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Cross-Cultural Group Process Losses in Computer Mediated Communication

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Abstract

A cross-cultural GSS study between the U.S. and Mexico was undertaken to study the presence of process losses during group idea brainstorming and consensus exercises. Six group process losses were analyzed across three study treatments (GSS-Anonymous, GSS-Identified and Manual-Identified) for each national culture. Results suggest that within U.S. groups, differences in sidetracking among treatments were found, with GSS-Identified groups generating the highest levels of sidetracking. Within the Mexican groups, GSS-Anonymous groups perceived the lowest levels of evaluation apprehension and perceived domination. A comparison study between cultures indicated that Mexican GSS groups perceived higher levels of dominance, lower levels of sidetracking, less information overload, less production blocking, and less forgetting than U.S. GSS groups.

Introduction and Background

Project teams and work groups have long been regarded by organizations as effective forums for the exchange of information and the enhancement of the decision making process (Steiner, 1972; McGrath, 1984; Fisher, 1989; Valacich, Dennis, & Connolly, 1994). However, if left unsupported, groups are often plagued by group “process losses” which may impair group outcomes relative to the efforts of the same individuals working by themselves (Lim & Benbasat, 1997). Examples of group process losses include evaluation apprehension, conformance pressure, information overload, forgetting, socializing, free riding, side-tracking and attention blocking and perceived domination (see Nunamaker et al., 1991). Many organizations have considered the use of group support systems (GSS) to maximize group productivity and reduce undesirable effects of process losses. GSS reduces process losses by creating a structured task and process environment which allows participants instantaneous, unabated, and parallel inputting into the group’s decision making process, (Nunamaker et al., 1991; Berdahl & Craig, 1996; Lim & Benbasat, 1997). Although much has been written about GSS technology and its ability to reduce group process losses, little research has been undertaken as to how effectively GSS may reduce process losses for work groups outside the U.S. The current study compares the effects of national culture (U.S. and Mexican), anonymity (identified vs. anonymous input) and technology support (GSS vs. non-GSS) upon the presence of perceived group process losses both within and between U.S. and Mexican groups. Groups from both cultures were exposed to three experimental study treatments: GSS-Anonymous, GSS-Identified and Manual-Identified. Matching field studies were conducted at the University of Arizona, and ITESM in Monterey, Nuevo Leon, Mexico.

Review of Literature

Studies have shown that face-to-face (FTF) interaction among individuals in groups create communication dysfunctions (i.e., “process losses”) that may potentially decrease group performance and inhibit groups from reaching their full task performance potential (Steiner, 1972; Deihl & Stroebe, 1987; George, et al., 1990; Valacich, Dennis & Connolly, 1994). The majority of US-based IT research supports the fact GSS enhances productivity via the reduction of process losses. However, only a few empirical GSS studies, (Ho, Raman & Watson, 1989; Watson, Ho & Raman, 1994; Chung & Adams, 1997), have considered *cultural* dimensions in their evaluation of GSS environments. What appears to exist in current IT literature is only an *implicit* recognition of the effects of national culture upon the transfer of new information technology (Koizumi, 1982; Keida & Bhagat, 1988; Ng & Ramiller, 1997).

Research Framework and Hypotheses

Predicting how GSS technology would affect process losses within work groups from different cultural environments proved challenging. The process losses selected for this study were *apprehension evaluation, perceived domination, sidetracking, production blocking, information overload and forgetting*. These process losses were selected due to their particular relevance to GSS technology

and because they have received the most attention in empirical GSS literature (George et al., 1990; Valacich et al., 1991; Nunamaker et al., 1991; Valacich & Dennis, 1992).

Hofstede's model of cultural differentiation (Hofstede, 1980, 1981) was used as a theoretical framework to predict perceptual differences between U.S. and Mexican groups participants of such process losses. While other cultural models such as Glenn and Glenn's (1981) associative-abstractive one-dimensional model were considered for the current study, Hofstede's four dimensional model (1980, 1981) appeared to be particularly appropriate to the current study because it included cultural variability indices from eighteen other Latin American countries whose individualistic-collectivistic, power-distance, and uncertainty-avoidance indices were similar to Mexico thus, providing a useful range of cultural reference points that could be contrasted with U.S. cultural scores. Hofstede's model has often been criticized because it was based upon *organizational* communication, suggesting that his cultural differentiation framework may not be applicable to *group* communication research (Gudykunst et al., 1988). However, several cross-cultural researchers state that Hofstede's model is one of very few empirically supported frameworks that endeavor to explain interpersonal phenomena and communication in terms of observed cross-cultural differences (Gudykunst et al., 1988; Watson, et al., 1994; Harvey 1997).

Hofstede's model (1980, 1981) stated that national cultures could be charted according to relative cultural index scores along four dimensions. These four dimensions were termed uncertainty-avoidance, power-distance, individualistic-collectivistic, and masculinity-femininity. Based upon the review of literature and Hofstede's model of cultural differentiation, two sets of hypotheses were proposed. Hypothesis Set A was used to predict perceptions of process losses *within* each national culture. Hypothesis Set B was used to predict differences in perceptions of process losses *between* U.S. and Mexican groups.

Hypothesis Set A (Analysis Within Cultures) Based upon previous research that suggests that GSS reduces the presence of process losses, the following hypotheses were presented:

H-A1: GSS group participants within both U.S. and Mexican cultures will perceive less evaluation apprehension and domination than participants from non-GSS groups.

H-A2: GSS group participants within both U.S. and Mexican cultures will perceive less production blocking and less information displacing process losses (i.e., sidetracking, information overload and forgetting) than participants from non-GSS groups.

Hypothesis Set B: (Analysis Between Cultures) Morales et al., (1995), stated that GSS often "levels the playing field" for Mexican GSS participants by encouraging higher levels of participation than most Mexicans have traditionally been accustomed to. Since GSS offers instantaneous, parallel, and anonymous brainstorming, GSS groups may not suffer the traditional feelings of conformance pressure or domination by their bosses or superiors which may sway group decision making in FTF groups (Morales et al., 1995; Mejias, 1995; Watson et al., 1994). Additionally, Hofstede's cultural index scores (1980, 1981) depict Mexico and other Latin American countries as ideological opposites to the U.S. U.S. individuals tend to see themselves as "I" (i.e., high individualism) and strive for self-actualization (Watson et al., 1994; Hofstede, 1980, 1981). Conversely, Mexican culture is characterized by a "we" perception (low individualism and high collectivism) and are more concerned with belongingness and the general welfare of the group (Gudykunst, 1986; Ho, et al., 1989). Additionally, Mexico's high power-distance scores reflect a culture that supports authority structures with corresponding social rankings (Hofstede, 1980, 1981). Mexican groups, therefore, were predicted to generate different perceptions of group process losses than U.S. groups with regard to evaluation apprehension and perceived dominance.

H-B1: Mexican GSS participants will perceive more evaluation apprehension and more domination than U.S. GSS participants.

High collectivistic and high power-distance cultural profiles scores generated by Mexico (Hofstede, 1980, 1981) would lead us to predict *less* "production blocking" process losses for Mexican groups than for U.S. groups. While Mexican groups in identified environments (i.e., Manual-Identified) could perceive more group process losses than U.S. groups, Mexican groups, due to their "collectivistic" cultural propensities, would be predicted to be more conscientious in working towards a common group goal and less likely to experience "side tracking" than their U.S. counterparts. Similarly, it is predicted that individuals from high power-distance cultures like Mexico may tend to "hold back" or defer to their supervisor(s) first, before making comments or contributing to the group's discussion. Therefore, while Mexican groups would be expected to experience more attention blocking (i.e., respectfully listening to others speak while not being able to express new ideas) they could be predicted to experience less information overload and forgetting within GSS environments because of their new exposure to open and unabated group communication. Therefore, we predict the following:

H-B2: Mexican GSS group participants will perceive less production blocking and less information displacing process losses (sidetracking, information overload and forgetting) than U.S. GSS group participants.

Research Methodology

This study consisted of two areas of analysis. The first area measured the effects of GSS upon the presence of group process losses *within* each national culture. This constituted a 2 x 2 within-subjects factorial design study with supporting technology (GSS vs. non-GSS) and identification features (anonymous vs. identified) as the two independent variables. The second area of analysis was a cross-cultural comparison of GSS effects upon group process losses *between* cultures. This constituted a 2 x 2 x 2 factorial design with supporting technology, identification features, and national culture (U.S. vs. Mexican) representing the independent variables. Student groups were randomly assigned to three experimental treatments: GSS-Anonymous, GSS-Identified, and Manual-Identified. A

Manual-Anonymous treatment was not used. Perceptual measures for process losses were generated using a 63 item, 7-point Likert scale questionnaire (i.e., strongly disagree to strongly agree) originally developed by Tyran (1993). A Spanish version of the questionnaire was developed using a double translation and verification process. Reliability measures for the seven process losses were considered adequate based upon inter-item reliability measures (Chronbach alpha) and use as validated items in prior GSS research (Green & Tabor, 1980; Dennis & Valacich, 1993; Tyran, 1993).

Table 1. Process Losses Within Each National Culture

| | United States | | | | | |
|--------------------------------|---------------------------------------|---------------------------------------|----------------------------|--|-----------------------|---------------------|
| Experimental Treatment | <i>Evaluation Apprehen</i> | <i>Perceived Domination</i> | <i>Production Blocking</i> | <i>Side-Tracking</i> | <i>Infor Overload</i> | <i>Forgetting</i> |
| GSS-Anon | 2.40 | 3.42 | 2.93 | 3.19* | 3.91 | 3.51 |
| GSS-Identif | 2.62 | 3.66 | 3.12 | 3.76* | 3.65 | 3.52 |
| Manual-Identif | 2.40 | 3.31 | 2.89 | 2.33* | 3.61 | 3.22 |
| Diff between Treatments | F = .649 p < .523 | F = 1.03 p < .360 | F = .697 p < .498 | F = 12.23 p < .001 | F = .94 p < .394 | F = .75 p < .475 |
| | Mexico | | | | | |
| Experimental Treatment | <i>Evaluation Apprehen</i> | <i>Perceived Domination</i> | <i>Production Blocking</i> | <i>Side-Tracking</i> | <i>Infor Overload</i> | <i>Forgetting</i> |
| GSS-Anon | 1.71* | 3.79* | 2.41 | 2.09 | 2.38 | 2.05 |
| GSS-Identif | 2.02 | 4.75* | 2.16 | 2.47 | 2.28 | 2.07 |
| Manual-Identif | 2.17* | 4.17* | 2.33 | 2.18 | 2.32 | 2.15 |
| Diff between Treatments | F = 3.14 p < .045 | F = 7.68 p < .001 | F = .966 p < .382 | F = 1.52 p < .22 | F = .12 p < .883 | F = .14 p < .867 |

Tukey post-hoc test: Difference between treatments p < 0.05

Table 2. Comparison of Process Losses Between National Cultures

| Experimental Treatment | Evaluation Apprehension | | | | Perceived Domination | | | |
|------------------------|-----------------------------|--------|-------------|------------------|----------------------|--------|--------------|------------------|
| | U.S. | Mexico | <i>t</i> | <i>p</i> | U.S. | Mexico | <i>t</i> | <i>p</i> |
| GSS-Anonymous | 2.40 | 1.71 | 3.69 | < .001 | 3.42 | 3.79 | -1.60 | < .109 |
| GSS-Identified | 2.62 | 2.02 | 2.95 | < .004 | 3.66 | 4.75 | -4.44 | < .001 |
| Manual-Identified | 2.40 | 2.17 | 1.07 | .286 | 3.31 | 4.17 | -3.37 | < .001 |
| Experimental Treatment | <i>Production Blocking</i> | | | | <i>Side Tracking</i> | | | |
| | U.S. | Mexico | <i>t</i> | <i>p</i> | U.S. | Mexico | <i>t</i> | <i>p</i> |
| GSS-Anonymous | 2.93 | 2.41 | 2.60 | < .01 | 3.19 | 2.09 | 4.80 | < .001 |
| GSS-Identified | 3.12 | 2.16 | 5.55 | < .001 | 3.76 | 2.47 | 4.47 | < .001 |
| Manual-Identified | 2.89 | 2.33 | 2.77 | < .006 | 2.33 | 2.18 | .59 | .557 |
| Experimental Treatment | <i>Information Overload</i> | | | | <i>Forgetting</i> | | | |
| | U.S. | Mexico | <i>t</i> | <i>p</i> | U.S. | Mexico | <i>t</i> | <i>p</i> |
| GSS-Anonymous | 3.91 | 2.38 | 6.97 | < .001 | 3.51 | 2.05 | 6.19 | < .001 |
| GSS-Identified | 3.65 | 2.28 | 6.05 | < .001 | 3.52 | 2.07 | 6.57 | < .001 |
| Manual-Identified | 3.61 | 2.32 | 5.56 | < .001 | 3.22 | 2.15 | 4.73 | < .001 |

Field Study Results

Results Within Cultures

One-factor ANOVAs were used for the analysis *within* national cultures, while *t*-tests for planned contrasts were used *between* national cultures. Field study results are reported in Tables 1 and 2. As seen in Table 1, within the U.S. culture only “sidetracking” generated significant differences between treatments. Within the Mexican sample, however, GSS-Anonymous groups reported significantly lower levels of evaluation apprehension ($F = 3.12, p < .045$) and perceived less domination ($F = 6.20, p < .002$) than Identified treatment groups (i.e., GSS-Identified and Manual-Identified). The findings from this study only partially support our predictions with regard to the ability of GSS technology to certain process losses. Because GSS-supported environments minimize the social and interactive cues often used within face-to-face meetings via the reduction of traditional communication barriers, it was predicted that GSS participants across both U.S. and Mexican cultures would perceive less process losses than FTF manual groups. Though GSS achieved these results for only three of the six process losses, the effects of GSS upon process losses were not uniform across *both* cultures.

Results Between Cultures

As predicted, Mexican groups perceived significantly different levels of process losses than U.S. groups in 14 of 18 t-test comparisons across three experimental treatments. However, in many cases the differences generated were not in the directions predicted. While Mexican GSS-Anonymous groups perceived less *evaluation apprehension* than U.S. GSS-Anonymous groups ($t = 3.31; p < .001$), they also perceived more *domination* than U.S. GSS groups, particularly for both *identified* treatments (i.e., GSS-Identified and Manual Identified). Mexican GSS groups also perceived less *production blocking* and *side-tracking* than U.S. GSS groups ($p < .01$ or better). Finally, Mexicans across all experimental treatments, perceived less *information overload* and less *forgetting* than U.S. groups ($p < .001$). Due to space limitations, an extended discussion of these results, questionnaire measures and related references are available from Dr. Roberto Mejias. (Rmejias@ou.edu).