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The Effects of Group Development on the Utilization of Video Channel and Decision Quality of Distributed Decision-Making Groups

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Introduction and Research Questions

The purpose of this research is to investigate the impact and efficacy of video communication channel relative to audio channel and face-to-face communication for ad hoc and intact groups in distributed decision-making environments.

During the past decade, we have experienced an explosive diffusion of IT, specifically designed to enhance group productivity (e.g., McGrath & Hollingshead, 1994). There is a mounting evidence that these new ITs can enhance the efficiency and effectiveness of groups (e.g., Nunamaker et al. 1989). One of most recent addition to this list is the Desktop Videoconferencing System (DVS). This research examines the effects of video communication channel on the performance and perceptions of decision-making groups in distributed environments interacting through DVS.

Specific questions to be addressed in the study are:

1. Do different communication modalities (face-to-face, video-and-audio, and audio only) influence group performance and satisfaction while performing information-sharing and negotiation tasks?
2. Does group development (intact vs. ad hoc groups) influence group performance and satisfaction while performing information-sharing and negotiation tasks?
3. Does group development (intact vs. ad hoc groups) influence group members' channel perceptions and appropriation patterns?

To evaluate these questions, several research hypotheses were formulated based on *Communication Channel Appropriation Model* (CAM) driven from *Adaptive Structuration Theory* (AST) originally developed by DeSanctis and Poole (1994; Poole & DeSanctis, 1990).

Theoretical Foundation

AST stresses the importance of group interaction processes, both in determining group outcomes and in mediating the effects of any given technology. It argues that ITs are social technology which groups may appropriate the technology either *faithfully* - in keeping with the structures intended by designers - or, *unfaithfully* - defeating the structures as intended by the designers. When faithfully appropriated, technology can bring in positive outcomes that designers intended. However, when unfaithfully appropriated, the outcomes cannot be predicted.

DeSanctis and Poole (1994) argue that appropriation approach is particularly useful to analyze the impact of advanced information technology since most systems are really "sets of loosely bundled capabilities and can be implemented in many different ways". This is particularly true when it comes to many emerging communication media. Griffith and Northcraft (1994) and Rice (1984) noted that a communication *medium* can be thought of as a constellation of communication *channels*. Most emerging multimedia communication media such as DVS can be thought of as loosely bundled channels that can be appropriated in many different ways. For instance, DVS is a communication medium that has video, audio, and shared textual channels. Unlike a simple telephone which enforces a certain communication channel (audio), such advanced communication tools don't reveal one particular way of using themselves to users. People can selectively focus on one particular feature (channel) at one point of time. This necessitates the

communication channel appropriation approach. The approach taken in this study represents a significant departure from that of the previous studies in small group communication media in which the communication medium, not the channel, was the primary unit of analysis.

Building on the work of DeSanctis and Poole (1994), I propose the term *communication channel appropriation process* to focus on a group's appropriation of communication channels. Communication channel appropriation is defined as the manner of a group's interaction process via a given communication channel under given technologies, contextual, and individual restrictions.

Space precludes a full description of the model, but briefly stated, the CAM builds on the premises that 1) communication media consist of a set of loosely bundled communication channels, 2) outcomes of group communication process will be mediated by the communication channel appropriation process, 3) group members are not *passively* utilizing the communication channels, but *actively* appropriating them based on their perception of the channels, 4) and group members' perceptions of channels are determined by technical characteristics of the media and other contextual variables including group, individual and task characteristics.

More specifically, based on group development literature (e.g., McGrath, 1991), CAM posits that individual's perception of communication channel will defer not only based on the mechanical characteristics of the medium as proposed by media richness theory (Daft & Lengel, 1984) but also based on various contextual variables including group development status. According to group development literature, groups will go through initial developmental stage focusing on issues of socialization, confrontation, and power, through which they develop their own identity. Once established, however, groups routinize the way working together, which reduces the level of inter-group coordination and information exchange required.

Driven from these theories, the following predictions are made regarding the video channel appropriation in DVS environments. First, members of intact groups are expected to perceive the same channel as a richer one than those of ad hoc groups. Intact group members who have already routinized ways to communicate and established interaction protocols, which reduces the ambiguity of their communication and increases the mutual understandings and information richness of a given channel, would perceive a lean channel - based on its mechanical characteristics - as a rich one.

Second, recent group development literature (McGrath, 1991) argues that groups engage in both socio-emotional and task-oriented behaviors that can operate simultaneously during group interactions. Further, members of ad hoc groups who are in their early developmental stage will likely need to spend a large amount of time in interacting with each other to develop rapport among themselves. They will also likely have to spend a significant amount of time in establishing task-related norms, roles and individual activity levels while trying to accomplish the goal (Dennis & Valacich, 1994). On the other hand, intact groups can reapply their established norms to the current task, if the environmental factors haven't changed (McGrath et al., 1993). Media richness theory suggests that rich media are likely to be preferred for such socio-emotional behaviors as group norm establishment and socialization.

Taken together, it is argued that groups' channel perception will differ based on their developmental stages. More specifically, it is hypothesized:

H1: Intact groups will perceive FtF to be richer than VA and AO.

H2: Ad hoc groups will perceive FtF and VA to be richer than AO.

H3: Ad hoc groups will perceive VA richer than intact groups do.

H4: Intact groups will perceive AO richer than ad hoc groups do.

Finally, CAM argues that group performance will be mediated by channel appropriation process. It posits that once the group members develop common perceptions of the channels, they will decide which channels to utilize with the consideration of the tasks that they have to process. Dennis and Valacich (1994) note that regardless of task type, groups and individuals within them show two micro-level communication behaviors: conveyance and convergence. The goal of conveyance is the exchange of information among the participants while that of convergence is the development of a shared meaning among group members. They argue that both conveyance and convergence are important for both equivocal and uncertain tasks. It is argued here that when a group is performing an uncertain task, conveyance mode will be predominant, while convergence mode will prevail when a group is performing an equivocal task.

Drawing upon existing literature (Daft & Lengel, 1986; Dennis & Valacich, 1994; Valacich et al., 1995), therefore, CAM posits that groups who show faithful channel appropriation pattern will have positive outcomes. More specifically, groups are expected to have positive outcomes when they utilize channels *commonly perceived* as lean by group members to perform conveyance-intensive tasks such as idea generation and information-sharing tasks. It further assumes that groups will show positive outcomes when they utilize channels *commonly perceived* as rich by group members to perform convergence-intensive task such as negotiation and preference tasks. Unlike media richness theory, it is group members' shared perception, not mechanical characteristics of channels, which is the basis of channel utilization decisions.

H5: Groups utilizing lean channels will outperform groups utilizing rich channels for conveyance-intensive task.

H6: Groups utilizing rich channels will outperform groups utilizing lean channels for convergence-intensive task.

Research Design

To empirically test the research questions, this study utilizes two distinct studies, a controlled laboratory experiment and a longitudinal field study.

The controlled laboratory experiment utilized a 2 x 3 factorial design which provides a means for comparing 1) ad hoc with intact groups and 2) FtF, VA, and AO. Two tasks, one conveyance-intensive and one convergence-intensive, were presented to the three person groups. The order in which each group received the tasks were balanced across all of the subject groups. Subject to the completion of pilot testing, 12 groups per treatment were assessed to provide adequate statistical power for hypothesis testing. Data collection for the controlled experiment was completed in December, 1995.

The longitudinal field study was conducted to complement the controlled laboratory experiment. Fifty-seven MBA students from two major state universities in United States participated in the field study. The subjects were divided up into fourteen, four-person teams, each consisting of two dyads representing one of the two universities. Each team completed a group task involving an analysis of business case which had two different versions containing common as well as unique information. E-mail and DVS were used for a communication among student teams for the project. An eight-item perceived media richness scale developed by Burgeon and Hale (1987) was used to measure the perceived media richness of e-mail and DVS. Data collection for the longitudinal field study was also completed in December, 1995.

Expected Contributions

By combining a controlled laboratory experiment and a field study, this study can provide unique contributions to IS field. The study may yield no differences between the group history treatments. Such a finding would suggest that the group history is not mediating the perception of channel and that communication technology can be used without considering group standing. The study may also yield no differences between the channel treatments regarding effectiveness of communications. Such a finding

would suggest that audio channel is as effective as video channel and that groups can effectively communicate without extra cost for video channel. Alternatively, one treatment may emerge as the most effective way for improving group outcomes via faithful appropriation of communication channels. Each potential finding will contribute to both theory and practice. For example, future DVS and small group media research will be able to build on the fact that group development is a very important mediating variable for communication effectiveness. Developers and consumers of DVS will be able to use the findings of this study to guide more efficient allocation of future development and communication support expenditures.

Selected References

Daft, R. L., and Lengel, R. H. 1984. Information Richness: A New Approach to managerial behavior and organizational design. *Research in Organizational Behavior*. 6. 191-233.

Dennis, A. R., and Valacich, J. S. 1994. Rethinking Media Richness: Towards a Theory of Media Synchronicity. Working Paper. University of Georgia.

DeSanctis, G., and Poole, M.S. 1994. Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organization Science*. 5:2. 121-147.

Fulk, J. Schmitz, J., and Steinfield, C.W. 1990. A Social Influence Model of Technology use. in J. Fulk & C. Steinfield (Eds.), *Organizations and Communication Technology*. 117-140. Beverly Hills, CA:Sage.

McGrath, J.E. (1991). Time, Interaction, and Performance (TIP): A Theory of Groups, *Small Group Research*. 22:2. 147-174.

McGrath, J. E. and Hollingshead, A. B. 1993. *Groups Interacting with Technology*. Newbury, CA: Sage.

McGrath, J. E., Arrow, H. Gruenfeld, D. H., Hollingshead, A. B., and O'Connor, K. M. 1993. Groups, tasks, and technology: The effects of experience and change. *Small Group Research*. 24:. 406-420.

Poole, M.S. and DeSanctis, G. R. 1990. Understanding the Use of Group Decision Support Systems: The Theory of Adaptive Structuration, in J.Fulk, & C. Steinfield (Eds.), *Organizations and Communication Technology*. 173-193. Beverly Hills, CA: Sage.

Valacich, J. S., Wheeler, B.C., Mennecke, B.E., and Wathcer, R. M. 1995. Uncovering limitation to media richness theory: The effects of varying media and tasks on user perception and task performance. *Organizational Behavior and Human Decision Process*.