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THE EFFECTS OF RESTRICTIVENESS AND PREFERENCE FOR PROCEDURAL ORDER ON THE APPROPRIATION OF GROUP DECISION HEURISTICS IN A GSS ENVIRONMENT

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ABSTRACT

This research examines two research questions. First, does restrictiveness (i.e., the manner in which use of group resources is limited or channeled) (Silver 1988, 1990; DeSanctis et al. 1989) influence group performance and member perceptions as measured by decision quality and satisfaction? Second, does the composition of a GSS supported group in terms of individual preference for procedural order (PPO) (Putnam 1979) influence group performance and member perceptions?

This research tests and extends the Adaptive Structuration Theory (AST) (Poole and DeSanctis 1990). AST argues that GSSs are a social technology through which groups may choose to faithfully or ironically appropriate GSS structures. The PPO construct was also examined in this research. The PPO construct suggests that individuals enter group work with predispositions for particular work habits. For instance, *High Procedural Order* (HPO) individuals prefer planned, sequential patterns of organizing task activities and will seek to structure activities by sending procedural messages while *Low Procedural Order* (LPO) individuals send fewer procedural messages and prefer a cyclical ordering of activities. We suggest that a group member's PPO may be an important source of contextual structures for the appropriation processes described by AST.

A laboratory experiment was conducted to evaluate the impacts of GSS- and facilitator-based restrictiveness on group processes and outcomes. The independent variables in this study were restrictiveness and the group's PPO composition. Twenty-eight 5-member groups composed entirely of all HPO individuals (fourteen groups) or all LPO individuals (fourteen groups) were randomly assigned to either a restrictive or nonrestrictive treatment. The restrictive treatment was operationalized by activating three sources of restrictiveness: user-based training, facilitator-based process guidance, and GSS-based (via a level-2 GSS — VisionQuest™). The nonrestrictive treatment did not specifically impose any form of restrictiveness. The comprehensive heuristic was a modification of Dewey's (1910) reflective thinking process. The $OB Policy Task, a hidden profile task (Stasser 1992), was developed and used for this experiment. This task is designed so that information from all members is essential for identifying the dominant problems and for finding a jointly acceptable solution.

In terms of decision quality, an ANOVA found no significant difference between groups in each of the treatment conditions; however, the trends in the data are suggestive and imply that LPO groups in the non-restrictive condition tend to produce better quality solutions ($F = 1.594$, $p = 0.219$). Further, a one-way analysis for groups in the non-restrictive condition across the PPO dimension approached significance ($F = 3.0846$; $p = 0.105$) and suggests that groups composed of LPO members performed this task better than groups composed of HPO members. Results for satisfaction (Green and Taber 1980) indicate that HPO group members reported greater participation in the discussion ($F = 12.27$, $p = 0.001$), that they were more satisfied with their group's solution ($F = 10.94$, $p = 0.001$), and that they were also more satisfied with the process than were LPO members ($F = 6.61$, $p = 0.011$). No significant difference was identified for participation in terms of the restrictiveness treatment; however, groups in the restrictive condition were more satisfied with the solution ($F = 5.78$, $p = 0.018$) and with the process ($F = 6.43$, $p = 0.012$). In terms of qualitative results, the facilitators noted that groups in the non-restrictive treatment generally could not or chose not to appropriate the heuristic. Even when groups requested the GSS tool specified by the heuristic, they often misappropriated the heuristic or the GSS.

These preliminary results are intriguing and suggest that PPO is a useful construct for understanding how group members appropriate and react to GSS technology and structured heuristics. A better understanding of the intricacies and differences in this appropriation process in the various conditions will be gained through a detailed examination of the decision-making process adopted by each group.

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EXEMPLAR: IMPROVING THE COLLEGE CLASSROOM WITH GROUP SUPPORT TECHNOLOGY

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ABSTRACT

Developments in learning theory and computerized group support offer the prospect of improving the quality of classroom interactions.

Research Questions. Will the use of group support technology increase student interest and participation in classroom activities? Will student problem-solving skills and grasp of course materials increase from using group support technology in the classroom?

Theoretical Foundations. Cognitive learning theory posits that people solve problems by developing mental models of a domain and applying these models to the problem at hand (Rumelhart 1980). Learning, then, is a process of building, testing, and refining these models until they are reliable for solving new problems (Shuell 1986). Given this view of learning, it is possible to demonstrate that the frequency and immediacy of feedback, cooperative learning, and well-structured exposition should enhance the learning process. The traditional classroom is hampered by limited ways to represent complex ideas, and limited access to communication channels resulting in limited opportunities for students to test their evolving mental models.

Research methodologies. In the Exemplar project, we are developing a suite of group support tools and techniques intended to maximize student opportunities to exercise their mental models. The Exemplar classroom has a networked workstation for each student. The software has three main parts. Q&A permits all students to answer classroom questions simultaneously and anonymously. The instructor can give immediate feedback. SynThesis lets all students participate simultaneously and anonymously in on-line discussions of complex issues. They give and receive feedback and engage in helping behaviors. Exposition is a hyperlinked environment that gives the instructor a flexible way to prepare and present lecture materials and control other Exemplar tools.

We conducted a two-treatment post-test-only experiment with 140 subjects to see whether students using Exemplar would exhibit the kinds of behaviors that cognitive learning theory predicts should lead to improved performance .

Challenges. Student participation and interest were fairly easy to measure, but with a single exposure to the technology it was not possible to rule out a Hawthorne effect for these constructs. Student grasp of course material was more difficult to measure. Traditional testing instruments typically test retention of facts and perhaps relationships between facts. However, we wanted to measure how well students could reason, from facts to a solution for an unfamiliar problem. Task and instrument development were therefore an ongoing challenge. We identified some minor flaws in classroom dynamics that resulted from limitations of the Exemplar tools which are now being corrected in anticipation of a new round of studies.

Preliminary Results. Students using Exemplar were more interested in both the lecture and the subject matter of the lecture. Exemplar students participated in classroom interactions much more fully and their contributions were of much higher quality. We did not find a statistically significant difference in student performance on a post-session quiz. We suspect that once the tools are refined and are used in a longitudinal study we will see the expected cognitive gains.