2. Literature review:

2.1. Culture:

In today's global marketplace, the ability of organizations to make the use of GSS in culturally heterogeneous work groups beneficial requires the understanding of how cultural diversity may impact the performance of these groups.

Several definitions of the word culture are found in the extant literature; however, we will use Hofstede's definition, which states that culture is "the collective programming of the mind which distinguishes one group or category [nation] from another" [12]. The extant information systems (IS) literature supports the view that different cultures differ with respect to issues dealing with IS ([30], [16], [5], [10], [31], [32])

De Vreede et al. [5] conduct a field study of GSS application in Africa using the Technology Acceptance Model (TAM) to investigate the effective use and acceptance of GSS technology in a cross-cultural context. The author's findings support the view that cultural characteristics can lead to significant differences in areas such as technology acceptance, use, and diffusion, in addition to user satisfaction. Mejias et al. [16] investigate the effects of "national culture" (US and Mexico) in a field study that shows significant differences in the relative levels of satisfaction and consensus. In a more recent cross-cultural study of the use of knowledge management systems, Yoo et al. [32] observe that the interaction between culture and technology leads to unique sociotechnological systems that result in different attitudes and behavioral patterns toward knowledge management systems and organizational knowledge in different cultures. In GSS research, culture seems to be "an area of great neglect" [8] which provides another motivation for this study. Samarah et al. [24] propose a framework that links cultural diversity to the collaborative conflict management style and performance of global virtual teams.

In order for us to examine the role of culture in GSS, reviewing the meaning of the term "cultural characteristics or elements" would be helpful. Hofstede's work in this area identifies five bipolar dimensions of cultural values [13]. A country's position on these dimensions allows us to predict how its society operates. The five cultural dimensions identified are: a) Power Distance, b) Individualism, c) Masculinity, d) Long-term Orientation, and e) Uncertainty Avoidance. A brief overview of these dimensions is shown in Table 1.

Understanding the differences in cultural characteristics across countries can help us understand the different ways of dealing with emerging problems in group settings [13]. Therefore, an understanding of these dimensions can provide us with more insight into the cross-cultural effects of GSS. Empirically examining these issues becomes a task that can reveal useful findings that would, hopefully, help us improve the outcomes of GSS in culturally diverse groups.

In addition to Hofstede’s five cultural dimensions, Boyacigiller and Adler [1] present a slightly different view on the cultural characteristics of nations. The authors discuss the three dimensions of individualism, free will, and high/low context orientation. Since the work of the former appears to be more comprehensive than that of the latter, this study refers to Hofstede’s scheme of the cultural characteristics of nations in the theoretical discussion.

Table 1. Cultural dimensions of nations [13]

| Dimension | Description |
|-----------------------|--|
| Power Distance | The degree of inequality among people that is perceived by the population to be normal. Western nations have lower scores on power distance than do Asian countries. |
| Individualism | The degree to which people prefer to act as individuals rather than members of groups. Westerners score higher on Individualism than do Asians. |
| Masculinity | The degree to which tough values like assertiveness, performance, success... (typically associated with the role of men) prevail in a society over tender values such as the quality of life, service ... (usually associated with the role of women.). Japan has the highest score of 95 with the Netherlands scoring lowest at 14. |
| Long-term Orientation | The extent to which societies prefer structured over unstructured situations. |
| Uncertainty Avoidance | Societies with a long-term orientation have values that are directed towards the future such as thrift (savings) and persistence. Others with short-term orientation have values that are oriented towards the past and present such as respect for traditions and social obligations |

2.2. Conflict management styles:

Researchers in the field of social psychology have documented five patterns of conflict management behavior that typically emerge in group settings ([27], [22], [23]). The commonly reported styles of conflict management are:

- *Avoidance*: the intentional failure to engage other members in the group and to just go with the flow.

- *Accommodation*: the tendency to being more concerned with the others’ needs and views than with one’s own.
- *Competition*: having no concern for the others’ interests or needs and to wrestle with the others so that one’s views and concerns might be the dominant ones.
- *Collaboration*: the drive toward integrating the interests and needs of all parties involved.
- *Compromise*: occurs when members focus on finding a common solution that addresses everybody’s interest.

These behaviors or attitudes may be compounded by the special circumstances present in a DGSS environment such as the remoteness of the members and the technology-supported interaction. In addition, in the context of DGSS supported meetings, collaboration and coordination play a critical role [29]. It is our conjecture that the collaborative conflict management style is more relevant for research involving DGSS use.

2.3. GSS variables:

Hiltz et al. [11] present a model that “organizes all the variables that have been used in GSS research under four dimensions: contextual, intervening, adaptation, and outcomes.” These dimensions represent broad categories each consisting of several more detailed variables. The contextual factors are the independent variables that are exogenous to the group’s decision-making activity. Examples of this category include the type of GSS used, the task type, group characteristics, and other environmental and organizational factors. Intervening factors change across sessions to reflect session-specific attributes such as session length or number of sessions. Adaptation variables reflect the interaction process of the group and include elements such as level of use or attitudes toward the GSS. The outcomes are the result of the process of interaction among the contextual, intervening, and adaptation dimensions. Outcomes of GSS sessions include measures of efficiency, effectiveness, satisfaction, and consensus.

Building on this classification and other GSS research, the following is a description of the variables used in this study.

2.3.1. Task type. The importance of the task variable is confirmed as often accounting for about 50 percent of the variance in group performance [21]. Tasks can be seen as actions taken by individuals in turning inputs into outputs [9]. The use of GSS can facilitate the accomplishment of tasks by individuals through the various types of support provided by the GSS. Task characteristics usually describe the activities required to accomplish the task [18]. Several classification schemes exist in the general

literature, but GSS research has mainly used two of these: Campbell's [2] and McGrath's [15].

Campbell [2] presents a typology of tasks that outlines five different types of complex tasks. In that typology, tasks are classified according to four complexity attributes: outcome multiplicity, path multiplicity, conflicting interdependence of the paths and outcomes, and the degree of uncertainty of the linkages among the paths and the desired outcomes. Based on these four attributes, Campbell's five task types are labeled as: simple tasks, decision tasks, judgment tasks, problem tasks, and fuzzy tasks. Table 2 provides a summary description of these task types.

Table 2. Campbell's task types [2]

| Task Type | Description |
|----------------|---|
| Simple Tasks | Do not display any of the complexity attributes. |
| Decision Tasks | Involve the selection of an optimal path (solution) from among several possibilities |
| Judgment Tasks | Involve conflicting interdependence and uncertainty regarding task information. |
| Problem Tasks | Have one clearly defined desired outcome and involve the selection of one best path to that outcome. Conflicting interdependence and uncertainty may or may not be present in problem tasks |
| Fuzzy Tasks | Have both outcome multiplicity and path multiplicity and may or may not have conflicting interdependence and uncertainty. Common in business settings. |

Another task typology that has been commonly used in GSS research is McGrath's "task circumplex" [15]. This typology identifies four categories of tasks: generate (planning and creativity tasks); choose (intellective and decision making tasks); negotiate (cognitive conflict and mixed-motive tasks); and execute (post-decision execution tasks). Of these types, only the generate, choose and negotiate types can be supported by GSS. Paul [20] outlines the limitations of DGSS in supporting these tasks. Table 3 provides a summarized description of McGrath's [15] task classification.

2.3.2. GSS support types. Several types of GSS support are discussed in the GSS literature. Nunamaker et al. [18] identify four types of GSS support types: task support, task structure, process support, and process structure. In addition, more recent work by Zigurs et al [33] discusses three types of support offered by GSS: communication support, process structuring support, and information

processing support. Tables 4 and 5 present summary descriptions of the two perspectives.

2.3.3. Group Performance. GSS performance has been commonly studied by assessing outcomes such as decision time, member satisfaction, participation,

Table 3. McGrath's task type [15]

| Task Type | Description |
|-----------|---|
| Generate | <u>Planning tasks:</u> require generating an action plan describing how some objectives are to be pursued and the actions that are necessary to be carried out in order to achieve these objectives. <u>Creativity tasks:</u> require generating ideas as to how to deal with an emerging problem or situation. |
| Choose | <u>Intellective tasks:</u> solve a problem for which an optimal solution exists through some computation, invention, or selection. <u>Decision making tasks:</u> no demonstrable correct solution exists for these tasks. |
| Negotiate | <u>Cognitive conflict tasks:</u> require the resolution of conflicting interpretations or viewpoints regarding a problem. <u>Mixed-motive tasks:</u> require resolving conflicting motives or interests |
| Execute | post-decision" execution that is beyond the scope of GSS |

Table 4. GSS support types [18]

| GSS Support Type | Description |
|-------------------|--|
| Task Support | Provides information and computation tools to help group members perform task activities. Examples include databases and pop-up calculators |
| Task Structure | Provides rules and techniques that help members analyze and understand task information and details. Examples include software for performing forecasts or simulation runs. |
| Process Support | Provides technology that facilitates intra group communication. Examples include workstations and public screens. |
| Process Structure | Provides procedures and rules that control the pattern, timing, and content of communication. Examples include facilitator intervention, parallel commenting and voting rules. |

consensus, agreement, and perceived decision quality ([3], [14], [17], [26], [29]). In this research we intend to focus on the effectiveness rather than the efficiency of DGSS supported groups and, thus, will exclude decision time from our current research model. Our model includes the variables of member agreement on final decision, participation and perceived decision quality. The level of agreement among group members is important in the context of culturally heterogeneous groups that are using a DGSS. Decision quality is another important variable for any research involving group decision-making. However, as fuzzy tasks have no right or wrong solutions (or decisions), we focus on the perceived decision quality in this paper. As we had subjects from two countries with diverse cultural backgrounds, we were interested in exploring whether the perceptions of decision quality were different.

Table 5. GSS support types [32]

| GSS Support Type | Description |
|--------------------------------|--|
| Communication Support | Technology that sports communication among group members. Examples include computers and media tools. |
| Process Structuring Support | Technology that supports and enhances group interaction. Examples include electronic agenda, script logs, and techniques for organizing the pattern and content of group interaction such as a time clock. |
| Information Processing Support | Technology to support information gathering, storage, and analysis. Examples include spreadsheets and presentations software. |

3. Theory development and research hypotheses

Hofstede’s work on cultural characteristics of countries provides a theoretical background for our examination of the impact of cultural diversity on GSS outcomes. Culture affects almost all of the mental programs of individuals (e.g., attitudes, personality, satisfaction, perception, etc.), which in turn are reflected by our behavior [12]. Thus, the collective effort, member interaction and level of success of a group of people working to achieve a certain task would be subject to the influence of the behaviors exhibited by the members of that group. For example, Watson et al. [30] observe that cultures exhibit different patterns of group interaction. For example, the authors note that groups from nations

with a high power distance appear to favor a more defined and gradual approach to convergence and agreement than groups from nations with a lower degree of power distance.

Culture is obviously a source of variance in the human behavior. Therefore, a culturally heterogeneous group would be expected to display types of behavior and interactions that are different from those displayed by a culturally homogeneous group. In a DGSS setting, the impact of cultural heterogeneity on group performance might ultimately result in performance outcomes that are different from those generated by a culturally homogeneous group.

The adoption of the collaborative conflict management style would be expected to promote higher levels of member participation, as members who adopt this attitude would find it natural to get involved in the activities of the group. The fact that a GSS provides parallelism for group discussions, member participation would be enhanced in a GSS environment. Moreover, since members retain a great deal of anonymity in a DGSS environment, higher levels of member participation can be expected. However, we expect membership in a culturally diverse group to have a negative effect on the potential for a collaborative style of conflict management to exert its potential effect on participation. The cultural diversity of a group of decision makers might play itself out in the resultant pattern of discussions and nature of opinions and viewpoints expressed by members, even without their knowing they are part of a culturally diverse group. As a result, group harmony and cohesion might suffer leading to psychological pressures such as discomfort and weak feelings of belonging to the group. In fuzzy tasks, the end result would be for some or all members to refrain from seeking necessary problem information and/or task details. In a DGSS setting, that might also lead to feelings of rivalry among members causing them to stay away from a collaborative spirit in favor of a more competitive, less conciliatory approach to conflict resolution. Therefore,

Hypothesis 1a: In DGSS supported fuzzy tasks, the collaborative conflict management style will exert a positive impact on member participation.

Hypothesis 1b: Cultural diversity will weaken the positive effect that the collaborative style will have on participation.

The collaborative conflict management style can also be expected to have positive effects on the degree of agreement on the final decision among group members. We expect that team members who are willing to and ready for collaborating with others will expend effort and energy in order to achieve decisions that are mutually

acceptable to the group. The more collaborative the members are, the higher the likelihood that they will arrive at decisions that are agreeable to all involved. Similar to hypothesis 1b, we expect cultural diversity to have a weakening impact on the positive effect of collaborative attitude on member agreement. Therefore,

Hypothesis 2a: In DGSS supported fuzzy tasks, the collaborative conflict management style will exert a positive impact on the degree of agreement among group members.

Hypothesis 2b: Cultural diversity will weaken the positive effect that the collaborative style will have on level of agreement.

As group members assume a collaborative conflict management attitude during their discussions, it is likely that they will perceive the final decisions to be of high quality. Collaboration by the members will help raise more issues and explore various perspectives and views of the decision problem. Members feeling that they have collaborated extensively will lead them to be more satisfied with the quality of their work and cause them to develop favorable feelings toward the quality of the final decisions. On the other hand, related to hypothesis 1b, when collaboration is weakened by cultural diversity, so will its effect on perceived decision quality. Therefore,

Hypothesis 3: In DGSS supported fuzzy tasks, the collaborative conflict management style will exert a positive impact on the members' perceived decision quality.

Hypothesis 3b: Cultural diversity will weaken the positive effect that the collaborative style will have on the perceived decision quality.

Figure 1 presents the hypothesized model of this study.

4. Research method

Volunteer subjects enrolled in MBA programs at a major Midwestern US university participated along with graduate students from a major management school in India. All subjects were experienced with information technology, including internet/Web skills.

4.1. Subjects

Subjects enrolled in graduate MBA programs at a major Midwestern US university were identified and selected along with graduate students from a major management school in India. 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 all subjects.

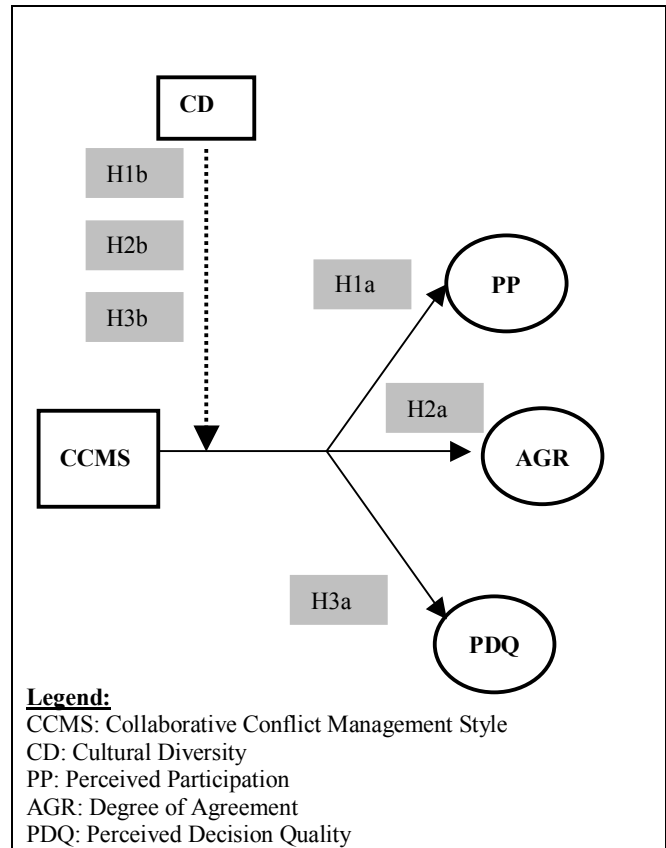


Figure 1. Research model

It should be pointed out that the students enrolled at the US university represented different cultural and ethnic backgrounds, in addition to students who were born and raised in the US and who had attended US schools all of their lives. An instrument on individualism/collectivism and uncertainty avoidance was administered and the data was analyzed. Based on the findings of the analyses, the student subjects were distributed among the following categories:

- US homogeneous: Consisting of students who had lived in the US since birth and the students who had resided in the US for a long duration (typically over 10 years).
- Indian homogeneous: Consisting of students residing in India.
- Heterogeneous: A mix of students who had lived in the US since birth, the students residing in India, and the foreign students who had lived in the US for a shorter duration (typically less than 10 years).

For the purpose of testing the hypotheses, the US and Indian homogeneous were considered *culturally homogeneous groups*, whereas the heterogeneous groups were labeled as *culturally heterogeneous groups*. A total of 83 persons completed all phases of the study as follows: 4 US homogeneous, 9 Indian homogeneous, and

9 heterogeneous groups. Seventeen groups had four persons; five groups had three.

Due to the nature of the study, the approximate 10 ½ hour time difference between the two countries, and the schedules of the students in each location, complete random assignment of subjects to groups was not possible. However, once the availability of the students in each location was known, accounting for the time differences, class schedules, etc., students were randomly assigned to either homogeneous or heterogeneous groups, based on their availability.

4.2. Task identification and description

Initially, 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 better if the task was one to which they would easily relate. Accordingly, the task chosen was the selection of a computer use fee for students enrolled in an online university. Groups were provided with a printed and online task description. It identified reasons why the university's administration was considering the implementation of a fee, e.g., need for a help desk. The description also identified five fee options: a flat fee for all course; one fee for undergraduate courses and a higher fee for graduate courses; a graduated fee, based on intensity of computer use in a course; a "fee for use;" and a fee based on the country of origin of the student.

As part of the experimental procedures, discussed below, students in each group discussed these options among themselves and selected one option as the one to recommend to the university's administration. Experimental procedures did not provide for identifying and recommending any option other than the five listed above.

4.3. Pre-experiment training

Subjects participated in a detailed training session that dealt with all phases of the study. The session consisted of a demonstration of each command of the DGSS software package to be used in the experiment and of a dummy task. The training session was conducted in a computer laboratory that was also used for the actual experiment. The session was conducted by one of the researchers who had extensive experience with the software.

4.4. Variable identification:

This study examined the influence of one independent variable and one moderating variable on three dependent measures. The independent variable is collaborative conflict management style of each group. Following on the instrument used by Montoya-Weiss [17],

collaborativeness was defined as the average of five items measured by a 5-point Likert-type scale (Appendix 1). The moderating variable is cultural diversity, consisting of two levels: homogeneous and heterogeneous groups. Homogeneous groups were either US homogeneous or Indian homogeneous groups. Heterogeneous groups were a mix of US and non-US students.

Degree of agreement of the group members was a dependent variable. This was measured as the percentage of members voting in favor of the final decision proposed by a group. The other two dependent variables were measured, all with 5-point Likert-type scales: perceived decision quality (five items), and perceived participation (six items). The indicator items of these scales are presented in appendix 1.

4.5. Experimental procedures:

The experimental sessions were carried out in July, 2002 at a major Midwestern university in the US and a premier business school in India. The subjects were randomly assigned to groups and were informed as to when they would participate. Anonymity among group members was maintained. Each session consisted of the following:

- Activity 1- commenting on advantages, disadvantages, etc. of each option. The software allowed students to read each option, comment on options as desired, comment on other group members' statements, etc. When finished, each group member rated the five options from 0 (least appropriate/worst) to 4 (most appropriate/best). Subsequently, each group member viewed the rating results for his/her group.
- Activity 2 – commenting on the group's rating in activity 1. This Activity centered on discussions about why or why not the option was good, etc. and resolved conflict if more than one option ended up having almost a similar rating. Near the end of Activity 2, each group identified an option as a choice of the group and members voted "yes" or "no" to accept or reject the proposed choice.
- Activity 3 – each group completed a short post-test questionnaire.

The task had various outcomes i.e. various options for computer use fee. Groups could select an option following multiple paths: selecting the option that had maximum average rating or minimum standard deviation or both in the group rating process of activity 1; or select an option that might not have the highest rating in activity 1 but appeared to be satisfactory to the majority of the group members during the course of the discussion in activity 2. The task had the complexity of a fuzzy task.

These activities were implemented using Consensus@nyWARE, a web-based GDSS. Each group was under the control of a facilitator, who communicated

using “instant messaging.” The facilitator monitored the discussions and dealt with any technical software questions; the facilitator did not interject anything into the discussion regarding the task and the computer use fee options.

5. Results

5.1. Reliability and validity:

Reliability assessments were calculated for the self-reported variables of perceived decision quality, perceived participation, and the collaborative conflict management style. 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 with the exception of the instrument for “collaboration conflict management style,” 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 [19]. An alpha of 0.903 was found for “perceived decision quality”; 0.816 for “perceived participation”; and 0.768 for “collaborative conflict management style.”

Content validity was established by examining the correlation matrix of the indicator variables for a construct [19]. For the “perceived decision quality” scale, all inter-item correlation coefficients were 0.636 or better ($p < 0.0001$); for “perceived participation”, with the exception of one case, all inter-item correlations were 0.378 or better ($p \leq 0.0004$). For the “collaborative conflict management style” scale the coefficients were 0.236 or better ($p \leq 0.0326$).

To examine convergent validity, factor analyses employing VARIMAX orthogonal rotation was carried out. The factor analysis of four items representing “perceived decision quality” produced a single-factor structure with a factor loading ranging from 0.844 to 0.903. The factor analysis of five items representing “perceived participation” scale produced a single-factor structure with a factor loading ranging from 0.712 to 0.819. The factor analysis of five items representing “collaborative conflict management style” loaded on a single factor and resulted in factor loadings ranging from 0.616 to 0.834.

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 “perceived decision quality” item 5 measured the overall perceived decision quality. The correlation between the 4-item scale and the overall perceived decision quality item was strong ($r = 0.865$) indicating quite a high predictive validity [19]. For “perceived participation” the corresponding correlation was 0.743 indicating yet another case of high predictive

validity. As the “collaborative conflict management style” was adopted from a validated measure of conflict management [17], its predictive validity was not tested.

5.2. Hypothesis Testing:

The hypotheses were tested using regression analyses with a level of significance of 0.05. Any weak significance level in the range of .05 to .10 was treated as suggestive of the nature of relationship between the variables.

We tested our hypotheses in three steps. First, we regressed the dependent variables on the main effect (collaborative conflict management style). Next, we regressed the dependent variables on the main effect, moderator effect (cultural diversity of DGSS groups), and the interaction between the main and moderator effects. Finally, we tested the significance of the interaction effect by comparing the two regression models. F-test comparison of the regression coefficients of the two models was significant at 95 percent confidence level for perceived decision quality and degree of agreement in groups.

The first regression analyses demonstrated statistically significant relationships the collaborative conflict management style has with the degree of group agreement and perceived decision quality (weak significance). However, the analysis with perceived participation of the group did not demonstrate any statistically significant result. The results, summarized in Table 6, support hypotheses 2a and 3a while hypothesis 1a remains unsupported in this study.

Table 6. Results of regression analyses with main effect (collaborative conflict management style)

| Independent Variable | Perceived Decision Quality | Perceived Participation | Degree of Group Agreement |
|--|----------------------------|-------------------------|---------------------------|
| Intercept | 1.364 | 3.817**** | -0.760 |
| Collaborative Conflict Management Style | 0.639* | 0.130 | 0.374** |
| * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$; **** $p < 0.001$ | | | |

The results of the second regression analysis, presented in table 7, show significant effect the interaction of collaborative conflict management style and cultural diversity of DGSS groups has on perceived decision quality and degree of group agreement. However, contrary to our expectations (as stated in hypotheses 2b and 3b), the cultural diversity has a positive moderating effect on degree of group agreement and perceived decision quality. Hypotheses 2 & 3 are thus partially supported.

Table 7. Results of regression analyses with main Effect and Moderator Effect

| Independent Variable | Perceived Decision Quality | Perceived Participation | Degree of Group Agreement |
|--|----------------------------|-------------------------|---------------------------|
| Intercept | 2.889* | 3.782**** | 0.145 |
| Cultural Diversity | -7.118** | 0.352 | -3.351** |
| Collaborative Conflict Management Style | 0.250 | 0.145 | 0.147 |
| Collaborative Conflict Management Style * Cultural Diversity | 1.847** | -0.105 | 0.923** |

* p<0.10; ** p<0.05; *** p<0.01; **** p<0.001

6. Discussion

In this research we examined the effect of the collaborative conflict management style on the performance of DGSS supported groups. We involved culturally homogeneous and heterogeneous groups in this experiment. The preliminary findings are quite interesting and provide motivation to pursue in depth analyses of the research data.

The groups with higher levels of collaborative conflict management style attempt to integrate the views of all participants. The participants feel that the final decision is fair and the best outcome that the group can offer. As a result the decision quality perceived by the group members improves. Integration of diverse views results in integrative decision and hence the level of group agreement improves. The results of this experiment do not reveal any significant effect of collaborative conflict management style on perceived participation. A content analyses of the participants’ discussions in activities 1 and 2 may provide an explanation.

6.1. Limitations:

There can be a large number of culturally heterogeneous groups with different cultural dimensions. This study considers only a few of such diverse groups. Therefore, the results cannot be generalized to all culturally heterogeneous groups. Only through cumulative research can we arrive at a clear picture of the impact of cultural heterogeneity on GSS outcomes. Future research directions should consider the examination of other types of cultural heterogeneity.

7. References:

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Appendix 1

Indicator Items for Collaborative Conflict Management Style

1. I exchanged accurate information with my teammates to solve a problem together.
2. I tried to investigate an issue with my team members to find a solution acceptable to us
3. I tried to bring all our concerns out in the open so that the issues could be resolved in the best possible way

4. I tried to work with my team members to find solutions to a problem that satisfy our expectations.
5. I collaborated with my teammates to come up with decisions acceptable to us.

Indicator Items for Perceived Decision Quality

1. The decision made by my group is practical
2. The decision made by my group is fair.
3. I am confident that the final decision we came up with is the best decision
4. I feel that the quality of the group's decision would have positive effects on the performance of the university
5. Overall, it is my opinion that our final decision is of high quality

Indicator Items for Perceived Participation

1. I always felt free to voice my comments during the meeting
2. Other members appeared to have felt free to make positive and negative comments
3. Everyone had a chance to express his/her opinion
4. Team members responded to the comments made by others
5. The group members seemed to participate actively.
6. Overall, it is my opinion that the team members had the freedom to participate in the meeting