

1-1-2001

# Participation Input and Participation Equality within Cross-Cultural Computer Mediated Communication (CMC) Environments

Roberto J. Mejias  
*Purdue University*

Follow this and additional works at: <http://docs.lib.purdue.edu/ciberwp>

---

Mejias, Roberto J, "Participation Input and Participation Equality within Cross-Cultural Computer Mediated Communication (CMC) Environments" (2001). *Purdue CIBER Working Papers*. Paper 14.  
<http://docs.lib.purdue.edu/ciberwp/14>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact [epubs@purdue.edu](mailto:epubs@purdue.edu) for additional information.

# Participation Input and Participation Equality within Cross-Cultural Computer Mediated Communication (CMC) Environments

**Roberto J. Mejias**

Krannert School of Management, Purdue University

[rmejias@mgmt.purdue.edu](mailto:rmejias@mgmt.purdue.edu)

## Abstract

*The current study measured the influence of national culture, anonymity levels, and technological support (CMC and non-CMC) upon participation input and participation equality within and between forty-two U.S. and Mexican groups constituting a total of 469 participants. Results indicate that both U.S. and Mexican groups supported by CMC technology (i.e., group support systems) were more productive in generating participation input than corresponding manual groups. While U.S. manual groups generated more unique or non-redundant ideas than U.S. CMC groups, Mexican CMC groups in contrast, generated more unique ideas than Mexican manual groups. With regard to perceived participation equality, U.S. groups indicated no differences between treatments while Mexican CMC-identified groups reported higher perceived participation equality than Mexican manual groups. With regard to actual participation equality, Mexican CMC groups generated higher actual participation equality indices than manual groups while U.S. groups reported no differences between treatments.*

*A comparison of results between cultures revealed that U.S. groups in general, generated more comments and more unique ideas than corresponding Mexican groups particularly when participants were identified and not anonymous. However, Mexican CMC groups perceived higher participation equality levels than corresponding U.S. CMC groups. Mexican CMC groups that were anonymous generated higher actual participation indices than corresponding U.S. groups. Interactive effects were found between national culture and technology in comparing actual participation equality indices between U.S. and Mexican groups. The study addresses an important gap in the use of CMC technology across different cultures and how technology and national culture may interact to affect group participation within organizational setting. **Key words: computer mediated communication, Cross-cultural, CMC, participation, participation equality, Group Support Systems, GSS.***

# Participation Input and Participation Equality within Cross-Cultural Computer Mediated Communication (CMC) Environments

## Abstract

*The current study measured the influence of national culture, anonymity levels, and technological support (CMC and non-CMC) upon participation input and participation equality within and between forty-two U.S. and Mexican groups constituting a total of 469 participants. Results suggest that both U.S. and Mexican groups supported by CMC technology (i.e., group support systems) were more productive in generating participation input than corresponding manual groups. While U.S. manual groups generated more unique or non-redundant ideas than U.S. CMC groups, Mexican CMC groups in contrast, generated more unique ideas than Mexican manual groups. With regard to perceived participation equality, U.S. groups indicated no differences between treatments while Mexican CMC-identified groups reported higher perceived participation equality than Mexican manual groups. With regard to actual participation equality, Mexican CMC groups generated higher actual participation equality indices than manual groups while U.S. groups reported no differences between treatments.*

*A comparison of results between cultures revealed that U.S. groups in general, generated more comments and more unique ideas than corresponding Mexican groups particularly when participants were identified and not anonymous. However, Mexican CMC groups perceived higher participation equality levels than corresponding U.S. CMC groups. Mexican CMC groups that were anonymous generated higher actual participation indices than corresponding U.S. groups. Interactive effects were found between national culture and technology in comparing actual participation equality indices between U.S. and Mexican groups. The study addresses an important gap in the use of CMC technology across different cultures and how technology and national culture may interact to affect group participation within organizational setting. **Key words: computer mediated communication, Cross-cultural, CMC, participation, participation equality, Group Support Systems, GSS.***

## Introduction

Organizations find an understandable appeal to the assertion that a group or project team will be more productive in generating more ideas and alternatives than individuals working separately. An effective, collaborative work environment summons a diverse range of personal skills, insights, and knowledge to the meeting agenda, which may plausibly lead to more creativity and participation (Valacich, Dennis and Connolly, 1994). Additionally, the synergistic interactions of participants in a work group are expected to lead to the generation of higher quality ideas and more unique courses of action (Nunamaker, Dennis, Valacich, Vogel, and George, 1991; Dennis, and Valacich, 1993). As multinational corporations

continue to expand their operations across cultural boundaries, enhancing the productivity of organizational project teams within international environments has become an increasingly important concern for management.

Group support systems (GSS) technology as a form of computer-mediated communication (CMC) has long been touted to increase the productivity and participation levels of members working within project teams and organization meetings (Nunamaker, Applegate and Konsynski, 1987; George, Easton, Nunamaker, and Northcraft, 1990; Reinig, Briggs, Shepherd, Yen and Nunamaker, 1996). Early studies indicate that CMC environments (e.g., GSS) reduced labor costs from 50 to 70 percent, reduced project cycle times by as much as 90 percent, and significantly increased the participation levels within group meetings (Dennis, George, Jessup, Nunamaker, and Vogel, 1988; George, et al., 1990; Dennis, Nunamaker and Vogel, 1991) is this repetitious?. Additional studies indicated that GSS elicited more equal participation and involvement among group members than traditional face-to-face (FTF) group meetings; (Chidambaram and Bostrom, 1993; Valacich, Dennis and Connolly, 1994; Kiesler, Siegel, and McGuire, 1994; Nunamaker et al., 1997).

However, despite the considerable amount of US-based GSS research compiled to date, surprisingly few studies have been undertaken in Latin American with regard to how CMC technology may affect group participation levels within different cultural environments. As information technology (IT) assumes an increasingly global role, national culture has received growing attention by researchers as to how culture may influence organizational communication and the decision process (Straub, 1994; Harvey, 1997). Empirical research concerning how CMC technology may interact within culturally diverse environments may therefore, prove to be beneficial, particularly when group

meetings must often be coordinated among various international and cross-cultural entities. This study addresses a gap in current IT research regarding how CMC technology and national culture may interact to affect group participation input and participation equality within group decision making environments.

The current study compared the effects of *national culture* (i.e., U.S. and Mexican), *anonymity* levels (identified versus anonymous responses) and *support technology* (CMC versus manual) upon participation input levels and participation equality within and between U.S. and Mexican groups. The study was conducted at a major southwestern university in the U.S. and a major technological institute in Monterrey, Mexico. Groups from each national culture were exposed to one of three experimental study treatments: GSS-Anonymous, GSS-Identified and Manual-Identified.

## **Literature and Theory**

A considerable amount of prior U.S.-based research has compared participation levels of work groups supported by CMC technology (e.g., GSS) with groups using conventional face-to-face (FTF) technology. While some studies found the effects of GSS upon group outcomes to be inconsistent, the majority of the literature indicates that GSS-supported environments lead to considerably more comments and ideas, more unique alternatives and more participation equality among group members than FTF groups, nominal groups, or unstructured “baseline” groups (George et al., 1990; Dennis, et al., 1991; Valacich, et al., 1994; Watson, Ho, and Raman, 1994, Reinig, et al., 1996; Nunamaker, Briggs, Mittleman, and Vogel, 1997; Fjermestad and Hiltz, 1998; Pinsonneault, Barki, Gallupe, and Hoppen, 1999).

Prior research indicates that GSS environments elicit more equal participation because they reduce many of the social interaction cues that generate communication dysfunctions

(i.e., “process losses”) which potentially decrease group performance and inhibit groups from reaching their full performance potential (Steiner, 1972; George, et. al, 1990; Valacich, et al., 1994; Pinsonneault, Barki, Gallupe, and Hoppen, 1999). Therefore, group process losses such as evaluation apprehension, domination, production blocking, information overload, and forgetting, to name a few, that are often be present in traditional FTF meeting environments may be reduced by CMC (i.e., GSS) technology (Hiltz, Johnson and Turoff, 1986; Dennis et al., 1991; Lim and Benbasat, 1996, Mejias et al, 1997). Additionally, since GSS environments are designed to allow instantaneous input by members (i.e., all participants can enter ideas simultaneously), participants do not have to wait and listen for other group members to submit their ideas. While the majority of these studies cite increased participation equality within GSS supported groups other studies found little or no differences in participation rates (Burke and Chidambaram, 1995; Berdahl and Craig, 1996; Watson, et al., 1994). These inconsistencies in the broader research related to the use of CMC to enhance participation make it reasonable to question whether a substantial relationship exists between participation and performance (Wagner, 1994).

Interestingly, the majority of GSS research and its relationship to participation input and participation equality have been traditionally confined to U.S. organizations within U.S. environments (Dennis, et al., 1990; Kendall, 1997; Mejias et al., 1997). Only a few empirical studies have addressed the effects of national culture and CMC environments upon participation input and participation equality levels. Ho, Raman & Watson (1989), found that anonymous GSS environments allowed dominant Singaporean members to openly express negative opinions about other member’s contributions, a behavior normally considered unacceptable within Singaporean culture. In a related study, Watson et al.

(1994) found that while U.S. manual and CMC-aided groups generated greater changes in consensus levels, Singaporean groups perceived more equality of participation than U.S. groups. Morales, Moriera, & Vogel (1995), found that Mexican participants using GSS technology reported higher levels of participation equality than they had previously experienced within conventional FTF meeting environments. Tan, Watson and Wei (1995) found that groups supported by anonymous GSS technology dampened power differentials between high influence and low influence group members.

The current study proves insightful because research has established that the proliferation of IT by larger developing Latin American countries such as Mexico may affect the “downstream” computing technology of smaller and neighboring Latin American countries (Robey and Rodriguez-Diaz, 1989; Vogel and Gricar, 1998). Small countries with populations less than 10 million make up a significant portion of Latin America and historically, have demonstrated a predictable economic dependence upon larger Latin American countries such as Mexico, Argentina and Brazil (The Economist, 2001). Empirical data relating to the use of CMC technology in a developing Latin American county such as Mexico may provide organizations with better insights into the effects of such technology upon group communication and the group decision process in other developing countries (Robey and Rodriguez-Diaz, 1989; Vogel and Gricar, 1998).

### ***Hofstede’s Model of Cultural Differentiation***

For the current cross-cultural study, Hofstede’s “model of cultural differentiation” (Hofstede, 1980, 1991) was used as a conceptual framework to predict differences between cultural groups. Although other relevant models using cultural dimensions, such as McClelland and Winter’s cultural analysis (1969) or Glenn and Glenn’s (1981) associative-abstractive model, were considered for the current study, Hofstede’s model (1980, 1991)

appeared to be best suited to predict differences in participation input and participation equality. Hofstede's model of cultural differentiation has been frequently used as a predictive model to explain the influence of national culture upon the design of information systems (Sondergaard, 1994; Tan, Watson and Wei, 1995; Harvey, 1997).

Hofstede's study included over 66 countries and surveyed over 116,000 respondents (Hofstede, 1980, 1991; Harvey, 1997). Hofstede's original model of cultural differentiation stated that national cultures could be mapped according to their relative scores along four dimensions. These four dimensions were termed *power-distance*, *individualistic-collectivistic*, *uncertainty-avoidance*, and *masculinity-femininity*. A fifth dimension, *time-orientation*, was later introduced by the Chinese Culture Connection and was added to this model (Gudykunst, Ting-Toomey, and Chua, 1988; Chinese Culture Connection, 1987). However, this dimension will not be addressed in this paper. As can be seen by Table 1, U.S. and Mexico exhibit considerably different cultural dimension index profiles particularly, with regard to scores for power-distance (PDI), individualism (IDV) and uncertainty-avoidance (UAI) (Hofstede, 1980, 1991; Gudykunst, et al., 1988). Previous cross-cultural studies have used the PDI and UAI indices together because of their interactive effects within organizations (Hofstede, 1980, 1991; Harvey, 1997). Because of the marked differences in PDI, and the IDV scores between U.S. and Mexican cultures, this paper focused on the power-distance, and the individualistic-collectivistic dimensions in interpreting the current study's results.

Hofstede's *power-distance* dimension describes the relative distance between a supervisor and a subordinate and the extent to which less powerful members of organizations within a society recognize the unequal distribution of power (Hofstede, 1980, 1991). Countries that scored high on the PDI appear to emphasize autocratic or paternalistic

behavior. Countries which score low on the PDI (e.g., U.S.) appear to favor participative management, equal employee rights, and the use of legitimate power versus coercive power (Hofstede, 1980, 1991). Hofstede's *individualistic-collectivistic* dimension refers to the relative importance assigned to individual goals as compared to group or collective goals. Low individualistic (IDV) or "collectivistic" cultures like Mexico prefer cohesive and tightly

**Table 1 - Hofstede's Cultural Dimension Scores of U.S., Mexico and other Selected Latin American Countries**

Country	<i>Power-Distance (PDI)</i>	<i>Individualistic-Collectivistic (IDV)</i>	<i>Uncertainty-Avoidance (UAI)</i>	<i>Masculinity-Femininity (MAS)</i>
<b>United States</b>	<b>40</b>	<b>91</b>	<b>46</b>	<b>62</b>
<b>Mexico</b>	<b>81</b>	<b>30</b>	<b>82</b>	<b>69</b>
Chile	63	23	86	28
Equator	78	8	67	63
Peru	64	16	87	42
Venezuela	81	12	76	73

*Note: Low Individualistic scores denote more "collectivistic" cultural tendencies.*

knit social frameworks, avoid disagreement among group members and strive to maintain harmony (Hofstede, 1980, 1991). High IDV cultures, as the U.S., are more independent and members appear to be more concerned with themselves and their immediate families.

## **Dependent Variables**

### ***Participation Input Level***

Participation is a process by which influence in the group decision process is shared among individuals who are otherwise hierarchical unequals (Locke and Schweiger, 1979; Wagner and Gooding, 1987). With regard to the current study, participation input referred to the *average number of comments* per individual and *the average number of unique ideas* per individual generated within each experimental group. The average number of comments per individual was the total number of ideas and comments submitted during the "idea brainstorming" portion of the experiment (described in the Research Methodology section),

divided by the number of members within a particular group. The number of unique ideas per individual referred to the average number of non-redundant ideas or “unique idea categories” generated by group members during idea brainstorming sessions. “Unique idea categories” were clusterings of similar ideas that were distinct or unique from other ideas. The term “number of unique ideas”, as a measure of creativity and participation input was initially used by Osborne (1957) when he introduced “brainstorming” as a structured technique to enhance idea generation and improve group problem solving.

### ***Participation Equality***

Participation equality refers to the unabated opportunity that each member possesses for contributing to the group discussion (Berdahl and Craig, 1996). *Perceived participation equality* was defined as the perceived opportunity by participants in each experimental group for equal and unabated input and participation into their group’s decision process. The rationale underlying the effectiveness of CMC technology such as GSS is that electronically communication in groups promotes equal participation and equal influence among group members. Though empirical evidence supporting this assertion has been mixed, there is widespread notion that CMC supported groups are more egalitarian than FTF or traditional manual group environments (Dubrovsky, Keisler and Sentha, 1991; Berdahl and Craig, 1996). The *actual participation equality index* was a computed measure using the distribution of actual comments submitted by each individual group member during the “idea brainstorming” portion of the experiment. The distribution of actual comments was used to derive an observed or “actual” group-level measure of participation equality index in an equation adapted from Hiltz, Turoff & Johnson (1989), (see Research Methodology section).

## **Research Hypotheses**

Based upon previous GSS literature and Hofstede's model of cultural differentiation (Hofstede, 1980, 1991), the following hypotheses were developed to predict differences in participation input and participation equality levels within and between U.S. and Mexican experimental groups.

### ***Hypotheses on Participation Input***

While previous research found that GSS-supported groups generate more total ideas and more unique alternatives than traditional, nominal, or unstructured, "free form" groups, there has been little empirical cross-cultural research to determine how GSS technology would affect group participation input levels in a collectivistic and high power-distance culture such as Mexico. Hofstede's cultural model (1980, 1991) portrays many Latin American countries as cultural opposites to the U.S. (see Table 1). Hofstede describes the U.S. as an individualistic and low power-distance culture, while Mexico and other Latin American countries are described as collectivistic and high power-distance cultures. According to Hofstede's findings, countries that score high on the PDI were also predisposed to score low on the IND index (i.e. more collectivistic tendencies). Conversely, low PDI countries were likely to score high on the IND index (i.e., more individualistic) (Hofstede, 1991). Thus, persons from an individualistic culture (e.g., U.S.) are likely to act according to their own self-interests and believe work should be organized such that these self-interests and the organization's interest coincide (Hofstede, 1991). In a low IND or collectivistic culture (e.g., Mexico), employees are expected to act in the best interests of the larger work unit which may not coincide with the employee's individual self-interests (Hofstede, 1991).

Based upon this conceptual framework, we hypothesized that U.S. groups, as members of a high individualistic and low power-distance culture, would generate more comments

and more unique ideas per individual than corresponding Mexican groups. We would expect that individuals from low power-distance cultures would experience fewer group process losses and feel less reluctance in freely submitting new and different ideas to the group discussion. Subsequently, this would lead us to predict that individual participation input levels within U.S. groups would not be limited by any type of “collectivistic” cognitive inertia where group discussions would be obligated to maintain some common thread. Instead, U.S. groups as members of an individualistic culture, would be less influenced by social evaluation pressures from their fellow group members and would be predicted to aggressively submit as many comments and ideas as possible. Therefore we propose that:

***Hypothesis 1:*** *U.S. GSS groups, across all experimental treatments, will generate a greater average number of comments per individual than corresponding Mexican GSS groups.*

Conversely, we hypothesized that Mexican groups would be more influenced by high power-distance and collectivistic cultural dispositions in submitting new or unconventional ideas to the group decision process. As members of a high power-distance culture, we reasoned that Mexican group participants would be more influenced by group social assessment and peer evaluation than their corresponding U.S. counterparts. Additionally, we would predict that Mexican group participants, due to collectivistic cultural tendencies, would be expected to more closely follow the direction of their group’s discussion than their “individualistic” U.S. counterparts. This would lead us to predict that Mexican participants would perceive more apprehension in submitting new ideas or “unconventional” alternatives to the group discussion and would subsequently, generate less unique or non-redundant ideas than corresponding U.S. groups. Following this logic, we proposed that:

***Hypothesis 2: U.S. GSS groups, across all experimental treatments, will generate a greater average number of unique ideas per individual than corresponding Mexican GSS groups.***

### **Hypotheses on Participation Equality**

Early research by Johansen, Vallee and Spangler (1979) found that CMC environments promoted equality of roles in-group communication by encouraging unabated input, viewpoints, and candid opinions. However, while GSS technology has been touted to promote increased and equal participation within U.S. groups, it was not known whether GSS could achieve the same effect within a different cultural setting such as Mexico. Morales et al., (1995) reported that Mexican group participants perceived higher levels of participation equality when supported by GSS technology than when using manual FTF environments. As members of a high power-distance culture, Mexican groups would be expected to experience more social assessment process losses (e.g., domination, evaluation apprehension) during group meetings than their low power-distance U.S. counterparts. Since communication barriers to equal participation are often driven by cultural norms (Steiner, 1972; Ho et al., 1989; Brislin, 1993), group domination by higher status individuals within high power distance environments would be expected to reduce perceived opportunities for equal participation among group members (Tan, et al., 1998, Ho et al., 1989). Subsequently, we predicted that Mexican groups, given the opportunity to engage in unabated group discussion, would *perceive* and *experience* higher participation equality levels than corresponding low power-distance U.S. groups, who may expect egalitarian meeting environments and take equal participation for granted. Following this reasoning we hypothesized that:

***Hypothesis 3: Participants from Mexican GSS groups will generate higher levels of perceived participation equality than corresponding participants from U.S. GSS groups.***

***Hypothesis 4:*** *Participants from Mexican GSS groups will generate higher indices for actual participation equality than corresponding participants from U.S. GSS groups.*

## **Research Methodology**

The international comparison of U.S. and Mexican groups constituted a 2 x 2 x 2 factorial research design. National culture (U.S. vs. Mexico), supporting technology (GSS vs. manual), and identification features (anonymous vs. identified) represented the three independent variables. While this 2 x 2 x 2 design would normally generate eight treatment cells, two of the treatment cells, (U.S. and Mexican Manual-Anonymous) were removed as viable treatments since a "Manual-Anonymous" group environment within an organizational setting have been considered to be artificial and unrealistic (George, et. al, 1990). Therefore, a total of six experimental treatment cells were left in the final research design.

***Research sites:*** Three Mexican universities were initially considered as comparable sample sites for the current cross-cultural study. Criteria were 1) similarity of academic programs for the participant sample base, 2) demographic similarity of the participant sample bases, and 3) identical version of the CMC group software interface used by each site. The group software to be used was particularly critical, as results would be confounded if differences could be attributed to different software interfaces. Based upon these considerations, the *Instituto Tecnológico y de Estudios Superiores de Monterrey* (ITESM) in Monterrey, Mexico proved to be the best match for the U.S. sample site.

***Subjects:*** The 42 groups in the research sample base consisted of 22 U.S. groups and 20 Mexican groups. The 22 student groups from the U.S. consisted of 230 upper division (juniors, seniors) production management and business administration college students. The 20 Mexican groups consisted of 239 upper division industrial engineering and business administration college students for a total of 469 participants in the study. Group sizes ranged

from seven to sixteen students per group for the U.S. sample and eight to sixteen students for the Mexican sample. The average age of participants across both national cultural samples was approximately 20.5 years of age. Groups were randomly formed and randomly divided into three experimental study treatments:

*GSS-Anonymous*; where group participants supported by GSS technology selected *anonymous pseudonyms* (i.e., alpha-numeric characters) or “pen names” such that the true identity of comments (submitted electronically) was unknown to others in the group,

*GSS-Identified*; where group participants supported by GSS technology used their *real first and last surname* so that the identity of the participant’s comments and contributions (submitted electronically) was appended to all comments and *clearly known* to the rest of the group,

*Manual-Identified*; where group participants were supported by face-to-face technology (e.g., a meeting environment with black board or flip chart) such that the identity of all group input (participants used name cards) was known to all group participants.

***Task and Study Procedures:*** The following procedures were used across both national samples:

1. Explanation of the purpose of the study and the related experimental task,
2. Unrestricted “idea brainstorming” by participants for exactly 15 minutes,
3. Preliminary categorization of brainstormed ideas into “unique idea categories”
4. Review and modification by participants of preliminary idea category list,
5. 1st rank-ordering of the idea categories list (From most important to least important),
6. Display of group 1st rank-order results and group agreement level (concordance),
7. Verbal discussion of group’s 1st rank-order results (10 minutes),
8. 2nd rank-ordering of idea categories (resubmitted in random order from 1st rank-order)
9. Verbal discussion of 2nd ranking of idea categories (10 minutes)
10. Completion of “Perceptions Questionnaire” post survey instrument.

For the “idea brainstorming” exercise, participants were asked to submit as many ideas or comments as possible for exactly 15 minutes in response to the topic, “*How will the global developments in Information Technology affect you and your career in the future?*”? As participants submitted comments (either manually or electronically) group facilitators simultaneously (i.e., “on the fly”) generated logical grouping or a preliminary list of “unique idea categories.” For the Manual-Identified treatment, brainstorming ideas were vocalized by group participants, written out by the research assistant and taped to a large display in front of

the group. Informal “clusterings” of similar idea categories were grouped together into idea categories and displayed on a large screen (for electronic groups) or chalkboard (for Manual groups). All groups were asked if the idea category list accurately reflected their group’s ideas and comments. The idea category list was modified or consolidated by each group until members agreed that the list of idea categories was accurate. Group consensus levels were generated across all treatments (GSS and manual) via electronic ballots. A comparison of U.S.-Mexico consensus levels is reported in another study by Mejias et al. (1996). Participants then completed a 45-item questionnaire, which utilized a seven-point Likert scale. The survey questionnaire for Mexican groups was translated into Mexican Spanish using a double translation process. In order to reduce “facilitator effect”, all experiments were personally conducted by the principal investigator and his support staff in the respective native language (i.e., English or Spanish) of each experimental group. The principal researcher conducting the studies at the U.S. and Mexican sites was a bilingual, fifth generation U.S. citizen of Mexican and Spanish heritage.

### ***Dependent Variables and Measures***

The four dependent variables for this cross-cultural study were:

***Average Comments per Participant*** - the total average number of comments submitted by group members during the idea brainstorming session divided by the number of group participants. These totals were tabulated from software transcripts for the GSS supported sessions and from the tally sheets for the Manual sessions.

***Average Number of Unique Ideas per Participant*** - the total number of unique or non-redundant ideas generated from the idea brainstorming session divided by the number of group participants. For the manual groups, two researchers observed the group discussion and independently recorded the number of comments by each participant.

***Perceived Participation Equality*** - refers to the perceived opportunity by individuals in each group for equal and unabated participation into the group discussion. Perceived participation equality was measured using 2 item measures from the 45-item questionnaire.

***Actual Participation Equality Level*** - was calculated by examining the transcripts of the group discussions and using the distribution of actual comments by each group member

to derive an observed group-level measure of participation equality. Equality ( $E$ ) was calculated using this distribution and an equation adapted from Hiltz, Turoff & Johnson (1989) who report a participation inequality measurement referred to as  $I$ .

$$\text{Participation Equality } (E) = 1 - I, \text{ where } I = \frac{\frac{1}{N} \sum_{i=1}^N (E_i - O_i)}{\frac{1}{2} \left(1 - \frac{1}{N}\right)}$$

*To calculate  $I$ , the comment distribution must be sorted in ascending order.  $N$  equals the group size for a particular meeting.  $E_i$  and  $O_i$  are both monotonically increasing where  $E_i$  is the expected cumulative portion of comments and  $O_i$  is the observed cumulative portion of comments. The differences between expected and observed participation among group members is represented by a score of 1 for perfect equality and a score of 0 representing when only a single person in the group participated.*

## Study Results

A significance level of  $p < 0.05$  was used for hypotheses testing. However, since few empirical studies have examined the effect of GSS support for groups across different cultures, Jarvenpaa, Rao, and Huber (1988) posits that research investigations of this nature are often considered "exploratory". Subsequently, Jarvenpaa et al., (1988) and Berdahl and Craig, (1996) recommend that such exploratory studies, particularly those using groups as the unit of analysis (rather than individuals, which by definition have larger sample sizes) consider an alpha level of 0.10 in testing their hypotheses. Therefore, while we adhere to the  $p < 0.05$  standard we will also briefly discuss those findings that approached the 0.05 level so that any interesting empirical results will not go unnoticed. For analyses *within* each national culture, a GLM (general linear model), sum of squares (SS) analysis for unequal cell sizes was utilized. If significant F values were found, Tukey post-hoc tests were used to determine where the greatest differences were generated. For the analysis *between* national cultures, t tests were used for *a priori* comparisons between groups under each of the three experimental treatments. A GLM-SS analysis was used to test for main effects and the presence of interactive effects. Levene's test for homogeneity of variances revealed that the

variance of the samples representing the populations within each experimental treatment were not dissimilar. While numerous t test comparisons were undertaken within and between cultures, test-wise Type-I error rates were controlled since statistical tests were *a priori* or planned comparisons based upon previous GSS literature and Hofstede's model of cultural differentiation. Additionally, *a priori* comparisons undertaken between U.S. and Mexican samples were independent of each other and did not utilize indiscriminate testing or "fishing expeditions."

## **Participation Input**

### ***Average Number of Comments per Individual***

As seen in Table 2, U.S. GSS groups generated a greater number of average comments per individual than U.S. Manual groups. Differences between treatments were significant at the  $p < 0.003$  level ( $F=7.92$ ). Tukey post hoc tests indicated significant differences among all three treatments at the  $p < 0.05$  level. Within the Mexican sample, GSS supported groups also generated significantly higher numbers of comments per participant than Manual groups ( $p < 0.001$ ;  $F = 13.53$ ). Tukey post hoc tests indicated significant differences among all three treatments ( $p < 0.05$ ).

A comparison of U.S. and Mexican groups revealed that U.S. Identified groups, (GSS-Identified and Manual-Identified) generated more average comments per individual than corresponding Mexican groups, although these differences were only significant for GSS-Identified groups ( $p < 0.02$ ). U.S. Manual-Identified groups generated more comments per individual than corresponding Mexican groups ( $p < 0.10$ ), but this was not significant at the 0.05 level. A GLM-SS analysis revealed main effects for both the culture factor ( $p < 0.008$ ;  $F = 7.88$ ) and the experimental treatment factor ( $p < 0.001$ ;  $F = 17.84$ ).

### ***Average Number of Unique Ideas per Individual***

Within U.S. groups, Manual-Identified groups, not GSS supported groups as expected, generated a higher number of unique ideas per individual. Although differences within U.S. experimental groups ( $p < 0.07$ ;  $t = 2.97$ ) were not significant at the .05 level, they suggest a need for further analysis and investigation. Conversely, Mexican GSS groups generated

**Table 2: Participation Input and Participation Equality *Within* and *Between* National Cultures**

Experimental Treatments	Avg. Comments Per Individual				Avg. Unique Ideas Per Individual			
	U.S.	Mexico	<i>t</i>	<i>p</i>	U.S.	Mexico	<i>T</i>	<i>p</i>
GSS-Anonymous	8.20 *	7.13 *	0.93	0.37	2.01	1.66 *	1.07	0.31
GSS-Identified	7.88 *	5.39 *	<b>2.57</b>	<b>0.02</b>	1.97	1.34	1.96	<b>0.07</b>
Manual-Identified	4.34 *	3.41 *	1.74	<b>0.10</b>	2.77	0.85 *	<b>6.22</b>	<b>0.001</b>
Diff. Between Treatments ( <i>Within Cultures</i> )	<b>F=7.92</b> <b>p &lt; 0.003</b>	<b>F=13.53</b> <b>p &lt; 0.001</b>			<b>F=2.97</b> <b>p &lt; 0.07</b>	<b>F=5.29</b> <b>p &lt; 0.02</b>		
GLM SS: <i>Between Cultures</i>								
Culture			<b>F = 7.82</b>	<b>0.008</b>			<b>F = 27.50</b>	<b>0.001</b>
Experimental Treatm't			<b>F = 17.84</b>	<b>0.001</b>			F = 0.363	0.70
Interaction: Culture x Exp Trtm't			F = 0.875	0.426			<b>F = 6.86</b>	<b>0.003</b>
			<i>df1=5;df2=36</i>				<i>df1=5;df2=36</i>	

Experimental Treatments	Perceived Participation Equality				Actual Participation Equality Index			
	U.S.	Mexico	<i>t</i>	<i>p</i>	U.S.	Mexico	<i>T</i>	<i>p</i>
GSS-Anonymous	4.97	5.74	<b>-5.28</b>	<b>0.001</b>	.757	.811 *	<b>-1.921</b>	.079
GSS-Identified	5.13	5.88 *	<b>-3.43</b>	<b>0.005</b>	.750	.756 *	-.130	.898
Manual-Identified	5.20	5.46 *	-1.32	0.153	.744	.634 *	<b>3.11</b>	<b>.009</b>
Diff. Between Treatments ( <i>Within Cultures</i> )	F=0.79 p<0.47	<b>F=3.99</b> <b>p &lt; 0.02</b>			F=0.08 p<0.922	<b>F=10.68</b> <b>p &lt; 0.003</b>		
GLM SS: <i>Between Cultures</i>								
Culture			<b>F = 32.46</b>	<b>0.001</b>			F=.688	.412
Experimental Treatm't			F = 1.09	0.344			<b>F=7.33</b>	<b>0.002</b>
Interaction: Culture x Exp Trtm't			F = 2.65	0.085			<b>F=5.57</b>	<b>.008</b>
			<i>df1=5;df2=36</i>				<i>df1=5;df2=36</i>	

\* signifies Tukey post hoc tests with greatest mean differences significant at  $p < 0.05$

more unique ideas than Manual-Identified groups ( $p < 0.02$ ;  $F = 5.29$ ). Tukey post hoc tests indicate the greatest differences existed between GSS-Anonymous groups and Manual-Identified groups.

A comparison of U.S. versus Mexican groups indicated that U.S. Identified groups generated more unique ideas per individual than corresponding Mexican groups. These differences were significant for the Manual-Identified groups at the  $p < .001$  level ( $t = 6.22$ ). U.S. GSS-Identified groups generated more unique ideas than corresponding Mexican groups ( $p < .07$ ;  $t = 1.96$ ), but this difference was significant at the  $p < 0.10$  level. A GLM-SS analysis revealed main effects for the culture factor ( $p < 0.001$ ;  $F = 27.50$ ) and significant interactive effects ( $p < 0.003$ ;  $F = 6.86$ ) between the culture and experimental treatment factors.

### **Participation Equality**

#### ***Perceived Participation Equality***

Within U.S. groups, no significant differences were found among experimental treatments with regard to perceived participation equality (see Table 2). However, within Mexican groups, differences in perceived participation equality were indicated ( $p < 0.02$ ;  $F = 3.99$ ) particularly, between Mexican GSS-Identified and Manual-Identified groups. A comparison of groups across national cultures indicated that Mexican groups supported by GSS recorded higher levels of perceived participation equality than corresponding U.S. groups ( $p < .01$ ). No significant differences in perceived participation equality were found between U.S. and Mexican Manual groups. A GLM SS analysis revealed main effects for the culture factor ( $p < 0.001$ ;  $F = 32.46$ ), and of interest, potential interactive effects ( $p < 0.085$ ;  $F = 2.65$ ) between the culture and experimental treatment factors.

#### ***Actual Participation Equality Index***

No significant differences among experimental treatments within U.S. groups were reported with regard to actual participation equality indices. However, significant differences in actual participation equality indices among all Mexican groups were

indicated ( $p < 0.003$ ;  $F=10.68$ ). A comparison between national cultures indicated significant differences between Manual-Identified groups ( $p < 0.009$ ;  $t = 3.11$ ) and GSS-Anonymous groups ( $p < 0.079$ ,  $t = -1.921$ ) although the latter difference was only significant at the 0.10 level.

## **Discussion of Results**

### ***Participation Input: Number of Comments per Individual***

Across both national cultural samples, GSS groups were significantly more productive than Manual groups, with GSS-Anonymous groups appearing to generate the highest average number of comments per individual. The parallel and instantaneous communication features of GSS, as a form of group CMC, may have logistically facilitated higher levels of individual input and participation for group members across both cultures. Anonymous GSS environments, when compared to Manual identified environments, may have dampened the social evaluative influences and group process losses often found in high power-distance cultures (e.g., Mexico) which have been shown to influence group participation levels (Watson et al., 1994; Tan et al., 1995; Mejias et al., 1998).

However, these results only partially support our hypothesis that U.S. groups across all experimental treatments would generate a greater number of average comments than Mexican groups (Hypothesis 1). Only U.S. GSS-Identified groups generated significantly more comments than corresponding Mexican groups ( $p < 0.02$ ). While U.S. Manual-Identified groups also generated more average comments per individual than corresponding Mexican groups ( $p < 0.10$ ), these differences were not significant at the 0.05 level. These findings suggest that the greatest differences in participation input between national cultures occurred when the identity of the participants was *known* (i.e., GSS-Identified and Manual-Identified groups) and not anonymous.

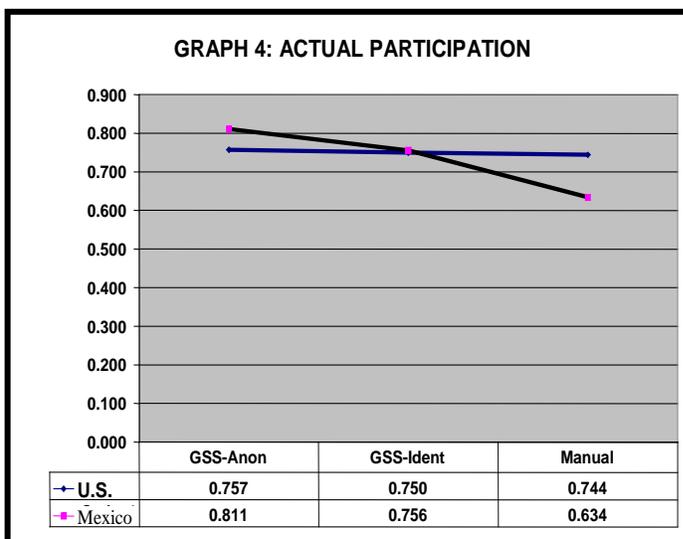
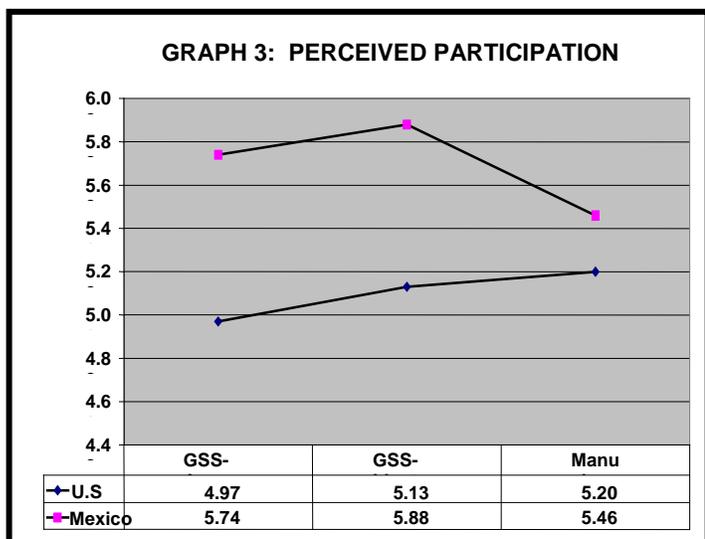
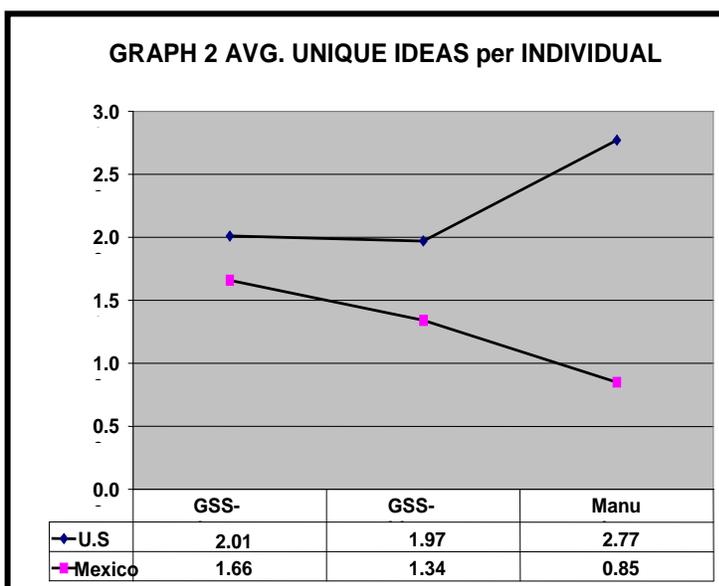
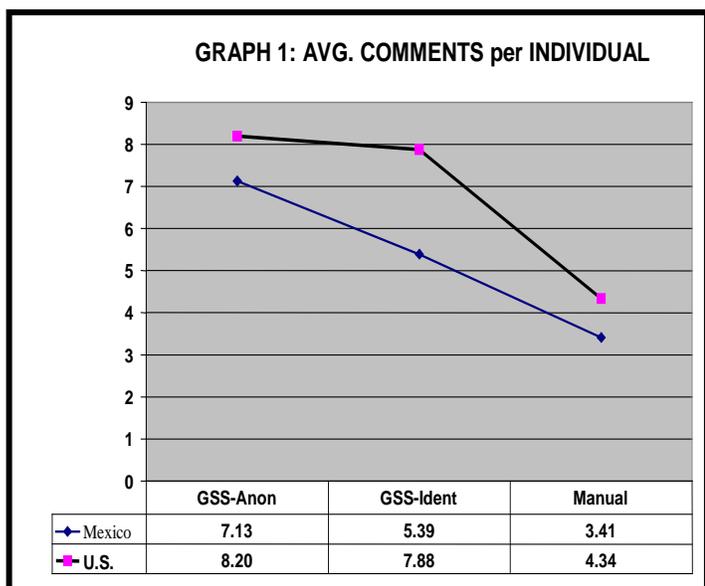
Mexican identified groups may have submitted fewer comments than corresponding U.S. groups because of the relative importance that collectivistic cultures (e.g., Mexico) place upon an individual contributions and how that particular input contributes to the betterment of the larger social entity (i.e., the group). As members of a collectivistic and high power-distance culture Mexican participants, particularly within identified environments, were predicted to experience more social peer evaluation and apprehension evaluation in submitting their comments and ideas than their corresponding U.S. counterparts. Previous research has indicated that group process losses from high influence members (heightened within identified FTF environments) often exist within high power-distance environments and may negatively affect the frequency of participation and contributions to the group discussion (Watson et. al, 1994).

***Participation Input: Average Unique Ideas per Individual***

While Mexican GSS groups generated more unique ideas than Mexican manual groups ( $p < 0.02$ ), this pattern did not hold true for U.S. groups. U.S. Manual-Identified groups, not GSS groups as expected, generated more unique ideas per individual ( $p < 0.07$ ) although this finding was significant only at the  $p < 0.10$  level. The removal of social evaluative cues through anonymous GSS environments may have provided a more supportive forum for Mexican participants to freely generate more alternatives and ideas often not possible within traditional or Manual, FTF environments. However, these results only partially support our predictions for Hypothesis 2. Although U.S. groups overall, generated more unique ideas per individual than Mexican groups, these differences were only significant for U.S. and Mexican Manual-identified groups ( $p < 0.001$ ), while U.S. and Mexican GSS-Identified groups indicated differences at the  $p < 0.07$  level. These findings however, must be considered in the light of the significant interactive effects between culture

and the experimental treatment factors ( $p < 0.003$ ;  $F = 6.85$ ) as indicated in Table 2 and Graph 2. Specifically, as experimental conditions varied from “most” anonymous (GSS-Anonymous groups), to more identifiable (GSS-Identified and Manual Identified groups), U.S. groups (particularly U.S. Manual-Identified groups) generated *more* unique ideas per individual while Mexican groups generated *less* ideas per individual.

### Graphs for Participation Input and Participation Equality



U.S. groups, particularly within identified treatments, may have generated more unique ideas than corresponding Mexican groups due to the cultural differences ( $p < .001$ ) in how new or unconventional ideas are acknowledged within a group context. U.S. participants may have perceived manual FTF environments as an opportunity to become independently recognized (i.e., high individualism trait) for their particular individual input and contribution to the group decision process. As members of a low power distance culture, U.S. group members may have felt less apprehension and less peer evaluation in submitting new and unconventional ideas to the group discussion than their high power-distance Mexican counterparts. The principal researcher observed that U.S. participants (in contrast to Mexican participants) often appeared to "crank out" as many comments or ideas as possible without regard to what other members were contributing (i.e., high individualism, low collectivism traits). This observation supports prior U.S.-based research which found that while more opinions are submitted within anonymous CMC environments, there is usually less explicit reaction to the opinions of other group members (Hiltz et al., 1989; Briggs, Nunamaker and Sprague, 1997). Conversely, though idea redundancies often exist within CMC environments, the sheer number of ideas generated during GSS "brainstorming" sessions usually spawns more unique alternatives than non-GSS environments (Briggs, et al., 1997).

In contrast, Mexican GSS participants were observed pausing to read other member comments, often asking (electronically) for clarification of information (i.e., low individualism, high collectivism traits) before submitting a response or an idea to the group discussion. Mexican group members within identified treatments (i.e., GSS-Identified and Manual Identified) may have felt a more "collective" obligation to evaluate their group's comments before submitting new or even "controversial" ideas. While this mode of "idea

presentation” may have generated less redundant ideas as noted above, fewer total ideas did generate fewer unique and non-redundant ideas for the Mexican sample.

### ***Perceived Participation Equality***

While Mexican groups generated significant differences in perceived participation equality among experimental treatments, no differences were indicated among U.S. groups. Significant differences among Mexican experimental groups ( $p < 0.02$ ), particularly between Mexican identified groups may be partially attributed to the design of GSS technology. Although Mexican GSS-Identified participants submitted their comments in a non-anonymous mode, they clearly believed that they possessed a greater opportunity than Mexican Manual-Identified participants to contribute their individual ideas to the group decision process. However, of interest was that across both national cultures, post-hoc tests indicated no significant differences between GSS-Anonymous and GSS-Identified groups (see Table 2). This particular finding may be partially explained by the study’s use of ad hoc groups within each cultural sample and it’s possible interaction ( $p < .085$ ,  $F= 2.65$ ) with GSS technology. Prior research has found that “ad hoc” groups often do not possess the same social regulation and feelings of inhibition within group settings as “established” groups (Pinonneault and Heppel, 1997). Since members of ad hoc groups can often be more anonymous than established groups, U.S. participants in particular, may not have been as affected by different anonymity environments in their perceptions of participation equality. Participants from identified treatments may not have felt as inhibited in conveying their input to their group’s decision process and subsequently, may not have perceived dissimilar levels of participation equality as GSS anonymous participants.

As predicted, higher perceptions of participation equality levels by Mexican GSS groups as compared to U.S. GSS groups (Hypothesis 3) may be attributed to the influence

of national cultural as a main effect (see Table 2,  $F = 32.46$ ;  $p < 0.001$ ). Traditional face-to-face discussion of ideas transmit cultural, social and contextual information through facial expressions, voice inflection, and other verbal and paraverbal cues that cannot be transmitted by CMC environments (Brislin, 1993.) Subsequently, conventional face-to-face meeting environments, particularly for high power-distance cultures (e.g., Mexico), may result in the domination of group discussion by higher status individuals and the intimidation of (and subsequent non-contribution by) lower status members of the group (Ho et al., 1989). These results may help explain why Mexican groups supported by GSS technology may have perceived higher levels of participation equality than they were traditionally accustomed to, yet more relative participation equality than what U.S. participants normally experience. Conversely, U.S. group participants, as members of an individualistic and low power-distance culture, may have been more accustomed to experiencing environments that encouraged equal participation. Since communication barriers to equal participation and effective group interaction are often driven by cultural norms (Steiner, 1972), U.S. group participants, regardless of experimental treatment, may not have perceived relative differences in participation opportunities and may not have felt inhibited from conveying their input to the group discussion.

### ***Actual Participation Equality Index***

The results of our study partially support our hypothesis (Hypothesis 4) that participants from Mexican GSS groups would generate higher indices for actual participation equality than corresponding participants from U.S. GSS groups. While Mexican groups generated significantly different results among experimental treatments ( $p < 0.003$ ) no significant differences in indices for actual participation equality were generated within corresponding U.S. groups. However, a comparison between U.S. and Mexican groups

reveals interesting interactive effects between the culture and experimental treatments factors as indicated in Table 2 and Graph 4. While Mexican groups perceived higher participation equality levels than corresponding U.S. groups (see Graph 3), Mexican and U.S. groups experienced different and opposite levels of actual participation equality across all experimental treatments. Mexican groups, particularly for GSS-Anonymous environments, both perceived greater participation equality and generated higher actual participation indices than their U.S. counterparts. Perceived participation equality levels by Mexican groups were also correlated with higher actual participation indices (see Table 3). Likewise, actual participation equality indices were highly correlated to Mexican participation input (i.e., Avg. Comment per Individual and Avg. Unique Ideas per Individual).

**Table 3. Correlations between Participation Input and Participation Equality**

	U.S.		Mexico	
	Perceived Participation Equality	Actual Participation Equality Index	Perceived Participation Equality	Actual Participation Equality Index
Actual Participation Equality ( <i>Sig level</i> )	.005 (.983)	1.00	<b>.404</b> <b>(.078)</b>	1.00
Avg. Participation per Individual	-.185 (.409)	.136 (.547)	.322 (.166)	<b>.626 *</b> <b>(.003)</b>
Avg. Unique Ideas per Individual	.255 (.253)	-.246 (.270)	.179 (.450)	<b>.575 *</b> <b>(.008)</b>

\* *Indicates correlation is significant at 0.05 level (2 tailed test)*

However, while Mexican GSS groups *perceived* more participation equality than corresponding U.S. groups, U.S. Manual-Identified groups generated higher *actual* participation equality indices than corresponding Mexican groups.

Mexican group participants, operating within GSS-anonymous environments may not have experienced some of the social evaluation cues and group process losses often exerted within traditional FTF, high power-distance environments. Actual participation and interaction within Mexican Manual-identified environments may have restricted the actual

discussion and contribution of ideas for Mexican participants relative to their U.S. counterparts. Conversely, while U.S. GSS participants perceived less participation equality than their Mexican counterparts, participants from U.S. Manual-identified they may have welcomed these FTF environments (as indicated by higher actual participation indices relative to Mexican Manual-Identified groups) as an opportunity to assert their individuality and to be recognized for their individual contributions to the group decision process. A summary of these study results is presented in Table 4.

### ***Limitations of Current Study***

The first limitation relates to the study's dependence upon Hofstede's model of cultural differentiation. Hofstede's model has often been criticized because the 116,000 respondents in his study were taken exclusively from one multinational company (i.e., IBM), thus

**Table 4 – Summary of Results: Analysis Between Cultures**

<b><i>Hypotheses</i></b>	<b><i>Study Results</i></b>	<b><i>p</i></b>
<b><i>H1: Avg. Comments per Individual</i></b>	U.S. GSS-Identified groups generated more average comments per individual than Mexican GSS-Identified groups. U.S. Manual-Identified groups generated more average comments per individual than Mexican GSS-Identified groups ( $p < 0.10$ ).	<b>0.02</b>
<b><i>H2: Avg. Unique Ideas per Individual</i></b>	U.S. Manual-Identified groups generated more average unique ideas per individual than Mexican Manual-Identified groups. U.S. GSS-Identified groups generated more average unique ideas than Mexican GSS-Identified groups ( $p < 0.07$ ).	<b>0.001</b>
<b><i>H3: Perceived Participation Equality (PE)</i></b>	Mexican GSS-Anonymous groups generated higher levels of perceived participation equality than U.S. GSS-Anonymous groups Mexican GSS-Identified groups generated higher levels of perceived participation equality than U.S. GSS-Identified groups	<b>0.001</b> <b>0.005</b>
<b><i>H4: Actual Participation Equality (PE) Indices</i></b>	Mexican GSS-Anonymous groups generated higher actual participation equality indices than U.S.-GSS-Anonymous groups ( $p < .079$ ). U.S. Manual-Identified groups generated higher actual participation equality indices than Mexican Manual groups.	<b>0.009</b>

raising the issue that the personnel of a multinational corporation may not be representative of a particular culture. However, the Hofstede model has been one of few empirically

supported frameworks that has endeavored to explain the influence of observed national cultural differences upon the design of information systems (Harvey, 1997). Another criticism relates to the time period in which Hofstede's data was collected (the 1970s) and whether any significant changes in either U.S. or Mexican national cultures may have occurred since that particular time, possibly affecting cultural dimension index scores. Hofstede (1991) argues that culture has been shown to be quite stable over long periods of time and would require a sharp or drastic discontinuity (e.g., a military conquest by another culture) to precipitate significant shifts in that culture's norms and values.

A second limitation refers to the use of ad hoc students from both national cultures as participants for the experimental groups. Members of ad hoc groups are by nature, more anonymous than members of established groups simply because they do not know each other as well (Pinsonneault et al., 1997). Subsequently, ad hoc groups may not acknowledge the same power and status differentials that established groups possess (Pinsonneault and Heppel, 1997). Social cues and behavior within low power-distance cultures (e.g., U.S.) may be already uninhibited within non-anonymous CMC environments (e.g., identified GSS) leaving little to be gained from anonymous contexts (Pinsonneault and Heppel, 1997). Therefore, the role of anonymity as a deindividuation factor may be less important for ad hoc groups because they may perceive less public self-awareness and may be less fearful of the social consequences of their actions. Subsequently, generalizations of these results to established groups must be undertaken carefully.

## **Conclusion and Implications**

The results of our study which examined participation input levels and participation equality between forty-two U.S. and Mexican groups generates interesting implications regarding the interaction of CMC technology (in the form of GSS technology) within

different cultural environments. First, with regard to participation input, GSS-supported groups across both U.S. and Mexican cultural samples produced more average comments per individual than traditional manual groups. While Mexican GSS groups generated more unique and non-redundant ideas per individual than Mexican manual FTF groups, U.S. manual groups and not GSS supported groups as predicted, generated more unique ideas. While the simultaneous communication features of GSS technology may have facilitated higher participation input levels across both cultures, the greatest differences in participation input levels between cultures appeared to occur when the identity of the group participants was known and not anonymous. These results suggest that anonymous GSS environments may generate markedly different effects in participation input levels upon groups from different cultures. GSS technology may have provided a more supportive forum for high power distance, collectivistic cultures such as Mexico to generate significantly more participation input and unique ideas often not possible within traditional or Manual, FTF environments. The use of computer mediated communication in the form of GSS technology within Mexican group decision making environments and its ability to enhance participation input suggest important implications for the use of CMC technology in other Latin American countries.

Second, although national culture has long been correlated with affecting work perceptions, simply predicting differences in outcomes based upon cultural models may be an over-simplification of culture's potential influence. While numerous U.S.-based studies have shown that GSS may enhance equal participation within group environments, it was unknown whether CMC technology would achieve similar effects in a high power-distance and collectivistic culture such as Mexico where socially embedded authority structures, inequality of position, and unequal participation have existed for centuries. Significant

differences in participation equality levels generated between U.S. and Mexican groups in this study suggest that GSS technology may increase opportunities for equal participation within different cultural environments beyond levels originally experienced within U.S. environments. Specifically, while Mexican groups supported by GSS perceived higher levels of participation equality, only Mexican GSS-anonymous groups generated higher actual participation indices than corresponding U.S. groups. Conversely, U.S. manual groups generated higher actual participation indices than Mexican manual groups. While Mexican GSS groups perceived higher levels of participation equality than corresponding U.S. groups and more participation equality than levels expected in traditional manual, face-to-face environments, Mexican GSS groups still generated lower actual participation equality indices than U.S. participants.

Third, an important component underlying much of GSS research is the assumption that anonymity will lead to less restrictive discussion (i.e., more comments and ideas submitted) and a more balanced involvement of group members (e.g., increased participation equality). Our results indicate that the effect of anonymity may be different for U.S. and Mexican groups in this study. Though GSS-Anonymous groups across both cultures generated more average comments per individual, this pattern was distinctly different when measuring unique ideas per individual. Manual groups from the U.S. sample and GSS-anonymous groups from the Mexican sample respectively, generated the greatest number of unique ideas per individual. Additionally, the greatest differences in both perceived and actual participation levels between cultures were generated by GSS-Anonymous groups. Conditions of anonymity using CMC technology for group decision-making may subsequently, generate diverse results when applied to high power-distance cultures such as Mexico. For example, research has revealed that the “lack of engagement” or vigorous verbal exchange (clearly

present in traditional face-to-face meetings) often leave users feeling emotionally unfulfilled and unchallenged despite exceptionally good results in anonymous CMC environments (Reinig et al., 1997).

Fourth, these results suggest the importance of cross-cultural IT studies in order to generate new insights into the interaction of emerging computer technology and national culture. Cross-cultural studies allow researchers to unconfound variables and take them apart to determine their relative contribution and effect upon behavior or performance (Brislin, 1993). At the same time, cross-cultural studies oblige researchers to develop increased sensitivity to the organizational setting in which a behavior is observed in order to analyze such phenomena in a fresher, less familiar mind setting than someone who may take such behavior for granted (Brislin, 1993). As multinational entities and international project groups interact with each other in the global marketplace, the design and implementation of new IT into developing countries must take into consideration that IT has often been a product of developed countries and as such, is likely to generate diverse outcomes and results (Ojo, 1992). As there is no universal "culture of developing countries" (Korpela, 1990), IT researchers are encouraged to continue to pursue empirical studies that will reveal new and interesting knowledge regarding the effects of emerging CMC technology within different cultural environments.

## REFERENCES

1. Berdahl, J. and Craig, K., "Equality of Participation and Influence in Groups: The Effects of Communication Medium and Sex Composition", *Computer Supported Cooperative Work*, Vol. 4, 179-201, 1996
2. Brislin, R. *Understanding Culture's Influence on Behavior*, Harcourt Brace College, Publishers, Orlando Florida, 1993.
3. Burke K., and Chidambaram, L. "Developmental Differences Between Distributed and Face-to-Face Groups in Electronically Supported Meeting Environments: An

- Exploratory Investigation”, *Group Decision and Negotiation*, Vol. 4, pp 213-233, 1995.
4. Chinese Culture Connection, Chinese Values and the Search for Culture Free Dimensions of Culture, *Journal of Cross-Cultural Psychology*, Vol. 18, No. 2, pp 143-164, June, 1987
  5. Chidambaram and Bostrom, “Evolution of Group Performance Over Time: A Repeated Measures Study of GDSS Effects”, *Journal of Organizational Computing*, Vol. 3, No. 4, pp 443-469, 1993
  6. Dennis, A.R., George, J.; Jessup, L.; Nunamaker, J.F.; and Vogel D.R.; "Information Technology to Support Electronic Meetings," *MIS Quarterly*, December, 1988.
  7. Dennis, A.R., Nunamaker, J.F., and Vogel, D.R. “A comparison of laboratory experiments and field studies in the study of electronic meeting systems”, *Journal of Management Information Systems*, Winter 1990-91, 107-135.
  8. Dennis, A.R., and Valacich, J. Computer brainstorms: Two heads are better than one. *Journal of Applied Psychology*, 78, 4 (1993) 531-537.
  9. Fjermestad J., and Hiltz, S.R., “An Assessment of Group Support Systems Experimental Research: Methodology and Results” *Journal of Management Information Systems*, Vo.: 15, No. 3, 1998-990-91,
  10. *The Economist, Mexico: A Country Profile: Annual Survey of Political and Economic Background*, The Economist Intelligence Unit, London, **2001**.
  11. George, J.F.; Easton, G.; Nunamaker, J; and Northcraft, G. “A study of collaborative group work with and without computer-based support”, *Information Systems Research*, Vol. 1, December, 1990, 394-415.
  12. Glenn E.S., and Glenn, C.G., *Man and Mankind: Conflict and Communication Between Cultures*, Ablex, Norwood, New Jersey’s (1981).
  13. Harvey, Francis. “National cultural differences in theory and practice: Evaluating Hofstede’s national cultural framework”, *Information Technology and People*, Vol. 10, No. 2, 132-146, 1997.
  14. Hiltz, S.R. and Turoff, M. "Structuring computer-mediated communication systems To avoid information overload," *Communications of the ACM*, 28(7), 1985, 680-689.
  15. Hiltz, S.R., Turoff, M., & Johnson, K. “Experiments in Group Decision Making, 3: Disinhibition, Deindividuation, and Group Process in Pen Names and Real Name Computer Conferences”, *Decision Support Systems*, Vol. 5, pp 217-232, 1989.
  16. Ho, T.H.; Raman K.S.; and Watson R.T. “Group decision support systems: The cultural factor, *Proceedings of the 10th Annual International Conference on Information Systems*, pp 119-129, 1989.

17. Hofstede, G. *Culture's Consequences: International Differences in Related Values*, Sage Publications, Beverly Hills, CA., 1980.
18. Hofstede, G. *Culture and Organizations: Software of the Mind*, McGraw-Hill Book Company, London, 1991.
19. Jarvenpaa, S.; Rao, V.S.; and Huber, G.P.; "Computer support for meetings of groups working on unstructured problems: A field experiment", *MIS Quarterly*, December, 1988, 645-666.
20. Kendall, K.E. The significance of information systems research on emerging technologies: seven information technologies that promise to improve managerial effectiveness", *Decision Science*, Vol. 28, No. 4, 1997, 775- 792.
21. Kiesler, S., Siegel, J. and McGuire, T.W., "Social Psychological Aspects of Computer-mediated Communication". *American Psychologist*, Vol. 39, No. 10, pp. 1123-1134, 1994.
22. Kraemer K.L., and Pinonneault A. "The implication of group support technologies: An evaluation of the empirical research", *The Proceedings of the Twenty Second Hawaii International Conference on System Sciences (HICSS)*, Hawaii, 1989.
23. Lim L., and Benbasat, I. A framework for addressing group biases with group technology. *Journal of Management Information Systems*, 13, 3, pp 7-24, Winter 1996-97.
24. Locke E.A., and Schweiger, D.M. "Participation in Decision Making: One More Look". In B.M. Straw's edition of *Research in Organizational Behavior*, Greenwich, Ct, JAI Press, 1979, Vol. 1, pp 265-339,
25. McClelland, D.C., and Winter, D.G., *Motivating Economic Achievement*, New York Free Press, 1969.
26. Mejias, R.J.; Shepherd M.; Vogel, D.; and Lazaneo, L.; "Consensus and Perceived Satisfaction Levels: A Cross-Cultural Comparison of GSS and non-GSS Outcomes Within and Between the U.S. and Mexico", *Journal of Management Information Systems*, vol. 13, No. 3, Winter 1996-97, pp 137-161.
27. Mejias, R.J.; Vogel, D.; and Nunamaker, J. "Cross-Cultural Group Dynamics in Computer Mediated Communication", *Fourth Annual Proceedings of the AIS Americas Conference on Information Systems*, pp 487-490, 1998.
28. Neko, Yengo Maombe, "The Cultural and Social Impact of New IT in Africa", Chapter I-6 in text, *Social Implications of Computers in Developing Countries*, by Bhatnagar, S.C., and Odedra, Mayuri, Tata McGraw-Hill Publishing Co, Ltd., New Delhi, India, 1992.

29. Morales, B.; H. Moriera, and D. Vogel, "Group support for regional development in Mexico", *Proceedings of the 28th Hawaii International Conference on System Sciences (HICSS)*, 1995.
30. Nunamaker, J.F. Jr.; L.M. Applegate, and B.R. Konsynski. "Facilitating group creativity with GDSS", *Journal of Management Information Systems*, Spring, 1987, pp. 5-19.
31. Nunamaker, J.; Briggs, R.; Mittleman, D.; Vogel, D. Lessons from a dozen years of group support systems research: A discussion of lab and field findings. *Journal of Management Information Systems*, 13, 3, (1997), 163-207.
32. Nunamaker, J.F., Dennis, A.R., Valacich, J.S., Vogel, D.R., and George, J.F. "Electronic Meeting Systems to Support Group Work," *Communications of the ACM*, 34(7), July 1991, 40-61.
33. Nunamaker, J.F., Dennis, A.R., Valacich, J.S., Vogel, D.R., and George, J.F. "Group Support Systems Research: Experience from the Lab and the Field," in L.M. Jessup and J.S. Valacich (eds.), *Group Support Systems: New perspectives*, Macmillan: New York, NY, pp 125-145, 1993,
34. Ojo, Sunday O. "Socio-Cultural and Organizational Issues in IT Applications IN Nigeria", Chapter II-1 in *Social Implications of Computers in Developing Countries*, by Bhatnagar, S.C., and Odedra, Mayuri, Tata McGraw-Hill Publishing Co, Ltd., New Delhi, India, 1992.
35. Osborne, A.F. *Applied Imagination: Principles and Procedures of Creative Thinking*", Revised Edition, New York, Scribner's, 1957.
36. Pinsonneault, A.; and Heppel, N., "Anonymity in group support systems research: a new conceptualization, measure and contingency framework", *Journal of Management Information Systems*, Vol. 14, No. 3, 1997, 89-108.
37. Pinsonneault, A., Barki, H., Gallupe,,R.B., and Hoppen, N. "Electronic Brainstorming: The Illusion of Productivity", *Information Systems Research*, Vol. 10, No. 2, pp 110 – 133, June,1999.
38. Reinig, B., Briggs, R., Shepherd, M., Yen, J., and Nunamaker, J. "Affective Reward and the Adoption of Group Supprt Systems: Participation is Not Always Enough", *Journal of Management Information Systems*, Vol. 12, No. 3, Winter 95-96, pp 169-185.
39. Robey D.; and Rodriguez-Diaz, A; The organizational and Cultural context of systems Implmentation: Case Experience from Latin American, *Information and Management*, Vol. 17, (1989), 229-239 .
40. FSteiner, I.D. *Group Process and Participation* , Academic Press: New York, 1972.
41. Straub, Detmar. "The effect of culture on IT diffusion: Email and FAX in Japan & United States", *Information Systems Research*, March, 1994, pp 23-47.

42. Tan, Wei, Watson, Walczuch, "Reducing Status Effects with Computer-Mediated Communication: Evidence from Two Distinct National Cultures", *Journal of Management Information Systems*, Vol. 15, No.1, pp 119-141, 1998
43. Tan, B.C.Y., Watson, R.T. and Wei, K.K (1995). National culture and group support systems : Filtering communication to dampen power differentials. *European Journal of Information Systems*, Vol. 4, No. 2, pp. 82-92.
44. Valacich J.; Dennis A.R., Connolly T. "Idea generation in computer based groups: A new ending to an old story", *Organizational Behavior and Human Decision Processes*, Vol. 57, pp 448-467, 1994.
45. Vogel D.R., & Gricar, J., "Using Electronic Commerce to Focus a Country: The Case of Slovenia", *International Journal of Electronic Commerce*, in press, 1998.
46. Wagner, J.A. III, "Participation's Effects on Performance and Satisfaction: A Reconsideration of Research Evidence", *Academy of Management Review*, Vol. 19, No2, 312-330, 1994.
47. Wagner J.A. III and Gooding, R. "Effects of Societal Trends on Participation Research, *Administrative Science Quarterly*, 32; 241- 262 1987.
48. Watson, R.; G. DeSanctis and M.S. Poole. "Using a GDSS to facilitate group consensus: Some intended and unintended consequences", *MIS Quarterly*, Sept., 1988, pp. 463-478.
49. Watson, R.; Ho, T.H.; Raman, K.S; "Culture: A fourth dimension of group support systems", *Communications of the A.C.M.*, October, 1994 pp 45-55.