

History and Future Development of Group Support Systems

Ta-Tao Chuang

Gonzaga University, USA

Wayne W. Huang

Ohio University, USA

Yue “Jeff” Zhang

California State University, USA

INTRODUCTION

A group support system (GSS) is created with information technology (IT) and decision support techniques for assisting problem formulation and evaluation of alternative solutions in a group meeting (DeSanctis & Gallupe, 1987). The idea of GSS dated back to the 1970s; however, not until late 1980s did GSS take the form as we know it now. In 1987, two GSS systems were developed by researchers in different universities: Software Aided Meeting Management system at University of Minnesota, and GroupSystems at University of Arizona (Wagner, Wynne, & Mennecke, 1993). Since then, much research on GSS has been conducted and many organizations such as IBM, the Department of Defense, and the Internal Revenue Services, have used SAMM and GroupSystems in solving organizational problems.

GSS is an inter-disciplinary area that involves management sciences, organizational behavior, IT, and social psychology. The number of publications and presentations attests to the rapid pace of GSS research and development. As of mid-1998, more than 230 papers were published on the topic (Fjermestad & Hiltz, 1998 – 99). Major international conferences, such as ICIS, AMCIS, and HICSS, provide a GSS track on a regular basis. IBM's CEO claimed that groupware (a commercialized version of GSS) would be a direction of software development in the IT industry for the 21st century.

The rest of the chapter is organized as follows: First, the historical development of GSS research is presented. Next, relevant theories and findings of prior research are discussed. Current key issues are identified in section four. Then, future trends of GSS research are described. A recapitulation concludes this article.

DEVELOPMENT OF GSS RESEARCH

In the 1980s, researchers started to explore how computer, communication, and decision support technologies could be put together to improve group meetings. Those applications had been called Group Decision Support Systems, Electronic Meeting Systems, Computer Supported Cooperative Work, and Groupware. In 1993, the standardized term GSS was used to refer to the above-mentioned applications (Jessup & Valacich, 1993).

The GSS research has grown over six distinct phases (Dennis & Gallupe, 1993; Saunders, 2000). The first phase, “Roots,” was the early research into computer messaging and individual support systems in the 1970s and formed the basis for the GSS work. Phase two, called “Initial Explorations,” occurred during the early 1980s and focused on the impact of rudimentary GSS on group outcomes and processes. The third phase, from mid- to late-1980s, was known as the “Early Experiments”. A series of experimental studies was conducted to compare groups supported by a GSS with unsupported groups. The fourth phase, from late 1980s to mid 1993, was called “Field Studies.” Research focus was on the use of GSS technology in organizational settings and on the impact of GSS on organizations. Phase five, the “In-Depth Studies,” started in mid-1993. In 1993, a group of researchers summarized lessons and experiences of the first decade GSS research in the book “Group Support Systems: New Perspective” (Jessup & Valacich, 1993). This book summarized studies on technical, behavioral, organizational, and social psychological aspects of GSS uses. One major conclusion from the review of the research was that while promising, the effect of GSS was mixed due to such factors as research settings, technologies employed, and group characteristics. This phase featured two developments

Table 1. Theories relevant to GSS

	Theories	Main thesis
Decision Theorist School	Media-Richness Theory (Daft & Lengel, 1986)	• The task performance depends on the extent to which the information richness requirement of the task matches the richness of the media used by the group.
	Task-Medium Fitness Theory (McGrath & Hollingshead, 1993)	• The optimal richness for each type of task is unique and the task performance depends on the extent to which the task fits the communication environment
	Information Exchange Theory (DeSanctis & Gallupe, 1987)	• A GSS may change the process of interpersonal information exchange and thus change the task performance.
	Task/Technology Fit Theory (Zigurs & Buckland, 1998)	• The task performance depends on the ideal fit between complexity level of the task and the GSS elements.
Institutionalist school	Social Information Processing Theory (Fulk, Schmitz, & Steinfield, 1990)	• Media characteristics as well as the attitude, statements, and behaviors of co-workers influence relational developmental perceptions.
	Information Technology Intervention Framework (Clapper & McLean, 1990)	• Group outcome depends on the informational and normative influence processes operating within the group
	Time, Interaction, and Performance (McGrath, 1991).	• Group processes are not necessarily linear or sequential process. The difficulty level of the task may force the group shift gear from one mode to another; thus, a richer medium required.
	Adaptive Structuration Theory (DeSanctis & Poole, 1994)	• Group outcomes are the results of group's attitude toward the technology and faithfulness of appropriation of social structures of the technology in the context of its use.

that responded to the above conclusion: First, more sophisticated research design was employed to examine particular aspects of GSS applications. Second, attempts were made to propose theories to explain the disparities in findings.

Furthermore, since mid-1990s, web technologies provide new opportunities for the deployment of GSS. The evolution of GSS research thus entered its sixth phase, being labeled as "New Frontier of GSS Research," which can be characterized by two main trends: First, the two developments in phase five continue (Chidambaram, Bostrom, & Wynne, 1990-91; Dennis, Wixom, & Vandenberg, 2001). Second, GSS research extends to the design of web-based GSS (Wheeler, Dennis, & Press, 1999), e-collaboration/collaborative commerce (Burke, 2001-02; Johnson & Whang, 2002; Chuang & Nakatani, 2004), and virtual teams (Saunders, 2000). These trends are shaping the future of GSS research.

MAJOR THEORIES ON GSS AND PRIOR RESEARCH FINDINGS

The review of first decade GSS research showed that there were no conclusive findings in prior research (Pinsonneault & Kraemer, 1990; Gray, Vogel, & Beauclair, 1990; Nunamaker, Dennis, Valacchi, Vogel, & George, 1993). Although the inconsistency could be attributed to the difference in technologies or research methods employed, many researchers attempted to explain the disparity with theories. Those theories can roughly be classified into two schools: decision theorist school and institutionalist school (Dennis, Wixom, & Vandenberg, 2001). The deci-

sion theorist school holds the view that the decision quality can be improved with aides of techniques or tools. In this sense, GSS is considered as an instrument that is capable of assisting decision makers to manage the complexity of decision. In contrast, the institutionalist school considers GSS as an opportunity for organizational change. The provision of GSS to a group of people engaged in teamwork does not necessarily improve the quality of group task. Instead, it is the way the technology is used that may help improve task quality. Theories in these two schools and their theses are summarized in Table 1.

While early research placed emphasis on the effect of GSS, lately, much research has been done to validate the theories. The effects of independent and intervening variables on group processes and outcomes are examined. Fjermestad & Hiltz (1998-99) presented a classification scheme of constructs that were studied in 200 experiments. The key factors in the scheme are shown Table 2.

Although numerous studies have been done, there are more unanswered questions than answered (Briggs, Nunamaker & Sprague, 1997-98). This section discusses critical issues of GSS in three areas: Traditional GSS, emerging technologies, and virtual team and e-collaboration (Table 3). First, many issues in traditional GSS need to be addressed. Those issues are either theoretical or methodological. A critical one is to validate and compare competing theories (Table 1). Also, recent research (Dennis, Wixom & Vandenberg, 2001) shows that an integrated approach might be more explanatory than a single theory from either the decision theorist school or the institutionalist school alone. Thus, what and how to integrate as a research foundation is another issue. Methodological

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