December 1998

Investigating the Impact of GSS Support on the Process Quality and Outcomes of a Group Meeting

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Abstract

Post-experimental surveys were collected based on a longitudinal quasi-experiment that compared manual and GSS-supported meetings. Then, a path analysis based on the structural equation model was conducted to confirm theoretical explanations of GSS effectiveness. It was found that GSS, indeed, could become a powerful tool that can facilitate increased quality of meeting processes and outcomes.

Introduction

A new form of meeting environment, group support systems (GSS), has been actively studied as a way to make group meetings more productive. GSS is an innovation to create the most desirable meeting conditions by removing the inherent limitations of manual meetings in terms of group dynamics and outputs. GSS empowered by information technologies provides fundamentally different environment from traditional meetings in that it can be flexibly designed to support meetings through multi-dimensional mechanisms of communication, information service, and decision support. Existing theoretical studies indicate that effective appropriation of technological features of GSS increases process gains and decreases process losses during a meeting. Qualitative enhancement in the group dynamics, in turn, is expected to substantially affect the performance of a meeting as well. This study is intended to validate the procedural integrity of the theoretical studies.

Research Methodology

Theory

A number of theoretical studies suggested the positive role of GSS in enhancing the process and outcome of meetings. Such theoretical models include George et al's (1990) model based on the communication theory, Rao and Jarvenpaa's (1991) contingency model, and Nunamaker et al's (1991) conceptual framework. Despite slight differences, these studies suggested that GSS is a technological and contingency factor that can lead to synergic group efforts and effective outcomes. GSS was expected to lift communication barriers by eliminating evaluation apprehension and conformance pressure as well as by promoting learning, synergy, and equal participation (Kraemer and King, 1988, Valacich, et al., 1992).

Survey Development

A survey questionnaire with 31-items, 7-point Likert-scale was designed to measure perceptions regarding group interactions and participants' learning and satisfactions. Repetitive questions were used for a construct to render a statistical test on the internal consistency of the indicators and to enable further purification of data. The survey included major constructs that represented the quality of meeting dynamics and outcomes. Group cohesion, production blocking, evaluation apprehension, free riding, and sucker effects display the level of the process quality of a meeting. Learning and satisfaction are two constructs that represented meeting outcomes.

Data was collected from a quasi-experiment that spanned two consecutive semesters. Two student classes (23 and 20 respectively) of a MIS introductory course participated in the experiment through discussions of eight different ethical issues of MIS such as software privacy and database marketing. Survey was collected right after each of the eight discussion sessions (observation size = 316). See Reinig and Briggs (1998) for the procedural details of the experiments.

Results and Discussions

Validation of Factor Structure

High construct validity of survey items is a necessary condition for achieving the reliability of study results. Discrimination among the constructs was first tested based on the exploratory factor analysis of all items. Factor rotation with equamax indicated

that constructs except "evaluation apprehension" achieved high discriminating validity. Evaluation apprehension was therefore dropped from further considerations. Confirmatory factor analysis for each construct proved high convergence among the construct items as well. Cronbach's alpha ranged from 0.71 to 0.83. Based on the chosen constructs and corresponding question items, the path analysis was conducted.

Results of Analysis

A structural model that incorporated the selected constructs was developed based on the theoretical studies discussed (Figure 1). The model was designed to test the direct as well as mediating effect of media support (GSS) on the group performance in terms of participants' learning and meeting satisfaction. Although learning was regarded as a measure for a meeting effectiveness, it also can be a procedural factor that influences participants' satisfaction for a group meeting (Nunamaker et al, 1991). Therefore, relevant path from *learning* to *satisfaction* was added to study their causal relationship.

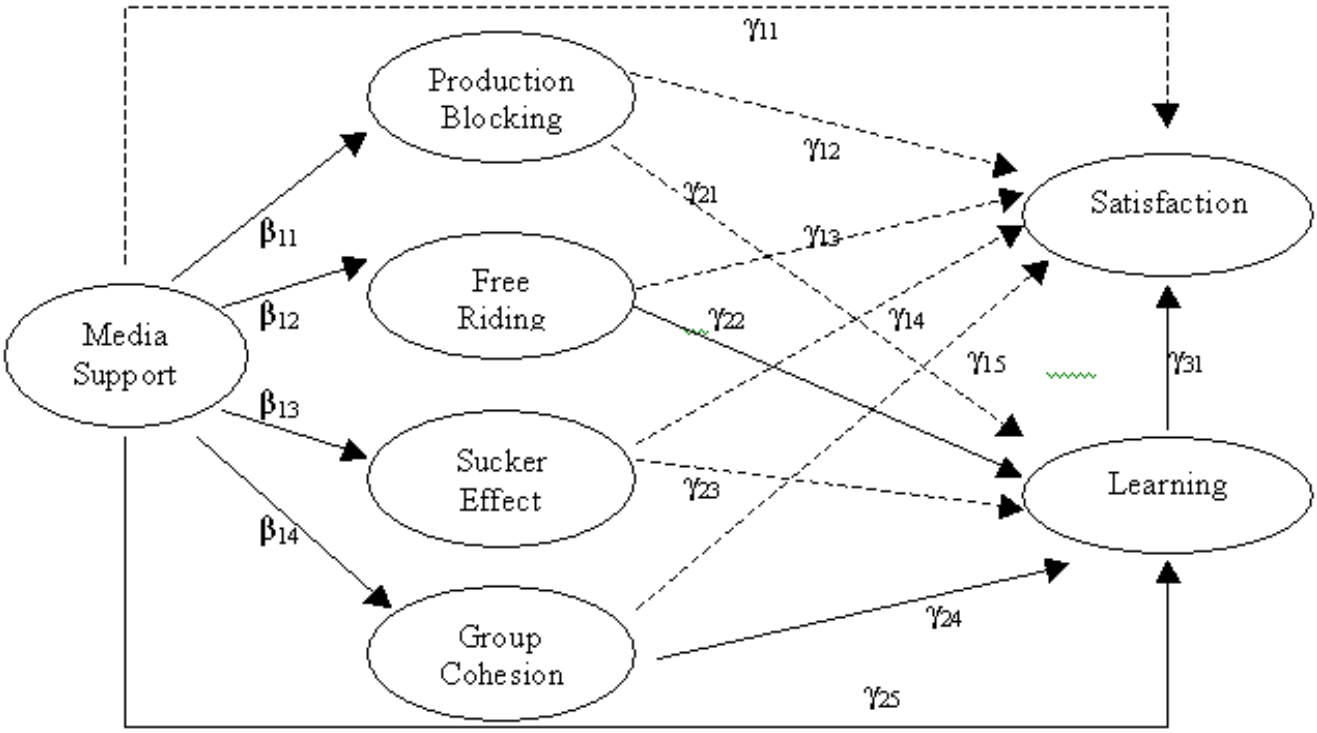

Figure 1. Structural Model to be Tested

The model was tested with EQS structural modeling tool. The solid lines in Figure 1 indicate significant paths. First of all, all indicator items pertaining to measurement models were highly significant. It was shown from the path coefficients that GSS support significantly reduced all process losses. It also increased group cohesion among participants (see Table 1). The large test statistics (t-values) indicated that the media support was especially effective in reducing production blocking and free riding during meetings. As the data was the result of repetitive measurements based on eight different tasks, this overall result rendered a strong indication that the GSS group consistently appropriated the media features in a positive fashion. Despite the provision of anonymity was frequently criticized for fostering free riding in GSS supported sessions, our study indicated sharply reduced free riding from participants. It appeared that the opportunity for equal participation enabled by the parallelism of GSS and anonymity had boosted mental efforts among meeting attendants.

Direct path from media support to participants' learning turned out negative and that on the meeting satisfaction was not statistically significant. Coefficients between process structures and outcomes (learning and satisfaction) partially supported early theoretical studies. Learning appears to be strongly affected by increased group cohesion and reduced free riding among participants. Furthermore, learning was the only factor that positively affected higher satisfaction. None of the other process variables significantly influenced the meeting satisfaction of participants. The result, in general, indicated that technology itself did not directly contribute to the formation of user perceptions on their learning or satisfaction. Rather the meeting outcomes were largely affected by the procedural structures formed during the appropriation of the GSS technology by participants.

Table 1. Path Coefficients of the Structural Model

Interaction between	Symbol	Est.	S.E.	t-value
Media support & production blocking	β_{11}	-2.319	.276	-9.396*
Media support & free riding	β_{12}	-3.592	.431	-8.331*
Media support & sucker effect	β_{13}	-.988	.284	-3.477*
Media support & group cohesion	β_{14}	.959	.220	4.366*
Media support & satisfaction	γ_{11}	3.831	3.10	1.236
Production blocking & satisfaction	γ_{12*}	420	.320	1.313
Free riding & satisfaction	γ_{13}	.535	.571	.937
Sucker effect & satisfaction	γ_{14}	.034	.050	.674
Group cohesion & satisfaction	γ_{15}	.219	.254	.861
Production blocking & learning	γ_{21}	-.373	.299	-1.248
Free riding & learning	γ_{22}	-.976	.415	-2.353*
Sucker effect & learning	γ_{23}	-.023	.063	-362
Group cohesion & learning	γ_{24*}	709	.116	6.109*
Media support & learning	γ_{25}	-4.797	2.31	-2.075
Learning & satisfaction	γ_{31}	.631	.311	2.029*

Conclusions

This study attempted to understand the process dynamics facilitated by GSS support. Although the data analysis did not fully support all theoretical explanations of GSS impact, its potential in improving meeting effectiveness was clearly revealed. GSS was especially instrumental in reducing bottlenecks of manual meetings such as production blocking, free riding and sucker effect, and promoting the cohesion among participants. However, the improvement of procedural quality was not necessarily channeled to increased meeting satisfaction. It was shown that the procedural effectiveness (especially increased group cohesion and reduced free riding) benefited meeting participants through enhanced learning, which in turn raised the their satisfaction for the meeting. Media (GSS) effect was not directly related with attendants' satisfaction. The estimation of the structural model indicated that meeting performance was rather the consequence of meeting quality that appropriated the features of information technology than the effect of the technology itself. This analysis seems to provide a clue on why prior attempts to decide the impact of GSS support from deterministic perspective without considering the group dynamics have resulted in the lack of consensus.

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