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Cultural Aspects of Group Support Systems

Fahri Yetim

Marmara University Istanbul
German Dept. of Information Systems
Anadoluhisari Kampüsü, TR-81616 Anadoluhisari - Istanbul
E-Mail: yetim@hisar.aenfor.marun.edu.tr

Summary
This paper is concerned with cultural factors in Group Support Systems (GSS) and the impact of technology and culture on the process and outcome of group decision making. Both current research findings in various cultural settings and propositions for further theoretical and empirical investigation are presented.

Contents

1. Introduction

As a result of modern technology and global interdependence, communication and cooperation between individuals from the same as well as from different cultures is occurring increasingly. The need to provide better tools for supporting groups shifts our attention from how our communication and computing technologies work to how people use these tools in their work (Winograd 1997) and, furthermore, how people use tools together are cultural matters (Yetim 1998).
In recent years, a few studies concerning the interaction of culture and information technology have been conducted in different research fields such as Computer-Supported Cooperative Work (Ishii 1993, Connolly 1994, Yetim 1995a/b) and

Human-Computer Interaction (Yeo 1996) as well as Hypertext Technology (Yetim 1996). Researchers have suggested that communication media can change group behavior (Nunamaker et al. 1991) and culture is an important determinant of group decision making (Hofstede 1981, Sauter 1992, Watson et al. 1994). These suggestions led researchers to examine explicitly culture as an influencing factor on both the outcome and the process of decision making. Technology used includes Group Support Systems (GSS), which combine computer, communication, and decision technologies to support problem formulation and solution in group settings (Nunamaker et al. 1997). In this paper, I will discuss current research efforts as well as some propositions concerning cultural aspects of GSS by considering both the understanding of culture and the findings based on it.

2. Conceptualizing cultural differences

2.1. Dimensions of culture: a brief overview

In the literature, there are many definitions of the term culture, which emphasize either the behavioral aspects of people's lives at a point in time, or the psychological ones. Some studies dimensionalize culture by dealing with various values. Kluckhohn and Strodtbeck (1961) have identified five dimensions of cultural differences such as time orientation, person-nature orientation, activity orientation, human nature perception, and relational orientation. Hofstede (1981, 1991) has identified dimensions of national culture such as individualism vs. collectivism, high vs. low power distance, high vs. low uncertainty avoidance, and masculinity vs. femininity. These have been widely applied by other researchers. Somewhat similar are Cohen's (1987) dimensions such as indirectness vs. directness, exaggeration vs. understatement, high vs. low impersonalism, and formality vs. informality. More recently Trompenaars and Hampden-Turner (1998) argued that every culture distinguishes itself from others by specific solutions it chooses to certain problems which (1) arise from our relationships with other people, (2) come from the passage of time; and (3) relate to the environment. They identified seven fundamental dimensions of culture. Five of them concern the relationships with people such as universalism vs. particularism, individualism vs. communitarianism, neutral vs. emotional, specific vs. diffuse, and achievement vs. ascription. The other two dimensions of culture are the attitudes to time and attitudes to the environment.

It is beyond the scope of this article to describe all these dimensions in details. However, a brief explanation of the Hofstede's dimensions is given, which have been used successfully by most GSS researchers.

2.2. Hofstede's cultural dimensions

Power distance is defined as „the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally (Hofstede 1991). In high-power-distance cultures, there are considerable differences between low- and high-status individuals. Subordinates in such cultures tend to defer to superiors and do not question their authority. In low-power-distance cultures, inequalities among people are minimized.

Uncertainty avoidance is defined as the degree to which uncertainty and unpredictability are tolerated in a society. In societies with a high degree of

uncertainty avoidance, people feel uncomfortable in unstructured or risky situations. Rules and procedures are more necessary for employees in cultures with high uncertainty avoidance.
Individualism vs. collectivism refers to the relationship between the individual and his or her larger environment. In individualistic cultures, ties between individuals are loose, and the interests of individuals and individual rewards and recognition prevail over those of the group. On the other hand, in collectivistic cultures, group interests tend to prevail over individual recognition and rewards. The focus in collectivism is on group harmony rather than on confrontation. When making group decisions, relationships are considered more important than the task at hand.
Masculinity vs. Femininity describes the relative tradeoff between an assertive environment vs. supportive environment. Cultures with high masculinity scores emphasize power, assertiveness, and individual achievement. Performance-contingent rewards is consistent with such a culture. However, cultures with high femininity scores place a high value on the quality of life and caring for others. Interpersonal relationships and quality of work-life issues are consistent with femininity.

2..3. Limitations of cultural dimensions

The recent debate over how to conceptualize cultural differences challenge the study of group differences as single bipolar constructs (Kim et al. 1997, Wink 1997). The danger of stereotyping are beginning to be expressed. In the previous research, individualism and collectivism are defined in terms of one another, and cultures high in collectivism are assumed, explicitly or implicitly, to be low in individualism and vice versa. This „either-or“ assumption of the bipolar model has been challenged by a coexistence model of individualism and collectivism. Although proponents of the coexistence model tend not to question the fact that Asian cultures are more collectivistic than Western ones, they contest the view that high collectivism precludes high individualism. It is argued, for example, that Asians accommodate the importance of both group and individual goals, or interdependence and independence of the self, by embracing and tolerating contradictions (Sinha/Tripathi 1994), by maintaining a distinction between the public and the private self, and by drawing a distinction between in-group and out-group behavior. Hofstede’s model has also been criticized because it is based on a study of 116,000 respondents taken exclusively from one multinational company (i.e., IBM). It is questioned whether the personnel of a single multinational corporation are representative of a particular culture. In addition, since Hofstede’s data were collected in the 1970s, there may have been significant changes in the cultures studied. Finally, it should also be remarked that studies on dimensions of culture concern only general cultural features and do not take into consideration the necessary interaction that characterizes all interpersonal or group communication: it is not enough to describe the participants separately - the model must show them together, which implies negotiating (or imposing) a common ground.
These remarks do not question the usefulness of these dimensions for studying cultural factors of technology. However, they can help to view the research findings or propositions carefully.

3. Culture and GSS

In the literature of Group Support Systems (GSS), which have been designed to support group work, much of the relevant research attempts to compare group process and outcomes with and without technology. Recently, scholars have began to address not only the question of what are the influences of media on decision making, but also the issue of how these influences are a function of culture.

3.1. GSS vs. face-to-face communication

GSS research has reported differences in group decision outcomes when comparing GSS meetings with face-to-face (FTF) meetings (Nunamaker et al. 1991). The difference in the outcomes result from the significant differences in the process of decision making provided by the GSS environment. FTF group meetings are seen as inefficient and ineffective because, as some studies have shown, individuals in a group setting may be apprehensive about how their ideas will be received, or some members of the groups dominate the discussion, causing premature consensus as well as a reduction in the collective values of the discussion. GSS therefore is seen as a technology that facilitates group interaction by empowering individuals to be more productive group members. Further, many GSS researchers argue that provision of an electronic communication channel enhances information exchange within a group and leads to a more balanced involvement of group members, which will in turn lead to better decision outcomes (for further benefits of GSS usage see Nunamaker et al. 1991/1997 and El-Shinnawy/Vinze 1998).

The features of GSS most closely associated with these benefits are *anonymity* and *parallel communication*. Anonymity reduces evaluation apprehension, conformance pressure and social cues. It is argued that a reduction in any of these „may encourage a more open, honest and free-wheeling discussion of key issues“ (Nunamaker et al. 1991, 55). Anonymity can reduce also the domination of some group members and allows participation based on content of communication rather than on the source that generated the communication. The parallel communication feature of the GSS gives group members the opportunity to contribute and work simultaneously. Good ideas or important thoughts are captured in a GSS setting whereas in a FTF meeting they are frequently lost because only one person can talk at a time. However, both anonymity and parallel communication can also have a negative impact on the group process. For example, anonymity can increase free riding, while parallel communication can cause information overload.

3.2. Adding culture to GSS: research findings

Watson et al. (1994) pointed out, arguments concerning the usefulness of communication media based on implicit assumptions that may be culturally specific: For example, an assumption is made that it is important for each group member to have an equal opportunity, regardless of status differentials, to express an opinion in a group discussion. It has also assumed that group members prefer open and direct communication to resolve conflict or disagreement. In addition, the GSS concept implicitly suggests that group decisions should further organizational objectives and little consideration is given to group harmony. If these assumptions are not valid for all cultures, they may not be acceptable, and existing GSS

designs may not be appropriate for all cultures. Furthermore, if the arguments are true that different cultures require different kinds of information, process information differently, and have different degrees of satisfaction with information systems (Watson et al. 1994), then current theories which support GSS research and drive its design, as well as the majority of empirical GSS research using local subjects in Western culture, may not hold in all cultures.
A few studies have explicitly investigated cultural factors in GSS research, i.e. the impact of technology and culture and their interaction on the process and outcome of group decision making. The described studies examine different phenomena in GSS environment such as consensus change, group polarization and persuasiveness of arguments, the use of systems, and participation. To measure the impact of culture on these phenomena, the majority of these studies employ Hofstede's dimensions of culture.

3.2.1. Consensus change

- *Impact of individualism and power distance on consensus chang*e:

Watson et al. (1994) investigated the impact of culture on the change in consensus resulting from GSS use. They used experimental data collected in Singapore and in the US, which culturally differ with respect to individualism and power distance. Consensus change was determined by comparing consensus before and after the meeting. Singaporean groups were found to have higher pre-meeting consensus and less change in consensus than US groups. This is consistent from a cultural perspective because Singaporean groups are more likely to be collectivists than US groups and collectivists more highly value and strive for consensus independent of GSS use. Therefore the ability of GSS to increase consensus will be diminished when employed by collectivists. Similarly, Mejias et al. (1996) found that Mexican FTF groups obtained higher consensus than GSS-supported groups, though this was not the case in the US. This finding is reasonable given the more collectivist culture of Mexico.

3.2.2. Group polarization and persuasiveness

El-Shinnawy and Vinze (1997) examined the phenomenon of group polarization - the tendency of individuals in a group setting to engage in more extreme decisions than their original private individual decisions. They define polarization as a choice shift resulting from group discussion. Using the theory of persuasive arguments which asserts that the degree of persuasiveness of arguments during group discussion can have a major effect on group polarization, they argued that polarization as a phenomenon and persuasive arguments as an explanation for it are largely US based. Persuasive arguments theory assumes that individuals are driven to present their ideas and influence others by their need to promote self-interest and to strive for self-actualization. This theoretical perspective is based on notions of individualism. Studying cultural settings that promote collectivism and accept higher degrees of power distance, would lead to low levels of polarization in the group's decision and persuasive arguments.
They compared decision making processes and outcomes of both FTF und GSS groups in the US and Singapore. Their results confirm that GSS technology does indeed have an impact on group decision outcomes such as polarization. However, their findings show a more interesting effect on the process of group decision making.

- *Impact of individualism and power distance on persuasive arguments*:

The effect of GSS on persuasiveness was most pronounced in the US groups. The US FTF groups have the highest level of persuasiveness in an argument pool resulting from group discussion, while the US GSS groups have the lowest level of persuasiveness. El-Shinnawy and Vinze (1997) explain the high level of persuasive content in the argument pool by the cultural traits of high individualism and low power distance attributed to groups operating in the US. In such cultures, group members are expected to be most active in contributing to the group discussion. The presence of higher-status individuals did not deter group members from contributing ideas that they consider important. On the other hand, Singaporean FTF groups experienced much lower levels of persuasive content in the argument pool due to the collective and high power distance of the culture, which suggests that contributions to the argument pool were based on support for the powerful person in the group rather than on the validity or novelty of the argument itself. Validity and novelty have been considered as the two important determinants of the persuasiveness of an argument pool.

Contrary to the expectations that GSS would increase the total number of arguments and thus the level of persuasiveness of the argument pool, GSS dramatically reduced persuasive arguments in the US setting and had very little impact in the Singaporean setting. The dramatic effect of GSS in reducing the persuasive content of arguments in the US is accentuated by the initial high level of persuasive content of the argument pool for the US FTF groups. Indeed, they recognized a higher number of arguments in the GSS session than in the FTF session. But, their persuasiveness was lower. According to El-Shinnawy and Vinze, these situations occur because parallel communication facility led to redundant comments, that do not contribute to the persuasiveness of the argument pool. They are neither new ideas nor new ways to address the task at hand. In addition, anonymity did not allow individuals to contribute more novel and creative ideas through reduced inhibition in the US groups. Free riding, as a possible result of anonymous communication, is a possible explanation for it: The high level of individualism that characterize the US culture my have caused group members to abstain from making their most notable contributions in a GSS setting because in this medium the source of the ideas is not identifiable and, therefore, individuals making these ideas would not get credit for the idea.

Also against their expectation, GSS had very little impact on persuasiveness in singaporean groups. Where conformity is the norm, such as is the case in Singapore, their expectation was that individuals would not contribute novel arguments in a FTF setting. In technology-supported groups where individuals are anonymous and parallel communication is possible, they expected, to see a significant difference in the novelty of the pool of arguments. El-Shinnawy and Vinze believe that the collectivist and high-power-distance attributes of the Singaporean cultures are so strong that the presence of technology did little to influence individuals' inherent need to conform and lack of motivation to be distinct and different from others.

3.2.3. System usage

In order to understand the use of information systems, the Technology Acceptance Model (TAM) has been widely used by researchers. TAM explains the behavior of computer usage and posts that the acceptance and use of information technology

are affected by both perceived usefulness, i.e. the extent of people's believe that the technology will help them to perform their job better, and perceived ease-of-use, i.e. the degree to which a person believes that using a particular system would be free of effort (Davis et al. 1989). To understand whether TAM applies in other cultures, Straub et al. (1997) tested TAM model across three different countries such as Japan Switzerland, and the US, by employing E-mail technology as an example.

- *Impact of uncertainty avoidance, power distance, individualism, and masculinity on technology acceptance*:

Straub et al. (1997) predicted that cultural differences in *uncertainty avoidance* could affect technology acceptance by influencing choices of computer-based media vs. traditional media. Based on the assumptions of both information richness and social presence theories that the individuals choose media on the basis of how well those media reduce uncertainty, individuals in high uncertainty avoidance are expected to use electronic media less often since these media are not well suited to uncertainty reduction as face-to-face and other rich channels. *Power distance* should have a marked bearing on the communication patterns of knowledge workers and their managers. In societies in which managers and workers are separated by a large power distance, the leveling effect of computer-based media is not seen or felt as a desirable feature. In high power distance cultures, individuals may show deference to authority by refraining from using media that do not allow them face-to-face contact. Concerning the effetc of *individualism vs. collectivism*, they predicted that knowledge workers in collectivist cultures cannot pick up cues about the social situation as readily from computer-based media and, therefore, would be inclined, overall, toward media such as face-to-face across all communications tasks. Because *Masculinity* (assertiveness) is highly related to interpersonal presence, media not conveying the social presence of the communicator, such as E-mail, would not be favored in cultures with high masculinity.

Their results indicate that TAM holds for both the US and Switzerland, but not for Japan, suggesting that the model may not predict technology use across cultures. In case of Japan, cultural tendencies toward more uncertainty avoidance, greater power distances between managers and workers, collectivist sentiments, and assertiveness may limit E-mail use and disassociate usefulness from use. Because the study did not directly measure cultural dimensions, "it is not possible to say with certainty that a link between cultural factors and technology has been empirically established." (Straub et al. 1997, 9)

3.2.4. Participation

Group participation is also affected by social norms. Therefore, the ability of GSS to reduce participation barriers may depend on culture in a given context. By explaining GSS participation in

Participation barriers	Power distance	Individualism-collectivism	Masculinity-femininity
Parallel entry			
Time domination	Increases participation of low-power members in high-power distance cultures;	Increases participation of non-in-group members in collectivist cultures;	Increases participation;
Dispensive free riding	Decreases participation of low-power members in high-power distance cultures;		
Media incompatibility	Decreases participation of high-power members in high-power distance cultures;		
Conflict avoidance		Decreases participation in collectivist cultures;	
Indifference free riding			Decreases participation in masculine cultures;
Anonymous entry			
Time domination	Increases participation of low-power members in high-power distance cultures;	Increases participation of non-in-group members in collectivist cultures;	
Evaluation apprehension	Increases participation of low-power members in high-power distance cultures;		
Conformance pressure	Increases participation of low-power members in high-power distance cultures;		
Dispensive free riding	Decreases participation of low-power members in high-power distance cultures;		
Conflict avoidance		Increases participation in collectivist cultures;	Increases participation in feminine cultures;
Indifference free riding		Decreases participation in individualist cultures;	Decreases participation in masculine cultures;

Fig 1: Propositions for GSS-culture interaction (cf. Robichaux/Cooper 1998, 292)

terms of the technology acceptance model (TAM), Robichaux/Cooper (1988) considered some determinants of ease of participation and usefulness of participation such as

- *Time domination* occurs when an information channel is dominated by members with some skills
- *Media incompatibility* occurs when user has not the ability to use a given media
- *Indifference free riding* occurs when a member believes there is no personal value participating and thus does not participate
- *Dispensive free riding* occurs when a member believes that other members have the same or better ideas and therefore does not participate
- *Evaluation apprehension* occurs when a member who wants to avoid negative evaluation does not participate

- *Conformance pressure* occurs when a member who wants to avoid punishment from powerful members does not participate
- *Conflict avoidance* occurs when a member does not participate in order to avoid conflict among members, and thereby enhance group maintenance

These can affect the value of participation. By employing Hofstede's dimensions of culture as example settings, Robichaux and Cooper (1998) hypothesized some participation barriers as affected by GSS features such as parallel and anonymous entry (fig. 1). However, as Robichaux and Cooper (1998) remarked, these propositions should be viewed as highly tentative due to the Western bias of the technology acceptance model, which the propositions are based upon. This model itself focuses on an individual's decisions to participate based on cognitive evaluations of his or her beliefs and perceptions. It could be contrarily argued that emotion rather than rational reasoning can predominate in some cultures. But, the authors assume that rational decision making and GSS behavior, such as participation, are applicable across-cultures.

3.2.5. Communication between diverse groups

The studies presented thus far were based on an assumption that individuals of a single culture were employing GSS. They made a significant contribution to the cultural aspects of GSS. However, they did not consider the impact of GSS when participants represent multiple cultures. This issue is getting more important in the age of globalization. Cultural differences in terms of language can affect the interaction between personal abilities and the supporting technologies, which result in a differentiation of behavioral skills and lead to differences in the ease of use and thus affect the participation in communication. Beside language barriers, culturally diverse groups may also be hindered by behavioral constraints posed by different cultural norms as well as discrimination. These groups might be assisted by computer-based systems that facilitate group interaction, and decision making by allowing individual idea generation, anonymity, parallel communication, providing multilingual interfaces that automatically translate comments to an individual's native language (Aiken et al. 1994, Yetim 1995a,b).

In a study, Daily et al. (1996) compared the effects of using group decision support systems on culturally diverse and homogeneous groups. Group performance was measured by the number of non-redundant, realistic ideas and the quality of solution produced in response to posed problems. Groups using the system, regardless of cultural make up, developed a significantly higher number of non-redundant, realistic ideas than groups that did not. Furthermore, among groups using the system, culturally diverse groups produced a significantly higher number of non-redundant, realistic ideas than homogeneous groups. But, they could not find any significant indication whether culturally diverse groups that use a group support system will generate a higher quality solution to a posed problem than culturally homogeneous groups.

Another empirical study concerning the impact of technology on communication among culturally diverse groups have been conducted by Ma (1996). After studying E-mail communications between East Asians and North American students, Ma found support for the hypotheses that both groups tend to be more direct and show greater self-disclosure in computer-mediated conversations than in FTF conversations and both groups are by communicating through media less likely to adapt to each other´s cultural rules than FTF communication. The latter is

based on the reasoning that the concept of „stranger“, which characterizes FTF intercultural communication situations and also implies that there is a host/guest distinction does not apply. Either all are „strangers“ or none is a „stranger“. They are not bound by any particular set of cultural rules.
However, these assumption can be questioned with the argument that knowing the place or culture of communication partner could still have an impact on communication behaviour in computer-mediated communication environment. Thus, I suppose that

- *Intercultural computer-mediated communication between two culturally different groups in one society will differ from communication between the same groups in another society (hypothesis 1); and*

- *Chosen language can have an impact on the relationship between high and low-status members in a group, because different languages offer different way to express relationships (hypothesis 2).*

The test of these hypotheses that have not been considered in the intercultural computer-mediated communication thus far, could inform us about the interaction between technology, language, culture, as well as the place of communication.

4. Conclusion

These research results confirm that technology and culture and their interaction indeed have an impact on group processes and their outcome. They also confirm that the extent of the impact is quite different depending on the culture that dictates the norms under which a group operates.
These results have implications for both GSS developers and researchers. For developers and designers of GSS technology, they provide impetus for incorporating cultural factors into existing GSS applications. For researcher, they signal the need to identify further cultural factors that might potentially hinder implementation of these systems in culturally different settings. A challenge to managers implementing GSS, for example, in high-power distance and collectivist cultures is to reduce the barriers. As Robichaux and Cooper (1998) discussed, if ideas are desired from low-power members specifically, meetings of only low-power members could be held to reduce dispensive free riding. Since members may withhold comments or ideas that oppose those of others to avoid conflict, managers could have members initially generate but not exchange ideas. This may reduce the knowledge that members have of one another’s ideas and thus reduce instances of their witholding ideas that they feel are in conflict.
However, these studies have some limitations, thus, implications drawn from this research should be viewed with caution. First, research findings are inconsistent concerning the effects of a GSS. This is not surprising because many of the cited studies differ on a variety of important factors. Some studies suggest that a GSS may increase group consensus, some studies report no change. Second, most studies are based only on general features of culture and on the „either-or“ assumption of the bipolar model which has been challenged by a coexistence model of individualism and collectivism. Third, the studies have some experimental limitations. Some of them are based on empirical data which „were not collected

under experimentally controlled conditions“ (Ma 1996, 184). Others used only a small sample size for the study and did not test hypotheses on different group support systems (Daily et al. 1996, 287). Different features provided by different GSS may affect group interactions to greater or lesser degree than the systems they used. Some of them did not measure cultural dimensions (Straub et al. 1997, Ma 1996). Thus, it is not possible to say with certainty that a link between cultural factors and technology has been empirically established. The propositions generated by Robichaux and Cooper (1998), but not tested empirically, should be viewed as highly tentative, and regarded as opportunities for further theoretical and empirical investigation.

Further research is needed, especially concerning the cooperation and communication of diverse groups. Designing modern communication systems that will help people overcome the cultural barriers to communication and cooperation is not only a linguistical and sociological issue, but also a philosophical one, as discussed in (Yetim 1998), because global communication systems require to some extent the establishment of communication and cooperation norms for common orientation of participants to solve common problems and work on shared tasks. Therefore, the question is whose norm?

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