Group Decision Support Systems

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INTRODUCTION

Group decision support systems (GDSSs) which aim at increasing some of the benefits of collaboration and reducing the inherent losses are interactive information technology-based environments that support concerted and coordinated group efforts toward completion of joint tasks (Dennis, George, Jessup, Nunamaker, & Vogel, 1998). The term *group support systems* (GSSs) was coined at the start of the 1990's to replace the term GDSS. The reason for this is that the role of collaborative computing was expanded to more than just supporting decision making (Patrick & Garrick, 2006). For the avoidance of any ambiguities, the latter term shall be used in the discussion throughout this paper.

If we trace back, GDSSs are specialized model-oriented *decision support systems* (DSSs) or management decision systems that were born in the late 1960s. By the late 1970s, a number of researchers and companies had developed interactive information systems that used data and models to help managers analyze semi-structured problems. From those early days, it was recognized that DSSs could be designed to support decision makers at any level in an organization. DSSs could support operations, financial management, and strategic decision making.

BACKGROUND

In the early 1980s, academic researchers developed a new category of software to support group decision making. Execucom Systems developed *Mindsight,* the University of Arizona developed *GroupSystems*, and researchers at the University of Minnesota developed the *SAMM system (Power, 2003)*. These are all examples of early GDSSs. The increased need for GDSSs arises from the fact that decision making is often a group phenomenon, and therefore computer support for communication and the integration of multiple inputs in DSSs is required. The desire to use GDSSs therefore comes from the need of technological support for groups.

GDSSs are designed to remedy the dysfunctional properties of *decision*-making *groups*. These systems are becoming popular in aiding *decision* making in many organizational settings by combining the computer, communication, and *decision* technologies to improve the *decision*-making process. These systems use a key tool to improve the quality of *decisions made by a group*. This key tool is the anonymity of members of a *decision*-making *group*. The purpose of GDSSs is to maximize the benefits of group work, while minimizing the dysfunctions of group work. This maximization and minimization can be made possible by GDSSs mainly by two factors: anonymity and parallelism.

MAIN FOCUS

Strengths and Weaknesses of GDSSs

GDSSs provide a lot of support for communication, deliberation, and information flow especially for group activities that may be distributed geographically and temporarily. Group work has numerous benefits and advantages. First, groups are better at understanding problems and catching errors than individuals. Second, a group has more information than any one member which when combined can create new knowledge. Third, working in a group stimulates creativity and synergy. Finally, groups balance out the risk-tolerant and risk-averse. GDSSs offer many benefits. First, GDSSs support parallel information processing, parallel computer discussion, and generation of ideas. Second, they promote anonymity, which allows shy people to contribute and helps prevent aggressive individuals from driving the meeting. Finally, these systems help

keep the group on track and show the big picture. The two keywords here are parallelism and anonymity (Turban, Aronson, & Liang, 2005).

Some of the potential dysfunctions of group work are not automatically eliminated by GDSSs. First, as mentioned earlier, groupthink is where people begin to think alike and not tolerate new ideas. We can also include inappropriate influences, and free-riding. Second are the lack of coordination, excess time consumption, poor quality solutions, and nonproductive time. Third are the duplication of efforts, and high cost of meetings, including travel. Finally, information overload, concentration blocking, and group misrepresentation add to the potential dysfunctions of group work. Process dysfunctions are caused by structural characteristics of the group setting that could hinder a group from reaching its full potential. Process dysfunctions hinder productivity because of unequal participation or unequal air time; this happens in a setting where only one person can take control of the floor. This sort of dysfunction can be countered by the use of computerized exchanges because people may enter their comments and thoughts simultaneously. Power (2003) states that simultaneous expression of ideas may be beneficial for the quantity of ideas generated because of the computer's capacity for concurrency. Finally, process dysfunctions are usually caused by limitations in the structure and form of meetings.

Social dysfunctions, as Power (2003) describes, can hinder group productivity through undesirable social processes that occur in the group. For example, a group may limit the quality and quantity of input from any of its members by social processes such as evaluation apprehension, conformity pressures, free riding, social loafing, cognitive inertia, socializing, and domination due to status imbalance, groupthink, and incomplete analysis. These problems arise from processes present in all groups and are rooted in the ways in which group members change their behavior to adapt to the group. Finally, the prevalent analysis of group decision making is that social influences within the group lead the rational individual astray.

The view of GDSSs portrayed by Power (2003) is that they are text-based tools made with the purpose of remedying some problems of *decision* making in co-present *groups*. These *systems* claim to remove the social obstacles that prevent individuals from attaining their full potential in the *group*. Anonymity is central to achieving this full potential of individuals in a group.

Recent GDSSs Research Findings

Decision-making in an organization today has become more the work of some form of group. Whether this group is a board, team, or a unit, important issues can be at stake. It is fair to ask, given the possible problems that occur in a group setting: Would the group setting have a negative effect on the quality of decisions that have to be made by the group? Current research in this area suggests that GDSSs, if implemented and used correctly, can improve the quality of group decision making significantly by minimizing the negative effects of group decision making and by maximizing the benefits of group collaboration and decision making. Having come a long way since their inception, current and previous research efforts have made significant findings on the effects of the numerous criteria that affect the decision-making process in a group setting while using GDSSs. The results show that while the Internet has made it easier and less costly to use GDSSs than ever before, the social effects of group decision making can have a significant effect on the quality of decisions made in a group setting using GDSSs. By manipulating things such as visual cues, group versus individual-based incentives, anonymity, group size, feedback, leadership role, communication mode, type of tool used, social presence, face-to-face versus distant, shift work or non-shift work, the fit between facilitation style and agenda structure, and finally, a relationship versus a task focus, it is possible to significantly impact the quality off decisions made by a group using GDSSs.

According to Barkhi, Jacob, and Pirkul (2004), GDSSs are divided into two groups: distributed GDSS (DGDSS) and face-to-face GDSS (FGDSS). DGDSS groups consist of members who use a GDSS at the same time but at different places. On the other hand, FGDSS groups consist of members who use a GDSS at the same time and same place. The authors studied and compared the decision process and outcomes of groups that use FGDSS to those that use DGDSS. The results indicate communication mode, and incentive structure can influence the effects of each other. Therefore, the appropriate design of incentive structures may be important to the success of virtual organizations.

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