Introduction to Special Section on GDSS

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Introduction

Organizations are undergoing radical changes in both their use of technology and their basic practices. We can expect that these changes will accelerate as the pressures continue to grow. Managers are faced with radical restructuring initiatives to support the downsizing, downscaling, and delayering of objectives. The growth of interfunctional teams and often cross-organizational teams is leading to further initiatives in the establishment of "groups" and cooperative clusters of both short and long term duration. Integration within and across the organizational boundaries is further stimulating interest in leveraging information technologies to enable and support work of groups and teams. Whether these are teams with a specific mission, standing committees that have a regular or recurring work schedule, or specially assembled groups that will have little cooperation beyond the current task at hand, each has different interests in applying information technologies to support these meetings and other group work.

Objectives and reviewing process

It is the purpose of this special section to examine several research projects on group decision support systems (GDSS). Research on organizational decision making, cooperative work, and information systems support for individual and group decision making are frequent themes in research programs in both university and industry settings. This overview provides the reader with some of our observations in assembling this collection of articles.

The initial intent was to develop a special issue of the *MIS Quarterly* dedicated to this theme: to collect eight or nine papers that would form an overview of the research and practice in the area of GDSS. In all, 25 articles were submitted to the special issue. Few described actual use of GDSS in organizations. Indeed, for the most part they reflected work going on in various university environments. Each article was sent out to three reviewers. We, as editors, evaluated the results. Through the first round of reviews, four articles stood out as requiring only minor revisions. Several other articles were returned to the authors with requests for rewrite and resubmission through the regular tracks of the journal. Two others were deemed worthy of consideration, but did not fit the theme of the special issue. These articles were returned with their reviews to the authors with encouragement to resubmit through the regular review process of the journal.

It was decided that rather than delay the publication of a full issue of GDSS articles on the chance that revisions would be forthcoming, a timely presentation of a subset of the articles to reflect some of the ongoing activities would be preferable. This would encourage submission of revised, as well as new work on GDSS. While the articles chosen do not address all of the critical research needs of the field, they describe current empirical and modelling work in GDSS.

It is clear that the activities that currently fall under the label of GDSS go beyond the initial scope of support for decision making by groups. Indeed, it is now clear that these technologies will quickly find their way into the basic infrastructure of the organization and become an integral part of its culture. Hence, we view these studies as reflections of the role of information technologies in the support of the work that groups perform in organizations.

Overview of articles

The article on the project at the University of Arizona gives us an historic glimpse at the evolution of a family of group decision environments. The work at Arizona began as an extension to the PLEXSYS project, which focuses on the use of information technology in strategic planning, requirements deter-

mination for large scale systems, and the computer-aided design and implementation of information systems. The project illustrates the directions that might be pursued when workstation design technologists apply their knowledge to the work of groups. It also serves to illustrate the transfer of knowledge from the academic laboratory to the industry work environment and briefly discusses some of the issues in the design of practical technology architectures.

The study by Jarvenpaa, Rao, and Huber reports on a field experiment conducted by researchers of the University of Texas, Austin, with the support and cooperation of MCC at its premises. The study contrasted two types of support technology — networked personal stations and an electronic blackboard (a public view surface incorporating a free-hand drawing tool and a list-making tool) — to a conventional pencil and paper communication approach for face-to-face group meetings. The results are interesting in that they show the electronic blackboard support technology to be a potentially promising one; the findings on the efficacy of the workstation technology were mixed. It is also noteworthy that factors other than those that were manipulated, such as differences between the groups studied and the quality of the interface to the technologies, strongly influenced the outcomes. The Jarvenpaa, et al., study plays an important role in moving the investigation of GDSS from the laboratory, where it has been examined to date, to the field, therefore providing data about the actual use of these technologies in organizations.

The study by Zigurs, Poole, and DeSanctis was conducted in a university laboratory setting. This work and that of Gallupe, et al. (see *MIS Quarterly*, June 1988) and Watson, et al. (see *MIS Quarterly*, September 1988) are part of an ongoing GDSS research program of the University of Minnesota; all three are based on doctoral thesis work at Minnesota over the last three years. What is most interesting in the Zigurs, et al., paper is the focus on the interaction process between the group members rather than solely on outcomes of group decision making. Unlike the works by Gallupe and Watson where process tracing data was presented in an anecdotal/qualitative manner, in the Zigurs study it plays a central role in hypothesis testing. The constructs, measurement methods, and coding schemes developed by Zigurs, et al., would be valuable to other researchers interested in pursuing process tracing research in the GDSS context.

The article by Liang presents a framework for the extension of principles of model management into the group decision environments. Liang examines the essential model management capabilities that can be made available in the distributed decision-making environment. The article also examines the few projects to date that have resulted in the delivery of model management capabilities in the group decision environment.

Recommendations for future work

From a review of the submitted literature, it is clear that there is much work to be done. Few projects have resulted in practical conclusions that (1) update the previous theories on how groups work, (2) contribute to the architecture of commercial GDSS environments and the promotion of cooperative work architectures outside of the laboratory environments, and (3) offer a clear taxonomy for the kinds of meetings and group work that can benefit from the application of information technologies.

Where is the best leverage for information technologies in the support of cooperative decision making? What levels of the organization should be involved? Which composition of technologies is affordable and beneficial at what levels of the organization? When is it beneficial to transcend the traditional organizational hierarchies? How should the GDSS architecture relate to the traditional information technology architecture in the organization? How will these systems impact work now and in the future? Will roles and responsibilities change in the short run? How will they change in the long run? What is the cost of establishing such structures?

While the focus of most of these efforts to date have been on face-to-face decision-making activities, most projects recognize the need to accommodate groups that are both geographically and temporally distributed. Future organizational forms will account for direct work by teams and groups that assemble to conduct business and dissolve when the work is concluded. There will clearly be more work by groups that are cross organizational and cross functional. We can expect that these environments will involve a significant amount of work that involves people distributed by geography and time.

The Arizona experience, and to some extent the joint work by the University of Texas and MCC, suggest how industry and universities can cooperate to develop and test technology and migrate that technology into the commercial environments as the technologies prove useful. They illustrate the opportunity for both academia and industry to benefit from such efforts.

In an age of redesign in which information technologies are used to break through traditional barriers of doing business, these cooperative work technologies offer significant promise. We believe that the articles in this special section offer some hints at the intellectual and practical progress that can be made in these areas.

It is clear that cooperative organizational structure will be the norm in the future. Cooperative activities will be both inside the organization and across the organizational boundaries. These issues are a part of organizational redesign. It is important that we seize the opportunity to facilitate the organizational restructuring that is happening and to enable the new organizational structures through the leverage of information technology resources.

The benefits lie in our facilitation of the communication interests in the organization. Will the new computer supported work environments enable new, positive forms of collaboration, or will they serve to set limits on cooperation and constrain progress in the growth of interfunctional and interorganization interchange?

It is probable that there are many forms of this interaction that could not exist without these information technologies offering new environments for small and large group interactions. New economies of scale in managing group activities are now affordable. Indeed, few would have predicted that groups larger than 40 could interact in the ways that are demonstrated in the Arizona laboratory environment.

We would like to thank the many reviewers and authors that participated in the submission, reviews, and, in some cases, second reviews of articles. We encourage authors to consider the review comments and submit revisions in order to enhance the dialogue on GDSS.