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### A PROTOTYPE INTERNATIONAL GROUP DECISION SUPPORT SYSTEM

*Almost all result for group decision support systems (GDSS) have been obtained in a United States context, based on conventions and culture of American group processes. This paper reports on the construction and testing of a prototype GDSS to support international negotiation. The system was shown to work and to provide gains in both the quality of the interaction and the attitude toward the decision reached. Although the prototype system is narrow in scope focusing on two specific cultures and a single scenario and uses simple and limited technology, the results obtained suggest that computer-based intercultural GDSS can help people in staying focused, in managing the added complexity of multinational negotiation, and in interacting effectively with one another.*

## I. Introduction

Extensive research results are now available that demonstrate the effectiveness of group decision support systems (GDSS). These studies [Beauclair, 1987; Gallupe, Desanctis, and Dickson, 1988; Nunamaker, Applegate, and Konsynski, 1988] show, for example, that GDSS can assist groups in reaching higher quality decisions, increase the range of alternatives considered, increase participation, and reduce negative aspects of group work such as groupthink. These results have been obtained in an American context, based on the conventions and culture American group processes. Whether or not these results carry over to other cultures and whether they apply in intercultural settings in an open question.

As markets become world-wide, the number of meetings of international groups from different cultures increases. The objectives of these meetings includes [Gray, Olfman, and Park,

1988]:

- ° presentations and briefings
- ° strategic planning
- ° information sharing
- ° crisis management
- ° contract or treaty negotiation
- ° cooperative problem solving

In this paper, we focus on meetings that involve negotiations between firms. That is, the meeting involves two teams from different countries. Members of each team speak a different language and have different cultural norms. Each team is trying to maximize their individual return but driven by the common purpose of reaching an agreement both sides can sign. We present the results of creating and testing a GDSS to support such intercultural trade negotiation.

The GDSS supports communication, information exchange, and decision making. We believe that this work provides insight into the general issue of supporting intercultural groups.

We take it as given that inte-

rcultural differences exist. For example, in the case described here we found that a particular sticking point in the negotiation was the choice of color for the goods involved. The producers were offering light-colored goods, which were preferred in their country, and the resellers were insistent on dark colors, which they preferred. This seemingly small point is typical of the increased complexity

that multinational negotiations introduce.

## II. Communication Model

Group process refers to the interactive part of group decision making that distinguishes it from individual decision making. Bostrom [1989] presents the communication model shown in Figure 1 for the group

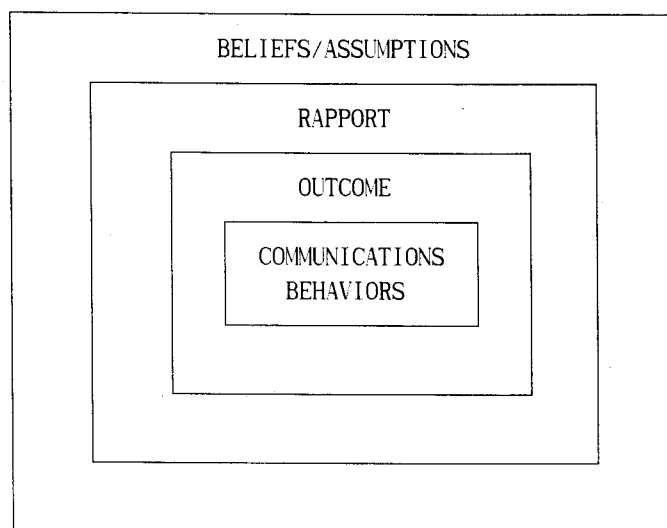


Figure 1. The Different Frames Operating in the Communications Process  
(adapted from [Bostrom, 1989])

process, He argues that:

"The first and essential step in communication is establishing rapport resourcefulness. Without rapport, no technique will work well. It is very difficult to establish rapport without having certain beliefs and assumptions.

Within the rapport frame, you need to have an outcome. If your behavior is not directed toward an outcome, you have no way to determine if that behavior is relevant or not. Once you have well-defined outcomes, you can then select from a wide variety of specific techniques... that are designed to get specific results." (p.291)

In the intercultural setting, communication becomes more difficult because participants have different beliefs and assumptions that result from the participants cultures (see, e.g., Hofstede [1980]). A step used in this research to potentially ameliorate these differences is to provide each side with information about the beliefs and assumptions of the other.

### III. Factors Affecting the Design of an Intercultural GDSS

In designing an intercultural GDSS, it is necessary to take into account the differences among cultures and provide support that minimize the miscommunications that can occur.

Among the factors to be considered are:

- Negotiation style
- Idiomatic and culture based understanding
- Multilingual Interfaces
- Translation

Before presenting the GDSS design, we discuss each of these factors.

#### 1. Negotiation Style

The way people negotiate policy issues differs from country. For example, Glenn, Witmeyer, and Stevenson [1977] identified three styles of negotiation in the United Nations Security Council:

1) Factual-inductive. People move from pertinent facts to conclusions. They try to ascertain the facts, find similarities or points which can be discussed with the other party, and proceed to formulate conclusions such as a range of action alternatives. The factual inductive style is common in the United States.

2) Axiomatic-inductive. People move from general principle to particulars which can be deduced easily. The deductions should be easily understandable since clarity is one criterion of proof. Negotiators find it difficult to move to particulars unless there is agreement on principles.

The axiomatic-deductive style is common in the USSR. The concept of "compromise" has a very negative connotation in Russian.

3) Intuitive-affective. People express their positions through appeals and emotions. Facts take second place to feelings. The intuitive-affective style is common in Arab countries.

According to Glenn et al. [1977] people accustomed to one style find it difficult or confusing to cope with another. People who use the factual-inductive style are puzzled by the high level of generality which is maintained where the axiomatic-deductive style is more common, and label people who use the intuitive-affective style as "hotheads" and "poor thinkers".

Graham, Campbell, and Meissner [1988] found significant differences in the way executives from around the world behave at the bargaining table. Analyzing videotapes, they obtained the results shown in Table 1. They found, for example, that Korean managers get upset when Americans think of South Korea as another Japan. The Germans, unlike the Japanese, have a clear-cut differentiation between business and personal relationships. In Brazil, executives have a tendency to interrupt frequently and touch those with whom they are speaking.

## 2. Idiomatic and Culture Based Understanding

Table 1. Negotiating: A Comparison By Nationality  
(from [Graham, Cambell, and Meissner, 1988])

\* Average number of times per hour

\*\*Average number of minites per 10-minute period

Bargaining Behaviors	American	Korean	Japanese	Brazilian	German	British
*No's	4.5	7.4	1.9	41.9	6.7	5.4
*You's	54.1	34.2	31.5	90.4	39.7	54.1
*Silent period	3.5	0	5.5	0	0	3.5
*Conversational Overlay	10.3	44.0	12.6	28.6	41.6	10.3
*Gazing	3.3	3.3	1.3	5.2	3.4	3.3
**Touching	0	0	0	4.7	0	0

Even when people understand each other's style, miscommunication can occur at the single sentence level. Consider, for example, the negative interrogative sentence "Don't you think so?" Americans answer "Yes" if they agree, whereas Koreans answer "No". Another example is "member of the family". A definition of who is a family member depends on the culture.

### 3. Multilingual Interface

Group members speaking different

languages introduce additional communications and decision support requirements. They want to be able to see and write on the screen in their own format and language [Perizzo, Hakimzadeh, Chen, and Varvel, 1987]. The requirement for different languages on the screen includes text, spreadsheet, databases and graphics. One approach to resolving the multilingual interface is to provide separate windows for each language. Another is to present the same information in both languages next to one another, for example, in

adjacent columns of a spreadsheet.

Both approaches were used simultaneously in this study. An example is shown in Figure 6 later in this paper.

#### 4. Language Translation

In a computer environment, language translation can take the form of machine translation, machine-aided translation and terminology data banks [Slocum, 1988]. Machine translation systems perform translation without human intervention, although they may require preprocessing or postediting. Machine-aided translation can be either human-assisted machine translation in which the computer interacts with a translator as it attempts to translate, or machine-aided human translation in which the human translator consults the machine from time to time. The least ambitious form of translation is the terminology data bank in which the computer provides only a dictionary of technical terms applicable to the material being translated. In this last approach, the

translator is assumed to know the common words being used.

Translation introduces both a delay and a barrier to communication. The speed and accuracy of translation required depends on the task being performed (Table 2). For example, in electronic brainstorming [Nunamaker, Applegate, and Konsynski, 1987], each idea would be generated in the participant's native language.

The idea would be translated and sent in the appropriate language to the next person. However, the translation speed need not be rapid and only the gist of the idea needs to be translated. In the case of negotiation, where the two parties are trying to find a mutually satisfactory solution to a complex problem, precision is particularly important.

Task	Translation speed	Translation Accuracy
Issue Analysis	high	Precise
Brainstorming	Medium	Slightly Fuzzy
Voting	Medium	Precise
Negotiation	Medium	Precise

Table 2. Allowable Speed and Accuracy of Translation

## IV. Scenario

To explore the potentialities and problems associated with GDSS in an intercultural setting, a prototype GDSS was built to assist in negotiation. The GDSS was designed to support the scenario shown in Appendix. This scenario simulates a *real-life* negotiati-

on between a Korean manufacturer of golf gloves (called Yonsoo) and an American distributor (called MAX).

Each side speaks its own language. The only technical point needed to understand the scenario is that golf gloves are only worn on one hand, and hence come singly rather than in pairs. Both sides were presented the scenario and a copy of the agreement reached at first meeting. Each side was also given its own negotiation goals.

The assumptions were adjusted so that the only variable which really needed to be negotiated was the level of advertising. However, the scenario

as given to the teams included other factors, such as mix of color, size, and quality level.

## V. Prototype GDSS

### 1. Objectives

A prototype GDSS for international negotiation was built and tested. The prototype had two purposes:

1. to explore whether and how the introduction of group decision support can aid international negotiation.

2. to explore the potential of the following design features:

- a multilingual interface that allows simultaneous presentation of information in two languages.
- a keyboard that allows changing between character sets at the touch of a "hot key"
- a trade dictionary serving as a terminology data bank.
- an on-line information base to provide shared understanding.



## 2. System Design

Modeling a negotiation process involves [Samarasan, 1988]:

- 1) representation of the relevant traits of each part, including preferences, beliefs, access to information, and control of the negotiation agenda, and
- 2) representation of the interactions between the parties, including exertion of influence, coalitions, the substantive nature of proposals, and eventual settlements.

The prototype system was designed on Samarasan's model [Samarasan, 1988] and tailored to the scenario of the Korean-US golf glove negotiation. Each side had a 2-person negotiating team. In addition to the four negotiators, a facilitator was provided.

The prototype GDSS design used commercially available hardware and software packages.

**Hardware.** Figure 2a shows the experimental facility for computer-

supported groups. A Macintosh II was provided to each side. Video cameras recorded the sessions. Figure 2b shows the same facility when used without computer support. In this case, a whiteboard, markers, paper, pencil, and calculators replace the Macintosh.

**Software.** Figure 3 shows the structure of the software. The following software packages were used:

- ° HangulTalk, a Korean version of the Macintosh operating system which allows switching between English and Korean keyboard characters.

- ° Hypercard which was used to provide the shared understanding and the meeting information. The Hypercard stacks used are shown at the right edge of Figure 3.

- ° Microsoft works, an integrated software package that provides word processing, a data base, and a spreadsheet.

The first screen, shown in Figure 4, indicates how the two languages are presented on the same screen. To

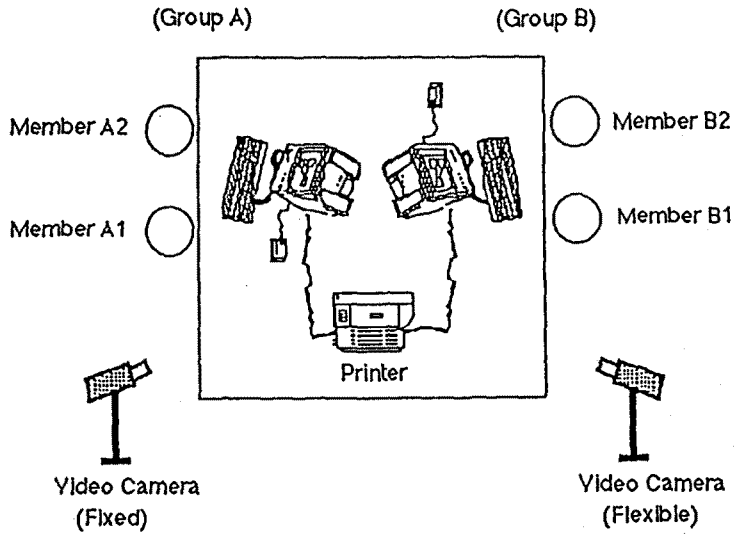


FIGURE 2a. EXPERIMENTAL FACILITY FOR COMPUTER SUPPORTED GROUPS

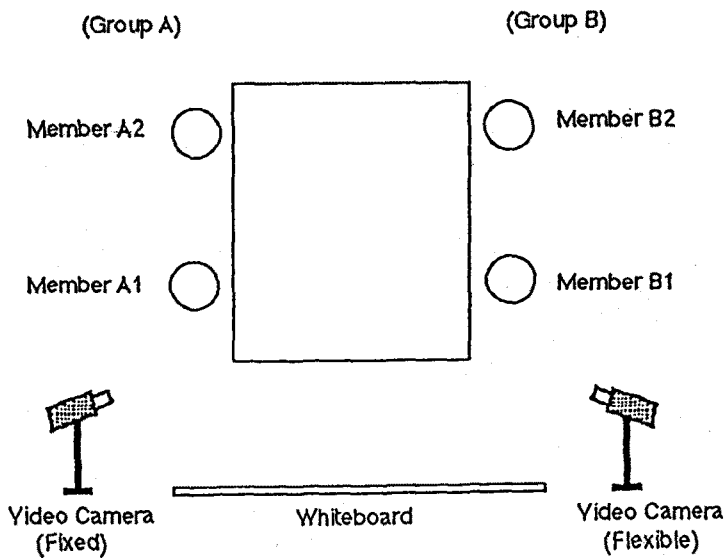


FIGURE 2b. EXPERIMENTAL FACILITY FOR TRADITIONAL GROUPS

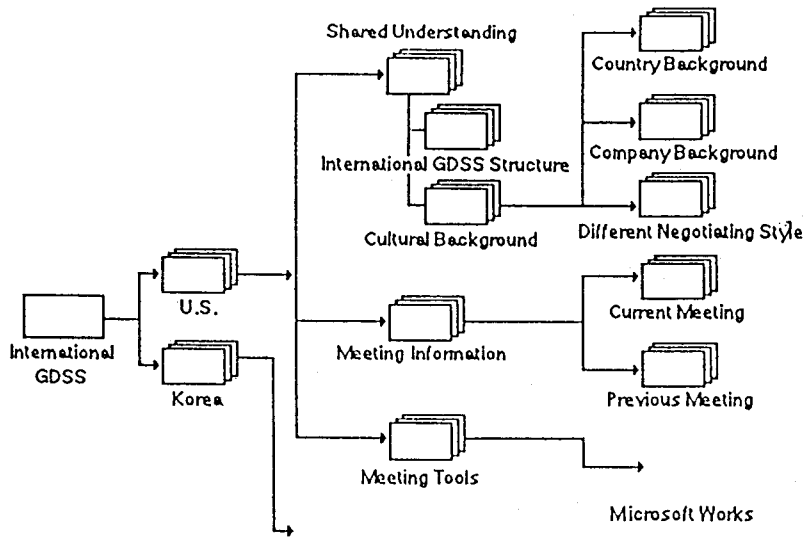


FIGURE 3. STRUCTURE OF PROTOTYPE SOFTWARE

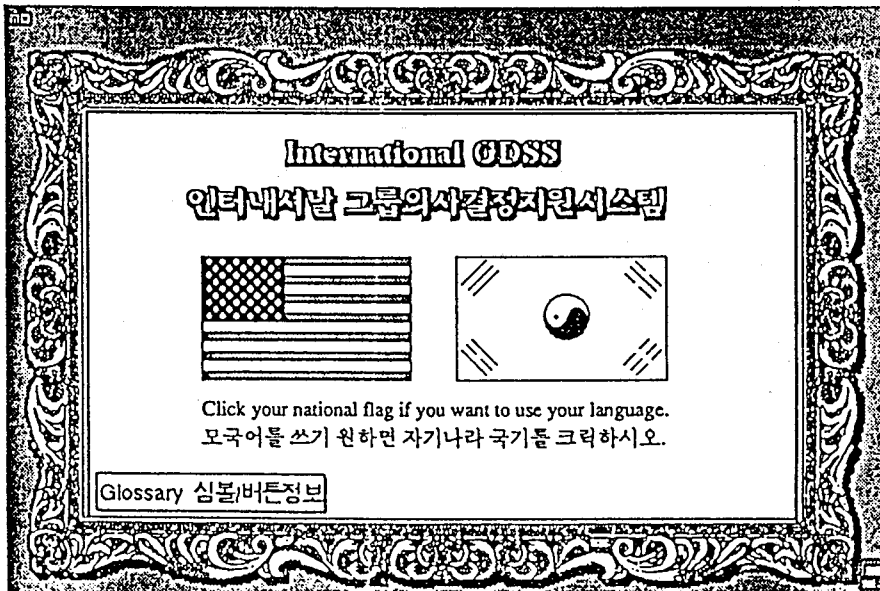


FIGURE 4. TOP SCREEN OF PROTOTYPE SOFTWARE

assist in shared understanding and to provide information about the meeting. Hypercard stacks were created for each side that showed the information listed in Table 3.

Participants could bring up windows showing the spreadsheet, the agreement, the bilingual trade dictionary, and the hypertext stacks. A typical screen is shown in Figure 5. Fortunately, the number systems in both languages are the same, so that it is possible for either side to create a "what if" case on the spreadsheet and share it with the other side.

<u>Country Background</u> - history - economic - political - golf environment	<u>Company Background</u> - history - organization - business philosophy - performance
<u>Negotiating Style</u>	<u>Meeting Information</u> - topic - meeting background - proposal - agreement

Table 3. Shared and Meeting Information Provided in Hypercard Stacks

## VI. Pilot Study

A pilot study was run to test the system. In the pilot tests, both

participants on each side had their own computer and participants communicated with one another on a network. When sending messages to the other side, the communication was first routed to a human translator, who performed the translation and then forwarded the messages. The system was relatively crude and the time delays encountered in the simple technological links were unacceptably long. It was also found that one of the two computers on each side was always used much more heavily than the other. As a result of this pilot finding, the main experiment, reported below, was run with only one computer on each side. If one side had an interesting what-if case to show to the other, they simply turned their computer around so that the other side could see it.

Analysis of the observed pilot data, a debriefing questionnaire, and observation of the sessions, all indicated that the computer-based, intercultural interface was suitable for use in testing an intercultural GDSS environment

	A	B	1 2 3 4 5 6 7 8 9 10
1		MAX PR	<p><b>AGREEMENT 합의서 #1</b></p> <p>der 첫번째 주문에 대하여</p> <p>but the first order will be further discussed be held in the beginning of June, 1989, in C</p> <p>가세한 내용들은 일반의사전달매체를 에서 보다 구체적으로 논의하기로 한다.</p> <p>tract 독점판매계약</p>
2	1. PRICE and VOLUME 가격 및 수당		
3		ELEGANT	
4	Unit = 1 dozen	최고급	
5	UNIT PRICE 단가	\$156.00	
6	UNIT COST 원가	\$108.00	
7	UNIT MARGIN 마진	\$48.00	
8	UNIT ADVERTISING 단위당 광고	\$9.00	
9	UNIT PROFIT 이윤	\$39.00	
10	PROFIT/PRICE 이윤/가격	25.00%	
11	VOLUME 판매 량 (dozen)	1625	
12			
13	INCOME STATEMENT 손익계산서		
14		ELEGANT	
15		최고급	

	A	B	C
151	C.I.F.; c.i.f.	Cost, Insurance, and Freight	운임, 보험료 포함가격
152	C.I.F. & C	Cost, Insurance, Freight, and Commission	운임, 보험료, 수수료 포함가격
153	C.I.F.C. & I	Cost, Insurance, Freight, Commission, and Interest	운임, 보험료, 수수료, 이자 포함가격
154	c.i.f.i. & e	cost, insurance, freight, interest, and exchange	운임, 보험료, 이자 및 환비용 포함가격
155	CIO	Congress of Industrial Organization	산업노동조합회의
156	Cir	Circa (Latin) - about	약
157	Cl.	Class, Clause	급: 조항; 약관
158	C.L.	carload lots	화차단위로 적재할 수 있는 화물의 양
159	Cld.	Cleared	통관하다
160	C.L.U.	Chartered Life Underwriter	공인생명보험회사
161	Cml.	Commercial	상업의

FIGURE 5. MULTILINGUAL MULTIWINDOWING

(see Park [1990] for detail).

## VII. Research Design and Method

The research question addressed was what effects does a GDSS with an

intercultural interface have on the process and outcomes of traditional international business negotiations. The specific goals of the experiments were to determine how a computer-based intercultural interface is used by people from different cultures and to gain practical insight into what this techno-

logical resource does well and what it does poorly. The approach used was to compare performance with and without the GDSS.

## 1. Experimental Design

The experimental design, shown in figure 6, used a randomized control-group posttest only design. Prior to the application of X, the subjects are assigned at random to the experimental and control groups. Randomization at the time of assignment allows the groups to be declared equal.

**Variables.** Figure 7 shows the variables and the relations among them.

The independent variable is the intercultural interface; either a computer-based intercultural interface or the traditional method.

"Traditional" means that groups in the control condition perform the task without computer support. Whiteboard, markers, papers, pencils, and calculators were provided for traditional groups. "Computer-based" means that

performing the task is enhanced by computers and accompanying software. The computer-based intercultural interface allows participants to access an on-line shared database, to refer to an on-screen business dictionary, and to manipulate some data values using the electronic spreadsheet features provided. These activities can be performed with a multilingual interface.

The dependent variables are (1) quality of participant interaction, and (2) participant's perceived attitude toward the decision. They measure group process (quality of interaction) and outcome (attitude toward decision). The controlled variables are group size, task, computer literacy, and project context for computer-based intercultural interface.

**Hypotheses.** The experiment compared the effectiveness of a prototype computer-based intercultural negotiation support technology to that of a traditional paper-and-pencil technology in a face-to-face meeting environment.

Based on the literature reviewed and

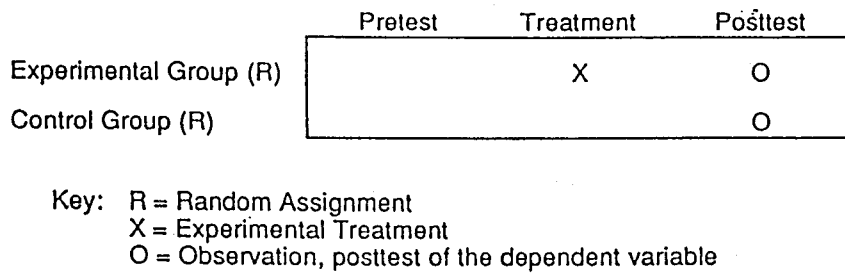


FIGURE 6. RANDOMIZED CONTROL GROUP POSTTEST ONLY DESIGN

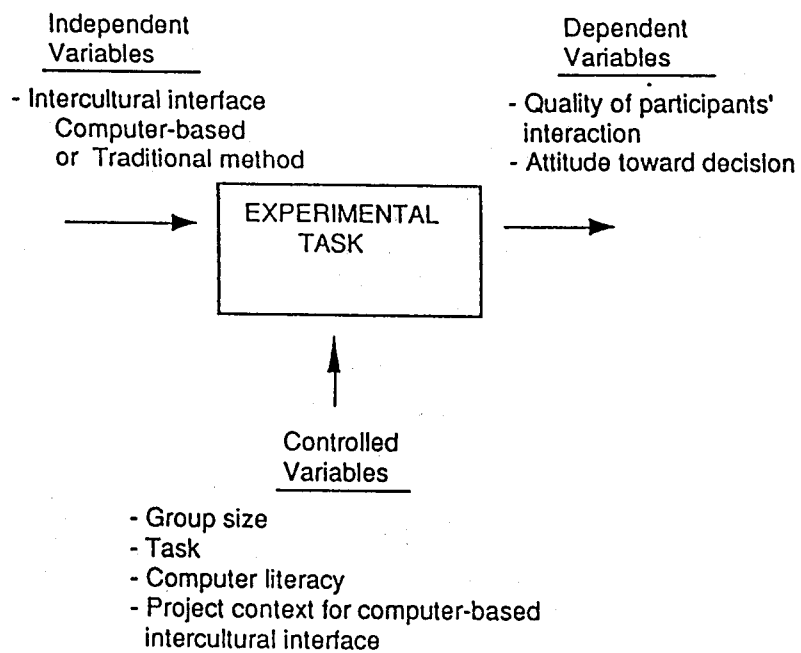


FIGURE 7. RELATIONSHIP AMONG VARIABLES

the pilot tests, the experiment was designed to address the following hypotheses:

**H1.** In an international negotiating environment, namely a negotiation between American and Korean participants, the computer-based intercultural interface will result in more positive attitudes toward the decision than the traditional way of conducting international negotiations.

**H2.** In an international negotiating environment, namely a negotiation between American and Korean participants, the computer-based intercultural interface will result in higher quality of interaction than the traditional way of conducting international negotiations. Over-all, it was predicted that groups in the condition of computer-based intercultural interface would outperform groups in the condition of traditional method.

## 2. Experimental Conditions.

**Task and Subjects.** The task was the international negotiation task designed and used for the pilot study. The experiment was run under two treatment conditions: with and without the intercultural interface provided by the GDSS. Each condition was run five times with a different group of four participants (two per side) each time. Thus, a total of ten tests were conducted, involving forty participants. Half the participants were American and half Koreans who spoke English well enough to make a business deal.<sup>1)</sup> The discussions were in English with support material provided in both languages. To control for potential computerphobia, people assigned to the computer-supported groups had previous computer experience. The subjects were 16 business people, 22 graduate students, and 2 undergraduates. Of the forty participants, 36 were volunteers and 4 were paid.

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1) A survey of people in US and Korean companies who had been involved in international negotiations showed that in most cases, the negotiations were conducted in English and that both sides received previous information about the other's culture. The 100 survey instruments yielded 64 usable responses.



### **Experimental Procedures.**

The experimental procedures were as follows:

#### 1) Introduction session

- An introductory announcement was made by the administrator of the experiment, and a background statement was read explaining briefly what the subjects would be doing in the meetings. ( 5 to 10 minutes)

- Subjects were asked to complete a consent form and a pre-discussion questionnaire. (5 minutes)

#### 2) Training and shared understanding session

Subjects for the computer supported group were given training to become familiar with the computer-based intercultural interface system. The traditional groups were given no training. The traditional groups were provided with handouts that contained the cultural background for shared understanding that was given on the computer for computer supported group. (15 minutes)

#### 3) Negotiation session

Subjects got together in one room and performed their negotiations.

(45 minutes)

#### 4) Feedback and reaction

Subjects completed a post-discussion questionnaire for measuring an individual's perception of the group decision-making process. (5-10 minutes)

### **Quantities Measured.**

To evaluate the quality of participant interaction, five observers viewed the videotapes. The attributes considered and the scales used to rate these attributes are shown in Table 4.

To obtain diversity, the raters included two US, two Korean, and one Indian native. Each rater reviewed five tapes from traditional groups and five tapes from computer groups. By having each rater review 10 tapes, a total of 50 ratings were obtained on each of 6 variables. Interrater reliability was satisfactory. Correlations were between .552 and .929. The Kendall's W is 0.774 ( $p < .001$ ).

Table 4. Quality of Interaction Measurements

Equal Status	Were opinions of participants considered as equal and did both groups have equal power. [4],[6]
Balance of Conflict	Extent of mutual satisfaction of conflicting parties. [1]
Level of Communication	Understanding the meaning of what is said. [4]
Friendliness	Acts which are positive in attitude shown toward others and concern for the progress of the group[1]
Tension Release	Acts(such as laughter) that bring about a release of tension. [1]
Expression of Agreement	Physical and verbal positive responses [1]

Table 5. Participant Measures

Measurements About an Individual's Own Responses	Beauclair,1987; Dennis et. al.,1988; Gallupe et. al.,1985
Satisfaction	with the negotiation process
Comfort	with the negotiation experience
Confidence	in their own negotiation performance
Measurements About an Individual's Perceptions About Group Performance	Foster,1986; Gallupe et. al.,1985; Hofstede,1980
Goals	clarity,importance and meaning of the goals to the group
Common Focus	extent to which group kept common focus on content as well as process
Conflict	extent to which group recognized differences and conflict and used them constructively
Communication	extent of open and distortion-free communication.

A post-test questionnaire was administered to all participants. The objective

was to determine the response of each individual to their own experience

and their perceptions about group performance. The measurement items are shown in Table 5.

## VIII. Experimental Results

This section presents the results of the statistical tests used to analyze the data collected in the experiment. The *t*-statistic was used to test for significant differences between the mean scores received under the two conditions for the two dependent variables (attitude toward decision and quality of interaction). Because the hypothesized effects were assumed to be in a particular direction and because this research study is exploratory, a one-tail test is appropriate. A liberal significance level of .10 was used. In addition to the quantitative results, the qualitative findings are described. The statistical package used was StatView 512+ (Version 1.2).

### 1. Hypothesis Testing

#### Hypothesis One

H1. In an international negotiating

environment, namely a negotiation between American and Korean participants, the computer-based intercultural interface will result in more positive attitudes toward the decision than the traditional way of conducting international negotiations.

Analysis of the aggregated data shows that the computer-based intercultural interface resulted in significantly more positive feelings toward the decision reached than the traditional way ( $t = 1.865$ ,  $p = .035$ , Figure 8).

The *t*-test result is consistent with the first hypothesis because it provides support for the expected finding that there is significant difference between the outcomes produced by the computer group versus the traditional group.

Table 6 disaggregates the results of the *t*-test to show the differences for each item used in measuring attitude toward the decision. In all seven dimensions, the observed mean for the computer group was greater than the mean for the traditional group. In add-

tion, in three dimensions, satisfaction (  $t = 2.143$ ,  $p = .0192$ ), comfort (  $t = 2.622$ ,  $p = .0063$ ) and conflict (  $t = 1.377$   $p = .0883$ ) the computer group was significantly higher at the .1 level than the groups using the traditional method. In the other four dimensions, confidence (  $t = .841$ ,  $p = .2028$ ), goals (  $t = 1.086$ ,  $p = .01423$ ), common focus (  $t = .466$ ,  $p = .3220$ ) and communication (  $t = .370$ ,  $p = .3568$ ) the difference was not significantly higher.

### Hypothesis Two

**H2.** In an international negotiating environment, namely a negotiation between American and Korean participants, the computer-based intercultural interface will result in higher quality of interaction than the traditional way of conducting international negotiations.

Figure 9 indicates that there was no significant main effect on quality of interaction (  $t = 1.205$ ,  $p = .117$  ). Although the t-test did not show the

quality of interaction effect to be significant, the effect was in the predicted direction.

Table 7 disaggregates the quality of interaction into its six components. It shows that the computer-based intercultural interface significantly affected communication and friendliness, but did not show significant differences for equal status, conflict, tension, or agreement. However, the computer group received the higher mean scores in all categories except tension than the traditional group.

## 2. Qualitative Findings

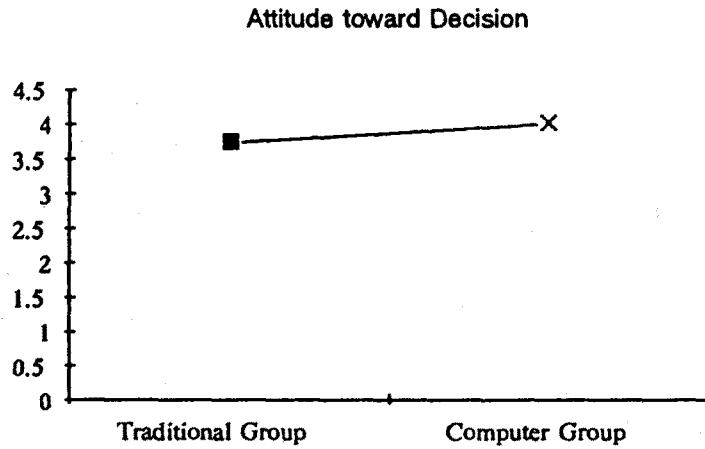
In addition to the quantitative findings, a qualitative analysis was conducted of the experimental sessions to look for consistent patterns of group behavior, particularly with respect to the use of the technology tools provided. The following observed behavior about the computer groups is worth nothing:

Table 6. Summary of t-Test Results for each item on the Post-discussion Questionnaire to Measure Attitude Toward Decision

Variable	Trditional Group (mean)	Computer Group (mean)	t-statistic	Probability (1-tail)
Individual's Attitude Toward Own Decision				
Satisfaction	3.70	4.15	2.14	0.02
Comfort	3.45	4.05	2.62	0.01
Confidence	3.45	3.65	0.84	0.20
Individual's Attitude Toward Group Performance				
Goals	3.95	4.20	1.09	0.14
Common Focus	4.05	4.15	0.47	0.32
Conflict	3.65	4.00	1.38	0.09
Communication	4.00	4.10	0.37	0.36
Sample Size (DF = 38)	20	20		

Table 7. Summary of t-Test Results for each item on the Observer Rating Instrument to Measure Quality of Interaction

Variable	Trditional Group (mean)	Computer Group (mean)	t-statistic	Probability (1-tail)
Equal Status	3.60	3.84	1.17	0.12
Conflict	3.36	3.54	0.95	0.17
Communication	3.44	3.80	1.72	0.05
Friendliness	3.64	3.96	1.45	0.08
Tension	3.36	3.34	-0.80	0.47
Agreement	3.40	3.50	0.46	0.32
Sample Size (DF. = 48)	25	25		

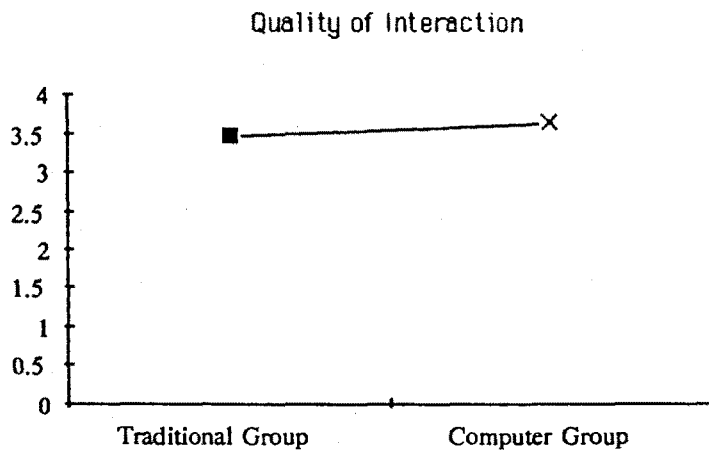


**Unpaired t-Test X<sub>1</sub>: Group Y<sub>1</sub>: Attitude toward Decision**

DF:	Unpaired t Value:	Prob. (1-tail):
38	1.865	.035

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Computer	20	4.043	.407	.091
Traditional	20	3.751	.571	.128

**FIGURE 8. RESULTS OF t-TEST FOR ATTITUDE TOWARD DECISION**



Unpaired t-Test  $X_1$ : Group  $Y_1$ : Quality of Interaction

DF:	Unpaired t Value:	Prob. (1-tail):
48	1.205	.117

Group:	Count:	Mean:	Std. Dev.:	Std. Error:
Computer	25	3.663	.635	.127
Traditional	25	3.467	.511	.102

FIGURE 9. RESULTS OF t-TEST FOR QUALITY OF INTERACTION

1) Participants appeared to interact with the computer than with one another. They appeared to turn to their computer screens and keyboards frequently while talking to one another. This behavior reduced eye contact and increased social distance between the two sides. This observation is similar to that in previous studies [Ho, Raman, and Watson, 1989], [Watson, Desantis, Poole, 1988].

2) Participants frequently used pencil and paper even though they were provided a computer-based notepad. This observation may imply that participants were not fully trained enough on the system.

3) The person in each pair handling the computer tended to be the more active participant in the negotiation. This difference may simply reflect the fact that this person was managing the data and therefore had better knowledge.

4) None of the participants (in either

the computer or the traditional groups) referred to the shared understanding information during the negotiation. In debriefings after the negotiation, participants indicated that they remembered the information from seeing it before the negotiation and that they were concentrating too much on the negotiation to refer to this material again. These findings indicate that providing on-line retrieval of cultural information may not be necessary. However, a survey conducted by Park [1990] indicated that in most cases, the participants in an international negotiation are, to a certain extent, told about the cultural backgrounds of the other party prior to the negotiation. Thus, having it available in computer form for reuse before successive sessions may still be useful.

5) The multilingual spreadsheet was used throughout the negotiation. Korean participants reported they felt more comfortable seeing the spreadsheet in their own language. The trade dictionary was not referred to. It is not clear



whether this was due to the participants knowing the trade terms or due to no new trade terms being introduced in the negotiations.

### 3. Interpretation of Results

Subjects in the computer group reported higher mean attitudes toward the decision reached than subjects in the traditional group. The difference was found to be significant in terms of satisfaction, comfort and conflict, but not significant in terms of confidence, goals, common focus and communication. The significant findings appear to be linked to the use of technology. Most participants in the computer groups expressed their satisfaction with the spreadsheet feature in the debriefing after each session, for example, saying that the electronic spreadsheet was a powerful tool to help them see what would happen as soon as various aspects of the negotiation changed. Korean participants in computer groups indicated that the multilingual feature made them feel really comfortable with the negotiation. The

computer-based intercultural interface improved confidence, and group perceptions such as goals, common focus and communication even though statistically significant differences from the traditional mode were not observed.

An assessment of the quality of interaction shows that the computer group ranked higher in all categories except tension release than the traditional group. The differences in equal status, conflict, tension release and agreement were not significant. The participants' unfamiliarity with the prototype system may have resulted in the lower tension release score for the computer group than for the traditional group. Some of the participants in the computer group commented, after the session, that they experienced some nervousness because of the lack of familiarity with the system.

In general, the results for the computer-based intercultural interface and for the traditional method investigated indicate that the effect on attitude toward decision was significant but the effect on quality of interaction

was not significant. However, the quality of interaction was in the expected direction. Attitude was not pretested so that it is possible that attitude was higher for the computer group at the outset. No apparent disadvantages except those mentioned in the qualitative findings resulted from the use of the computer-based intercultural interface.

## IX. Conclusions

This paper reports on the construction and testing of a prototype GDSS to support international negotiation. the purpose of the study was exploratory. The system was shown to work and to provide some gains in both the qu-

ality of the interaction and the attitude toward the decision reached.

The system described is quite narrow in scope, focusing as it does on two specific cultures and a single scenario. The technology is quite simple and limited. Thus, while encouraging, the results should not be generalized across multiple cultures or across all technologies.

Nonetheless, the study suggests that computer-based intercultural GDSS can be very helpful to people in staying focused, in managing the added complexity of multinational negotiation, and in interacting positive to warrant further development of this concept.

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## APPENDIX. SCENARIO

At their first meeting on December 11, MAX Corp. and Yonsoo Corp. agreed that MAX would be the exclusive U.S. distributor for Yonsoo's golf gloves. Price, quantities, delivery dates and other details are to be worked out at the next meeting scheduled for early June. Between meetings, MAX provided the following specifications for their

first order, which would be placed at the June meeting. Gloves to be assorted in five U.S. sizes (small, medium, medium large, large, Xlarge) and in for colors (light blue, light yellow, bone , and pearl white).

Both sides have agreed on the following assumptions :

1. The sales volume anticipated is

- equal to the order quantity. They, therefore, agreed that the only variable that can control sales is unit advertising.
2. Elasticity of sales volume to price is 1 (i.e., dollar sales remain constant even if price changes)
  3. Sales (Volume) change in direct terms so that:

Type	Leather	Appearance	Cost/dozen
Elegant	Cabretta, High Quality	Two holes on back and palm finger ball marker snap button; Wide velcro band back	\$108
Stylish	Cabretta, Low Quality	Two holes on back and palm finger ball marker snap button; Wide velcro band back	\$ 95
Plain	Calf	One hole on back and palm finger Wide velcro band back	\$ 70

- Escalator clause applies if price of material goes down as well as if it goes up.
- "Date of first shipment" is the date of arrival at the dock in Los Angeles.

#### Meeting Goals For MAX

(told to MAX only) :

1. Try to reduce price so it is half or less of unit advertising for each style.
2. Keep (unit profit/unit price) at least 20% for elegant, 15% for stylish, and 12.5% for plain.
3. Obtain clarification of contract proportion to changes in advertising.

#### Meeting Goals For Yonsoo

(told to Yonsoo only):

1. The price for Elegant, \$108, offered in the specification should not be accepted since the difference of material between Elegant and Stylish is over \$13. Keep (unit profit/unit price) at least 15% for elegant and stylish, and 10% for plain.

2. Try to add the cadet size (a size smaller than U.S. small) in all three types.
3. Ask them to present the details in terms of color and size for the first shipment.
4. Obtain clarification of contract terms so that:
  - "Date of first shipment" is the date of loading at the dock in Pusan.

- Escalator clause: Keep the initial agreed price even if the price of material goes down.

Notes:

1. The manufacturer favors light colors and small sizes, which are popular in his domestic market.
- The distributor needs dark colors and large sizes for the U.S. market.

### ◇ 저자소개 ◇



저자 박홍국은 서울대학교 경영대학을 졸업하고, 동 대학원 경영학과를 수료한 후 미국 클레어모트대학의 The Peter F. Drucker Graduate Management Center 에서 경영학 석사 및 경영정보학 박사 학위를 취득하였다. 현재 상명여자대학교 정보처리학과 조교수로 재직중이다.

박사학위 취득직후 약 2년간은 대우조선 MIS실에 근무하였으며 대우조선의 MIS 중, 장기계획수립과 생산일정계획 전문가시스템개발의 산파 역할을 하였다. 주요 관심분야는 EIS(Executive Information System: 고위관리자정보시스템), GDSS(Group Decision Support System: 그룹의사결정지원시스템), Expert System(전문가시스템) 등의 의사결정지원분야와 MIS Planning 및 통신기술 분야이다.