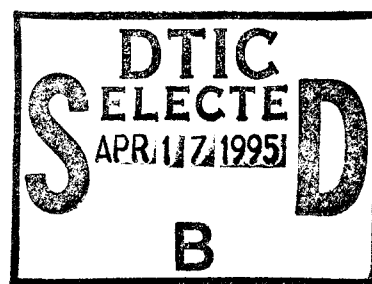


NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA



THESIS

IMPLEMENTING A GROUP DECISION
SUPPORT SYSTEM AT
MARINE CORPS BASE, CAMP PENDLETON

by

David W. Maxwell

December, 1994

Thesis Advisor:

Nancy Roberts

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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
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1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE December 1994		3. REPORT TYPE AND DATES COVERED Master's Thesis
4. TITLE AND SUBTITLE IMPLEMENTING A GROUP DECISION SUPPORT SYSTEM AT MARINE CORPS BASE, CAMP PENDLETON			5. FUNDING NUMBERS AA 1741804.11M0	
6. AUTHOR(S) Maxwell, David. W.				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Total Quality Leadership Office, Headquarters Marine Corps, Washington, D.C. 20380			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words) Advocates maintain a Group Decision Support System (GDSS) creates an environment which enhances the group decision making process. There appear to be numerous areas where the Marine Corps might benefit from the use of GDSS. However, introducing GDSS into the Marine Corps' culture challenges traditional decision making processes. Using both qualitative and quantitative methods, this study evaluates factors which affected the implementation of a GDSS at MCB, Camp Pendleton. Interview and survey data revealed four: the new technology's purpose, organizational commitment, training, and system design. These four factors form the basis for a proposed model of software implementation. The research also evaluates perceived changes in the decision making process. These changes include: reduced meeting time requirements, increased group consensus, and improved decision quality. A preliminary assessment of the implementation efforts and the research indicates success in establishing this GDSS at MCB, Camp Pendleton. However, the environment at Camp Pendleton has changed and the true success of the implementation process remains to be fully tested.				
14. SUBJECT TERMS Group Decision Support Systems. Implementation, Electronic Meeting Systems.			15. NUMBER OF PAGES 172	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL	

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AT
MARINE CORPS BASE, CAMP PENDLETON

by

David W. Maxwell
Captain, United States Marine Corps
B.S., United States Naval Academy, 1988

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN SYSTEMS MANAGEMENT

from the

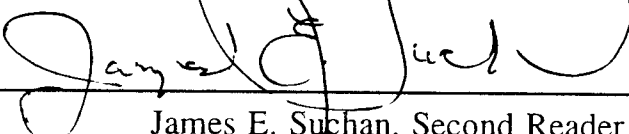
NAVAL POSTGRADUATE SCHOOL
December 1994

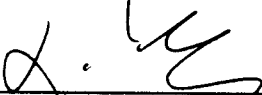
Author:


David W. Maxwell

Approved by:


Nancy Robers, Thesis Advisor


James E. Suchan, Second Reader


David R. Whipple, Chairman
Department of Systems Management

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ABSTRACT

Advocates maintain a Group Decision Support System (GDSS) creates an environment which enhances the group decision making process. There appear to be numerous areas where the Marine Corps might benefit from the use of GDSS. However, introducing GDSS into the Marine Corps' culture challenges traditional decision making processes.

Using both qualitative and quantitative methods, this study evaluates factors which affected the implementation of a GDSS at MCB, Camp Pendleton. Interview and survey data revealed four: the new technology's purpose, organizational commitment, training, and system design. These four factors form the basis for a proposed model of software implementation. The research also evaluates perceived changes in the decision making process. These changes include: reduced meeting time requirements, increased group consensus, and improved decision quality. A preliminary assessment of the implementation efforts and the research indicates success in establishing this GDSS at MCB, Camp Pendleton. However, the environment at Camp Pendleton has changed and the true success of the implementation process remains to be fully tested.

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ACKNOWLEDGEMENT

The author would like to acknowledge the support of the TQL Dept., Headquarters Marine Corps, for funding the travel required to complete this research. This work was performed under funding code AA 17441804.11MO.

The author wants to thank the TQL Coordinator and the Command Center staff at Marine Corps Base, Camp Pendleton, for their cooperation and assistance in conducting this study.

I. INTRODUCTION

Advocates believe a Group Decision Support System (GDSS) creates an environment that allows participants to conduct an effective meeting and that enhances the group decision-making process. Features such as anonymity, ready referencing, the ability to conduct synchronous face-to-face or dispersed on-going meetings, and the ability of the system to provide decision support based on models like CPM, PERT and Network Flows are designed to enhance the decision-making process and increase group consensus. There appear to be numerous areas where the Marine Corps might benefit from the use of GDSS, such as contracting and acquisition, long range budget forecasting, and developing decision alternatives.

A. THE MARINE CORPS AND GDSS

Recently, a GDSS has been introduced and used at a few Marine Corps units to assist commanders in evaluating various issues. In early 1993, Marine Corps Base (MCB), Camp Pendleton, purchased and began using GroupSystems V, a GDSS program. Manufactured by Ventana Corporation, GroupSystems V (GSV) is one of the most advanced GDSS programs commercially available. Other present users of GSV include HQMC, which in February, 1994, contracted to have the system installed at Marine Corps headquarters in Washington, D.C., and the Marine Corps Systems Command in Quantico, Virginia. Other Marine Corps units are considering purchasing GSV.

The implementation of GSV at MCB, Camp Pendleton is unique. Camp Pendleton was the first unit in the Marine Corps to install and use a GDSS. GSV operation and maintenance is supported entirely through internal MCB staffing (HQMC GSV administrator is a representative of a consulting agency specializing in GDSS). Camp Pendleton's system is the only

one presently configured to support remote users outside of the meeting room setting.

B. RESEARCH OBJECTIVE

Change literature and experience suggest that introducing any new, technical system into an organization risks distrust, animosity, and resistance to change. Research has demonstrated that the implementation of a new technology requires attention to organizational issues in addition to technical implementation. Bullen and Bennett state, "Groupware implementation is simultaneously a social and technical intervention" (Bullen and Bennett, 1992, p. 17). Walsham further emphasizes the importance of the social issues.

The technical implementation of computer-based IS (information systems) is clearly necessary, but is not sufficient to ensure organizational implementation... Organizational implementation involves a process of social change over the whole time extending from the system's initial conceptualization through to technical implementation and the post-implementation period. (Walsham, 1993, p. 223).

Introducing GDSS into the Marine Corps' culture challenges the organization's traditional styles of leadership and decision making. This thesis focuses on the implementation of a GDSS at Marine Corps Base, Camp Pendleton. The research addresses the organizational aspects of system introduction, user satisfaction with the system, and the changes in the decision making process that GDSS brings to a traditionally hierarchical organization.

C. RESEARCH QUESTIONS

To clarify the direction and establish the scope of the research, the following questions were addressed.

- What factors affected the implementation of the GDSS at Camp Pendleton?
- How has the implementation of a GDSS affected the decision making process at MCB, Camp Pendleton?

D. BENEFITS

The results of this research provide managers a model of critical factors which are believed to impact the implementation process. As Marine Corps units begin to install and use similar GDSS, the application of the model is particularly relevant. Additionally, in suggesting measures of implementation, the model provides a foundation for future research on the organizational aspects of software implementation.

E. SCOPE, LIMITATIONS AND ASSUMPTIONS

This study focuses on the implementation of the GDSS at Marine Corps Base, Camp Pendleton. Present users of GroupSystems V were interviewed to identify their level of satisfaction with a GDSS. Interviews also addressed the users' opinions on the value of GDSS in: maintaining anonymity, brainstorming, managing meetings, and achieving consensus.

The introduction and implementation of the GDSS to the command was documented through individual interviews. The financial aspects associated with the acquisition and operation of GroupSystems V were not considered to be within the scope of this analysis and were not evaluated.

Additionally, GSV can support dispersed meetings, which was not addressed in this study. This research limited the focus to GroupSystems V meetings conducted face- to-face in a meeting room.

F. METHODOLOGY

The research and collection of data for the thesis combine both quantitative and qualitative methods. The study began with a review of current literature for an overview of the current research in GDSS. It continued with the specific study of GroupSystems V to enhance understanding of the system's capabilities and limitations.

Research data were collected by three methods: personal interviews, meeting session observation, and post-session surveys.

Twenty interviews were conducted with service members and DoD civilians. Seventeen of these have used the program since inception. These individuals provided the historical data regarding the implementation process. Interviews continued with other users less experienced in using the system.

Concurrent with the interview process was the observation of actual meeting sessions. Three separate meeting sessions were observed.

Finally, surveys were conducted following five independent meetings with different participants in which GroupSystems V was used. A total of 53 individuals responded to a combination of multiple choice and open-ended questions.

G. ORGANIZATION

The text is organized into seven chapters. The contents of the remaining chapters are outlined below:

- Chapter II reviews the relevant literature pertaining to the background of GDSS and their implementation in other organizations.
- Chapter III provides a basic description of the GDSS, and the system configuration at Camp Pendleton.
- Chapter IV describes the methodology of the research.
- Chapter V presents a summary and analysis of the data.
- Chapter VI proposes and explicates a model for the organizational implementation of new software technology.
- Chapter VII presents the conclusions of the research.

II. LITERATURE REVIEW

The principle of applying Decision Support Systems to group applications has been discussed and experimented with in academic research since the early 1980's. However, the technology is still maturing. Although tested extensively in research settings, the number of applications of these systems in business and government organizations remains relatively small.

This chapter discusses the definitions and taxonomies of GDSS, provides a brief chronology of GDSS research to date, and draws on previous field research to identify factors affecting the successful implementation of GDSS in an organization.

A. GDSS DEFINITIONS

Group Decision Support Systems have grown out of the concepts of Expert Systems or Decision Support Systems. Jarke, in his article "Group Decision Support Through Office Systems: Developments in Distributed DSS Technology," attributes the improved communication capabilities of computer systems to the transition from DSS to GDSS. However, during this transition, the character of DSS within the GDSS environment has changed. Traditional DSS focused on expert systems which provide some degree of simulation or modeling capabilities. GDSS focuses on facilitating the interactive process of group problem solving and decision making. Definitions of GDSS reflect this principal issue:

- A GDSS consists of a set of software, hardware, and language components and procedures that support a group of people engaged in a decision-related meeting. (Huber, 1984)

- An interactive, computer-based system which facilitates solution of unstructured problems by a set of decision makers working together as a group. (DeSanctis and Gallupe, 1985)
- Computer-based systems that support groups of people engaged in a common task (or goal) and that provide an interface to a shared environment. (Ellis, Gibbs and Rein, 1992)

Essentially, GDSS is computer based support designed to assist a group in a task oriented process. All of these definitions are broad in scope, indicative of a system whose boundaries are not yet defined and reflective of the wide expanse of potential applications which may fall within the GDSS environment.

B. GDSS TAXONOMIES

Kraemer and King, in a survey of GDSS research, concluded that many "divergent and conflicting definitions of what the term (GDSS) means," existed (Kraemer and King, 1988, p. 140). After an analysis of four GDSS experiments concluded that designers also have a wide range of opinions about what constitutes a GDSS, George suggested that researchers focus their attention on the development of GDSS taxonomies (George, 1989).

At that time, DeSanctis and Gallupe (1987) had already proposed one taxonomy based on task type, group size and member proximity (Figure 1). Following George's call, Ellis, Gibbs and Rein (1992) proposed an alternative taxonomy (Figure 2) based on a time-space relation. This differs from the DeSanctis and Gallupe model, emphasizing member proximity and relative meeting times. Most recently, Teng and Ramamurthy (1993) proposed a model (Figure 3) based on content and process support. They describe content support as "the extent

to which a computer-based system is capable of providing support to its users in addressing the substantive issues in a specialized domain" (Ellis, Gibbs and Rein, 1992, p. 169). Process support is "the extent to which a computer-based system is capable of supporting and/or influencing proceedings in a group meeting" (Ellis, Gibbs and Rein, 1992, p. 169).

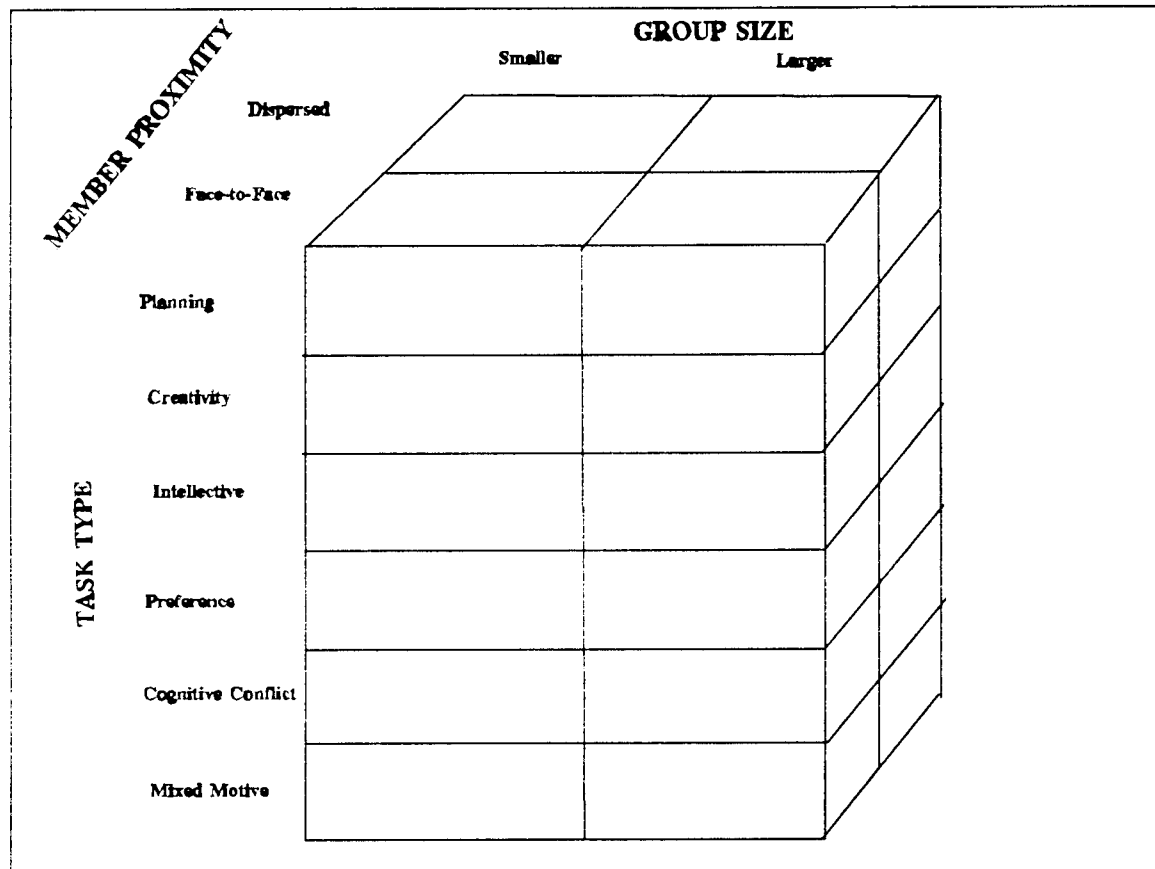


Figure 1: DeSanctis & Gallupe's Contingency Perspective for GDSS Research

As these taxonomies illustrate, GDSS design and performance is shaped by a number of issues, including task type, group size, group location, concurrency of meeting times, degree of process support, and finally, level of content support.

	SAME TIME	DIFFERENT TIMES
SAME PLACE	face-to-face interaction	asynchronous interaction
DIFFERENT PLACES	synchronous distributed interaction	asynchronous distributed interaction

Figure 2: Ellis, Gibbs & Rein's Time/Space Taxonomy

C. EVOLUTION OF GDSS RESEARCH

Despite the differences between the numerous GDSS definitions and taxonomies, research into the design and implementation of GDSS has continued and, relative to meeting room environments, can be divided into roughly five areas. These are summarized from Vogel and Nunamaker (1988):

- GDSS Domain and Applicability - focused on impacts of technology in group decision making, design issues and means of supporting group techniques with computer software. (Huber, 1984; Gray, et al. 1981; Gray, 1986).
- Facility Development - addressed effects of setting/environment on group processes. (Gray, 1981;

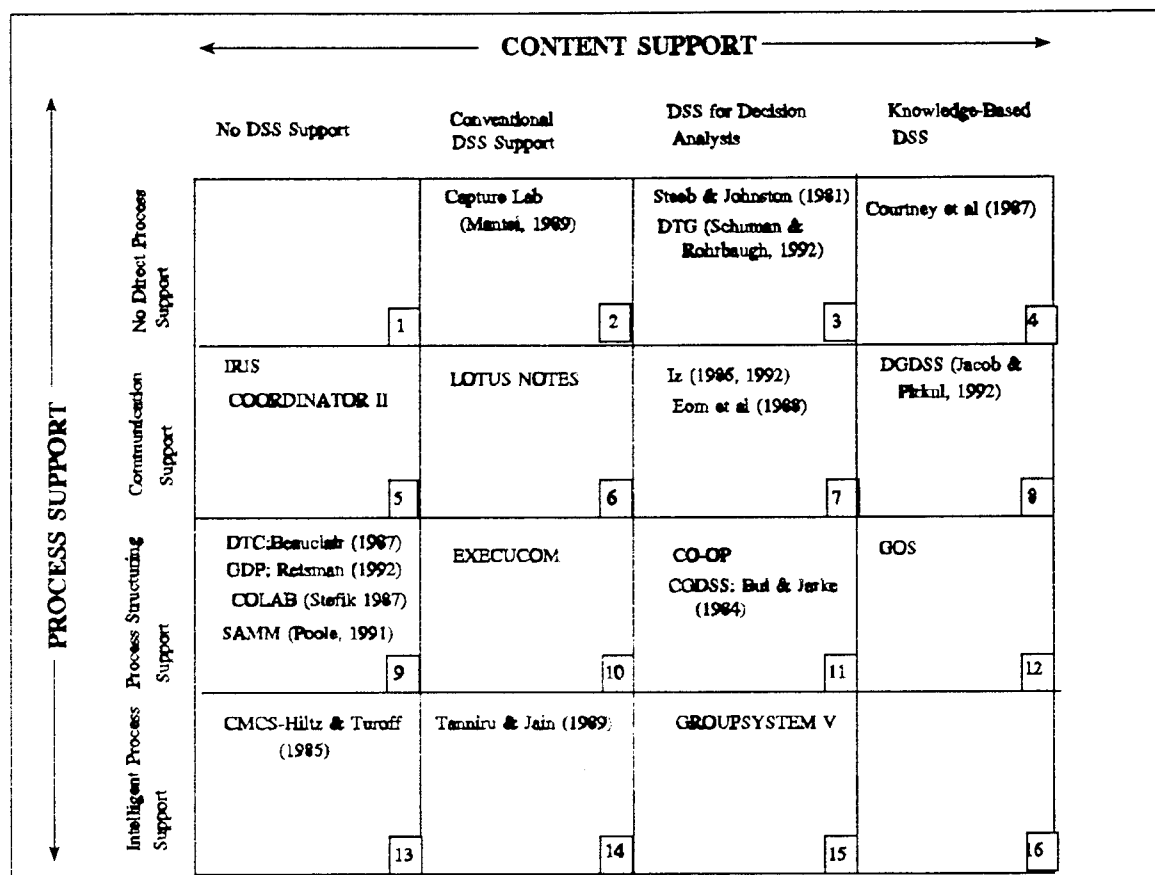


Figure 3: Ramamurthy & Teng's Functional Taxonomy of GDSS

Applegate, Konsynski and Nunamaker, 1986; Nunamaker, Briggs and Romano 1993).

- Survey Papers and Research Agendas (Gray, 1981; DeSanctis and Gallupe, 1987; Kraemer and King, 1986).
- GDSS Evaluation and Experimental Results - observation and testing of groups in an experimental setting. (Gallupe, DeSanctis, and Dickson, 1988; Nunamaker, Applegate, and Konsynski, 1987; Hughes and Webb, 1987; Driscoll and King, 1988).
- Operationalized Use of GDSS - implementation and evaluation of GDSS in field settings with private organizations. (Vogel et al., 1987; Dailavaile, Esposito and Lang, 1992; Yellen, 1993; Grohowski, et al., 1990; Post, 1992).

The operationalized research has focused exclusively on private sector corporations. Out of these field studies, researchers have identified a number of issues which impact the implementation of GDSS into an organization. However, because of the limited number of actual field studies, the full significance of these issues in implementation remains open to debate.

D. FIELD STUDY RESULTS

Field studies have focused on two major issues: the implementation/integration of a GDSS into an organization and the measurement of the effects of GDSS on meeting processes. To date, this research has been limited to same time/same place decision room environments.

1. Measurements of GDSS Effectiveness

Bellcore evaluated participant perceptions comparing the productivity and time requirements of a GDSS supported meeting to a similar meeting without GDSS support. Survey results showed that 80 percent of the participants felt they were three times as productive and 60 percent felt their task was accomplished in 1/3 the amount of time (Dailavaile, Esposito and Lang, 1992, p. 5).

The Boeing Company also evaluated the effects of a GDSS. Using a test facility, Boeing evaluated five issues: process flowtime, decision quality, ROI, the value added by GDSS, and cost-benefit relations. Using GDSS demonstrated labor savings of 11,678 hours equating to 432,260 total labor dollars saved, and a reduction of 1,773 days of flowtime (Post, 1992, p. 10).

Finally, Grohowski et al., reported achieving numerous gains through the use of GDSS at various IBM locations:

The case results provide strong support for the contention that use of electronic meeting systems

will improve the performance of work groups. Results show that man-hours fell an average of 55.51 percent on a per-session basis and 61.71 percent on a total man-hour savings basis. Furthermore, administrative costs fell; calendar time was reduced; and the number of meetings necessary to complete a project diminished. (Grohowski et al., 1990, p. 374).

All of the field studies reviewed reflect the achievement of significant reductions in meeting time and labor costs. They also generally reflect high participant satisfaction with the GDSS supported process.

2. Implementation Success Factors

In addition to recording impressive gains in productivity, articles by Grohowski et al., and Dailavaile, Esposito and Lang, along with other researchers have identified factors which facilitated the use of a GDSS in the organizations they evaluated. In some cases these were identified as a result of concerns identified in the implementation process or during actual GDSS meeting sessions.

The first success factor Grohowski addresses is organizational commitment. This organizational commitment,

recognizes the need for practical demonstrations and use of a system by organization members prior to installation to develop support and obtain sufficient resources for effective project completion (Grohowski et al., 1990, p. 380).

The commitment of the organization addresses not only gaining the support of individuals for the system, but in combination with that, some of these individuals must be in the position to allocate the resources of time, money and labor to the system. Organizational commitment calls for more than general support; it calls for an individual willing to "champion" the system.

Grohowski goes on to say, "An executive sponsor who is committed and informed is crucial to implementation success" (p. 380). Notes Yellen, addressing the importance of "champions" in his experience introducing a GDSS to a university faculty:

High status champions are important. More important, though, is a personally-committed champion who is in the trenches with the troops. This champion must be willing to lead by example and use all of his/her influence to enlist participation. (Yellen, 1993, p. 8).

The attitude is echoed by Grohowski et al., as they stress the need for not only an "executive sponsor," but an "operating sponsor," who helps achieve implementation of the system.

In a survey of 223 people in 25 enterprises using "groupware" systems, Bullen and Bennett identified a number of organizational issues relevant to the implementation of a GDSS. Among these, they assert that

Groupware implementation is simultaneously a social and technical intervention...One of the most important aspects of this complex intervention is that it is a "strategic intervention." Whether the strategy of technology introduction is made explicit or kept implicit, it exists and can have a significant impact on the organization. (Bullen and Bennett, 1992, p. 17)

They proceed to discuss the effects of implementation strategies as reflected by the degree to which various GDSS capabilities were being utilized. The finding was that organizations failing to provide users a sound basis in the theory of system use, saw only minimal utilization of the system's capabilities.

Bullen and Bennett's comments lead directly to a discussion of the training requirements for GDSS use. Bullen and Bennett identify that most participants received only

limited training in the use of their groupware system. The training tended to focus on the mechanical skills required to use the system. They conclude that "Given our previous observations that people are not using the functionality provided by these tools, the fact that they have also received only basic, mechanical training would tend to indicate that the training is not adequate" (Bullen and Bennett, 1992, p. 18). The experience at Bellcore contrasts the remarks of Bullen and Bennett. Bellcore found that "formal training needed to be supplemented with 'hands on' experience in using the tools" (Dailavaile, Esposito and Lang, 1992, p. 6). Bellcore conducted extensive "hands on" training with the facilitators using the system in meetings.

Both studies clearly reflect the need for a combination of theoretical understanding and practical training in GDSS.

Expectation management is also a factor. Grohowski states,

Meeting managerial expectations is the ultimate indicator of successful EMS implementation. EMS technology by nature tends to evoke thoughts of automated decision making. Corporations and organizational users need to appreciate an emphasis on 'support' (Grohowski et al., 1990, p. 382).

Bellcore facilitators found managers often had "totally unrealistic expectations about groupware" (Dailavaile, Esposito and Lang, 1992, p. 7). Facilitators often had to provide additional information so managers could develop a better understanding of the GDSS capabilities.

Bullen and Bennett also touch on the evolutionary aspects of implementation in their conclusions. They address the fact that implementation of GDSS is not a short term process, completed with the installation of the hardware. Rather, the evolutionary perspective looks critically at the value of training which is not followed by practice, the tendency to

use only those tools with which one is most familiar, and the organizational process which tends to reach a "plateau of competence" (Bullen and Bennett, 1992, p. 19). An evolutionary perspective towards systems implementation suggests that the effectiveness of a systems implementation should be reevaluated periodically, perhaps after key variables change. In this view, the remark that "Meeting managerial expectations is the ultimate indicator of successful EMS implementation," (Grohowski et al., 1990, p. 382), appears even more significant.

Most of the research also addresses issues related to the design of the system and the facility. Both Grohowski (1990) and Valacich, Dennis and Nunamaker (1991) discuss the importance of designing meeting room facilities with attention to environmental and ergonomic variables, ensuring that they are aesthetically pleasing. Yellen comments on the deteriorating effect that poor system reliability has on individuals' willingness to use the system.

These factors, although not comprehensive, provide basic points of reference for discussing and evaluation the process/success of an effort to introduce GDSS to an organization.

III. SYSTEM DESCRIPTION AND EMPLOYMENT

This chapter provides a brief overview of the development of GroupSystems V, the system operating requirements, the various support tools that GroupSystems V includes, and the configuration of GroupSystems V as employed at Marine Corps Base, Camp Pendleton.

A. DEVELOPMENT OF GROUPSYSTEMS V

GroupSystems was originally developed by the University of Arizona. In 1984 the University of Arizona constructed a

16-station computer-assisted group meeting facility with a single public display screen. This facility was originally intended to support users, analysts and project leaders in defining the requirements for large software development projects. (Nunamaker, Briggs and Romano, 1993, p. 4)

Faculty then began using the system to support a broader scope of meeting objectives. Positive feedback led to the construction of a larger 24-computer facility, designed to support as many as 40 participants.

The University of Arizona and IBM entered into an agreement to conduct a field study of the system at IBM. In 1986 IBM installed a meeting room at a manufacturing facility in Oswego, N.Y., and conducted an extensive study of the effects using GroupSystems had on the organization's meeting processes.¹ IBM proceeded to install a number of additional electronic meeting rooms throughout its organization.

As a result of the strong reception from IBM and other corporations that tested GroupSystems, researchers from the

¹See Grohowski et al. "Implementing Electronic Meeting Systems at IBM: Lessons Learned and Success Factors." MIS Quarterly, December 1990.

University of Arizona's Management Information Systems Center established Ventana Corporation to market GroupSystems to the private sector. Ventana Corporation is closely linked to the University of Arizona and benefits from research conducted at the University.

GroupSystems has been marketed since 1989 by Ventana Corporation as an electronic meeting system (EMS) to improve group processes. The first commercial version in 1989 was GroupSystems. GroupSystems V, version 1.1 is being distributed now, with a new windows version scheduled for release in late 1994.

The University of Arizona continues to actively research the impacts of EMS on organizations and potential future applications of EMS in laboratory studies. The University is presently installing three additional electronic meeting rooms on the campus to test and develop new technologies designed to support group processes (Nunamaker, Briggs and Romano, 1993, pp. 6-7).

B. SYSTEM OVERVIEW

GroupSystems V is designed to provide various tools to support the range of different meeting environments discussed in Chapter II. Initially, the system was designed to support synchronous, face-to-face meetings. The system now supports both face-to-face and dispersed meeting environments which may be conducted at the same time, or over a period of time. Group size is essentially limited to the number of personal computer stations configured to use GroupSystems V.

1. Groupware Defined

To effectively evaluate any system, it is necessary to understand the philosophies and principles upon which the system is based. As illustrated in the Literature Review,

many definitions of Group Decision Support Systems, or Groupware exist. Ventana Corporation has defined Groupware as "the use of technology to support the work of a group or team." (Ventana, 1993, p. SLG-2). To help clarify its philosophy regarding the role of GroupSystems V within the GDSS environment, Ventana has developed the illustration in Figure 4.

The bottom level includes personal computer based tools such as word-processing, spreadsheet, database and calendar management tools which are used only on the individual level. The second level encompasses E-mail and other communication

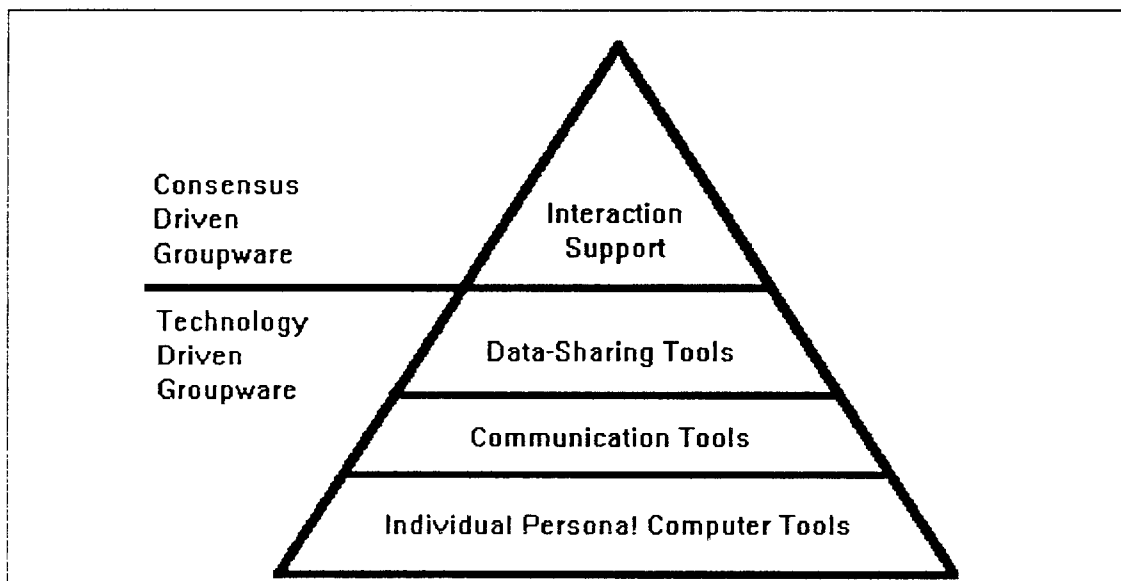


Figure 4: Computer Supported Collaboration (Ventana, 1993).

tools. These tools are also used principally at the personal level, where one individual may send a message to someone else. The third level, which is still relatively undeveloped, includes software designed to assist the organization and management of group projects. These tools focus on sharing information among groups. Group members have access to the same data, helping establish a "group memory."

Consensus driven groupware is defined by the level of interaction support provided:

At the apex of the pyramid are the behavior support tools. These help groups work interactively and dynamically with collective group data toward common goals, promoting a greater sense of ownership of the results. These tools support common and accepted collaborative group processes: generation of ideas, organization of ideas, alternative evaluation and consensus building, analysis/decision making/action plans, and information management/record keeping. (Ventana, 1993, p. SLG-3).

Ventana places GroupSystems V at the apex of the pyramid, supporting the collaborative processes of groups. It also claims to incorporate elements of the third level, permitting some degree of data-sharing in group project management.

2. Supported Environments

GroupSystems V is designed to support electronic meetings in a variety of situations. As referenced in the Literature Review, a number of taxonomies have been proposed which focus on factors such as group size, meeting participant location, and the length of the meetings. GroupSystems V is designed to support the entire range of alternatives, depending on the hardware configuration within the organization being studied.

The taxonomy adopted by Ventana to illustrate the variety of environments which it supports is pictured in Figure 5. As the illustration shows, GroupSystems V is capable of supporting small and large groups, in either real-time or on-going meetings conducted out of an individual's office or in an appropriately configured conference room. The ability to

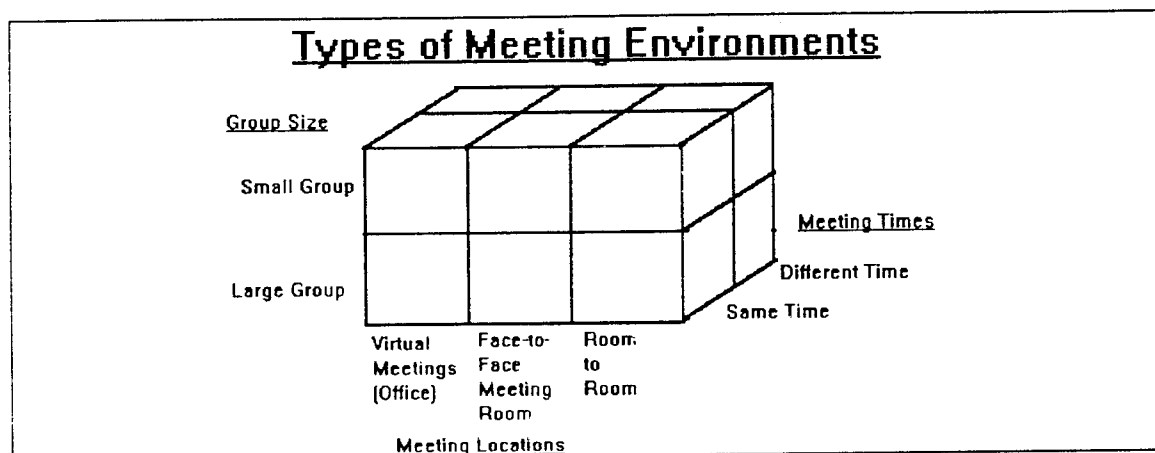


Figure 5: Types of Meeting Environments (Nunamaker, Briggs and Romano, 1993, p. 5)

conduct a meeting with multiple participants in multiple rooms is being researched by faculty at the University of Arizona.

GroupSystems V operates in two modes, **Meeting Manager** or **Group Link**. "Meeting Manager is designed solely for face-to-face meetings in a meeting room (same time/same place)" (Ventana, 1993, p. SLG-5). Meeting Manager permits a session leader to manage the meeting, allowing only the session leader to start and stop the GroupSystems V tools. Group Link allows meetings to be conducted from a distributed setting over a period of time. Group Link is designed to facilitate the data sharing and project management aspects of collaborative computing. Group Link also allows individuals who may not be physically present at a face-to-face meeting supported by Group Systems V's Meeting Manager, to access the meeting from a Group Link supported station. Group Link is limited in this respect because it does not presently provide full motion video teleconferencing. Rather, remote meeting participants see only the dialogue which is typed in to the computer by other meeting participants. Because the remote user is unable to experience the vocal dialogue and see the visual cues which may take place in a face to face meeting, the effectiveness of the remote user's participation in a meeting may be limited.

3. Individual Roles

The GroupSystems V User's Manual identifies specific roles which should be filled to facilitate the use of GroupSystems V in a same time/same place electronic meeting environment (Ventana, 1993, p. SLG-7).

The **Session Leader** is essentially a meeting's facilitator. This individual provides the group a variety of tools designed to increase the group's productivity. The session leader also ensures the group stays focused on its objective and task. In this case, the session leader may recommend the use of various GroupSystems V tools for the group to use.

The **Group Leader** is the meeting's sponsor. The group leader is the individual who has called the meeting and has established the purpose and objectives of the meeting. The group leader and the session leader may be the same person.

Participants are group members who have been brought together to achieve the group leader's objective.

An additional individual often involved with face-to-face meetings is a **technographer**. The technographer functions as the meeting manager, inputting commands into the computer to initiate the use of various tools and begin various sessions at the session leader's direction. Theoretically, the technographer, session leader and group leader could all be the same person.

C. SYSTEM OPERATING REQUIREMENTS²

Complete installation of GroupSystems V requires an extensive investment in three areas: computer hardware, network hardware, and software.

² All references to technical specifications in this section are from the GroupSystems V Technical Reference, pp.3-6.

1. Computer Hardware

Hardware requirements can be broken into the following categories:

- File Server
- Meeting Room Session Leader and Group Link Stations
- Participant Stations
- Meeting Room Public Display
- Printer

a. File Server

GroupSystems V requires a 386DX-25MHz PC/AT compatible with a minimum of 40MB of free disk space and 8MB RAM be available as a dedicated file server. Given the software demands of GroupSystems V, this is a slow computer. To improve performance, Ventana recommends use of a 486DX-66MHz with an EISA I/O bus, 16MB of RAM, an SCSI cache controller, and a high capacity SCSI hard drive.

b. Meeting Room Session Leader and Group Link Stations

The Meeting Room Session Leader or the Technographer and other computer stations designed to operate in the Group Link environment require at a minimum, a 286 processor with 1MB of RAM, a 3.5" high density drive, a hard drive and a color monitor.

For optimal performance, these stations will be equipped with at least a 386DX operating at 33MHz with 4 MB RAM. Additionally, 2MB extended RAM should be available for utilization of the Briefcase tool. 14MB of available hard disk space is required for loading executable files.

c. Participant Stations

Participant Stations require essentially the same basic configuration as the Meeting Room Session Leader and Group Link Stations. However, these stations require significantly less memory, only 640K RAM in the basic configuration or 6MB of hard disk space if executables are to be loaded onto each station.

d. Meeting Room Public Display

This is a large screen monitor, projector or a XEROX Whiteboard, which can project the display at the Session Leader's station onto a larger screen which is visible to all meeting participants.

e. Printer

The printer is required for hard copy reports of meeting agendas and minutes. Any printer which supports ASCII text is adequate.

2. Network Hardware

GroupSystems V requires either an Ethernet or Token Ring topology with network cards that run at least 4 Mbps. 4-pair level 5 data grade unshielded twisted pair cable and a simple network management protocol are the recommended cabling and concentrators.

3. Software

Novell's NetWare is the recommended Network Operating System for running GroupSystems V. The system can also run on OS/2's LAN Server, IBM's PC Local Area Network or Banyan Vines.

GroupSystems V runs on Disk Operating System, DOS version 3.3 or later.

D. SYSTEM TOOLS

GroupSystems V has a number of tools or software applications which are designed to support various routines which are commonplace to meetings. The intent of these tools is to facilitate the process and generate an environment which fosters active meeting participation by all group members. These tools are separated into basic and advanced tools which are described below.

1. Basic Tools

This group includes tools which assist meeting participants in the process of idea generation through the decision stage. The names of these tools effectively describe their purpose.

- Electronic Brainstorming - Facilitates idea generation. Individuals share ideas, and are able to either comment on an earlier thought by someone else or generate a new idea.
- Categorizer - Allows the grouping/categorizing of ideas developed in brainstorming session. Facilitates organization of results.
- Vote - Used to develop group consensus and identify areas of disagreement. Can help prioritize categories developed earlier. Provides basic statistical analysis on voting distributions.
- Topic Commenter - Similar to electronic brainstorming but more structured. Topics are predetermined. Meeting participants can comment on individual topics.
- Group Dictionary - Can be used to clarify terminology which may be ambiguous. May be consensus driven to provide common understanding.
- Alternative Evaluation - Alternatives are rated against various requirements by individual meeting participants. Ratings are accumulated. Basic statistical/graphical functions are available for analysis.

- Policy Formulation - Text editor which can be used to draft policy. Facilitates group involvement because participants can comment on the text.

2. Advanced Tools

Idea Organization, Group Outliner and Group Writer are tools which modify or enhance the operation of the tools described above. Additional tools which provide new capabilities include:

- Questionnaire - Allows meeting manager/session leader to generate a specific set of questions and receive feedback through a predetermined form.
- Stakeholder Identification - Assists in identifying individual's degree of involvement with specific issues and assumptions which have been made about a project or task.
- Group Matrix - A table format used to identify relationships between individuals and/or activities. Allows the degree of involvement to be identified as well.
- Survey - Permits information gathering from meeting participants through traditional survey format. A variety of survey methods are available, allowing flexibility.

E. CAMP PENDLETON SYSTEM CONFIGURATION

The GroupSystems V electronic meeting system installed at Camp Pendleton has grown from an electronic meeting room to an extensive system incorporating Group Link and a mobile system for meetings in environments not normally supported by GroupSystems V.

1. Operating Environments

GroupSystems V at Camp Pendleton has been configured to support all types of meeting environments. A meeting room was established in the MCB Command Center comprising sixteen meeting participant stations and a meeting manager's station. It incorporates two large screen monitors for use as large group displays that are visible by every participant. Figure 6 is a diagram of the system layout in the Command Center. The Command Center is available to any organization desiring to make use of the facility on a scheduled basis.

Group Link is also installed at Camp Pendleton, and ties together the base commanding general, various camp commanders



Figure 6: Camp Pendleton Group Systems V Configuration

on the base, and all of the assistant chiefs of staff. This network allows the commanders and staff to conduct meetings over an extended period of time and at different locations.

Finally, to support a mobile use with GroupSystems V, MCB Camp Pendleton recently acquired 10 laptop computers which have GroupSystems V installed and will be deployed to permit use of the electronic meeting system in remote locations.

2. Individual Roles

At Camp Pendleton, there are no restrictions on who can participate in electronically supported meetings except as established by the specific group leader. Likewise, group leaders are not restricted to specific individuals. If a need to use GroupSystems V exists, the user's needs will be met through the use of a facilitator trained on GroupSystems V who acts as the session leader and another individual acting as a technographer.

a. Session Leader

The session leaders for meetings using GroupSystems V are trained facilitators. The majority of these individuals are also their department's Total Quality Leadership Coordinator. Session leaders are responsible for meeting with the group leader prior to the actual meeting to establish the meeting's agenda, objectives, and its participants. The session leader also recommends potential GroupSystems V tools which may facilitate the achievement of the meeting's objective.

b. Technographer

Technographers are specifically trained on the computer interface to access the various tools within GroupSystems V. At Camp Pendleton this is a separate and distinct role from that of the session leader. Technographers respond to the requests of the session leader by starting and stopping various tools for the meeting participants to use. The objective is to avoid having the session leader tied to

the computer and unable to focus on facilitating the group's meeting.

3. Hardware/Software Characteristics

The hardware and software configuration of MCB, Camp Pendleton's electronic meeting system generally conforms with the hardware and software configuration recommended by Ventana Corporation. Two key differences, however, relate to the network operating system. The Marine Corps operates its LAN and WAN using Banyan Vines. Additionally, the network cabling used at Camp Pendleton is an older, less reliable cable than that recommended by the Ventana.

IV. METHODOLOGY

This chapter presents the methodology incorporated in the author's research into the GroupSystems V program at Camp Pendleton. It addresses in further detail the focus of the study, the strategy pursued in collecting and recording data, and the limitations impacting the results of this field study.

A. FOCUS

This case study analyzes the issues involved in implementing GDSS at Camp Pendleton. It does not address the entire spectrum of issues associated with using GroupSystems V in an organization. Specific issues which are not addressed are further discussed in Section F of this chapter.

In choosing to do a case study, employing both quantitative and qualitative research techniques, the study surrenders the ability to make broad characterizations about the implementation of GroupSystems V over a number of organizations. Although the questions are fairly broad in scope, the focus of these questions is limited to one organization.

The nature of the research questions also drives the method for data collection. This research centers on participant perceptions dealing with the implementation and use of new technology. The qualitative data collection methods used in this research, although not lending themselves to statistical analysis, provide rich, personal information. The focus of this research is not on the measurement of time, the summation of costs, or an experimental analysis of performance improvement, but rather on tracing and analyzing the implementation and operating processes of the GDSS at Camp Pendleton.

Some measures of the GSV implementation process are derived from participant perceptions about the value of GSV. To achieve a broader sampling of user perceptions, some limited survey techniques were employed. This quantitative research permits general trend analysis and may validate interview responses.

B. UNITS OF ANALYSIS

There are two major themes within the research questions presented in Chapter I: the implementation process of GSV and changes in the decision making process resulting from the use of GSV. The primary source of information for both themes are individual interviews. To answer the questions related to implementation, trends among the responses to each question are identified by subject.

C. RELEVANCE OF THE RESEARCH SITE

Marine Corps Base, Camp Pendleton, employs a relatively developed GDSS program. Manufactured by Ventana Corporation, GroupSystems V is one of the most advanced GDSS programs commercially available. HQMC has recently contracted to have GroupSystems V installed at the Marine Corps headquarters in Washington, D.C. and at Systems Command in Quantico, Virginia based on demonstrations of the system at Camp Pendleton.

Although a few organizations in the other services have used EMS to support various activities, Camp Pendleton was the first Marine Corps organization to use an EMS. At Camp Pendleton electronic meetings have been conducted both in a synchronous, face-to-face mode and, on a limited scale, in an asynchronous, dispersed mode. The systems at HQMC and Quantico are presently configured to support only face-to-face meetings. In the private sector, the use of GroupSystems V to

conduct asynchronous, dispersed meetings has been relatively limited. These characteristics make Camp Pendleton unique. It may be viewed as the field test site for EMS within the Marine Corps.

Camp Pendleton has been working with GroupSystems V for about two years. By answering the questions posed, the experiences at Camp Pendleton can potentially assist other Marine Corps Organizations implementing EMS.

D. DATA COLLECTION

Three methods of data collection were utilized for this research: observations, interviews, and surveys. Interviews were the primary source. The observations and survey data are compared to interview data to test the validity of the findings. These three data collection methods help counter the weaknesses associated with the exclusive use of only one method.

1. Observation of Electronic Meetings

Participant observation of electronic meetings was conducted intermittently over three separate weeks. Three meeting sessions were observed. Observation served to identify characteristics of interaction between participants and observe time of system use relative to meeting length. The meetings observed were pre-scheduled and participants were informed that an observer would be present prior to the meeting. Information and data collected from this portion of the research provides the researcher additional background information upon which to base guided interviews and to validate responses of the standardized open-ended interviews. Observations from this portion of the research will be compared to the trends identified in the analysis of the interviews.

2. Fast-Survey Technique

A short survey was also conducted, which was completed by meeting participants at the conclusion of five meetings. Fifty-three participants responded to the survey. This survey was conducted using the GroupSystems V Survey Tool which was briefly described in the System Description chapter. The survey attempts to determine the perceived effectiveness of the support GroupSystems provided the users, asking for responses on factors such as meeting length, consensus, and decision quality. The survey also used open ended questions to ask participants to provide feedback to the session leader and the facilitator. The survey format and session responses are in Appendix A. Appendix A does not include the open-ended responses which were reserved for the use of the facilitator and meeting leader.

3. Interview Methods

The interview strategy incorporates a combination of interviewing techniques for both the sample selection and the interview format.

a. Sampling Strategy

Interviews were conducted with representatives of three groups who possessed various degrees of familiarization with the system. Interview participants were chosen based on attendance records from GSV supported meetings and participant availability. The groups consisted of support personnel, meeting leaders/facilitators, and meeting participants. In a number of cases, the experiences of individuals placed them in two or all of the above groups.

Support personnel were interviewed based on references from the TQL Coordinator, who also functions as a facilitator for electronic meetings with Marine Corps Base Headquarters personnel. These individuals were interviewed

because of their knowledge of specific aspects relating to the acquisition and implementation of GroupSystems V.

Meeting leader and facilitator observations on the effectiveness of GroupSystems V for various meeting goals are instrumental in answering the research questions relating to appropriateness of task. They possess a relatively thorough knowledge of at least the characteristics and capabilities of the EMS. These individuals bring not only knowledge of the system, but also knowledge of the goals or objectives of meetings which they have led or facilitated.

Finally, interviews with meeting participants, whose knowledge and exposure to GroupSystems V and EMS may be limited, are necessary to provide insights into the attitudes of the occasional user who may or may not support the program. This balances the potential bias injected by interviewing the facilitators and meeting leaders who have chosen to use the system.

b. Sample Characteristics

The following tables summarize the rank, frequency of GroupSystems V use, and participant roles of the individuals interviewed. With the exception of three individuals, all served in the MCB command structure. The other three were members of tenant commands aboard Camp Pendleton who had used GroupSystems V within their respective commands.

It is important to note that an individual may have assumed more than one role in the use of GSV. As an example, one manager may have facilitated one meeting using GSV, but participated in others as a meeting participant. Because of the multiple roles individuals have filled, the number of participants in the rank breakdown is less than the number of participants in various roles.

RANK	NUMBER	GENERAL SCHEDULE	NUMBER
MajGen	1	GS-15	
Col	4	GS-13	3
LtCol/Cmdr	2	GS-11	2
Maj/LtCmdr	1	GS-07	1
Capt	3	GS-06	1
GySgt	1	Total Participants 20	
SSgt	1		

Table 1: Participant Breakdown By Rank/General Schedule

Roles	No. Interviewed
Meeting Participant	14
Group/Meeting Leader	7
Facilitator	8
Technographer	6

Table 2: GSV Meeting Roles of Interviewed Participants

GSV Use Frequency	No. Interviewed
1-4	7
5-8	4
9-12	2
13-16	2
>17	4

Table 3: Participant Frequency of GSV Use

c. Interview Format

In establishing the format for the conduct of the interviews, two approaches were taken, dependent on the subject being interviewed and the information desired. For support personnel and technical representatives, a general guided interview approach was chosen. For the facilitator/group leader and meeting participant groups, a standardized open-ended interview was used. To supplement the open-ended responses and to provide an additional measure of analysis, participants were asked to respond to some statements with a set response based on a Likert five point scale.

(1) General Guided Interviews. Guided interviews were used for support personnel and technical representatives. This approach

involves outlining a set of issues that are to be explored with each respondent before interviewing begins. The issues in the outline need not be taken in any particular order and the actual wording of questions to elicit responses about those issues is not determined in advance...The interviewer is thus required to adapt both the working and the sequence of questions to specific

respondents in the context of the actual interview.
(Patton, 1990, p. 280)

Naturally, there are advantages and disadvantages to this method. Advantages include having a predetermined guide which helps standardize the content of the material. It also forces the interviewer to remain on task. Although the interviewer is limited to pursuing only those topics addressed in the guide, the depth of inquiry into the identified topics is not limited. The guided interview does result in increased deviation because the interviewer is not required to ask questions in the same order or in the same way. This can also result in variations in the subject's understanding of the question.

This format is appropriate for interviews with the support personnel and technical representatives. In these interviews, the objective is to identify an individual's particular experience with the implementation process of GroupSystems V, focusing on the subject's specific area of knowledge. Because this element of the research is either historical or expert based, the increased deviation as a result of the variable question format is less important than pursuing questions of the research.

(2) Standardized Open-Ended Interviews. In the facilitator/group-leader and the meeting participant groups, the research focuses on individual experiences and identifying trends within these interviews. The standardized open-ended interview facilitates this research. This format

consists of a set of questions carefully worded and arranged with the intention of taking each respondent through the same sequence and asking each respondent the same questions with essentially the same words. (Patton, 1990, p.280)

The standardized format reduces the variation associated with informal or guided interviews by having predetermined

questions already written out. The standardized interview also limits the amount the interviewer may delve into specific issues, thereby focusing the interview and reducing the interviewees time.

This format allows sorting responses by question and provides an efficient means for analyzing the data. Since subjects will answer the same questions, the answers will be comparable. Finally, the standardized open-ended format significantly reduces the effect that the interviewer can have on the conduct and outcome of the interview.

However, while conducting the interviews, many interviews were required to be conducted in limited time. As a result, every individual was not asked all of the questions. This causes the data presented in the next chapter to appear inconsistent with respect to sample size. Recognizing this, the number of respondents to each question is provided within the discussion of each question

4. Recording Observational, Survey and Interview Data

Information from the observation of electronic meetings was recorded by handwritten notes during the meetings and supplemented with additional taped and/or typed observations after the meetings.

Fast-survey data was collected using the GroupSystems V, and recorded onto 3-1/2 inch diskettes.

Interview data were recorded by means of an audio tape recorder when permitted. Subjects were always provided the option of not having the interview taped, in which case, notes were taken and the interview content was reconstructed as soon after the interview as practicable.

E. DATA ORGANIZATION AND ANALYSIS

Relevant segments of all interviews were transcribed from audio tape and notes and grouped together by question as presented in Appendix B. Trends or common issues among the responses to each question were identified. Significant issues which seemed to contradict claims about GDSS and earlier research were also identified. Taped interviews were retained on file.

Observational data and survey results were organized chronologically. Mean and standard deviations responses were calculated for survey responses based on a five point Likert scale. Data were informally categorized by issues observed within the meetings.

F. TRAINING REQUIREMENTS

To develop proficiency with GroupSystems V, the author attended a systems training class at Ventana Corporation. The class focused on providing the knowledge and tools required to effectively run a meeting using GroupSystems V. The training was two days. All training was conducted in a GroupSystems V meeting room, with constant hands-on applications.

The training, in addition to the research cited in the literature review, provided a sound base for understanding GDSS design and system specific operating issues. This training established a common basis between the interviewer and the individuals interviewed. It also assists in developing judgments regarding the interviewee's expertise in the area of GDSS and GroupSystems V in particular.

G. LIMITATIONS OF THE RESEARCH

Although the system at Camp Pendleton has conducted meetings in both the distributed/asynchronous and the face-to-face/synchronous mode, the research centers on the face-to-face mode. Information collected concerning distributed meetings is discussed briefly in the conclusions, but was not part of the data analysis. Interview results containing information relating to distributed meetings was coded on the interview transcripts.

Confidentiality was strictly observed. Although interviews were transcribed verbatim, names of individuals in the interviews were omitted from the transcript and replaced either with a billet or, if this was also sensitive, replaced with a generic descriptor. While it may be felt that this step reduces the effectiveness of the study as a means to correct problems identified in the analysis and conclusions, the purpose of this research is to assist other commands in implementing a GDSS within their organization. Therefore, no value is gained by identifying individuals or offices that may have been negatively portrayed in individual interviews.

Again, because of time restrictions imposed by individual interview participants, not every participant responded to each question. To present the data fairly, the number of respondents to a specific question is presented within the discussion of the question itself.

V. DATA PRESENTATION AND ANALYSIS

This chapter is divided into four sections. The presentation and discussion in the first three sections revolves around the three techniques used to gather the raw data. These three techniques, as discussed in the methodology, consisted of individual interviews, meeting observations, and a short survey conducted immediately following meetings in which GroupSystems V was used. Interview data is presented first, followed by a summary of the meeting observations, and then the presentation of data from meeting surveys. The chapter concludes with a summary of issues in the preceding sections that affected individual perceptions about changes in the decision making process and the general value of GSV.

A. INTERVIEW DATA

This section includes a synopsis of the responses of the interviewed subjects to both multiple choice questions and open-ended questions. The question asked is listed first, followed by a summary of the participant responses. The questions are listed in the order in which they were asked.

The questions address participant experiences with GroupSystems V, meeting leader and facilitator attitudes about the system, and finally, participant evaluation of GroupSystems V based on their experiences. The data is organized to reflect these areas. A descriptive profile of the interviewed subjects was provided in Chapter IV, Methodology. Complete verbatim responses to interview questions are included in Appendix B.

1. Initial GroupSystems V Experiences

This section details the responses to questions relating to how participants initially became involved with the use of

GroupSystems V and their recollection of their experiences with the system. Recall from the previous chapter that although 20 participants were interviewed, participants did not respond to every question. As a result, the sample size for individual questions is not consistent. To ensure data is presented accurately, the sample size of each question is provided within the discussion.

a. How did you learn about GroupSystems V?

From the interviews, five of eleven (over 45%) of the respondents identified that they learned about the system from the Commanding General. This proportion increases with the realization that three of the eleven (27%) respondents were not assigned to MCB until after the GSV was operational. Therefore, effectively five of eight (62%) of the respondents who were present when GSV was installed at MCB learned about it from the Commanding General.

b. Before you used GroupSystems V, what did you believe were its capabilities?

Ten of twelve respondents (83.3%) identified GSV as providing decision support or meeting management tools. One participant elaborated on this question.

Sounded like it could be a really good tool to help decision making as they explained it. But I think I got to expect more than what it could deliver from talking to Gen. Lynch about what it could do. I was under the impression that it could do a lot more than it actually could. I was under the impression that it was going to have an addition to the accumulation of information. That it was going to be somewhat of a database and could provide those functions such as adding the amounts that were plugged in there, giving us totals, giving splits in different manners. Being able to pull out certain portions or requirements and of course it wasn't that, it was not a database tool.

c. Participant training on GroupSystems V is necessary before using GroupSystems V in meetings.

The 16 responses in Figure 7 reflect a range of opinions. Five (31%) said they disagreed with the statement. The response distribution may be explained by the wording of the question, in effect permitting the subjects to choose

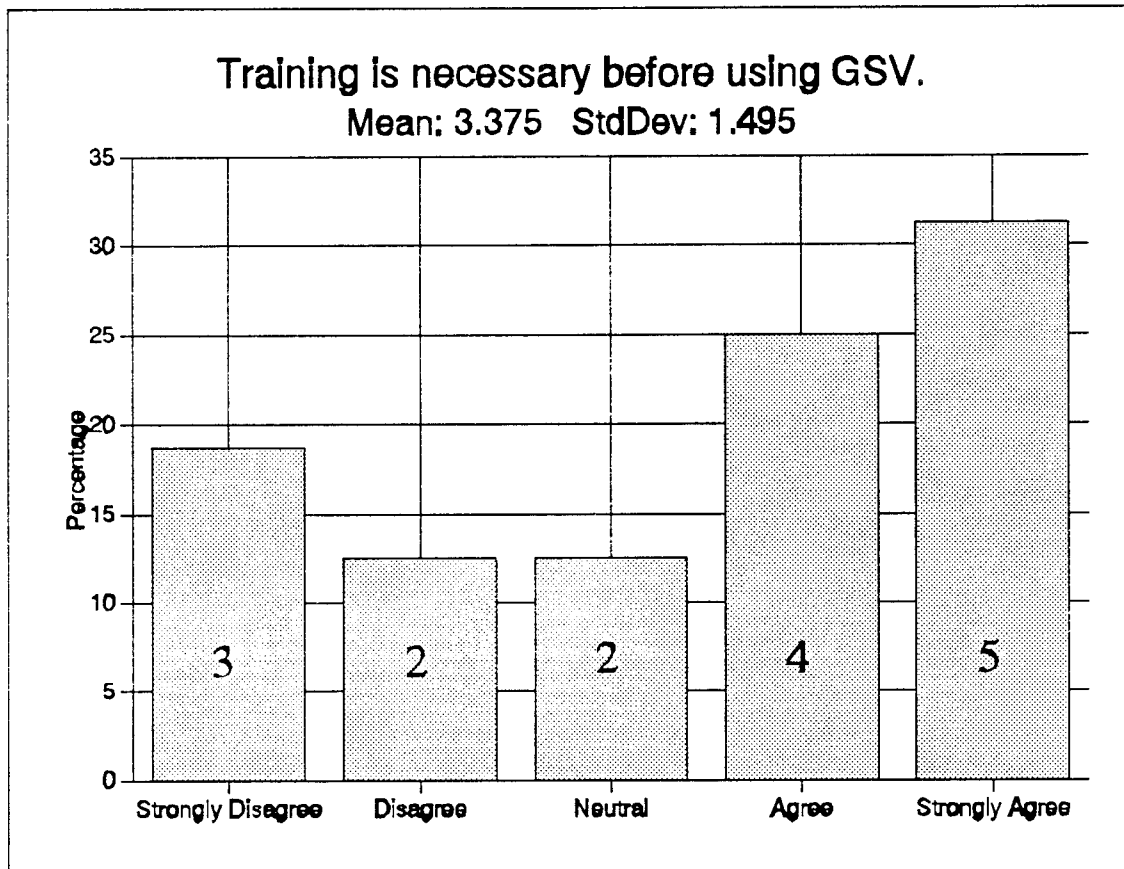


Figure 7: Participant Training on GroupSystems V

their own definition of "training." This appears to be supported by various comments: "Oh, number one, strongly disagree. 15 minute training on-line," "I am neutral, Participants require about 3-5 minutes of OJT," and "Agree, but anybody who's already computer literate only needs 10-15 minutes of hands on orientation." The contradiction is obvious. Although participants identified the need for some

form of training, each individual had a different perception of what constitutes "training."

Despite the disparity in Figure 7, participant comments reflect the belief that most EMS participants should be trained in fundamental system operations in a short "hands-on" session before an actual meeting.

d. Could you describe the training you received?

Facilitators and technographers attended the same course. The course was a two-day program designed to teach the student the elementary functions of the basic tools and how to plan and run a small meeting using GroupSystems V. The material in Ventana's class focuses on the actual use of the system. Approximately 33 people attended this course taught by Ventana. About eight of these individuals attended the training when the system was initially installed at Camp Pendleton. Of the eight students, four or five attended an advanced course also taught by Ventana which provided specific system troubleshooting information and lessons on the advanced system tools. The remaining 25 were trained about one year later. One of these students commented on the most recent technographer training:

Twenty-five of us were trained as technographers by Ventana a while back but most of us haven't used the system since then. It has pretty much been wasted training. I've forgotten a lot of what we were taught. I think it would be better if they just put a technographer up in the command center to support it full-time.

The meeting participants and meeting leaders were also provided a degree of training. Three individuals describe their initial training:

- One or two hours when we first got together to do a budget review. We all got on the machine and walked through pulling up the program, walked through making

entries, we were explained what the program was doing and how it could be used. It involved all the participants being on the machine and walking through and having the "duty experts" there walking us through. Except there was no such thing as "duty experts" because even the ADP folks were learning it. There were a lot of questions that they didn't have the immediate answer to. I got the sense there was a lot of phone communications between MIS folks and GSV headquarters.

- It was a short familiarization class that explained an overview of the system and walked through the menus. It was conducted in the command center with a facilitator. The real training took place during the actual meeting itself.
- We had OJT for about 2 hours. We used scenarios to generate a brainstorming session and then went through a voting cycle and stakeholder drill.

Based on these descriptions, the training of the facilitators, meeting participants, and technographers, focused predominantly on the mechanical aspects of using the system. Little time appears to have been spent discussing the purpose and theory of the system.

e. Can you describe what happened the first time you used GroupSystems V?

Of 12 respondents, four reported frustration with system failures. These comments were from individuals involved with the initial meetings using GroupSystems V as a tool for developing budget priorities:

- It was a catastrophe. Like trying to watch a monkey screw a football. All the Assistant Chiefs of Staff were in the room. Everyone was pushing buttons and the system was taking forever.
- I expected the machines to work. Didn't anticipate all the downtime. The data had been loaded in already. Some stations were very slow. This electronic slowdown interfered with the meeting a lot.

- I expected that the system would work. There was a lot of down time. On the second day the system was really slow just loading the files. It took us a day just to load the disk.
- It was the fear of the unknown, you don't want to feel foolish and make mistakes, but keying in information its very easy as a participant. I really don't remember that much about it.

Three participants, introduced to the system after a major hardware upgrade and increased experience of the technographers, indicated satisfaction with GSV's performance: "It was a powerful tool, wonderful. I loved it." Additionally, in one of the first meetings in which the system was used that was not related to budget development, another subject responded that "there weren't any technical glitches."

f. How were your initial expectations about the capabilities of GroupSystems V met the first time you used GroupSystems V?

Six of ten participants expressed positive feelings for an increased awareness about MCB operations and the effectiveness of GSV in improving meeting processes. Four participants identified problems they experienced. Two addressed limited technographer proficiency and the other two discussed the GSV's inability to act as a database.

- We had some system problems. A lot of this was because the technographers were not proficient. They were new and really hadn't used the system enough.
- It is a really good system for brainstorming, but it is bad for the budget - the system is not a database, it can't keep running totals.
- It looked like a good management tool, but not the only one for budgeting. The meetings increased our workload in the budget office, but also provided more data which is useful.

- I'm impressed by the system in that the whole base is involved in what is going on in the whole base. It really is a TQL type process. I also saw that some people tried to be team players, some were in it for themselves, that kind of thing - the human thing came out too.
- I saw it as a way to improve meeting effectiveness. It would also help leverage the TQL team process by giving quicker data and results and introduce technology into a backward system.

g. How did your experience affect your thoughts about the system?

Three of eight individuals made comments addressing the educational benefits achieved by using GSV to support the new budget development process. Improved teamwork, better communications and more focused meetings were also noted as benefits realized using GSV. One individual expressed dissatisfaction with the time required in meetings and another reported a perceived problem with report generation and distribution.

- The process is slow and tedious. It was more or less what I expected, but it is a long process. It ties up the Colonel's more. People that aren't normally so deeply involved in the budget process, so you have a lot of teaching and explaining and I think that makes it slower.
- I was disappointed with the results at the end of the meeting. We weren't able to get immediate feedback at the end of the meetings. It would sometimes take days to get input back from the budget meetings.

h. In what ways have subsequent meetings changed since you first used GroupSystems V?

Eight of ten participants reported improvements in system reliability resulting from upgraded hardware, or increased meeting productivity and efficiency because of

increasing familiarization of technographers and meeting participants with GSV operation. Additionally, individual participants reflected on their use of GroupSystems V within their divisions/command for meeting objectives other than budget preparation:

- Now we're using the system as a QMB within Facilities. We are looking at possibly reorganizing Facilities. We've been at this 7-8 weeks. This is our second session using GSV. We used it for brainstorming. We have a lot of departments and we're looking to see if we can do business in a better way.
- I took the officers in my command to a GroupSystems V session...I wanted responses on five questions I asked. It was pretty much free-response based questions. In this meeting -idea generation- there was a lower level of complexity in issues compared to the budget brief. It really streamlined the process. Without GroupSystems V it would have increased the time required in developing and writing down recommendations.
- Meetings are getting progressively more sophisticated as we learn more about the system. We are using more tools and different combinations of tools. Senior people are more willing to use the system. They aren't as afraid of it. I think the meetings are becoming more effective.

2. Group Leader and Facilitator Perspectives

Twelve subjects who indicated they had been a facilitator or group leader in a meeting using GroupSystems V responded to the first question. The second question was asked of five group leaders. Two group leaders, a facilitator and a technographer responded to the last question.

a. GroupSystems V helps achieve meeting objectives.

As indicated in Figure 8, respondents generally agreed with this statement. Of the nine respondents who commented on this question, three cited improved group focus

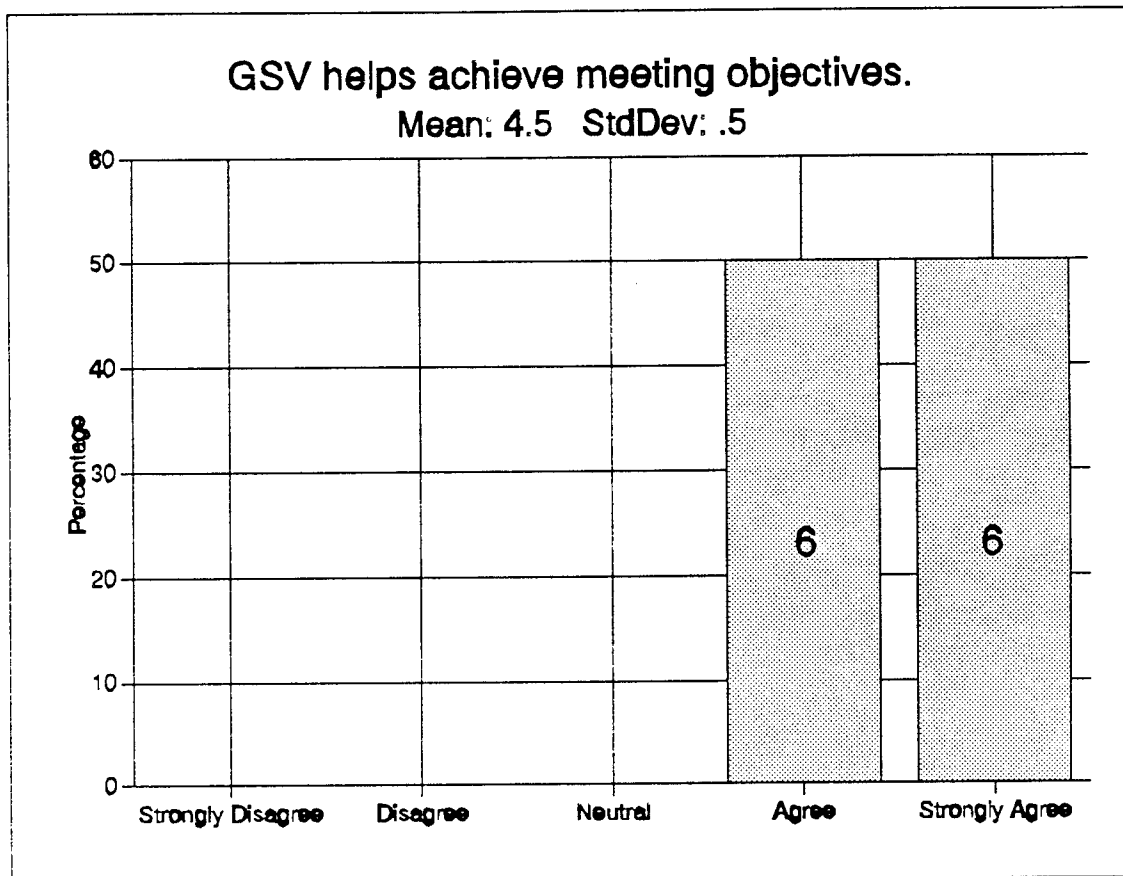


Figure 8: GroupSystems V Helps Achieve Meeting Objectives

on the task, two commented on the reduced record-keeping requirements, and three mentioned improved pre-meeting planning and development of an agenda, as factors in which GSV has facilitated achievement of meeting objectives. However, four respondents also indicated that the meeting objectives must be appropriate and clear for GSV to effectively aid in achieving objectives. One participant noted the results: "Two hours work using GroupSystems probably saved eight hours worth of work."

b. Why did you choose to use GroupSystems V in meetings?

Four of five respondents cited the ability of the system to support TQL principles and processes. Two

participants praised the support the system provides in brainstorming and categorizing. A respondent indicated GSV was used because it was directed:

Because the CG directed that we use it. It has proven beneficial, but I can't say that if asked to use that system over the way we were doing it before, I don't know that I would necessarily agree to that. Not because of the system itself, but because of what goes with it. When you do GSV, because of the purpose of GSV to make group decision, it winds up dragging out the decision process a lot longer than the old way...It winds up being maybe something that might have been done in a month taking two to three months.

c. How has the use of GroupSystems V affected how you prepare for a meeting?

Respondents noted the following changes associated with the use of GSV in meeting preparation: increased planning time involved in formalizing an agenda, the involvement of an additional person (the technographer), and an occasional requirement to conduct a dry run. Additionally, frequency of use appears to affect this also: "even after having done a couple of them, the curve doesn't improve any because if its been two to three months since we've done the last one, you kind of forget it."

3. Participant Evaluations

This section identifies the perceived effectiveness of the system from the perspective of the twenty participants who were interviewed.

a. Why did the Commanding General, Marine Corps Base purchase GroupSystems V?

The Commanding General, during an interview, explained that GSV was:

a means to an end. To try and turn TQL around and have a product that people could relate to and you could get to a decision point...the Marine Corps has had a very difficult time implementing TQL. And the reason is that people can't see results. They can't see involvement because it takes so long with people writing on butcher paper, trying to order things.

When asked this same question, three of the eleven respondents specifically identified the purchase of GroupSystems V with TQL. Four individuals, while not citing TQL specifically, addressed consensus and improved communications, issues commonly associated with TQL processes. Their comments are summarized below:

- It provides a TQL approach to financial management. Get everyone involved, look at the entire picture, with the experts all together and come up with a plan to execute.
- He also saw GSV as a way to speed up the process of TQL in the Marine Corps as our leadership philosophy, as the way we do business. Because if you say to someone you have to do business this way and it's very painful for them or they are unfamiliar with it they will tend not to do it they will resist it. GSV keeps it from becoming a laborious record keeping nightmare, which was the hallmark of TQM.
- The Commanding General saw it as a way to move the Marines into the 21st century and to leverage the implementation of TQL and participative management.
- I think it's designed to help in meetings in getting information and help reach consensus or at least majority. Giving more people input or the chance to have input.
- I look at it as a tool to facilitate a meeting where you have a significant number of people or a fairly large group of people when you have some significant issues.
- To ensure that it is more of a group recommendation to the CG. Ultimately still a CG decision, but the CG

felt that he was making those decisions based on a broader consensus than in the past.

However, the first response in the list above also reflects a second issue which a number of participants perceived as a key reason for the acquisition of GSV:

- It provides a TQL approach to financial management.
- Because of the shortage of funding to ensure that the funding decisions are not strictly a comptrollers decision.
- The General was interested in making Camp Pendleton more effective in dealing with scarce resources.
- He used it for the budget, prioritizing the budget.

The Commanding General's purpose with GSV was principally to facilitate the implementation of TQL at MCB. Approximately 50 percent of the respondents also cited TQL, or concepts associated with TQL, as the reason for GSV. However, a second purpose, the role of GSV in budgeting, was also perceived by one in three respondents as shown by the comments above.

b. GroupSystems V effectively supports the decision making process.

As Figure 9 shows, 18 of 19 participants agreed with this statement. Contributing factors are apparent from participant comments:

- It is a consensus builder.
- The anonymity - the admiral's lead paradox, everyone looks to the leader. GroupSystems helps reduce that influence.
- Everyone has the opportunity to provide personal input irrespective of rank. Equal vote. What I call participatory management.

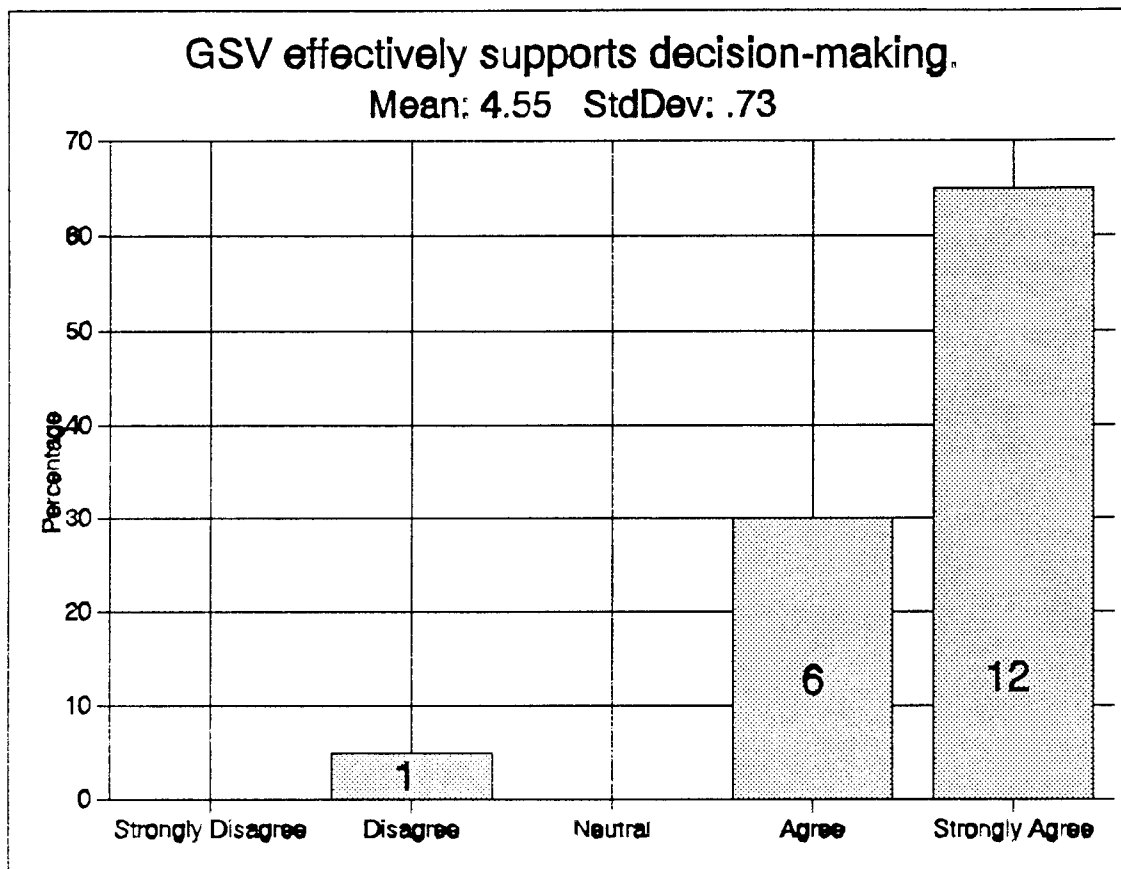


Figure 9: GroupSystems V Supports the Decision Making Process

- I guess I thought it had more capabilities than what it does. I think there's room to develop some more analytical capability.
- GSV enables teams to get more data quicker. It allows for more participation, removes a lot of fear. People tell more truth about the situation. It creates a forum for people to explore options quickly with data. In the long run, more decisions are based on better facts instead of relying on intuition or only knowing part of the story.

Four participants also identified increased focus and improved group dynamics as GSV contributions to the decision making process. However, as one of the comments

alludes to, three participants also felt the limited numerical processing capabilities of GSV hindered system effectiveness.

c. How has GroupSystems V changed the decision making process?

Seven of ten participants noted GSV facilitates the use of various TQL techniques during meetings and the increased participation brought about in using the system. One participant focused on the increased time involved in developing the budget using GroupSystems as a tool. One participant observed that GSV did not necessarily change the process, but that it may have enabled the change. The comment clarifies the thought:

GSV was basically driven by Gen. Lynch. He was the guy with the vision that brought it here. I think the decision-making process would have been changed anyway because of General Lynch and his approach using TQL. I think GSV helped to really formalize it. It is a tool and I think the decision-making process changed because Gen. Lynch allowed it to change.

d. GroupSystems V supported meetings require what amount of time relative to traditional meetings?

As evidenced by the distribution of the 19 responses in Figure 10, there were a variety of opinions concerning the time requirements for GSV supported meetings. Three respondents who indicated more time was required identified that they felt the discussion was more comprehensive than it would have been without GroupSystems V support. Two comments focused on the benefits achieved by running pre-planned meetings which have an agenda.

Four individuals commented on the time required for meeting preparation. Three of these comments referred to the budget development sessions. For some meeting participants,

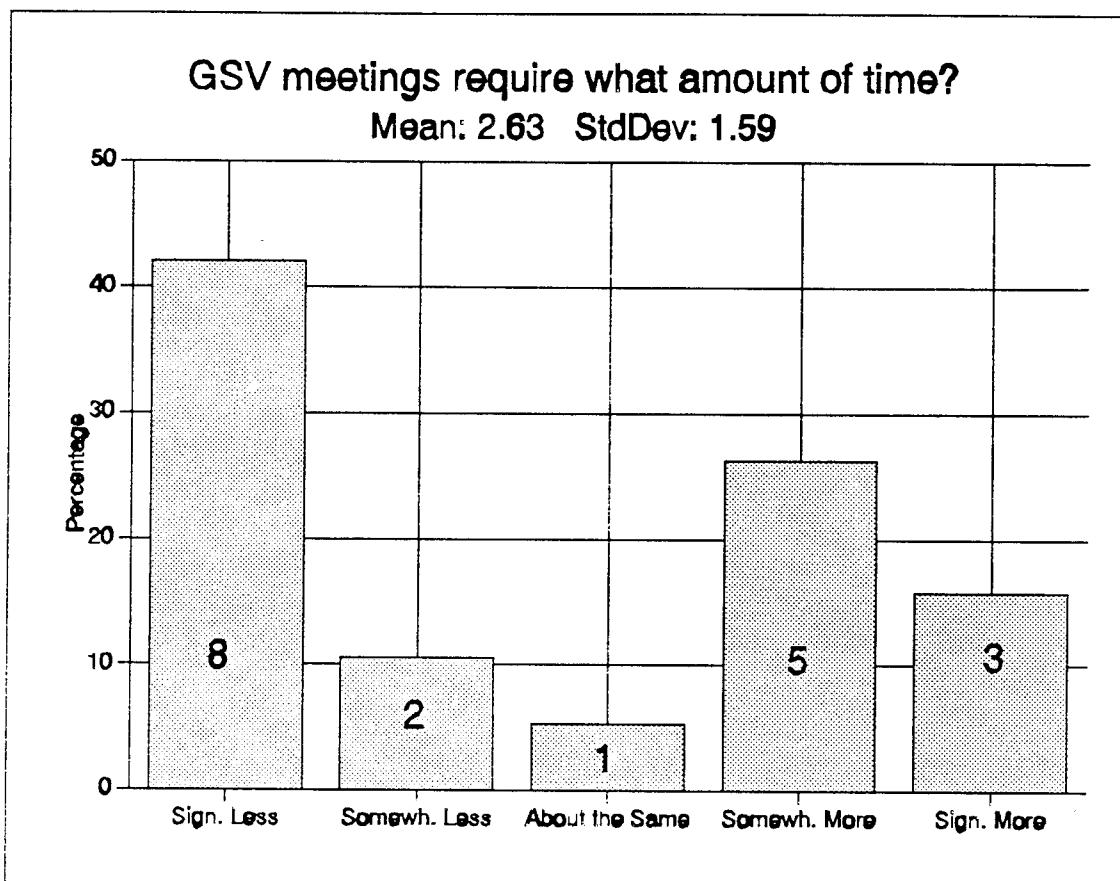


Figure 10: Time Requirements for GroupSystems V Meetings

little or no preparation was involved. However, for the budget prioritization meetings, a large number of people had a lot of work to do. One division responsible for coordinating the sessions described what is involved:

Tremendous amount of extra preparatory time. If you want the meeting to go as smoothly as possible, you have to put out specific guidance on what your goals are, the rules and so forth. In order to do that, you have to give it a lot of thought and do a lot of coordination with the people that know the system to make sure that guidance is right on the money. Then getting the sessions ready themselves is significant. I've found that even after having done a couple of them, the curve doesn't improve any because if its been 2-3 months since we've done the last one, you kind of forget about it.

A representative from another division then described the data inputting process from the first meeting and then subsequent evolutions:

I was suddenly the person that had to key in the budget, I had to do it for all of facilities. I spent many, many hours keying in the information before the meeting. I was using GroupLink to do the keying. Of course when you went to the meeting and saw what it did it was worth it. I was here till 11:30 at night sometimes trying to get it keyed in. We had a lot of system problems. That first meeting preparation I probably spent 40-50 hours trying to get things keyed in. I wasn't real thrilled when it kept going down and we had all these problems. But I think too that a lot of it was we were using the system a lot differently than Ventana, and so everyone was on a learning curve the first time.

I think as we learn the process it is getting shorter. Part of the problem is that everyone doesn't have an on-line computer so I have to input it for everybody, or we have to all go over to the command center and spend 4-5 hours keying in the information. Plus the unfamiliarity. You know until you get familiar with something it's always slower. And I think more people are involved. Somebody has to write up the budget first and then somebody else may have to go to the terminal and key it in. So right now it's taking a lot of time.

Responses varied about whether a time savings was realized using GSV to support meetings during the actual meetings. When asked about this issue, the focus of five respondents was on the budget briefs. These comments all generally indicated increased time requirements and provide various explanations:

- Before it was more of everybody sat there and listened to the other's presentation, there weren't that many comments, but in GSV, people are commenting about the other person's. And people can go in there, like we have to have inputted data in a week before and people

can go in there and read and make comments and the day of the meeting you have to answer the comments that people put in. So there's a lot more interaction.

- If time required for planning the meeting is excluded then the time required for the same level of productivity is less as long as the facilitator sticks to the agenda.

One respondent captured a number of the factors to be considered in a discussion of meeting length by explaining:

I would say that in some cases they required significantly more time. But you have to put that in perspective. Whereas probably less time was used in the past in the traditional meeting or decision making where there was less reliance on using hard data, hard facts to base your decision on. Or incomplete information. I think another thing that GSV did for us is that it allowed everyone to voice their opinion or provide their unique input on an issue. Rather than a traditional meeting where you may have only a few people given the opportunity to speak just because of time constraints, here you could get an input from every person. Every person had a voice using GSV. All the comments were put up for everyone to see in a very short period of time. But the meetings went longer because you were able to gather so much more information and so many more opinions, you spent so much more time sorting through all that. And of course the discussions that followed were much more significant in the way that we arrived at a decision. It wasn't so much a shoot from the hip or the loudest voice being heard and the decision was made, so that's why it took longer. If you were to apply the same process without GSV so that every voice was heard, it would take even longer. You've got to put it in perspective.

Two participants addressed issues affecting the logistics of getting the meeting room reserved and travel requirements:

- If we used the remote link, then there are the time/distance forces. I don't have to spend 1-1/2 hours commuting.
- There are a lot of problems logistically. Because there is only one meeting room, getting initial entry into the room is a scheduling problem.

e. How does the anonymity of GroupSystems V affect meetings?

Individuals who had only been involved with budget meetings felt that the anonymity did not significantly affect the conduct of meetings or the results. Individuals who had used the system in other situations generally responded that the anonymity provides some benefit in both idea generation and the voting sessions. Some comments are illustrative:

- Helps encourage people to express themselves. I remember running meetings and almost begging people to get their thoughts. This system makes it flow.
- It's irrelevant. And why? Because everybody types in their stuff and then when they start talking about it, whoever invariably types it in explains it when there's a question. People may have never put it in before, but immediately, pride of authorship comes out. Now voting I think it works very well. The anonymity almost goes away in most meetings. It does help getting the initial input it is very valuable cause they're just typing away and nobody knows. Especially when somebody puts a joke in. It kind of breaks the ice. But the real key is when you vote. The leader doesn't sway it. When you have to put your hand up and a General doesn't put his hand up. You know what I'm saying. These boys, a lot of them didn't get where they are in life by disagreeing with Generals, but in this one they can. And the boss wants someone working for him who will disagree with him. This way you can slam-dunk a pet project.
- The anonymity feature provides the ability to set aside personalities.

- It affected all phases. It gives people a way to communicate without politically sabotaging themselves. It increased participation. Anonymity did become less of a factor in the budget sessions because participants were expected to clarify their comments if requested, and to justify their budget requests.

f. GroupSystems V reduces group consensus when making decisions.

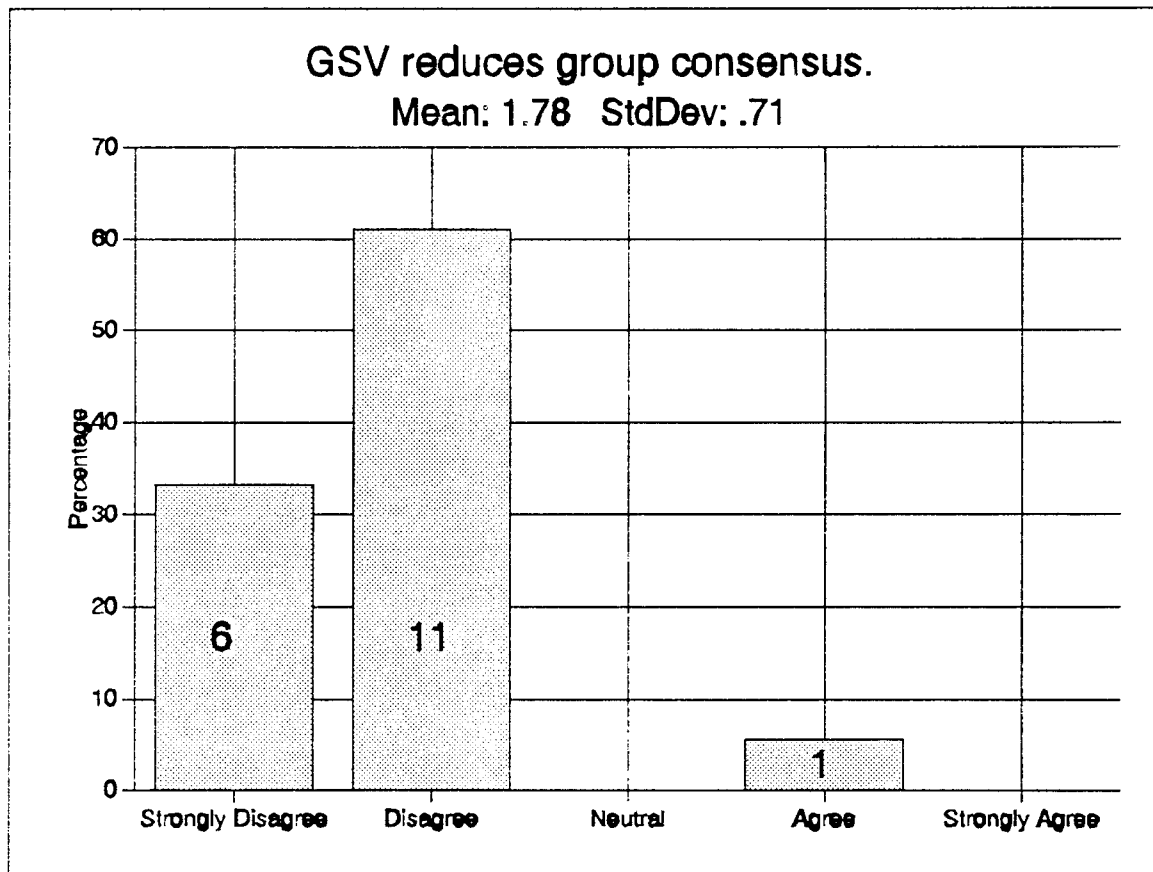


Figure 11: GroupSystems V and Group Consensus

The 18 respondents generally disagreed with this statement as illustrated in Figure 11. Nine comments centered around increased opportunities for participation during the session and on the ability to use the system to gauge participants' satisfaction. One comment focused on how comments generated with GSV in turn generated conversation

among the group. Participants felt this group involvement increased the consensus of the group. A variety of comments reflect this idea about "whole group involvement:"

- I thought decisions were made were based more on Group Consensus than had been arrived at under the more traditional approach. But you gotta remember that because Gen. Lynch introduced this he already had this approach using TQL. This just helped to facilitate him with group consensus making to make decisions.
- Everybody sees the big picture and feels like they have an impact in solving the problem.
- The time required to achieve consensus is reduced. I remember sitting through a TQL session without GroupSystems and the facilitator required complete consensus before moving to the next item. Well, people got tired of that real quickly and soon just stopped participating. With GroupSystems you don't have to have 100% consensus this helps prevent the apathetic situation.
- It is similar to process action team and TQL philosophy. Removes some of the emotional aspect -- Fear of juniors-senior relationship. The system gives credence to the written word. It is more of a democratic process. We may still end up with the commander making the decision but it shows that the commander values staff officers input.

g. How has GroupSystems V affected you?

Thirteen participants responded to this question. Three subjects, in one department, indicated that because of GSV data processing limitations, their workload had increased significantly. Others identified both the ability and the requirement to be more prepared for GroupSystems V meetings than for traditional meetings as a result of the Group Link feature and the reports which GSV can generate.

h. There are better alternatives to GroupSystems.

The 12 neutral responses in Figure 12, reflects participants' lack of knowledge or awareness about possible system alternatives. Comments of the two who agreed with the statement, indicated the need for system refinement.

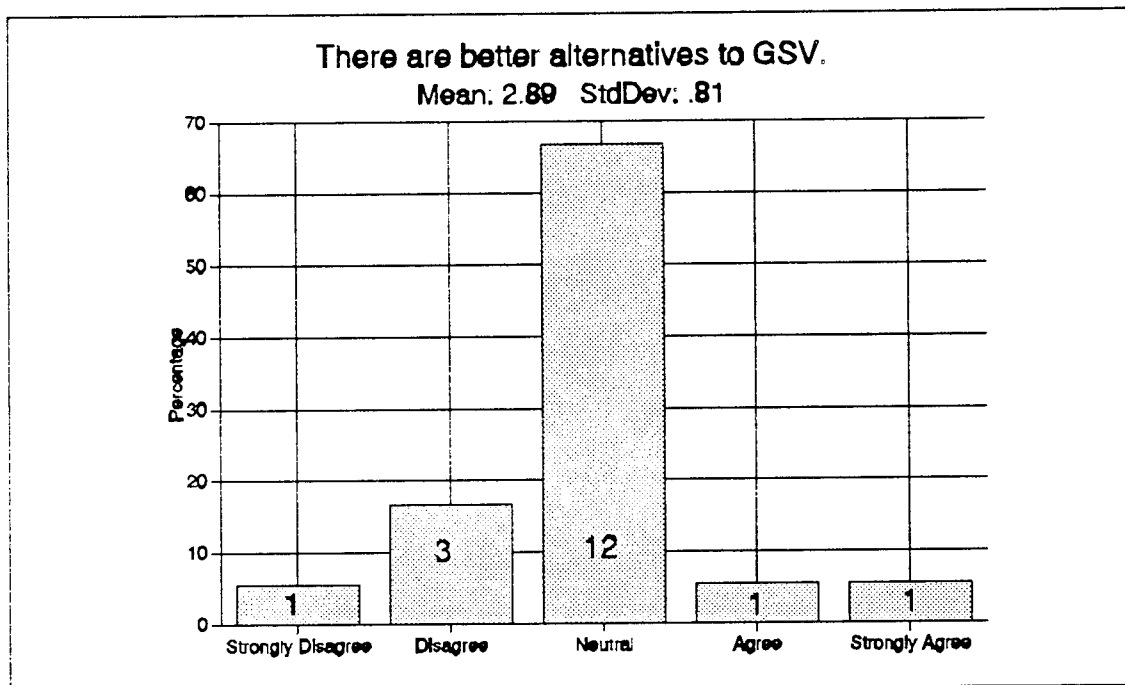


Figure 12: GroupSystems V Alternatives

i. GroupSystems V enhances meeting productivity.

Nineteen of 20 respondents agreed with this statement as indicated in Figure 13. Five comments addressed either improved agenda planning, decreased record-keeping requirements, or increased awareness on the part of all participants about the meeting subject. Some representative comments include:

- You are forced to plan the meetings which improves productivity. Cleaning-up after the meeting is easier. The reports are pretty much finished.

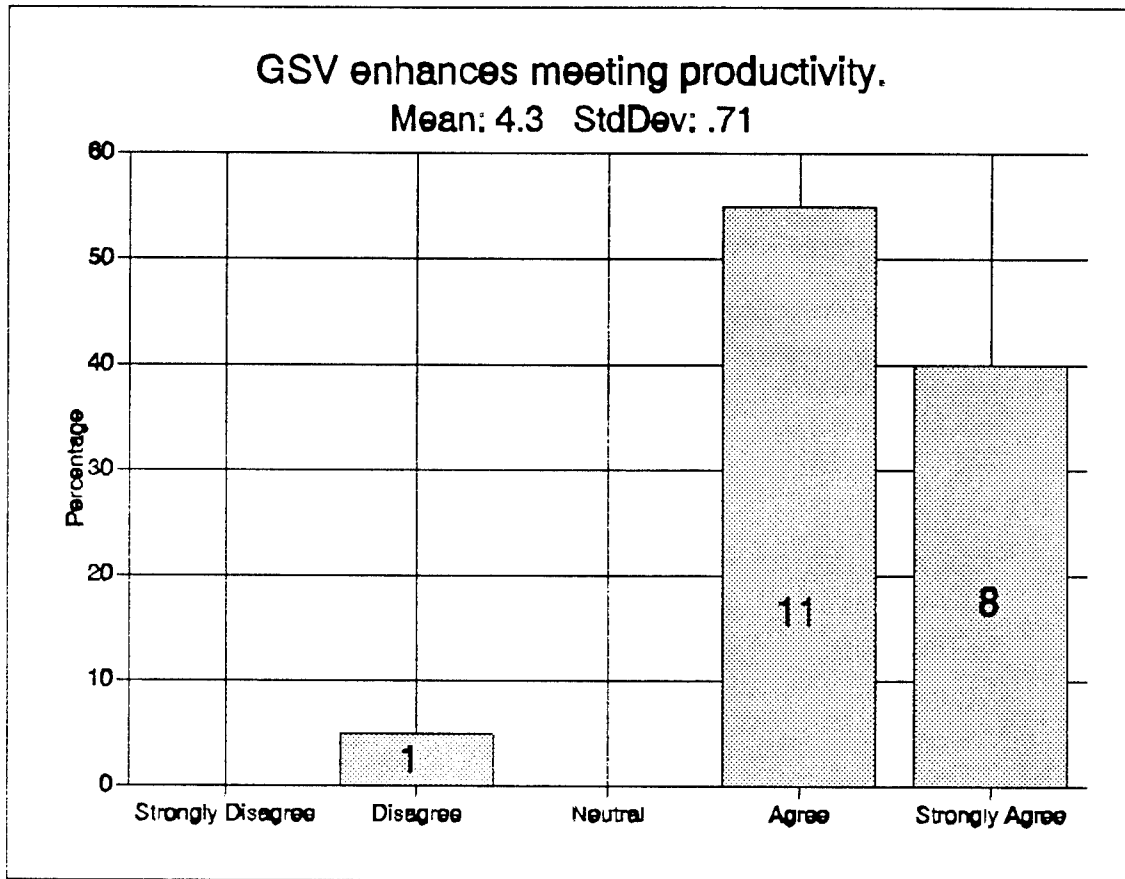


Figure 13: GroupSystems V and Meeting Productivity

- GroupSystems provides a written record of everything that is said and charts and printouts of votes.
- Depends on the type of meeting. If it's a brainstorming, idea generation meeting, something like that, it does tremendously. If it's a budget meeting? Kind of tough.
- If used properly. But also - it doesn't have to only be used for meetings. A distinct advantage is in preparation for meetings. If the preparation is not done ahead of time then the meeting is destined for failure. "He who brings the paper to the table usually wins the argument." If we use GroupSystems V for budget meetings, I can do my analysis and type comments at leisure. Then everyone is prepared and the meeting becomes management by exception.

j. The Marine Corps should purchase GroupSystems V for Marine Corps bases and stations.

Individuals tended to be supportive. However of 20 respondents, four identified that the system still needs refinements in its ability to process data. Figure 14 illustrates the range of responses. The mean response was 3.65, between neutral and agree.

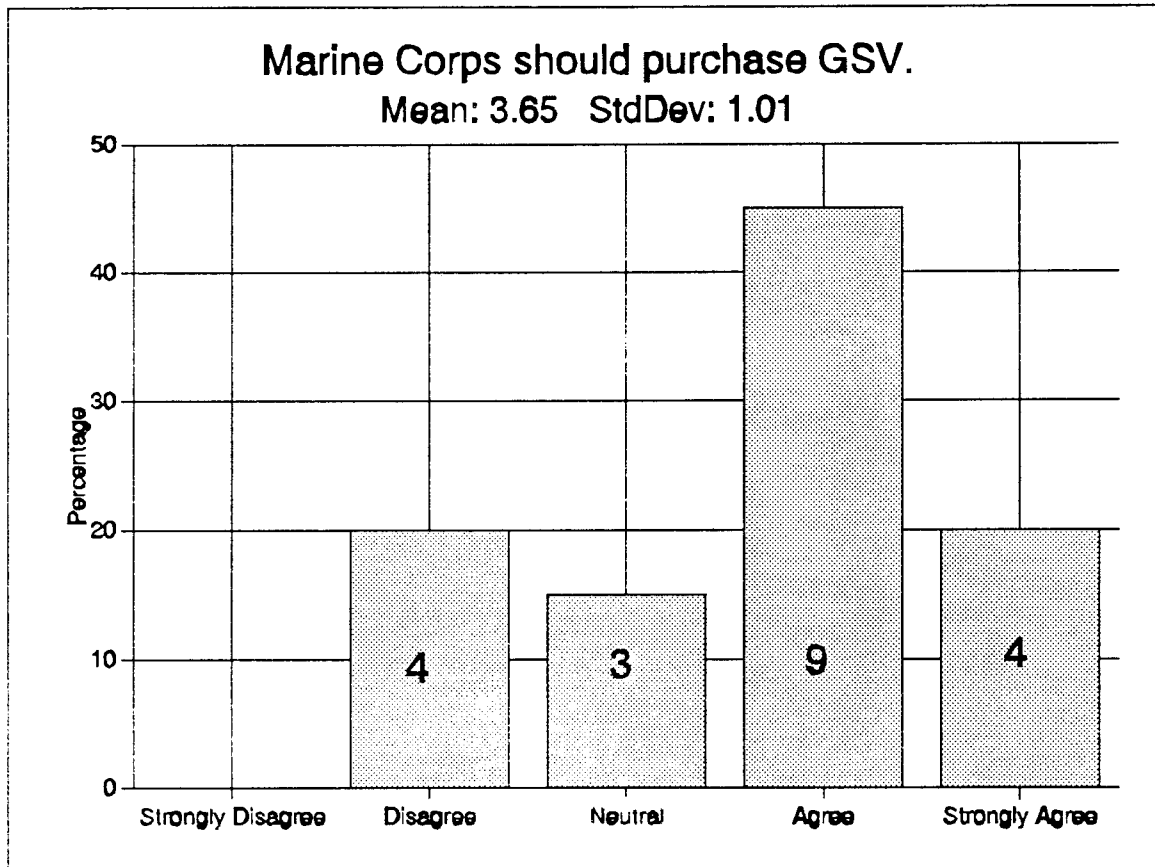


Figure 14: Marine Corps Purchasing GroupSystems V

Because of the response distribution, the participant comments are useful in identifying some of the issues.

- Budgetwise, nothing is better than communications. GroupSystems V takes the personality out of the budget.
- I'd have to be neutral, I think it would definitely depend on the command.

- Probably limited to the larger bases.
- If you have a CG with a specific purpose, that knows what he wants to do then it turns out to be a good tool.
- In the future, if problems are addressed and macros developed to consolidate data and allow participants to correct mistakes, then it could be OK. Right now, it isn't a mature technology.
- Given tight management controls and attention to the life cycle costs. It is easy to drop a lot of money into this program over time.
- If we are serious about TQL, then we better buy the tools to do it. And one of the key tools is being able to automate meetings. To capture all those ideas from the bottom up to prioritize them so we can get on with doing them. If you can't do that initial step bringing ideas up from the bottom, if you don't document that then you lose them. You've got to have that key first step and that's getting ideas into the system and I think that's the *(missing phrase)* and we can't preach it if each base can't come up with that kind of money and a place to run it. Then why the hell we saying that's our leadership philosophy. We can't look people in the eye and say "that's the future of the Marine Corps and we don't put any money into it, we don't put any resources then why we saying that. That's the difference between TQL and TQLS which is Total Quality Lip Service.
- The system needs fine tuning. Group-linking could enable us to do it from our offices rather than a common site. The Marine Corps needs to move ahead into newer technology. The system provides another training. We need a good hard system like this to deal with complex issues. Marine Corps Base is a business based operation that needs the electronic support like GroupSystems.
- Access. The system must be available. Scheduling the room for use is difficult. It does provide instant results and goes faster than TQL meetings.
- It is a valuable tool.
- Maybe for the bigger bases like Pendleton, Lejeune, Quantico and Albany. There are a lot of smaller stations where the investment wouldn't be worth it.

- There has to be a better, cheaper way. It is too expensive. Having the system at the base level is too high. It won't get the usage that it needs.

Three of the respondents noted that GroupSystems V requires a large investment of resources initially. Many questioned the value of the system given the cost.³ Two individuals perceived the system lacked the ability to perform basic tasks which should be built in.

B. NON-PARTICIPANT MEETING OBSERVATIONS

One element of the research consisted of non-participant meeting observations on the part of the author. In conjunction with the meeting participant interviews and the post-session surveys, the meeting observations provided the author the opportunity to view the system operation and the group dynamics which occurred during the meeting. The author was a non-participant observer of three meetings. This section details the number of participants, the meeting objective, the length of the meeting observed, and any other relevant data.

1. First Force Service Support Group: Cold Weather Support

On 25 March, the commanders and staff of the Force Service Support Group used GroupSystems V to plan for cold weather training. The objective of the meeting was to identify training and support issues unique to operating in a cold weather environment, categorize them and then use the data developed in this meeting as the foundation for

³The cost of software and licensing for GSV was approximately \$66,000. Training costs amounted to \$13,350. Hardware and facility upgrade cost approximated \$222,400.

development of standard cold weather support procedures. Categorizer and Topic Commentor were used for brainstorming and then organizing the ideas and issues generated. The meeting was a full day session from 0730-1630. There were fifteen participants in the meeting. There was no system down time.

2. Facilities Maintenance Working Group: Organizational Restructuring

On 15 June, the author observed this group using GroupSystems V for one session from 0700-1000. The group had met twice previously and was an ongoing committee working to identify a more effective organizational structure for Marine Corps Base Facilities Maintenance Division. In previous meetings the group used GroupSystems V to identify all of the processes within the Facilities Maintenance division. The purpose of this session was to sort the processes previously identified into categories using the Categorizer tool. There were eleven participants for this meeting. Throughout the morning GroupSystems V had technical problems. The system was either not operating or operating extremely slowly for 50 minutes of the three hour meeting. There were two technographers present, but no technical systems support personnel.

3. Marine Corps Base: Annual Budget Brief

The annual budget brief entails a significant amount of pre-meeting preparation. Responsible parties must enter all budget items into the system two weeks prior to the actual meetings. The annual budget brief was scheduled to take three full days, from 0800-1600 each day. There were 19 meeting participants for this three day session. Additional representatives from the various divisions were also present to provide clarification or additional support for their

particular budget areas of interest. In support of the meeting, two technographers were present to operate GroupSystems, one technical support representative was always present to troubleshoot, and the GroupSystems V administrator was in an adjacent office to answer technographers' questions.

This meeting used Categorizer, Topic Commentor and the Vote tools exclusively, to identify valid requirements for budget submission. The Categorizer was used to divide funding requirements into the various budget levels and then subdivide them into budget activities. Topic Commentor was used to provide justification for various budget requirements and as a forum to place questions concerning specific budget items. All items in a budget level were then briefed to the group. Following each budget level brief, participants voted on each budget item in that funding level. Budget items which did not receive 17 of 19 YES votes were automatically moved down to the next budget level. At each budget level there were 124 - 200 budget items to be voted on.

On the last day of this meeting, participants were asked to respond to a short survey using the Survey tool in GroupSystems V. The results of this survey are presented in the next section.

There were intermittent system problems throughout the three day meeting. On the first day, the start of the meeting was postponed from 0800 until approximately 1300 because GroupSystems was not operational. On the second day, the system slowed down significantly during the first 20 minutes as participants signed in. Finally, on day three, GroupSystems V stopped operating for 10 minutes during a voting session. This problem was cleared by the technical support representative and was caused by interference from users outside of the meeting environment using GroupLink and unintentionally interfering with the systems protocol.

C. SURVEY DATA

As discussed in the methodology, five surveys were conducted. Fifty-three individual participants responded to the statements using a five point Likert response. The statements are listed down the left column. Possible response alternatives are numbered 1-5 along the top row, which correspond to the response shown at the bottom of each table.

In their responses, participants evaluated their meeting experience using GroupSystems V based on the meeting's agenda and objectives. Additionally, participants were asked to respond to statements estimating aspects of the meeting, given the same agenda and objectives, if they were not using GroupSystems V. As a result, three of the statements in the first section have a contrasting statement in the second section.

Because the surveys were conducted independently from the researcher, specific knowledge about meeting agendas and objectives was not available. In the evaluation of this section, the survey response data were compiled and evaluated as the aggregate of the individual sessions' survey data presented in the five tables in Appendix A. Figures 15-18 reflect the aggregate responses. Means and standard deviations were calculated based on the five point scale shown above.

The statements attempted to identify participants perception of the effect GSV had in the following areas: supporting the decision making process, decision quality, consensus, and time required to complete the meeting objectives.

1. GroupSystems V Supports the Decision Making Process

From the aggregate response distribution illustrated in Figure 15, 51 participants (94%) felt that GSV supported the decision making process.

2. GroupSystems V and Decision Quality

The two graphs in Figure 16 provide some valuable comparative statistics. Participants, responding to the first statement asserting GSV improved the quality of the decisions reached, tended to agree with a mean response of 3.85. Sixteen strongly agreed (30%), 18 said they agreed (34%) and 15 were neutral (28%). The significance of this response distribution increases given participant responses to the second statement that, given the same agenda and objectives, the group would have made better decisions without using GSV. Although 34 respondents agreed with the first statement, 39 (an additional ten percent) either disagreed or strongly disagreed with the second statement. Stated differently, while 19 individuals may have felt GSV did not greatly improve decision quality, only 14 believed that decision quality could have been improved by using another approach besides GSV.

3. GroupSystems V and Group Consensus

The two graphs in Figure 17 illustrate the impact GSV appears to have on facilitating group consensus. Thirty-one participants strongly agreed that GSV helped achieve consensus among their groups. Of the eight who responded with a response indicating neutrality or disagreement, six were participants in the MCB Annual Budget Brief (Table 4, Appendix A). The second graph reinforces the effectiveness of GSV in helping to achieve consensus. Only three respondents indicated consensus would have improved without the use of GSV. However, ten respondents were neutral compared to only four in the first responses.

4. GroupSystems V and Meeting Time Requirements

Response distribution between the two statements related to meeting time shifted in an interesting fashion. In the first statement, that it took less time to accomplish meeting

objectives using GSV, 22 agreed (41%) and another 13 strongly agreed (24%). When the question was rephrased to indicate that the meeting would have taken less time without GSV, given the same meeting objectives, the response distribution shifted significantly. Twenty-three strongly disagreed (43%) and an additional 18 disagreed (34%). In effect, this 12 percent shift shows that participants feel GSV decreases meeting time.

A final point regarding meeting time is that nine of the 53 respondents when asked the second question indicated that meetings could be accomplished faster without GSV. Five of the nine respondents were meeting participants in the MCB Annual Budget Brief.

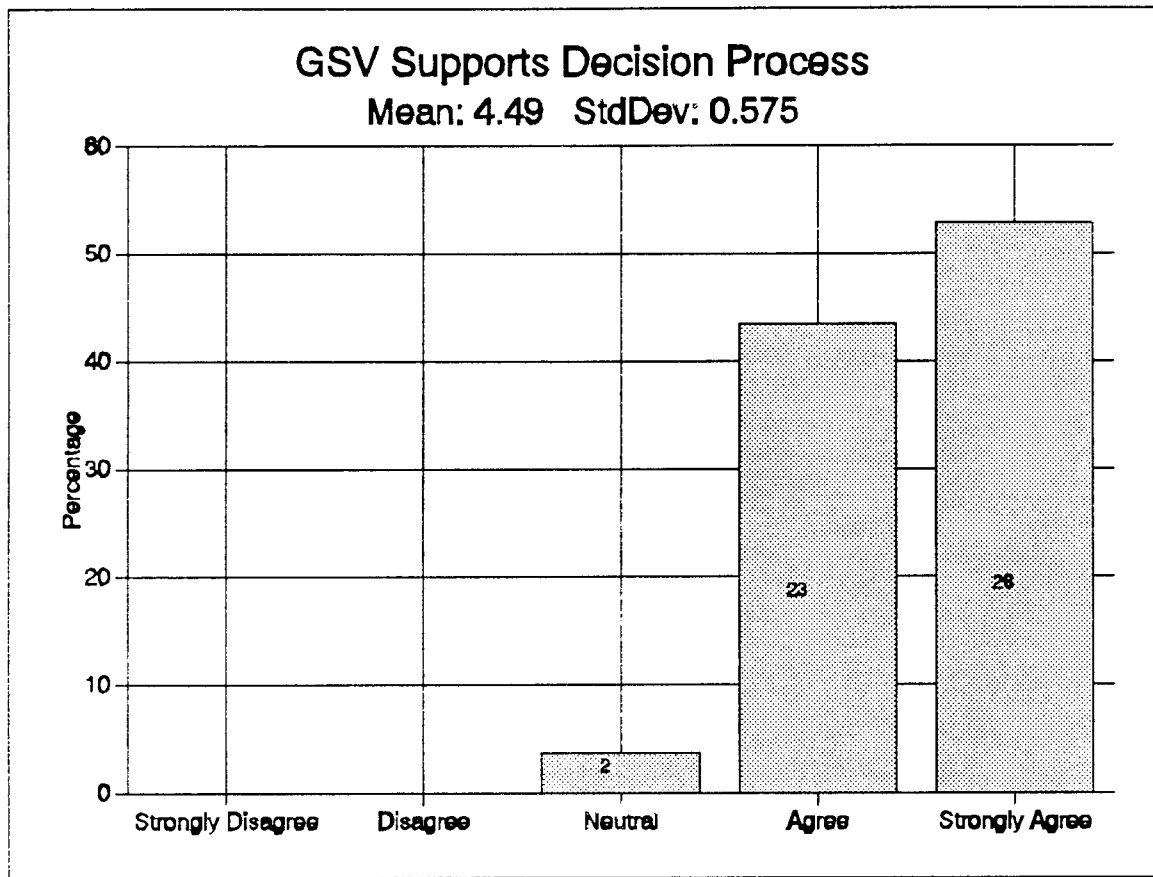


Figure 15: GroupSystems V and Decision Support (Survey Data)

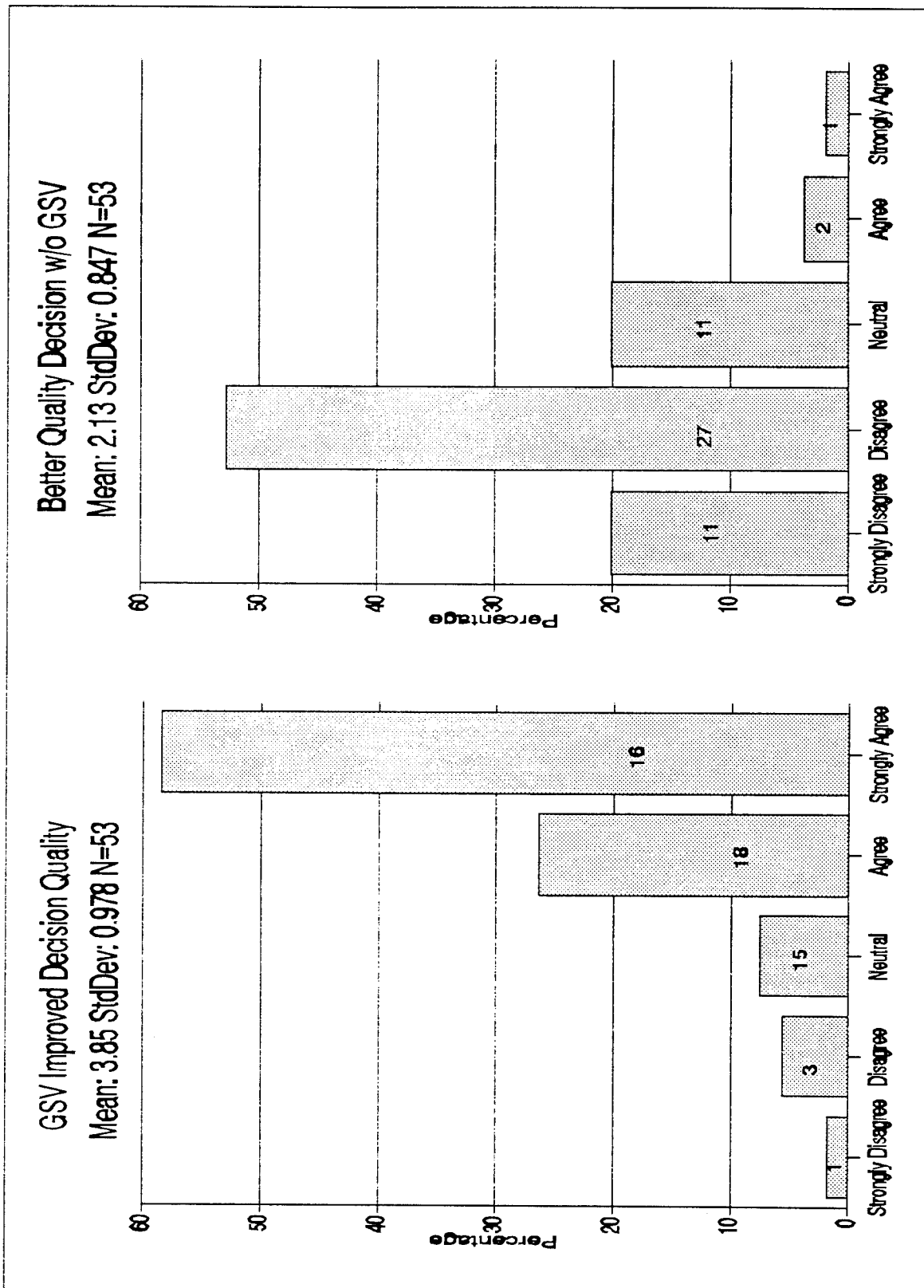


Figure 16: GroupSystems V and Decision Quality (Survey Data)

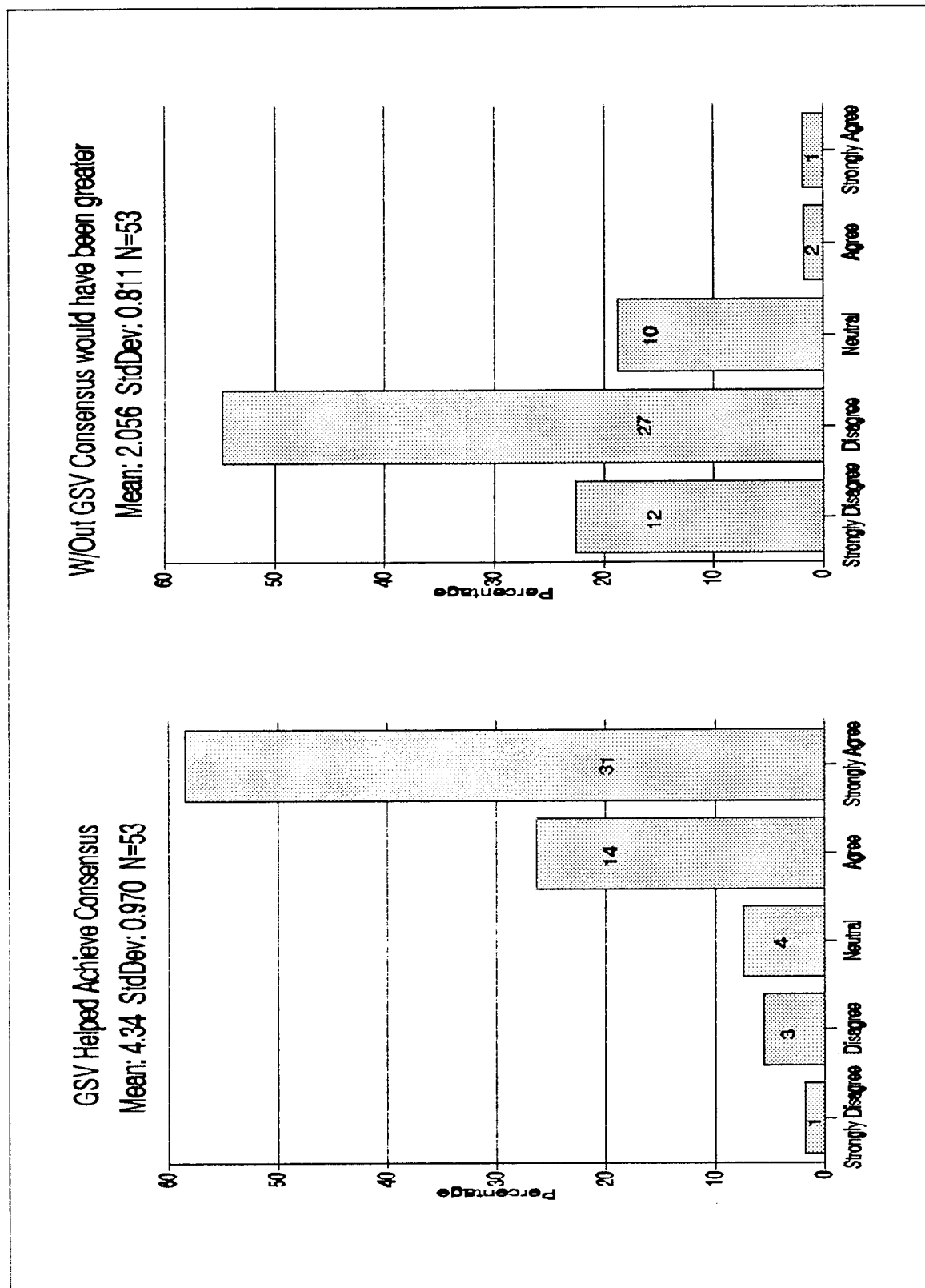


Figure 17: GroupSystems V and Consensus (Survey Data)

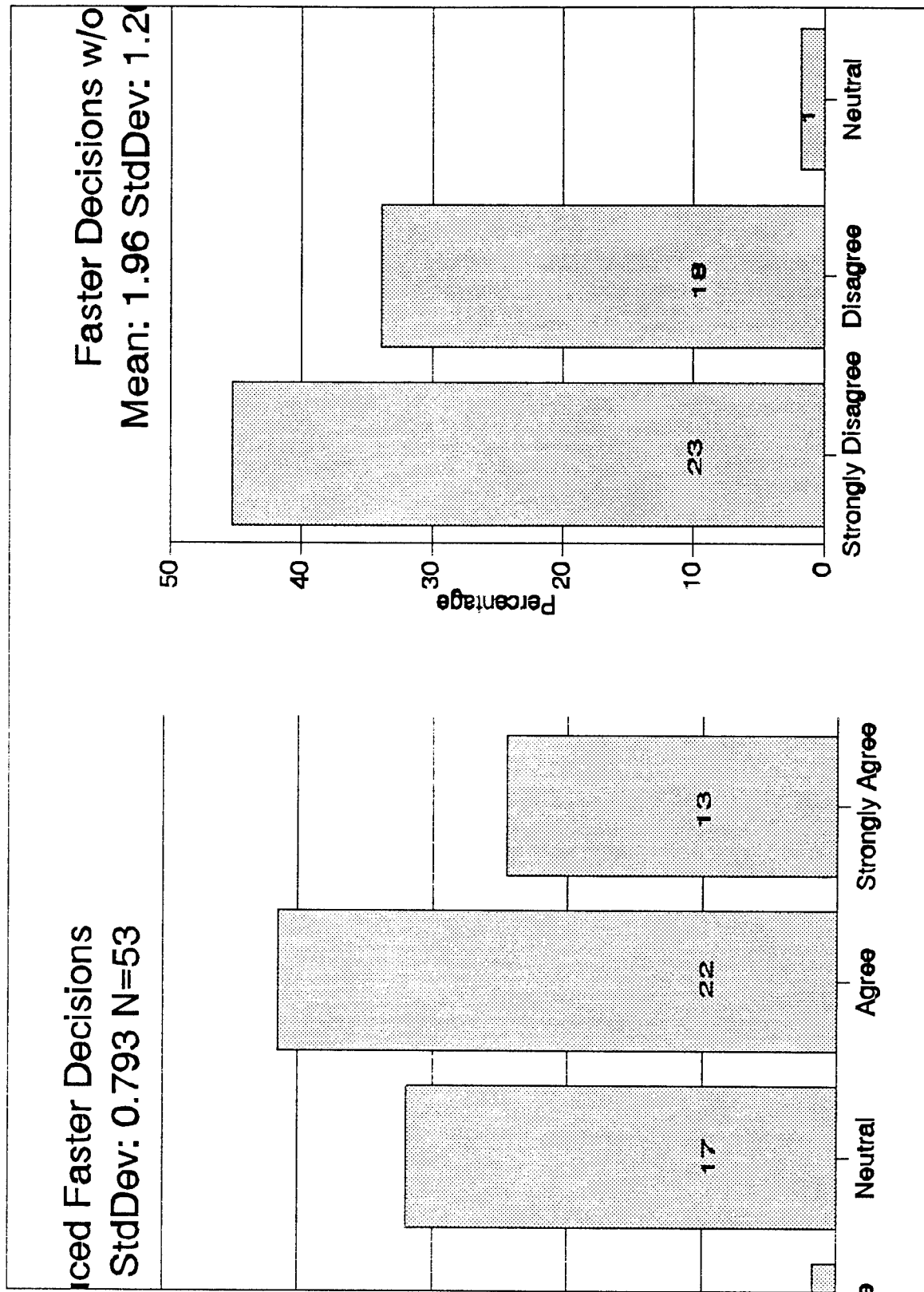


Figure 18: GroupSystems V and Meeting Time (Survey Data)

D. CHANGES IN THE DECISION MAKING PROCESS

From the previous sections it is apparent that a number of issues have affected individual perceptions about the general value of GroupSystems V. The next four points address perceived changes in the decision making process which may indicate participant satisfaction with the electronic meeting support concept embodied by GroupSystems V. The remainder of the discussion focuses on the effect of anonymity on decision making and the impact of GSV on the budget development process at MCB.

From the data presented in this chapter, the perceived effect of GSV on four meeting aspects (meeting length, decision quality, group consensus, and meeting productivity) has positively impacted individual perceptions about the value of using GroupSystems V in meeting environments.

1. Meeting Length

Participant opinions vary greatly about the realization of time savings. Participants who were heavily involved in the budget preparation sessions generally felt that preparing for these GSV supported meetings required a significantly larger investment of their time.

However, perhaps a more objective response is available in the survey results. Data from five different meeting sessions, each with different objectives, indicate 65 percent of the participants felt GSV enabled them to spend less time to accomplish their objectives. An additional 30 percent were neutral. More revealing is the response distribution when asked to respond to the statement that the meeting would have taken less time, given the same objectives, without GSV support. Over 77 percent disagreed with this statement. The general consensus is that GSV does achieve time savings in meetings.

2. Decision Quality

Sixty-four percent of the survey participants felt that GSV support improved the quality of the decisions reached. Conversely, only 5.6 percent felt they could have made a better decision without the support of GroupSystems V. Participants seem to believe that GSV does support the decision making process. This is substantiated by both interview and survey responses.

A contributing factor to the perceived improvement in the decision quality is the breadth and depth of discussions. As one individual noted:

Probably less time was used in the past in the traditional meeting or decision making where there was less reliance on using hard data, hard facts to base your decision on...Every person had a voice using GSV...But the meetings went longer because you were able to gather so much more information and so many more opinions. you spent so much more time sorting through all that. And of course the discussions that followed were much more significant in the way that we arrived at a decision. It wasn't so much a shoot from the hip or the loudest voice being heard and the decision was made, so that's why it took longer.

3. Group Consensus

Another potential indicator of participant satisfaction is the degree of agreement between the desires of the individual and the decision of the group or leader. The individual may not agree with the decision made, but is more accepting of it because he/she better understands the rationale behind the decision due to increased communication and information sharing in the GSV sessions.

The effectiveness of electronic meeting systems in facilitating group consensus is a key feature of GSV. Respondents strongly felt the use of GSV helped achieve consensus among meeting participants. Both interview and the

survey responses supported this perception. Nearly 85 percent of the survey respondents felt that GSV facilitated consensus. The opinion was echoed by interview participant comments throughout the interviews and reinforced by a 96 percent disagreement with the statement that GSV reduces group consensus.

4. Meeting Productivity

Meeting productivity is very subjective. Participant evaluations may be impacted by a number of issues already discussed such as meeting length, degree of consensus achieved, etc. However, if participants feel that the system does not enhance productivity, then the participants are probably not satisfied with GroupSystems V support of meetings and thus would be unlikely to continue to use the system.

While most respondents agreed with the basic premise, that GSV enhances meeting productivity, a number of individuals voiced concerns in other segments of the interview about perceived issues which may have negatively impacted productivity. Representative issues include the amount of time that some specific meetings required of relatively senior officers and GSV's inability to incorporate simple database/spreadsheet functions into the systems operation. Indeed, for many traditional DSS techniques such as linear programming, probabilistic techniques, inventory and network flow problems, GroupSystems V is not effective because it is not designed to support these problem types.

There also appears to be an implicit contradiction between the set answer questions in which the respondents generally indicated agreement and the open-ended responses where system weaknesses were identified. However, this conflict can be resolved by observing that, while the comments reflect respondents' awareness of some inherent limitations with GSV, their set answer responses reflect their opinion

that the overall value added with electronic meeting support outweighs the liabilities.

5. Anonymity

An important GDSS feature is the participant anonymity provided during electronic meetings. However, as was clearly evident in the previous sections, anonymity can affect meetings differently. In observing the three sessions, the researcher noted that during brainstorming sessions meeting members who may not have been active in vocal discussions participated actively by inputting and sending comments or ideas via the electronic medium.

A drawback of the anonymity feature in GSV is the meeting facilitator has no means of knowing if everyone is participating in brainstorming sessions. However, even though this was addressed as a potential problem, the consensus was that the anonymity feature is correlated to greater participation from all meeting members.

In the budget meetings, anonymity was effective only during the voting stage. The feature did not impact the earlier aspects of the budget prioritization sessions because each sponsor had to defend his/her initial input using face-to-face, verbal communication. Anonymous voting, though, allowed individuals to vote their conscience rather than the "politically correct" response.

The data also indicates that during brainstorming, anonymity is effective to help generate ideas. However, if, following idea generation, participants are asked to defend merits of their individual input verbally in a pessimistic or cynical environment, the effectiveness of anonymity in generating ideas in future brainstorming sessions may diminish.

6. MCB Budget Sessions and GSV

The limited role of anonymity during MCB Budget sessions is just one example of the apparently unique effects which GSV has had on the budgeting process. Participant perceptions and participant observations about the nature of the MCB budget sessions account for a significant portion of the response variation for the majority of the questions and survey results.

The extensive commitment of time to prepare for and conduct the meeting by supporting budget personnel within the budget office and other departments is a concern. The commitment of approximately 17 Colonels, plus their supporting staffs for one to three days of meetings reflects a major resource commitment during the budgeting process. This does not include the meeting preparation time which, as alluded to above and discussed earlier in this chapter, is also significant.

The survey results for one budget session (Table 4, Appendix A) reflect that three of 13 respondents felt that using GSV did not help achieve consensus among the group. This appears to be an unusual response distribution since 17 of the 18 interview responses and 38 of the remaining 40 survey respondents felt that GSV contributed to achieving consensus. The presence of the new Commanding General may have affected these results. This budget session was the first GSV supported meeting with the new Commanding General. As a result, there may have been hesitation on the part of meeting participants because of uncertainty about the new Commanding General's perception of electronically supported meetings. Because of this change in meeting leaders and the increase in uncertainty, some participants may have felt less satisfied with the results of the meeting than in previous sessions under the previous Commanding General.

Using GSV to assist budget formulation also identified a serious weakness within GSV. The inability of the system to incorporate basic data summation of numerical information hinders the effectiveness of the system and results in the additional allocation of people and resources to track the cost effects associated with decisions made in GSV.

However, despite the computational limitations of GSV, the initial budget sessions did educate all the participants on the total fiduciary obligations of MCB. The process heightened the awareness of senior management about financial obligations external to their individual departments by involving all of the GSV meeting participants in a way that would have been difficult to achieve by traditional meeting processes. As one individual said,

It (GSV) provides a TQL approach to financial management. Get everyone involved, look at the entire picture, with the experts all together, and come up with a plan to execute.

During interviews, two senior budget personnel recognized that the system was good at accumulating requirements, but felt the traditional process was more efficient and effective because of the increased time and manpower commitment required using GSV. Although the responses from the MCB budget survey (Table 4 in Appendix A) do not reflect total group consensus, seven of 13 respondents felt the system improved the quality of the budget decisions. The remaining six participants were neutral.

Participants appear to feel GSV did contribute to an improved decision making process within the budget sessions despite the system limitations in supporting the budget prioritization objectives. Increased time commitments, reduced perceptions of group consensus in the budget session survey data compared to the interview and aggregate survey data, and limited data processing capabilities negatively

affected the perceptions of the budget session participants. However, respondents recognized that using GSV heightened awareness of individuals about basewide commitments and resulted in greater discussion about commitments. These factors contribute to 12 of 13 survey respondents identifying that GSV supported the decision making process.

VI. MODEL DEFINITION AND EXPLICATION

This chapter proposes a general model of key organizational issues which influence the implementation of groupware⁴ technology in organizations. The model is a synthesis of the previous case studies on GDSS, discussed in the Literature Review, and the findings from the study of the implementation of GroupSystems V at MCB, Camp Pendleton.

The model functions not only as a foundation for future research in organizational implementation, but also as a guide to individuals responsible for implementing groupware. The model provides a summary of essential elements for successful implementation and proposes measures to evaluate the implementation process.

A. MODEL DESCRIPTION AND DEFINITION

Based on participant responses to questions discussed in the previous chapter, and the researcher's observation of electronically supported meetings at MCB, Camp Pendleton, four major issues impacted the implementation of GSV at Camp Pendleton. These issues comprise the basis of the proposed model and are discussed in the following section. The model also defines implementation within the context of groupware technology, proposing two measures for implementation evaluation. Figure 19 summarizes the relationship by a graphical representation of the model. The relation between each issue, measures for implementation evaluation, and the implementation of GSV at Camp Pendleton is more closely examined in section B.

⁴Recall from Chapter 3, that Groupware was defined as "the use of technology to support the work of a group or team" (Ventana, 1993, p. SLG-2), which potentially encompasses a variety of software applications.

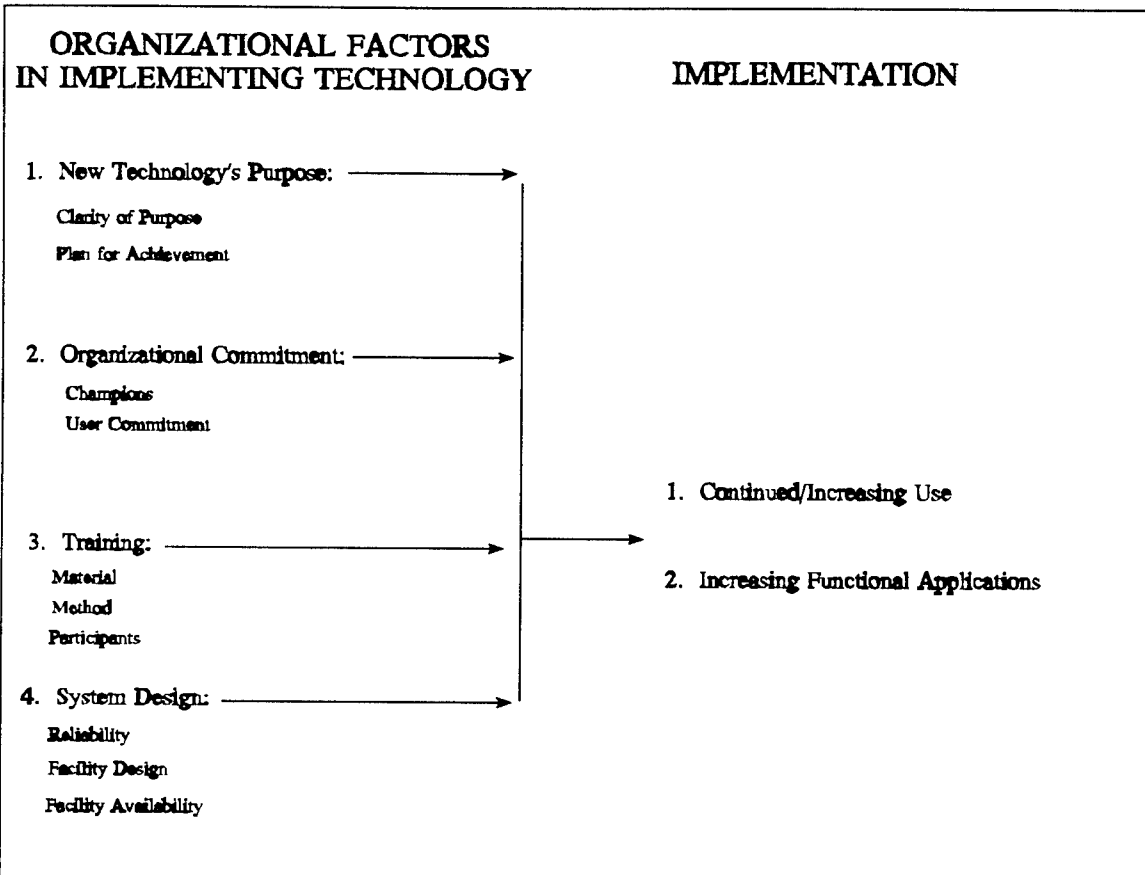


Figure 19: Organizational Model of Software Implementation.

1. Four Factors in Organizational Implementation

a. New Technology's Purpose

New software technology should be introduced into an organization to satisfy a perceived need. When acquiring new technology, management must understand their organization, its needs, objectives, and values. New software technology should be introduced when management believes the technology will meet the needs or objectives of the organization. This requires a clear understanding on the part of management about the purpose for the new technology and how they intend to employ it within their organization.

b. Organizational Commitment

Organizational members' understanding of the purpose of the new technology leads directly to organizational commitment. Members of an organization, recognizing that the new technology satisfies a current need, will commit themselves to using the program. Most change literature focuses on the importance of a "champion" who can see how the technology fills the void and commits to persuading the rest of the organization of the technology's value. Although a champion may be key, sooner or later, if the technology is to be successfully implemented, the entire organization must commit to its use.

c. Training

Essential to gaining organizational commitment is training. Training in this sense encompasses not only instruction on the mechanics of system operation, but a learning process whereby members of the organization recognize the value of the system by understanding how it satisfies an organizational need. Without this fundamental understanding of the theoretical aspects of the technology's applications, the organization will be unable to maximize the value of the technology.

d. System Design

This final section may appear technically oriented. However, there are organizational issues affected by specific aspects of system design. For example, constant failures of the new technology will inevitably affect organizational commitment. Poorly designed facilities housing the technology will adversely impact level of use. These aspects are not software design issues, but rather design issues which focus on fitting the system to the operating environment.

2. Implementation Defined

Current "change" literature provides various perspectives on the "how to" process of implementation, but often the definition of success is either overlooked or else assumed away. As a basis, Webster's defines implementation as "to carry out, to accomplish, to give practical effect to and ensure of actual fulfillment by concrete measures." This general definition comprises two main elements: first, something is to be accomplished and second, the accomplishment is ensured by establishing some evaluation measures. Walsham provides little assistance defining successful implementation, but does identify various measures of successful implementation:

The definition of successful organizational implementation is problematic, and alternative implementation measures include the meeting of strategic objectives, high levels of system use, and the satisfaction of different stakeholder groups. (Walsham, 1993, p. 225)

High levels of system use is one measure of implementation. However, implementation measured by system use may not constitute successful implementation. As Walsham points out in his critique of level of system use as a measure of the success of implementation,

High levels of use do not necessarily imply the effective use of systems in either economic or organizational efficiency terms...For example, the imposition of systems on unwilling stakeholder groups can create a climate of opposition for future initiatives. (Walsham, 1993, p. 226)

Successful implementation encompasses more than just level of use. For the purposes of this study, the author defines **successful implementation as increasing levels of use and expanding functional application of the new technology resulting in improved organizational effectiveness.**

The second aspect of Webster's definition of implementation involves measuring the implementation. Two measures are important in software implementation: increasing levels of use and expanding diversity of application. Significantly, neither of these measures is static; they imply a continuum of change. Increasing levels of use implies that as more individuals are introduced to the software they too will desire to use the system because of its inherent value. Individuals forced to use a system they do not like will minimize their use. Expanding diversity of application builds upon increasing levels of use. As people become more familiar with the software, they begin to apply it in different situations.

An example illustrates these two concepts. A start-up company invests in a "suite" of software applications. Initially, only a few employees use the system's word processing for basic correspondence. As more employees become aware of the system features, usage increases. The company also begins to use the database to track clients and customers; they use the spreadsheet to assist in bookkeeping expanding the functional applications of the system.

B. GROUPSYSTEMS V IMPLEMENTATION AT MCB, CAMP PENDLETON

The remainder of this chapter addresses the implementation of GroupSystems V at MCB, Camp Pendleton in terms of the proposed model. The discussion focuses on the relevance of the data presented in Chapter V to the four factors and implementation.

1. The New Technology's Purpose

Two issues are involved when evaluating the purpose of a new technology: the clarity of purpose and a plan to achieve that purpose. If users do not believe the new technology

provides value to their organization or themselves, they will not maximize the use of the system. However, users may not be aware of a need, even though one exists.

a. Clarity of Purpose

There must be a clearly stated purpose for the new technology. Merely telling members of an organization that they should use a new system, and that it will improve efficiency or effectiveness in the organization, without telling them how the system will help, invites resistance. Management must clearly define for the users how the system fits with the organization. To enlist participation in using a new technology, the leadership must identify how the system will help, not simply demand usage.

The Marine Corps has worked to instill the principles of TQL within the organization for the past few years. The effort has met significant resistance from most of the commands within the Marine Corps. Camp Pendleton was no exception. The Commanding General recognized this resistance in his organization and felt that GSV would facilitate the TQL process:

the Marine Corps has had a very difficult time implementing TQL. And the reason is that people can't see results. They can't see involvement because it takes so long with people writing on butcher paper, trying to order things. I saw this as a great way as a means to an end. To try and turn TQL around and have a product that people could relate to and you could get to a decision point.

The Commanding General had identified a need for, and the objective of GroupSystems V: to facilitate the use of quality management principles within the organization. This idea was his vision. He communicated his purpose in both word and deed. He spoke about GSV whenever he had a chance. That over

62 percent of the interviewees learned about the system from the Commanding General and 50 percent understood the system's purpose was to facilitate TQL at Camp Pendleton, illustrates the effectiveness of his communication. However, he also embodied it in concrete applications by personally demonstrating the ability of the system to facilitate meeting activities such as brainstorming, categorizing and prioritizing. The Commanding General's initial sessions using GSV helped him define the purpose of the system for other users.

b. Implementation Plan

The Commanding General's demonstration of potential applications of GSV implies that he had developed some basic ideas, a simple plan, about how he would introduce the system to users. Bullen and Bennett emphasize the importance of planning implementation: "Whether this strategy of technology introduction is made explicit or kept implicit, it exists and can have a significant impact on the organization" (Bullen and Bennett, 1992, p.17). Mintzberg notes that "Planning cannot generate strategies. But given viable strategies, it can program them; it can make them operational" (Mintzberg, 1994, p. 112). Initially, only the Commanding General was convinced of the potential value of GroupSystems V to his organization. To communicate his vision, he formulated an informal strategy to enlist participation from prospective users.

The Commanding General used two scenarios to introduce the system to the organization. The first use was in a demonstration to the Assistant Commandant of the Marine Corps:

We used GSV with a rifle squad to get their ideas about how to improve the quality of life aboard Camp Pendleton... We trained the Marines how to use the system and then got some excellent feedback

from them. The General used the feedback to improve some BEQ issues.

This demonstration convinced his seniors at HQMC of the potential value of the system to MCB, resulting in external support for the use of the system.

To ensure that all the staff understood the General's desire to use the system, the Commanding General used GroupSystems V to assist in the development of budget priorities. Using the system quarterly for budgeting issues, demonstrated to the staff that even processes as large as budget formulation could be dealt with from a continuous improvement perspective, given the right tools. A budget exercise was the first meeting in which the entire staff was involved using GSV. GSV continues to be used for budget prioritization by the staff at MCB. The extensive use of GSV for this purpose helps explain the association of GroupSystems V with budget prioritization addressed earlier.

Working towards the ultimate goal of facilitating the implementation of TQL, the Commanding General sent the Marine Corps Base TQL Coordinator to an intensive training session on the capabilities and use of the system. This training provided the TQL Coordinator with an understanding of the potential importance of the system in facilitating TQL. After this training, the TQL Coordinator assumed responsibility for coordinating GSV supported meetings and then facilitating them.

Based on informal conversations with various individuals involved in the system, a formal plan for the implementation of GSV was not developed. However, it is clear that the Commanding General had conceived a basic implementation program. Even though the plan was not formalized, to paraphrase Mintzberg (1994), the Commanding General developed a broad vision, the implementation of which was deliberately

kept informal and flexible, allowing the process to adapt to a changing environment.

2. Organizational Commitment

Perhaps the principal indicator of the potential success of any implementation is the commitment of a large number of individuals to the program or system. The commitment of one or two individuals, which may sustain the program for a period, will not result in an implementation characterized by increasing levels of use and expanding functional application. Instead, these one or two individuals, as the "champions," must develop and foster the commitment of the entire organization. A critical mass of users must develop. An increasing number of individuals, as representatives of the organization, who understand the system, must believe the system contributes value to their work.

In the case of Camp Pendleton, the individual who controlled the resources was also the one who supported the system and was "selling" it to the rest of the base. The Commanding General was the first to perceive a need for a GDSS at MCB and made the necessary resources available for the system's installation. The majority of the users were not involved in the acquisition of the system. Since the Commanding General wanted it, they got it. As a result, the only individual initially committed to the program was the Commanding General.

a. System Champion: The Executive Sponsor

The Commanding General's commitment to using GSV at MCB, Camp Pendleton is possibly the most significant factor in the successful introduction of GroupSystems V into this organization. The impact that a commander has on how a system is perceived by the users is immense.

The importance of a high level champion such as the Commanding General is revealed in the responses of how individuals at Camp Pendleton first learned about GroupSystems V. Of the individuals who were at the base when GSV was first introduced, 62 percent learned about the system from the Commanding General. As the champion of the system, the Commanding General promoted it before it was initially used and explained how it would support various processes in meetings.

In the military establishment, use can be directed, and people will use a system because they may feel compelled by the pressure of their leader. As the Commanding General, this system champion was also able to profoundly influence system use. He was in a position to direct his staff and junior commanders to attend budget development meetings supported by GSV. As the executive sponsor of the system, by the nature of his position, the Commanding General created a climate of support for GroupSystems V. Individuals who may have balked at having to try something new had it been anybody else's program, were obliged to "get on board" with the system.

From this perspective, high level system champions can help implement a new technology in at least three ways: they can expedite processes and commit resources to solve problems confronting lower level management; respected within their organization, they can help "sell" a new system to potential users; and finally, they are in a position to exert their influence to generate initial system use.

b. System Champion: The Operating Sponsor

The Commanding General, while actively supporting the use of the system and removing roadblocks to installation, lacks the time to be deeply involved in the intricate details that must be addressed in introducing a

system to an organization. For GSV, the TQL Coordinator assumed unofficial responsibility as the operating sponsor. The TQL coordinator was deeply involved in agenda preparation, identifying meeting participants, system planning, session facilitation, and finally, meeting wrap-up. These are the daily activities which an executive sponsor doesn't have time for, but without their completion, GSV supported meetings would fail.

Besides various meeting preparation activities, the operating sponsor was directly involved with system training and positioned to influence the expectations of management and respond to their concerns.

c. User Commitment

Ultimately, the efforts of the system champions will be for naught if they fail to develop commitment to the new technology within the potential users. As alluded to at the beginning of this section, without users who believe in the purpose and value of the technology, support and use of the new technology will gradually diminish. Grohowski reinforces the importance of addressing user expectations, and therein gaining user commitment: "Meeting managerial expectations is the ultimate indicator of successful EMS implementation" (Grohowski et al., 1990, p. 382).

One element in gaining user commitment is to ensure the users understand the purpose of the technology and how it is intended to impact the organization. The Commanding General's purpose in implementing GSV into the organization was to provide a tool which would facilitate the implementation of TQL. How clearly the Commanding General's intent and therein the purpose of GroupSystems V was communicated to the users is revealed by the responses to the question which asked "Why did the Commanding General purchase GroupSystems V for MCB?" Over 50 percent of the responses

directly addressed TQL or associated concepts such as consensus and improved communications. However, approximately 30 percent of the responses associated the purpose of GSV with the budget exercises. This association may be a function of the sample population and their personal meeting experience using GroupSystems V with the Commanding General, but it does reflect a fundamental disagreement about the purpose of the system. Although the purpose of GroupSystems V did not reach all of the system users, it is clear that the Commanding General did effectively communicate his purpose (using GSV as a tool to facilitate TQL) to most of them.

Another element in garnering this support involves successfully managing the expectations of the users after they begin to use the system. At Camp Pendleton, the manner in which the system champions managed user expectations, both before using the system and after the first experience, had a great impact on the implementation of GroupSystems V.

The realization of individual expectations during the first meeting demanded expectation management. Some users were disappointed with the system, having mistakenly believed it to have spreadsheet or database capabilities. Other participants were frustrated with repeated problems of system operation. The champions had to convince individuals that although the system did not meet user expectations in every respect, issues such as system reliability and timeliness were problems that could be dealt with and corrected. Additionally, the champions emphasized the positive aspects of the system.

Again of course, the commanding general's influence in getting individuals to work with a system is sizeable. People who might have walked out because the system did not function as a database, instead used an alternative method to perform the database functions. Because the initial meeting with all the staff was a budget session with a week reserved

to accomplish all of the objectives, the champions had the means to ensure all participants used the system over a number of days. The length and importance of the meeting, as well as the commanding general's presence, prevented impatient, frustrated individuals from walking out of the meeting. It also allowed initial system operation and technographer skill levels to improve throughout the week. Additionally, meeting participants became more familiar with the mechanics of using the system.

From the discussions above, it is clear that the system champions attempted to shape user attitudes. How successful were they in meeting management expectations? The participant impressions that GSV generally supports improved decision quality, increased group consensus, and greater productivity in less time than it would take to conduct the meeting without GroupSystems support indicate participant satisfaction with the process. Participant satisfaction implies some degree of user commitment.

In summary, it appears that although users may have initially been disappointed with the realization that GSV was not capable of meeting all of their expectations and frustrated with system reliability problems, the system champions have demonstrated and convinced a majority of users that GSV addresses some of the organization's needs. The survey results and interview responses indicate users perceive that using GSV adds value to group-oriented tasks.

3. Training Requirements

Much of the learning about the capabilities of GroupSystems V has come through its use during meetings. Because GSV is a new technology to the Marine Corps, the inherent value of the system and knowledge of its applications is not obvious to the users. Training and education can mitigate the effects of the foreign nature of the technology.

The success of the implementation is driven in part by the training process. Determining who participates in the training, what is discussed, and how it is presented directly affects the success of systems introduction into the organization.

a. Participants

The first question to be addressed is "who needs formal training provided by the contractor?" This is ultimately a cost-benefit issue. Since course registration costs average 500 dollars per individual, it is not practical to send every potential system user to the manufacturer's two day course. In the case of Camp Pendleton, formal training with the corporate representatives was limited to facilitators and technographers.

The remainder of the system users (meeting participants and group leaders) received a basic hands-on class which presented the mechanics of system operation prior to and during meeting sessions. As discussed in the previous chapter, meeting participants and group leaders felt the 15 minute, hands-on lesson in the mechanics of using the tools, was quite sufficient to meet their needs.

At first glance, this appears to be a logical method for determining training requirements for various users. Theoretically, by providing the more extensive training to the facilitators, when a group leader wanted to have a meeting and knew the meeting's objective, the facilitator would be able to suggest GroupSystems V use when appropriate. Unfortunately, this leaves the meeting leader dependent on a facilitator to recommend the best method to support a meeting's objectives. The process described could limit the level and application of the system. Three facilitators probably have fewer ideas about applications than 15 meeting leaders. This does not suggest there is no value in training facilitators.

Facilitator training is necessary. However, meeting leaders, possessing a better understanding of the theoretical applications of the system, are then in a position to identify opportunities for the application of GSV rather than depending on a facilitator. Providing more potential users, especially meeting leaders, with better education on the system, the level and variety of application would increase.

b. Material

Bullen and Bennett contend that training participants and group leaders in the mechanics of the system while avoiding the theory behind the system, limits the functional use or application variety of the system (Bullen and Bennett, 1992). This is substantiated by GSV use at MCB, Camp Pendleton. The principal use of GSV at the base has focused on supporting budget prioritization efforts. The limited variety of system application is revealed by the relative use of various tools within GSV. Of the 14 tools incorporated in the Meeting Manager of GSV, (excluding the briefcase applications) only four -- Brainstorming, Categorizer, Vote and Topic Commentor -- are generally used.

From participant observation, it was clear that while a number of individuals believed the system added value to their meeting processes, few had any ideas about how GSV could be used outside of the applications they were already familiar with.

The implication is that individual participants do not understand all of the concepts GSV is designed to support. This limited understanding results from the focus on demonstrating the mechanical requirements (which keys to press in which order) to use a tool. Unfortunately, even the training conducted by manufacturer representatives places emphasis on the mechanics of using the system. Understanding the mechanics is insufficient to meet the requirements for

successful implementation. There must be a focus on understanding goals and purposes of the technology and how it can meet the needs of the organizations. Some members of the organization must conceptually understand the purpose of the technology and be able to identify opportunities for application.

c. Method

For meeting participants the present hands-on training method, focusing on the mechanics, and conducted in a few minutes preceding a meeting, appears adequate. This short, pre-meeting refresher process provides enough information to actively participate in the meeting. Unfortunately, this pre-meeting method does not facilitate increased levels of use or expanded functional application. As a result, the short course method is inadequate for meeting leaders.

Meeting leaders also require the basic knowledge of the system mechanics, making the hands-on environment ideal. However, to achieve a more complete understanding of the systems value requires that hands-on applications be rooted in a facilitated, group-oriented, problem solving environment which highlights the functional capabilities of GSV. The facilitator enhances the learning process by suggesting GSV tool use to help meet particular objectives.

4. System Design

Three issues related to system design significantly impact organizational implementation of a new technology. The design issues of reliability and availability directly affect user expectations about the system. Additionally facility design, based on the researcher's observation, can potentially impact the group dynamics of the organization using the EMS.

a. Hardware-Software Reliability

Comments illustrate that the perceived low reliability of the system negatively influenced individual expectations about the system. Despite efforts to improve the situation, comments from fast feedback surveys continue to reflect poor system reliability. It is difficult to garner enthusiastic support for a system which is not reliable. It is even more difficult to get meeting leaders to want to use a system which takes part of the meeting just to get operational. To be accepted and used, the system being implemented into an organization must be operational when the users require. At MCB, Camp Pendleton, poor system reliability is a continuing problem which dampens enthusiasm to use the system.

b. System Availability

Another aspect affecting level of use is system availability. An inaccessible system is of little use. GSV meeting room availability at MCB is affected by two major factors: competing interests for the facility and the proximity of the system to the users.

The GroupSystems V meeting room is housed in the Base Command Center. It is a common conference room which supports numerous tenant activities. Training is conducted at the command center for various supply and fiscal activities. Other organizations regularly use the Command Center for larger conferences. These various activities restrict the amount of time available for GroupSystems V meetings.

A number of system users are also geographically separated from the GroupSystems V meeting room. This increases the logistical difficulty of using the system. The difficulty in reserving the meeting room and getting everyone together, while not a GSV problem, is an organizational management issue that deters potential users. One participant

mentioned using Group Link for remote users during synchronous meetings. The potential of using Group Link has not been fully explored at Camp Pendleton. Hardware configuration problems have prevented a large-scale attempt to conduct a synchronous, dispersed meeting. However, if the hardware limitations could be overcome, then Group Link may provide an alternative to the synchronous, face-to-face meeting environment.

c. Facility and Environment

The layout and furnishing of an electronic meeting room has significant implications for group dynamics. Grohowski, in the study of IBM, noted that "facilities that look like laboratories or training rooms with EMS installed as an afterthought tend to evoke poor response from executive users" (Grohowski, et al. 1990, p.380). Creating an environment in which managers feel comfortable working will enhance managements willingness to use the meeting room. Facility design must consider several variables such as lighting, noise, air-conditioning, communication patterns, and workstation layout.

The preceding discussion of system availability reflects a limitation in the design of the facility. Designing the meeting room as a dedicated GDSS facility reduces conflicts between GSV users and facility users with alternate objectives, thereby increasing system availability.

The meeting room at Camp Pendleton is not air-conditioned. Participant observation and open-ended survey responses noted the lack of air-conditioning was one of the most prevalent complaints of system users during the summer months. The absence of air-conditioning in a meeting during a meeting with 20-25 participants during summer months in southern California is likely to have a negative impact on user experiences.

As shown in Chapter III, the meeting room at MCB is arranged in a U-shape. This design leads one to expect that the group leader would sit somewhere at the bottom of the U. Centering the higher management around the bottom of the U could result in decreased involvement/interaction from participants at the remote ends. Such an arrangement could negatively impact the communication patterns of the group. At the MCB budget meetings, in which the Commanding General was the group leader, the Commanding General was seated towards the end of one of the U's arms. This arrangement distributed the power around the configuration and based on the researcher's observation, mitigated the convergent effects of the U shaped table.

In the GSV meeting room each meeting participant has a dedicated workstation. This gives all meeting participants an equal chance to contribute and provide input. Each workstation also has a hard drive, permitting storage of personal notes generated using GSV's Briefcase accessory. Additionally, each workstation is equipped with a telephone, allowing meeting participants to contact their office for additional information without having to leave the meeting. Thoughtfully designed workstations meet management expectations by supporting individuals' efforts as they interact in the GSV environment.

The design of the GroupSystems V meeting room at Camp Pendleton has affected implementation. Although areas exist where facility design could have been improved, the attention to workstation design, group communication patterns and, to the extent possible, aesthetics and participant comfort, has created the environment of an executive meeting room. This environment positively affects meeting experiences of users.

The impact of the problems with system reliability, availability, and facility design has not been fully realized

yet. Within the next year, as system usage continues under new leadership, poor reliability, limited availability and lack of air-conditioning may significantly affect the frequency of facility use by groups.

5. Measuring Implementation

Measurement and evaluation of implementation were not a focus of this study. However, it is an integral element of the proposed model and therefore warrants discussion. How could increasing levels of use and expanding functional application be evaluated in the GroupSystems V environment at MCB, Camp Pendleton? Although data was not accumulated to measure the success of the implementation, there are a number of ways to measure the implementation.

Given there is only one meeting room, one measure of increasing levels of use is simply to identify the frequency of system use over time. The Command Center maintains calendars as a record of operations which illustrates the times GSV was reserved for use each month. If a trend can be established indicating more meeting sessions are being conducted, then this supports the increasing levels of use measurement.

An indication of whether the functional application is expanding would be to record the meeting objective or purpose and the GSV tools used to support the meeting. This measures variety of application in two ways. First, if groups are using the system for an increasingly diverse meeting objectives, then the functional application of the system to various meeting objectives is increasing. If the number of tools used within meetings increases, then it is reflective of an increasing functional application of the system within the constraints of the meeting objective.

C. SUMMARY

Four key factors (new technology's purpose, organizational commitment, training and system design) were important in the implementation of GSV at Camp Pendleton. The model of organizational implementation proposes that an awareness and understanding of these key factors is essential to the successful implementation of groupware technology in organizations. The discussion illustrates the importance of these factors in the implementation process at Camp Pendleton.

The second element of the model defined implementation and proposed two measures (increasing levels of use and expanding functional application) by which to evaluate the success of the implementation process.

VII. CONCLUSION

This case study focused on the implementation of a GDSS at MCB, Camp Pendleton. The objective was to identify the factors affecting the organizational implementation of GDSS and the changes in the decision making process resulting from the use of GSV.

A. FACTORS AFFECTING THE IMPLEMENTATION OF GSV AT MCB, CAMP PENDLETON

This section briefly presents the four factors which were found to have affected the implementation of GSV at MCB, Camp Pendleton in the previous chapter.

1. New Technology's Purpose

It is important to have a clear vision of the purpose of the system. Additionally, a plan must be developed by the system champions for introducing the system to the rest of the organization. The plan does not necessarily need to be formalized, but it must exist.

The purpose of GroupSystems V was to facilitate the use of TQL processes and techniques at Camp Pendleton. The Commanding General developed an informal plan to implement GSV at Camp Pendleton which was characterized by the process in which he first trained essential staff in the use of GSV, then demonstrated GSV's value to potential users, and finally, used the system for budget sessions.

2. Organizational Commitment

To convey the purpose of the technology and enlist participation, system champions that believe in the capabilities of the technology and have a vision for potential applications are required. They must communicate the value of the technology to the users, but they must also develop user

commitment to the technology. At Camp Pendleton, the Commanding General and the TQL Coordinator were the GroupSystems V champions and appear to have been effective in addressing these issues.

User commitment is the ultimate predictor of a program's success. If users do not perceive value in a technology, the technology will gradually fall into disuse. As a result, users must understand the purpose of the new technology and the principles behind its use. Users believe the system does add value to a number of meeting processes. The exception appears to be the GSV budget sessions in which participant opinions were divided.

3. Training

To use a new technology requires training. To exploit the potential of a new technology and use it to increase the effectiveness of the organization requires learning and understanding. Training at Camp Pendleton tended to focus on mechanical aspects of system operation. As a result, managers do not fully comprehend the theoretical possibilities and capabilities of GSV and as a result do not recognize potential benefits which can be gained from new applications of the technology.

4. System Design

System design requires looking at the setting in which the system will be used. The facility must be appealing to the users. This involves designing the environment to suit the user group. Camp Pendleton's meeting room is laid out as an executive conference room, with recessed computers and a telephone at each station, creating a professional appearance. However, the system must also be available for use and be reliable. The meeting room at Camp Pendleton, was fairly well designed. However, not having a dedicated meeting room,

perceptions of poor system reliability, and lack of air-conditioning deters potential users.

B. EVOLUTION

None of the factors previously described are static, point in time issues. The implementation of GroupSystems V at Camp Pendleton is not complete. The Commanding General, as the system's champion, strongly influenced the level of use. With the turnover of commanders at MCB, the true test will be whether the system continues to be used.

C. CHANGES IN THE DECISION MAKING PROCESS

A secondary research question centered on identifying how GSV affected the decision making process. Given a well planned meeting, participants felt that GSV:

- Reduced the time required to accomplish meeting objectives;
- Improved group consensus regarding the final decision;
- Improved the quality of the decisions made;
- Enhanced overall meeting productivity.

Perhaps the key point to recognize in this analysis, however, is that GSV did not change the decision making process. People caused the decision making process to change.

GSV was basically driven by Gen. Lynch. He was the guy with the vision that brought it here. I think the decision-making process would have been changed anyway because of General Lynch and his approach using TQL. I think GSV helped to really formalize it. It is a tool and I think the decision-making process changed because Gen. Lynch allowed it to change.

As has already been pointed out, the implementation of change, any change, is an evolutionary process, a process that

is dependent on people. Although the mechanics appear to be in place to establish GroupSystems V as a tool to facilitate meetings, successful implementation of any new technology is dependent on users' knowledge and understanding of the technology and its theory which enables them to identify the technology's applications. The environment at Camp Pendleton has changed. The champion has left. The success of the implementation of GroupSystems V will be fully tested in the coming year.

D. DIRECTIONS FOR FUTURE RESEARCH

This case study addressed only the issues associated with the implementation of GroupSystems V at MCB, Camp Pendleton. Out of this study, additional research in the following areas will be valuable:

- Cost - Benefit Analysis: This research did not attempt to evaluate the benefits participants gained from using GSV against the costs. However, a number of participant comments indicate this is a concern.
- Measures of Success: The analysis focused on identifying and evaluating the variables which appear to be involved with the implementation of a new technology. Evaluating the ultimate success of the implementation was not an objective. The fact that the implementation process of GSV at MCB, Camp Pendleton is not complete suggests that future research focusing on identifying measures with which to evaluate the success of the organizational implementation process would be of value and address the desired effects of the model proposed in this study.
- Model Validation: The validity of the proposed model should also be evaluated against other organizations in the process of implementing new technology to verify the relevance and evaluate in more depth the effects of each major factor.
- Effects of Anonymity: The manufacturer of GroupSystems V suggests that the effects of anonymity are significant in improving the discussion and decision

making process. Interview participants' opinions on this subject varied. The effects of anonymity on the decision making process warrant further research.

- Appropriateness of Task/Objective: The marked difference in responses about the effectiveness of GSV in supporting different meeting objectives (e.g., the budget sessions) suggests that the value added by the system may depend in part on the meeting objectives and the ability of GSV to support the specific objective.

This short list provides some indication that the value of Group Decision Support Systems is by no means established. More research and analysis is required to determine the ultimate effectiveness of GroupSystems V and GDSS in general.

APPENDIX A. SURVEY DATA

This appendix presents the data obtained from five individual GroupSystems V survey sessions. Each table presents the response data from one survey.

Response: Questions:	1	2	3	4	5
Given today's agenda and meeting objectives,					
a. GSV supported the decision-making process.			1	10	2
b. GSV helped achieve consensus among the group.		3	3	4	3
c. GSV improved the quality of the decisions reached today.			6	6	1
d. It took less time to accomplish our objectives using GSV.		1	3	9	
Given the same meeting agenda and objectives, but without GSV:					
a. This meeting would have taken less time.	4	3	1	2	3
b. We would have made better decisions.	1	7	4	1	
c. There would have been a higher degree of consensus among the group.	2	7	4		

Column Definitions:

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neutral
- 4 - Agree
- 5 - Strongly Agree

Table 4: Annual Budget Brief Survey

Response: Questions:	1	2	3	4	5
Given today's agenda and meeting objectives,					
a. GSV supported the decision-making process.			1	6	5
b. GSV helped achieve consensus among the group.				4	8
c. GSV improved the quality of the decisions reached today.	1	2	5	3	1
d. It took less time to accomplish our objectives using GSV.			6	3	3
Given the same meeting agenda and objectives, but without GSV:					
a. This meeting would have taken less time.	6	5			
b. We would have made better decisions.	2	6	3		
c. There would have been a higher degree of consensus among the group.	1	5	4	1	

Column Definitions:

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neutral
- 4 - Agree
- 5 - Strongly Agree

Table 5: TQL Seminar W/ GSV Introduction

Response: Questions:	1	2	3	4	5
Given today's agenda and meeting objectives,					
a. GSV supported the decision-making process.					9
b. GSV helped achieve consensus among the group.	1			1	7
c. GSV improved the quality of the decisions reached today.				3	6
d. It took less time to accomplish our objectives using GSV.			1	2	6
Given the same meeting agenda and objectives, but without GSV:					
a. This meeting would have taken less time.	5	3			
b. We would have made better decisions.	4	4	1		
c. There would have been a higher degree of consensus among the group.	5	3	1		

Column Definitions:

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neutral
- 4 - Agree
- 5 - Strongly Agree

Table 6: Facilities Working Group W/ GSV

Response: Questions:	1	2	3	4	5
Given today's agenda and meeting objectives,					
a. GSV supported the decision-making process.					4
b. GSV helped achieve consensus among the group.				1	3
c. GSV improved the quality of the decisions reached today.					4
d. It took less time to accomplish our objectives using GSV.				1	3
Given the same meeting agenda and objectives, but without GSV:					
a. This meeting would have taken less time.	2	1		1	
b. We would have made better decisions.	2	2			
c. There would have been a higher degree of consensus among the group.	2	2			

Column Definitions:

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neutral
- 4 - Agree
- 5 - Strongly Agree

Table 7: Dental Bn Exercise W/ GSV

Response: Questions:	1	2	3	4	5
Given today's agenda and meeting objectives,					
a. GSV supported the decision-making process.				7	8
b. GSV helped achieve consensus among the group.			1	4	10
c. GSV improved the quality of the decisions reached today.		1	4	6	4
d. It took less time to accomplish our objectives using GSV.			7	7	1
Given the same meeting agenda and objectives, but without GSV:					
a. This meeting would have taken less time.	6	6		2	1
b. We would have made better decisions.	2	8	3	1	1
c. There would have been a higher degree of consensus among the group.	2	10	1	1	1

Column Definitions:

- 1 - Strongly Disagree
- 2 - Disagree
- 3 - Neutral
- 4 - Agree
- 5 - Strongly Agree

Table 8: MCRD Exercise W/ GSV

APPENDIX B. INTERVIEW TRANSCRIPTS

This appendix contains the transcripts of the participants responses. Answers to various questions have been coded by number to reflect the specific individual providing the response. These numbers are consistent throughout the transcript. Additionally, questions are numbered in the same sequence as presented in Chapter V to facilitate referencing.

A. INTERVIEW DATA

1. Initial GroupSystems V Experiences

a. *How did you learn about GroupSystems V?*

- 01: General Lynch swore by it after seeing it at a demonstration back on the East Coast.
- 02: A year ago, Sept of 93 because of the budget formulation that General Lynch wanted input.
- 03: That was maybe about a year ago when I first heard about it. I first used it last fall.
- 04: Another Assistant Chief of Staff mentioned it to me in passing, but he also briefed the CG. Mentioned that there was this great decision-making aid. Gen. Lynch decided that this was a tool he could use locally. He has become one of its primary proponents.
- 05: It was ongoing when I arrived in Camp Pendleton.
- 10: I checked in July 19, 1993. The system was up and somewhat running. The system had been installed in the command center and was running on a 386 server with Zenith 248 machines -you know- 286 stations. The day I checked in I was told Assistant Commandant would be there tomorrow to see it demonstrated and make sure that there are no problems. That was my introduction to GSV. I was told to make sure there were no problems for the brief the next morning.

- 16: The CG went back to the National War College and saw it. He brought the idea back to me. I then checked on the acquisition information and details. We purchased it through GSA and installed it on our existing hardware. We had some difficulties getting it to work initially.
- 17: When I checked in in December, I replaced the previous technographer.
- 18: The department was using it when I came on as the TQL coordinator.
- 19: The battalion commander wanted to use it in preparation for training. That was March of 93.
- 20: I learned about GSV by seeing an actual demonstration by the company who developed it.

b. Before you used GroupSystems V, what did you believe were its capabilities?

- 01: It was a meeting manager tool theoretically. I thought it would have a significant impact on our being able to make the right decision in a timely manner.
- 02: I really didn't know, I didn't know that much about the system. I was told it was a good decision-making tool and we would be learning about the system how to use it.
- 03: It would provide the capability to prioritize and assign weights, where you could have weighted values and the computer would basically generate relative priorities for whatever you were looking at.
- 04: Sounded like it could be a really good tool to help decision making as they explained it. But I think I got to expect more than what it could deliver from talking to Gen. Lynch about what it could do. I was under the impression that it could do a lot more than it actually could. I think the first time I used it, I came away somewhat disappointed. Not because it didn't do what it was supposed to but because I had gotten to believe that it had more capabilities than it actually did. I was under the impression that it was going to have an addition to the

accumulation of information. That it was going to be somewhat of a database and could provide those functions such as adding the amounts that were plugged in there, giving us totals, giving splits in different manners. Being able to pull out certain portions or requirements and of course it wasn't that, it was not a database tool.

- 05: To enable A/CS, commanders to be involved in prioritization of requirements and actual budgeting so that they'd have a say as to consensus as to what was to be funded on the base. And they'd be able to understand more thoroughly what the requirements were.
- 10: I had no ideas about the capabilities, I had no idea. GroupSystems V has become depending on how you look at it, base wide a tremendous asset, for command center a tremendous pain-in-ass. A tremendous deterrent from me doing what my primary mission is and that's disaster planning and preparation.
- 15: I had heard it was a decision-makers system that protected the anonymity of individuals involved in decision-making. However, the hallmark of a Marine officer is that he has the fortitude to be responsible and defend his beliefs. The risk in the system is a lack of accountability. Decision-making by committee also needs to be guarded.
- 16: It was an automated decision support system. It was a consensus builder, idea generator for brainstorming. It helped on the closure of issues. It also had number crunching abilities for voting and surveys.
- 17: I knew absolutely nothing about the system.
- 18: I had heard it helps run meetings efficiently, anonymously, quickly and you could have minutes produced immediately.
- 19: I thought it would be able to take suggestions and give priorities back. It was kind of a black box with anonymity. But I also saw 14 new computers going into the command center and was upset. My company has one old Zenith 286 computer that isn't capable of running some of

the required programs like the new Smartsuite. A lot of other companies or organizations are in the same bind. Why we put 14 brand new 486 computers into the command center when there are other organizations which need them as badly seemed like poor management of resources.

- 20: I thought the system was very capable of providing the things that we needed to do.

c. Participant training on GroupSystems V is necessary before using GroupSystems V in meetings.

- 02: I'm kind of neutral. Depends on how computer literate you are, how quickly you pick up on things. I mean before you go in you need a little bit, familiarization. It's pretty user friendly.
- 03: Agree, but anybody who's already computer literate only needs 10-15 minutes of hands-on orientation. And if the facilitator puts up the different commands for whatever the required actions are, to input data, send data or add comments, as long as you know what those are it only takes a few minutes to find your way around and your good to go for the rest of the session.
- 06: A minimal degree of familiarization is required. For some users touching a keyboard is a new experience.
- 10: Oh, number one, strongly disagree. 15min training on-line.
- 17: I am neutral. Participants require about 3-5 minutes of OJT.

d. Would you describe the training you received?

- 04: 1-2 hours when we first got together to do a budget review. We all got on the machine and walked through pulling up the program, walked through making entries, we were explained what the program was doing and how it could be used. It involved all the participants being on the

machine and walking through and having the "duty experts" there walking us through. Except there was no such thing as "duty experts" because even the ADP folks were learning it. There were a lot of questions that they didn't have the immediate answer to. I got the sense there was a lot of phone communications between Mis folks and GSV headquarters. Training was conducted at the command center.

- 07: 25 of us were trained as technographers by Ventana a while back but most of us haven't used the system since then. It has pretty much been wasted training. I've forgotten a lot of what we were taught. I think it would be better if they just put a technographer up in the command center to support it full-time.
- 08: Two day class in the command center with Ventana Rep. who walked through some of the sessions.
- 14: We set up a one-day participant training class for the hospital staff. It was a hands-on training using brainstorming and prioritization for the staffing of civilian vacancies. It was held in the command center. Julie McCullogh was the facilitator and trainer.
- 15: It was a short familiarization class that explained an overview of the system and walked through the menus. It was conducted in the command center with Donna Tierney as the facilitator. The real training took place during the actual meeting itself.
- 16: We had OJT for about 2 hours. We used scenarios to generate a brainstorming session and then went through a voting cycle and stakeholder drill.
- 17: I attended the 2 day fundamentals of GroupSystems class in the command center. We used the 486's and had a trainer out from Ventana.
- 18: They provided an orientation briefing, type of hands-on.
- 19: The system is very simple to use. We just had some basic hands-on training before the class and before we moved into a new tool.

e. Can you describe what happened the first time you used GroupSystems V?

- 01: It was a catastrophe. Like trying to watch a monkey screw a football. All the Assistant Chiefs of Staff were in the room. Everyone was pushing buttons and the system was taking forever.
- 02: It was the fear of the unknown, you don't want to feel foolish and make mistakes, but keying in information its very easy as a participant. I really don't remember that much about it. I was suddenly the person that had to key in the budget, I had to do it for all of facilities. I spent many, many hours keying in the information before the meeting. I was using GroupLink to do the keying. Of course when you went to the meeting and saw what it did it was worth it. I was here till 11:30 at night sometimes trying to get it keyed in. We had a lot of system problems. That first meeting preparation I probably spent 40-50 hours trying to get things keyed in. I wasn't real thrilled when it kept going down and we had all these problems. But I think to that a lot of it was we were using the system a lot differently then Ventana, and so everyone was on a learning curve the first time.
- 04: We were working with year end funding with CG.
- 05: We were consolidating the amounts of budget session for the requirements of the first quarter of '95. The first one I sat in on was a quasi-midyear review. Everyone went in and sat down and voted. They discussed what deficiencies we had and if anybody had money to give up to go towards the base's mandatory requirements.
- 10: We did it as an Ops & Trng reorganiztion drill. We didn't use it correctly, we used it more as a gorified word processor. We used GSV but we didn't use it for what its strong points were and thats automating a TQL session. We used it as a place where you could put a lot of data in and then start moving it around. That's word processing, we were wasting a lot of people's time and money.

- 14: I expected that the system would work. There was a lot of down time. On the second day the system was really slow just loading the files. It took us a day just to load the disk.
- 15: I expected the machines to work. Didn't anticipate all the downtime. The data had been loaded in already. Some stations were very slow. This electronic slowdown interfered with the meeting a lot.
- 16: Very effective in assisting the prioritization. Even though it sometimes took 1-2 days, everyone knew in detail what their budgets were. It helped to make the hard decisions.
- 17: It was a good experience. Everything worked.
- 18: It was a powerful tool, wonderful. I loved it.
- 19: We were trying to develop a training plan and determine where priorities should be placed. The company commanders, principal staff officers where the participants.
- 20: We used GSV with a rifle squad to get their ideas about how to improve the quality of life aboard Camp Pendleton. There weren't any technical glitches. We trained the Marines how to use the system and then got some excellent feedback from them. The General used the feedback to improve some BEQ issues.

f. How were your initial expectations about the capabilities of GroupSystems V met the first time you used GroupSystems V?

- 01: It looked like a good management tool, but not the only one for budgeting. The meetings increased our workload in the budget office, but also provided more data which is useful.
- 04: I didn't necessarily understand what the system was going to do for me. And I didn't understand yet that the system didn't have the capability to act as a database.
- 05: I'm impressed by the system in that the whole base is involved in what is going on in the whole base. Everybody sees the problems

environmental is having, the kinds of problems Facilities is having. And as people start to look beyond their own unit they can see that sometimes you have to give up things for the good of the whole. It really is a TQL type process. I also saw that some people tried to be team players, some were in it for themselves, that kind of thing - the human thing came out two. And as far as the system, in that sense, its good because everybody sees what's going on and I think they feel more responsibility to the base instead of just their department.

- 10: I only sat in on one meeting that we really used what the system was designed to use for and in that meeting it worked well. We looked at all the permanent personnel billets for SNCO's and they did a weighting scale for which were the more important billets and that was the SNCO's themselves went through and prioritized that based on the knowledge that we could only fill about 80%.
- 14: It is a really good system for brainstorming, but it is bad for the budget - the system is not a database, it can't keep running totals. Grouping items was also difficult after brainstorming. I spent one full day in preparation for this meeting.
- 15: At the end of the meeting we voted on our level one and two funding priorities. There was not a lot of discussion on the amounts. If a chief of staff or commander said he has done an analysis of the item, the others tended not to question his figures.
- 16: The system did change the decision-making process, but it was predominantly a function of leadership style.
- 17: If you have a good technographer it provides timeliness. You also get input from reluctant participants. The meetings are more relaxed, low stress.
- 19: We had some system problems. A lot of this was because the technographers were not proficient. They were new and really hadn't used the system enough.

20: I saw it as a way to improve meeting effectiveness. It would also help leverage the TQL team process by giving quicker data and results and introduce technology into a backward system.

g. How did your experience affect your thoughts about the system?

02: Everybody presented their budget and everyone saw what everyone was putting there money in and I thought it was great. I thought it was great education for the Colonels on the base. Everybody always thinks 'mine is the most important.' If nothing else it sure showed everybody where the money goes. It was all there nothing was hidden. There was no hidden agenda. Everybody had put in what they thought they needed and told what they were going to spend it for and you saw it in black and white. The Colonel's were responsible for their input and explaining there budget. I think it helped really make Pendleton a team. After a few meetings people were saying well I can give this up to help this person, or maybe they were spending money on the same thing. You weren't working in this little tunnel or this vacuum.

03: It formalized the comments, formalized the issues so that you could still have the discussion, but the meat of what was being discussed wasn't lost in all the talk. It was there for the record and didn't just drop out of sight unless the group made a conscious decision that it wasn't important. Plus it tended to get people to focus on the issue and not on posturing and other things that get in the way on some very difficult issues. At this meeting you had high level staff. I thought it facilitated the interaction among that particular group of people.

04: I still came away with the thoughts that it was interesting and wait to see what else it can do.

05: The process is slow and tedious. It was more or less what I expected, but it is a long process. It ties up the Colonel's more. People that aren't normally so deeply involved in the budget process, so you have a lot of teaching and

explaining and I think that makes it slower.

- 15: It provided more exposure to everyone about base-wide commitments. From the CG's perspective, he should have had two meetings: one for O&M funding levels and another for Training money. There were problems with people not being accountable for responses or comments. This could have been overcome by declaring the commentators identity. When someone types in a response or has a comment then they should identify the source of the comment.
- 16: Not as dynamic a tool for defining mission and vision statements. It is better in guiding principles where lists are generated with brainstorming. It generates more lists faster. Everyone is talking at once versus taking turns talking.
- 17: I think a lot of time could be saved by using Groupwriter for orders. When an order needs to be revised then you can use Groupwriter to do it.
- 19: I was disappointed with the results at the end of the meeting. We weren't able to get immediate feedback at the end of the meetings. It would sometimes take days to get input back from the budget meetings. Another problem we ran into was inputting data. Once data was sent or saved it could not be edited or corrected by the person inputting the data. If it was going to be corrected it had to be corrected by somebody else.

h. In what ways have subsequent meetings changed since you first used GroupSystems V?

- 01: We now use Group Link to identify requirements prior to the meeting.
- 02: The bad part was the it became very apparent that there were certain rules and regs but you had to spend the money on some issues. I think the fact that the General said 'I only have one vote and we're equal, now's the time to say your piece.' I think everyone felt more comfortable. There became more of an attitude 'well I'll give this up because you need it' I think the last

meeting the Gen said we needed 2.5 million dollars and everybody came prepared to give up something. Now we're using the system as a QMB within Facilities. We are looking at possibly reorganizing Facilities. We've been at this 7-8 weeks. This is our second session using GSV. We used it for brainstorming. We have a lot of departments and we're looking to see if we can do business in a better way.

- 04: They haven't changed tremendously from the first budget meeting. The only thing that has changed is we have become more familiar with the systems limitations and have learned how to incorporate other software to make up for the things GSV doesn't do. It is a good tool to accumulate budget requirements, but when we have to do the tallying we still have to punch that information into Lotus 123. In the long run I'd say its been very useful for use.
- 05: It depends on the leader, if you do a vote, it is a lot longer than if you don't. The A/CS's were more knowledgeable in the later meetings and that helped speed up the process too.
- 10: Well, first of all we've improved our hardware so they go a lot faster and don't break down as much. We upgraded the hardware. When we first started we got bogged down, just in waiting and it was so slow. And with GSV building all the flat files, the files would get so large the user would just be waiting and whistling. And that killed it for the user. The user would have to sit around and wait and sit around twiddling his thumbs. The first time we did a huge session and we had it set up correctly it just clicked they were awesome. They were like "why can't the rest of the system be like this we love this system doing it this way.
- 15: I took the officers in my command to a GroupSystems V session. I wanted to familiarize my officers with automated systems. I believe an officer must be computer literate to function in the '90s in both a garrison and a tactical environment. I wanted responses on five questions I asked. It was pretty much free-response based questions. In this meeting -idea generation- there was a lower level of complexity in issues compared to the budget

brief. It really streamlined the process. Without GroupSystems V it would have increased the time required in developing and writing down recommendations. Out of these recommendations I got three types of responses. Those that were outside my area of influence, like bringing the east coast command out here to Pendleton and combining them. Then there were the responses that I could incorporate but I didn't have the resources. I used these for my next budget submission. And finally, the ideas that I could do now and that made sense I made happen.

- 16: For the first meeting all the chiefs of staff and commanders input their own budget during the meeting. Now we do our budget input before the meetings. We then vote and rank it during the meeting and items are upgraded and downgraded based on the voting.
- 17: I have had good experiences. We did have problems with the mobile system at Camp Horno. There were hardware problems. A powerspike blew a lan card in one of the lines. We had problems with the laptops running too long and overheating or slowing down.
- 19: After the technographers became more proficient the system became more reliable meetings began to go faster. We had fewer problems with the system. Everybody became more aware of what their role was in the budget meetings.
- 20: Meetings are getting progressively more sophisticated as we learn more about the system. We are using more tools and different combinations of tools. Senior people are more willing to use the system. They aren't as afraid of it. I think the meetings are becoming more effective.

2. Group Leader and Facilitator Perspectives

a. Why did you choose to use GroupSystems V in meetings?

- 02: For brainstorming and categorizing its wonderful. Everyone sat there and did their input. We have over 200 processes and if we had done this verbally we'd probably still be trying

to identify our processes. Tomorrow we'll validate the list and see if we have duplication. We have 21 categories right now and that's a lot and we might want to see if we can combine some of our categories. I think you know, brainstorming your supposed to put down everything as it comes down out of the peoples mouth and you're not supposed to object to it or reword it or anything. I think this way it definitely gets that way because everyone just keys it in as it comes into their mind and once it is in there is nothing they can do about it until the group reviews it. It's locked in once you press that button that sends it public and there's no debate. I think if you do it verbally its human nature to want to inject something and I think this way it gets done better. And I think it gets done more quickly too especially when, like I said, you've got over 200 items.

- 04: Because the CG directed that we use it. It has proven beneficial. but I can't say that if asked to use that system over the way we were doing it before, I don't know that I would necessarily agree to that. Not because of the system itself, but because of what goes with it. When we do a normal budget call, you put the guidance together, you send it out, you put a due date on it, you get all the data back, you accumulate it, lay it out how you want it. Then you do a lot of communications with the fund administrators, clarify unclear submissions, do the follow up with administrators that didn't make the deadline. That's a process we're familiar with. You put the package together for the CG and he approves it and it is done. When you do GSV, because of the purpose of GSV to make group decision, it winds up dragging out the decision process a lot longer than the old way. Since it was initiated by the CG we had to get his approval, instead of just signing it out, then you have to send out guidance and give people time to input it. Then you have to meet the General's schedule and get a time when everyone can get together. Then you have to have the sessions divided into several days for briefings. But this is something that wasn't being done before and so every staff officer and commander has to brief their budget and that takes several days. And then, we had to take

votes, because the CG was looking for group consensus and that takes time. What I found is that because it takes that time, you really only ended up briefing your high priority items. And that's OK because everyone understands that the low priority items aren't going to get funded, so its OK. You vote only on high priority items. And then after the session, we still have to go back and lay the numbers out, load them into the spreadsheet, make phone calls, the same old thing. That takes a few weeks. It winds up being maybe something that might have been done in a month taking two to three months.

- 17: With people using TQL in meetings you go through this process. You can have spontaneity in the meetings. The technographer and facilitators must be good enough to make it work.
- 18: We used it for our TQL strategic planning to identify key issues. The group was used to using it so I just wanted to maintain the continuity.
- 20: The brainstorming tools like Categorizer and Idea Organizer help get issues surfaced, generate ideas for improvement and I think you really get honest feedback. The voting tools help to rank and prioritize the many issues we need to work on. They also build participation and buy-in on the team. I've also used the Group Writer to work on strategic planning updates and to chop documents. The Group Matrix helps to weigh options against set criteria.

b. GroupSystems V helps achieve meeting objectives.

- 02: I think it focuses you more. It keeps you doing what you're there to do. It is so easy with the mechanism to get your input, change your input and then vote on it if that is what you're there for and then get the results on your vote too.
- 04: It depends on what you feel the objective is. In my mind the objective was to identify the true high priority items and requirements for this command. The system helps you do that but

if you don't use it correctly it doesn't help you do that. For instance, we were given specific definitions for priorities by the CG, and if people adhered to those definitions it would make it very simple. People would input according to those definitions and bam you've got everything laid out. The problem is human nature being what it is, everybody always skirts the definitions, everybody thinks all their requirements are the number one priority. To make the system work you've got to keep people honest by being hard-nosed about it. We tried to do that, but the CG's philosophy is that 'if a commander or staff member tells me that's a level one requirement, then that's the way it is.' So it undermines the intent of the system to have you lay things out. If the individual running the system doesn't stick to it then right away you've lost. Now we do have a vote to try to overcome that, to see if the group agrees that all of these requirements are really level one. You have to have 15 of 17 votes to stay in level one. That works somewhat but I believe there's a tendency to say "I don't want to vote against his because he might vote against mine." There's not as much hard discussion about whether this requirement is really that level of priority. In some instances, folks still don't really know the requirement when it is not their expertise.

10: Because it allows you to focus on the issues, not the recording of the issues. You don't have to wait for the recording to be done. You can get all the ideas up there and quickly separate the wheat from the chaff. You can expeditiously vote on them and have a written record when you walk out. And that's the key, to make it happen while you're there at the meeting. There's no wordsmithing after the meeting with GSV.

15: Assuming meetings are appropriate. It is not a panacea for every meeting. As I said to Captains and commanders in my command: Think of potential applications of this system if you were in an FMF unit and had a mobile GroupSystems V. There is tremendous potential with the Rapid Action Process. We could preformat an OpPlan and then get respective staff input. The preformatted OpPlan would be the boilerplate stuff. Then when we had to use

it, we would just have to put the meat on the bones during the planning phase. Concurrent and parallel planning is redefined. One major objective between I MEF, the Navy and Army joint targeting board was coming to grips with a group target list. With GroupSystems V everything could be brought together. Also, the remote links could be an asset. From the remote link people could plan and conduct meetings. It would save me a minimum of 1-1/2 hours every meeting because I wouldn't have to commute into mainside.

- 16: If the facilitator does the job, then an agenda is prepared that provides and organized tool to keep on track. You don't get out in the weeds, tend to stick to the issues. Less temptation to have sidebar conversations.
- 17: When it is properly applied you can have spontaneity in the meeting. However, some things don't work together. Electronic Brainstorming doesn't convert easily into the Categorizer or Topic Commentor sessions. We use Categorizer for brainstorming.
- 18: For brainstorming, all the ideas were gathered quickly. Everyone had a chance to provide input. Without GroupSystems, the meeting would have taken a lot longer. Voting would have had to be silent. Two hours work using GroupSystems probably saved eight hours worth of work.
- 19: If the objectives are clear, it allows everybody to put input back and forth. On budget meetings it allowed people to have discussion going even before the meeting. Initially the budgets were input and people asked questions through GroupLink. This allowed some questions to be answered before the meeting and the briefer to be prepared to answer some of the other questions during the actual budget meetings.
- 20: The meetings are usually better planned, they take less time and get results. Everyone participates without fear of reprisal - there's more candor or honesty in the responses. There's a whole lot less admin required to meeting minutes and record keeping. I think people like the electric meetings better than the old ones.

c. How has the use of GroupSystems V affected how you prepare for a meeting?

- 02: It hasn't changed it from my point of view because I'm not the tech. All we had to do was come there prepared to throw out the ideas that we had. And all you really have to do is think about that before you go to the meeting. As a facilitator, I used to just talk to whoever was heading the meeting and then we would go in with the chalkboard or whatever we were using. So that's different, you have to let the tech know what you want and what tool you want to be in so they can prepare it.
- 04: Tremendous amount of extra preparatory time. If you want the meeting to go as smoothly as possible, you have to put out specific guidance on what your goals are, the rules and so forth. In order to do that, you have to give it a lot of thought and do a lot of coordination with the people that know the system to make sure that guidance is right on the money. Then getting the sessions ready themselves is significant. I've found that even after having done a couple of them, the curve doesn't improve any because if its been 2-3 months since we've done the last one, you kind of forget about it.
- 16: I have to have my information into the system prior to the meeting. I also must have my briefing notes prepared.
- 17: I meet with the Group Leader at the Command Center and prepare the agenda. Then we walk through the meeting on 2-3 terminals to ensure the group leader, facilitator and myself all understand what is supposed to happen during the meeting.

3. Participant Evaluations

a. Why did the Commanding General, Marine Corps Base purchase GroupSystems V?

- 01: I have no idea.
- 02: Gen. Lynch thought it would be a great way for all his colonels to communicate. He envisioned they would be able to all sit in their office

and not even go to the meetings. I think it's designed to help in meetings in getting information and help reach consensus or at least majority. Giving more people input or the chance to have input.

- 03: I look at it as a tool to facilitate a meeting where you have a significant number of people or a fairly large group of people when you have some significant issues. I mean obviously you wouldn't use it to make decisions for everything, but I think when you have issues that are base-wide or beyond in scope, it does offer some advantages to just an open staff meeting. Nobody can write that fast on a chalkboard or keep track of the dialogue that's going on. Things get lost in conversation sometimes or you start to lose focus if people start to drift off to side issues. When you have the issue on the screen and everybody is looking at it, it tends to keep people focused a little better.
- 04: Because of the shortage of funding to ensure that the funding decisions are not strictly a comptrollers decision. To ensure that it is more of a group recommendation to the CG. Ultimately still a CG decision, but the CG felt that he was making those decisions based on a broader consensus than in the past.
- 05: It provides a TQL approach to financial management. Get everyone involved, look at the entire picture, with the experts all together and come up with a plan to execute. Instead of having one office focus on requirements of the base that may not understand all the support required.
- 10: The CG firmly believes that 90% of the Marine Corps has not gone beyond the word-processing stage with the personnel computer. We treat them as a glorified typewriter. And he saw GSV as one of the ways to break through that. He also saw GSV as a way to speed up the process of TQL in the Marine Corps as our leadership philosophy, as the way we do business. Because if you say to someone you have to do business this way and it's very painful for them or they are unfamiliar with it they will tend not to do it they will resist it. GSV keeps it from

becoming a laborious record keeping nightmare which was the hallmark of TQM. The meetings were great but the record keeping was terrible. How do you take a vote. How do you keep all the stuff recorded. Who was the unlucky person who's the recording secretary for the group.

- 11: General Lynch was back on the east coast. He saw General Boomer there demonstrating GroupSystems V. When General Lynch saw the idea he bought it for Camp Pendleton.
- 15: The Commanding General is a forward thinking individual. He is well read on industry developments. The General was interested in making Camp Pendleton more effective in dealing with scarce resources.
- 17: He used it for the budget, prioritizing the budget.
- 19: It enables organizations to make prioritization and then to expedite the solution to the problem.
- 20: The Commanding General saw it as a way to move the Marines into the 21st century and to leverage the implementation of TQL and participative management.

b. GroupSystems V effectively supports the decision making process.

- 01: Other things are cheaper and just as effective for budgeting. GroupSystems V is not the sole source of decision-making.
- 02: By focusing people, having the information there and allowing them to vote.
- 03: I guess I thought it had more capabilities than what it does. I think there's room to develop some more analytical capability.
- 04: When you use it right it does, but not in all cases. I can't strongly agree because we kind of circumvented the tool itself.
- 05: You've got all the principal players requesting and challenging deficiencies of other units.

You've got the thinkers and the movers and the shakers right there. It doesn't have to be passed to the representative and then passed up and down the chain. In that sense it does.

- 10: It's another tool, I don't know if I strongly agree, I'll say four.
- 11: Everyone has the opportunity to provide personal input irrespective of rank. Equal vote. What I call participatory management.
- 12: Eliminates some unnecessary items, putting everything out in front of everyone. We used it on a flood-ex. It made it easy to make decisions.
- 14: Despite the technical problems it is great for group dynamics. It supports TQL principles and provides immediate results.
- 15: The system can rapidly put opinions on the board so everyone can read them. Many people in meetings talk for the sake of talking. To put it in writing forces them to make succinct, clear responses.
- 16: It is a consensus builder.
- 17: You get a broader range of ideas, nothing is missed. It also gives instantaneous results. Like the session with the Day Care Center. We generated 20 ideas, then ordered them and voted on them based on the comments. GroupSystems allows you to view the comments during votes.
- 18: The anonymity - the admiral's lead paradox, everyone looks to the leader. GroupSystems helps reduce that influence.
- 19: When it is used correctly, if everyone is voting honestly then you get a good process.
- 20: GSV enables teams to get more data quicker. It allows for more participation, removes a lot of fear. People tell more truth about the situation. It creates a forum for people to explore options quickly with data. In the long run, more decisions are based on better facts instead of relying on intuition or only knowing part of the story.

c. How has GroupSystems V changed the decision making process?

- 01: It has lengthened the time and effort required to accomplish it (budget review). There are extra steps. It ties up 17 O-6's for days now with the budget process. Now Colonels are inputting budget data. Then during the meeting they have to brief the group and answer others questions. General Lynch has made the A/CS' and commanders aware of all the financial requirements impacting the base.
- 02: I think it did when Gen. Lynch was here. I think it opened the CG's eyes to some things too. I think he truly considered peoples opinions, he may have been the one to make the final decision, but I think he weighed peoples opinion. Doesn't mean it changed his mind, but he was at least open. Plus it gave him a chance to educate people on the base about what his concerns were. I think he did a very effective job of that.
- 03: GSV was basically driven by Gen. Lynch. He was the guy with the vision that brought it here. I think the decision-making process would have been changed anyway because of General Lynch and his approach using TQL. I think GSV helped to really formalize it. It is a tool and I think the decision-making process changed because Gen. Lynch allowed it to change.
- 04: I do think its given us a better picture of the requirements. Before, because folks were responding to the budget officer instead of the CG, they didn't do as thorough a job as they did with GSV. And because the General was personally admonishing to identify all requirements, I feel like we have a far truer picture of the total requirement than we might have in the past. GSV has helped in that effort, but a lot of that is the CG's focus on the issue.
- 05: It has changed it as a way we do business because final recommendations now are made by group consensus. The process is different but the goal is still the same. Everyone is more involved.

- 11: It is similar to process action team and TQL philosophy. Removes some of the emotional aspect -- Fear of juniors senior relationship. The system gives credence to the written word. It is more of a democratic process. We may still end up with the commander making the decision but it shows that the commander values staff officers input.
- 12: There is more participation by all hands. Dominant personalities influence is reduced. Individuals are more willing to participate.
- 15: It can make it by committee. If a commander says we're going by votes then it is decision-making by committee. If the commander reserves the right to make the decision, then it doesn't change.
- 17: There is a broader spectrum of individuals involved. One session I tech'd for was looking at ways to reduce illegal weapons aboard Camp Pendleton. In the meeting there was one SgtMaj, one SSgt, and 17 Cpls plus myself. This would have been very difficult to make work without GroupSystems.
- 19: It has changed the prioritizations. With GSV you're able to do your homework ahead of time. You can come to a meeting prepared for some of the questions that are going to be asked. It allowed you to make a better decision. We also became aware of the level of fenced funds and how much money is required to be spent on them. It gave everybody a knowledge of what's going on. Core costs were identified-those things that the base had to fund to keep operating.

d. GroupSystems V supported meetings require what amount of time relative to traditional meetings?

- 02: In the beginning it was significantly more, but I think as we learn the process it is getting shorter. Part of the problem is that everyone doesn't have an on-line computer so I have to input it for everybody, or we have to all go over to the command center and spend 4-5 hours keying in the information. Plus the unfamiliarity. You know until you get familiar with something it's always slower. And I think

more people are involved somebody has to write up the budget first and then somebody else may have to go to the terminal and key it in. So right now its taking a lot of time. The first budget meeting the General had before we had GSV it was maybe a day, a day and a half. I think because of the detail and maybe it was just what he was trying to do, make people aware, but we're going to spend three days with the new general in this first budget session. Before it was more of everybody sat there and listened to the others presentation, there weren't that many comments, but in GSV, people are commenting about the other person's. And people can go in there, like we have to have inputted data in a week before and people can go in there and read and make comments and the day of the meeting you have to answer the comments that people put in. So there's a lot more interaction and maybe that's it because before you just went into the meeting that day. got your presentation and that was it, because people hadn't read it ahead of time and they had no way to put comments in, more like a traditional meeting. And it wasn't really a meeting, well it was an information type. It was a brief is what it was. Everybody briefed their budget and that was it. Now you can read it ahead of time and put comments on it if you want.

03: I would say that in some cases they required significantly more time. But you have to put that in perspective. Whereas probably less time was used in the past in the traditional meeting or decision making where there was less reliance on using hard data, hard facts to base your decision on. Or incomplete information. I think another thing that GSV did for us is that it allowed everyone to voice their opinion or provide their unique input on an issue. Rather than a traditional meeting where you may have only a few people given the opportunity to speak just because of time constraints, here you could get an input from every person. Every person had a voice using GSV. All the comments were put up for everyone to see in a very short period of time. But the meetings went longer because you were able to gather so much more information and so many more opinions, you spent so much more time sorting through all that. And of course the discussions that followed were

much more significant in the way that we arrived at a decision. It wasn't so much a shoot from the hip or the loudest voice being heard and the decision was made, so that's why it took longer. If you were to apply the same process without GSV so that every voice was heard, it would take even longer. You've got to put it in perspective.

- 04: Significantly more preparation. During the session itself, here you are tying up the entire staff for a 3-5 day stretch for the budget review. When normally they wouldn't personally be doing these things. And then the amount of time it takes to wrap up all this and put a nice neat package together that makes sense for the CG to ultimately make his decision. The last part isn't any more than the old way. The extra work comes in the preparations and then in the amount of time taken up not just by me, but in the sense of having the entire staff tied up for that amount of time.
- 05: Because you don't have spreadsheets, it doesn't consolidate into spreadsheets, so all of that you need to do over again. Just setting up the meetings, that's just another additional requirement. You have to have the room, the facilitator, a systems person and the big chunk of work is the consolidation and interpretation of data. Prior to a meeting everybody has to input into the system. Corrections can't be made once something is sent except by the group leader. The group leader then has to go in and make corrections. All this is prior to the meeting.
- 09: If time required for planning the meeting is excluded then the time required for the same level of productivity is less as long as the facilitator sticks to the agenda.
- 10: Recordkeeping. You see it all, you can quickly instead of the yellow sticky drill, now you see it, its done. When you vote, how did you vote before? Here its already done, its already there. Tabulating votes its all done. Just by sheer admin load you've reduced your meeting time considerably.
- 11: I don't think the meeting time changes much.

However, it quickly documents in writing what is involved.

- 12: If the meetings are properly planned for.
- 14: Significantly less is for actual meeting time only. It also depends on your experience with the system.
- 15: Again, if we used the remote link, then there are the time/distance forces. I don't have to spend 1-1/2 hours commuting.
- 16: Allows us to get more done in a shorter period. When we leave a meeting we press the command for reports and they are done.
- 17: Preparation time is shorter. Also, scheduled breaks are not required. If someone wants to make a head call he can just get up and go.
- 19: There are a lot of problems logistically. Because there is only one meeting room, getting initial entry into the room is a scheduling problem. When inputting data, corrections can't be done by the individual inputting the data, but by somebody in the comptroller which requires more coordination. Also, during the meetings peoples typing skills may slow them down also. Finally, the transportation involved in getting everybody to the same location takes time.
- 20: Meetings are preplanned, you have set agendas. The tools allow you to tabulate the data quickly. And automatic record keeping--you don't have to have a recorder taking notes anymore.

e. How does the anonymity of GroupSystems V affect meetings?

- 01: It does not affect the meetings for budget aspects. If you don't have the intestinal fortitude to take responsibility for your input you don't get funded. It does encourage pot-shots also.
- 02: Wonderful, especially with the brainstorming session. You know unless somebody really

identified their department you could put anything in there and nobody would know. It really helped on the brainstorming session in facilities. Of course, you don't know if everyone is participating, where if its verbal you can kind of coax people into saying something so you really don't know that you have everyone involved and that's what you want to do is get everybodys input. Plus maybe verbal might stimulate more ideas from other people. They might hear something and if they're not taking the time to look at the screen and see what other people have put in, it might generate more ideas.

- 03: I think it has had a positive impact. Even though after a while you can figure out whose comment it was, initially it allows everybody an open forum to shoot these ideas and comments in. Your comment may be one of dozens by the time the whole thing comes out. I think people are a little more objective about it. And I thought the follow-on discussions people were more considerate of other opinions, other data. I think because it was there in print. It wasn't something somebody had said. If somebody's willing to write something down it carries a little more weight than just talk.
- 04: That hasn't really been a player in ours because our sessions were full disclosure so to speak, with everyone having to brief their requirements. So we never used that portion of it.
- 05: I think its positive because you've got somebody to challenge somebody. As far as being anonymous, since we're in a political arena at least it gets the question into the open and lets somebody know there may or may not be a problem here. I think its enhanced it.
- 10: It's irrelevant. And why? Because everybody types in their stuff and then when they start talking about it whoever invariable types it in explains it when there's a question. People may have never put it in before, but immediately, pride of authorship comes out. Now voting I think it works very well. The anonymity almost goes away in most meetings. I does help getting the initial input it is very valuable cause

the're just typing away and nobody knows. Especially when somebody puts a joke in. It kind of breaks the ice. But the real key is when you vote. The leader doesn't sway it. When you have to put your hand up and a General doesn't put his hand up. You know what I'm saying. These boys, a lot of them didn't get where they are in life by disagreeing with Generals, but in this one they can. And the boss wants someone working for him who will disagree with him. This way you can slam-dunk a pet project.

- 11: It is a matter of personality. Good thinkers may be uncomfortable in the public forum. Good people at putting their thoughts on paper may not be good verbalizers.
- 12: Helps encourage people to express themselves. I remember running meetings and almost begging people to get theri thoughts. This system makes it flow.
- 13: The anonymity feature provides the ability to set aside personalities.
- 14: It affected all phases. It gives people a way to communicate without politically sabotoging themselves. It increased participation.
- 16: It is important. Many ideas are flashed on the screen that never would have been put forward if the person had to say it in front of everyone.
- 17: In every meeting there is at least one dominant person. Other people are intimidated. With GroupSystems V, his comments get equal weight. There are no repercussions. It takes away the possibilities of brown-nosers. You get much more honest opinions
- 19: It is not really anonymous during the budget meetings. Everybody knows who puts in what information. The voting sessionn keeps the anonymity and maybe its more effective because of that.

f. GroupSystems V reduces group consensus when making decisions.

- 02: I don't see why it would. If its used the way we've been using it, it generates conversation and comments and that's usually what gets you to group consensus is when people talk about things. Unless you just don't ever discuss anything, you just you know, then it would definitely.
- 03: I thought decisions were made were based more on Group Consensus than had been arrived at under the more traditional approach. But you gotta remember that because Gen. Lynch introduced this he already had this approach using TQL. This just helped to facilitate him with group consensus making to make decisions.
- 04: That is one benefit, it does pretty much get that consensus. Even if people don't like that they didn't get some money, the can pretty much agree why it had to go somewhere else. But there's still some lack of consensus.
- 05: The group makes the decision. The CG may pass off on it. But whatever the group came up with, that's what he usually goes with. Later, if it had to be reevaluated, the CG would do that. but at least he had initial input.
- 10: It doesn't hinder it. it helps it but not a great deal. It lays it out so you can see what the disagreements are. You've got a feel for how many are for and against it. But as we were discussing, a consensus agreement is probably the worst kind of decision you can get because it doesn't do anything well. But GSV says here it is. You still discuss it and make the decision.
- 11: Topics and comments are displayed on the screen. Everyone has opportunity to have input and a vote.
- 12: Everyone knows exactly where they stand when they walk away from the table. Everyone had an opportunity to put in their two bits.
- 14: The consensus is honest and quantified. If

provides managers numbers which helps them feel comfortable with the decision.

- 15: The time required to achieve consensus is reduced. I remember sitting through a TQL session without GroupSystems and the facilitator required complete consensus before moving to the next item. Well, people got tired of that real quickly and soon just stopped participating. With GroupSystems you don't have to have 100% consensus this helps prevent the apathetic situation.
- 18: I can use the mood-meter. It allows the group to see where you are.
- 19: Everybody sees the big picture and feels like they have an impact in solving the problem.

g. How has GroupSystems V affected you?

- 01: It has provided more tools or data for making recommendations. It hasn't reduced my workload. I still have to go back and contact the commander to validate the priorities.
- 02: From a budget standpoint its created more work for me. We're doing this quarterly budget whereas before it was always a year so that definitely has increased the workload.
- 03: I'm more careful about jotting down ideas or data thats going to be used at that session, because like I said, you input it into the system and its there in print. To a certain extent you try to have maybe more information available than you would. I make a more complete list and thats the only difference.
- 05: It has provided more insight into the requirements of the base. The workload in the budget office has increased. It is a good system, the thought process, the approach, but it needs some macros built in. There is an extra week's worth of work for us after every meeting putting it into usable spreadsheet format.
- 09: More time is required for GroupSystems planning than with traditional meetings. Meeting

planning requires the facilitator, group leader and the technographer get together before the meeting to plan it. As a technographer, about 40% of meeting related time is spent planning and preparing, 50% in the meeting, and 10% in consensus, print reports etc.

- 10: Like having a boat anchor around my neck. GSV limits my effectiveness to do my principal job because it resides in my space and takes up a lot of my time. In the past it has. Now that we've hired a GSV administrator hopefully much of that burdent will pass over to her.
- 11: I have the opportunity to see printout as homework and then work with those. It gives a neat, clean package. Everyone is on the same sheet. The methodology of note taking is different with every individual.
- 12: It has reduced the amount of preparation required as a participant in on-going meetings. Reports are provided which requires less time in preparing personal notes and reviewing them.
- 14: I am using the results of our first meeting in the budget review right now. However, I don't see us doing it again. I do see the directors using GroupSystems within their divisions to meet some of their requirements.
- 16: I haven't used it as much as I desired. Access is a problem. We started our strategic plan in the conference room. Then we moved into the GroupSystems V room and compressed the time 3-4 fold.
- 18: People are more focused when the meeting is going on. Pre-meeting planning is very important. GroupSystems keeps folks into the subject at hand.
- 19: I have gotten the most use from the budget meetings. It would be nice though if it could interface with other software.
- 20: My biggest concerns with the system is the technical support. All of our primary systems technicians and technographers are Marines who rotate frequently. This means constant training. Also, the learning curve on the

system for technographers is long. It seems as soon as someone is trained and becomes effective on the system, they're transferred. We've also had technical communications problems with the LAN that interferes with the effective use of the system.

h. There are better alternatives to GroupSystems

V.

- 04: That's very subjective. If your purpose is to ensure everybody participates that everybody is educated on the requirements of the base, then I don't know any better alternative. If your purpose is to just identify the requirement and set a priority for those requirements then the better system is the old process.
- 05: It's a good idea, helps get a joint effort. Parts need to be refined. We shouldn't have to do two sets of budgets.
- 06: Recently received Collaborative Technologies "Vision Quest" product for evaluation. It hasn't been loaded out yet, though.
- 10: They say it wins best of show everywhere. PC Magazine rates it #1. Do I know any better? Don't have a clue.
- 11: It depends on what the meeting requirements are. I think having a common ground facilitates using GroupSystems in meetings.
- 16: GroupSystems V is the Cadillac of the industry.
- 19: There are a lot of limitations with the system's capabilities. It could be better, faster and cheaper. I think the system needs to be pushed farther down to be more available at the user level.

i. GroupSystems V enhances meeting productivity.

- 01: People still have to brief their specific issues.
- 04: In view of the CG's purpose of involving and educating the entire staff, I would agree.

- 06: You are forced to plan the meetings which improves productivity. Cleaning-up after the meeting is easier. The reports are pretty much finished.
- 09: GroupSystems provides a written record of everything that is said and charts and printouts of votes.
- 10: Depends on the type of meeting. If its a brainstorming , idea generation meeting, something like that, it does tremendously. If its a budget meeting? Kind of tough.
- 11: There is enthusiasm in trying to identify mission task and functions. For us we are essentially doing a miniscule Bottom-up Review with the Facilities Working Group. We need to identify a better way of doing business.
- 15: If used properly. But also - it doesn't have to only be used for meeings. A distinct advantage is in preparation for meetings. If the preparation is not done ahead of time then the meeting is destined for failure. "He who brings the paper to the table usually wins th argument." If we use GroupSystems V for budget meetings, I can do my analysis and type comments at leisure. Then everyone is prepared and the meeting becomes managment by exception.
- 19: More people are informed about what is going on throughout the base and the funding issues.

j. The Marine Corps should purchase GroupSystems V for Marine Corps bases and stations.

- 01: Budgetwise, nothing is better than communications. GroupSystems V takes the personality out of the budget.
- 02: I'd have to be neutral, I think it would definitely depend on the command.
- 03: Probably limited to the larger bases.
- 04: If you have a CG with a specific purpose, that knows what he wants to do then it turns out to be a good tool.

- 05: In the future, if problems are addressed and macros developed to consolidate data and allow participants to correct mistakes, then it could be OK. Right now, it isn't a mature technology.
- 09: Given tight management controls and attention to the life cycle costs. It is easy to drop a lot of money into this program over time.
- 10: If we are serious about TQL, then we better buy the tools to do it. And one of the key tools is being able to automate meetings. To capture all those ideas from the bottom up to prioritize them so we can get on with doing them. If you can't do that initial step bringing ideas up from the bottom, if you don't document that then you lose them. You've got to have that key first step and that's getting ideas into the system and I think that's the and we can't preach it if each base can't come up with that kind of money and a place to run it. Then why the hell we saying that's our leadership philosophy. We can't look people in the eye and say "thats the future of the Marine Coprs and we don't put any money into it, we don't put any resources then why we saying that. Thats the difference between TQL and TQLS which is Total Quality Lip Service.
- 11: The system needs fine tuning. Group-linking could enable us to do it from our offices rather than a common site. The Marine Corps needs to move ahead into newer technology. The provides another training. We need a good hard system like this to deal with complex issues. Marine Corps Base is a business based operation that needs the electronic support like GroupSystems.
- 14: Access. The system must be available. Scheduling the room for use is difficult. It does provide instant results and goes faster than TQL meetings.
- 16: It is a valuable tool.
- 17: Maybe for the bigger bases like Pendleton, Lejeune, Quantico and Albany. Not the smaller stations. There are a lot of smaller stations where the investment wouldn't be worth it.
- 19: There has to be a better, cheaper way. It is

too expensive. Having the system at the base level is too high. It won't get the usage that it needs.

LIST OF REFERENCES

Applegate, L., Konsynski, B., and J. Nunamker. "A Group Decision Support System for Idea Generation and Issue Analysis in Organizational Planning." Proceedings of the Conference on Computer-Supported Cooperative Work. October 1986, pp. 16-34.

Bullen, C., and J. Bennett. "Learning from User Experience with Groupware." in Groupware: Software for Computer-supported Cooperative Work, by D. Marca and G. Bock. IEEE Computer Society Press, 1992, pp. 11-22.

Dailavaile, T., Esposite, A., and S. Lang. "Groupware - One Experience." Paper presented to the Fifth Conference on Corporate Communication, Fairleigh Dickinson University, Madison, New Jersey, May 20 & 21, 1992.

DeSanctis, G. and R. Gallupe. "Group Decision Support Systems: A New Frontier." Database. Winter 1985, pp. 3-10.

DeSanctis, G. and R. Gallupe. "A Foundation for the Study of Group Decision Support Systems." Management Science. Vol. 33, No. 5, May 1987, pp. 589-609.

Driscoll, J. and J. King. An Empirical Experiment Evaluating the Effectiveness of Group Decision Support Systems (GDSS). Masters Thesis, Naval Postgraduate School, Monterey, California, September, 1988.

Ellis, C., Gibbs, S., and G. Rein. "Groupware: Some Experiences and Issues," in Groupware: Software for Computer Supported Cooperative Work, by D. Marca and G. Bock. IEEE Computer Society Press, 1992, pp. 23-43.

Gallupe, R., DeSanctis, G., and G. Dickson. "Computer-Based Support for Group Problem-Finding: An Experimental Investigation." MIS Quarterly. June 1988, pp. 277-296.

George, J. "A Comparison of Four Recent GDSS Experiments." Proceedings of the Twenty Second Hawaii International Conference on System Sciences. Hawaii, 1989, pp. 397-411.

Gray, P. et al. "The SMU Decision Room Project," Transactions of the First International Conference on Decision Support Systems, Atlanta, Georgia, pp. 122-129, June, 1981.

Gray, P. "Group Decision Support Systems." in Decision Support Systems: A Decade in Perspective. McLean, E. and H. Sol, eds. Elsevier Science Publishers B.V. 1986, pp. 157-171.

Grohowski, R., et al. "Implementing Electronic Meeting Systems at IBM: Lessons Learned and Success Factors." MIS Quarterly. December 1990, pp. 369-383.

Huber, G. "Issues in the Design of Group Decision Support Systems." MIS Quarterly, September 1984, pp. 195-204.

Hughes, A. and D. Webb. A Comparative Study of GDSS Use: Empirical Evidence and Model Design. Masters Thesis, Naval Postgraduate School, Monterey, California, September 1987.

Jarke, M. "Group Decision Support Through Office Systems: Developments in Distributed DSS Technology." Decision Support Systems: A Decade in Perspective. McLean, E. and H. Sol, eds. Elsevier Science Publishers B.V. 1986, pp. 145-155.

Kraemer, K. and J. King. "Computer-Based Systems for Group Decision Support: Status of Use and Problems in Development." Proceedings of the Conference on Computer-supported Cooperative Work. October 1986 pp. 353-375.

Kraemer, K. and J. King. "Computer-Based Systems for Cooperative Work." Computing Surveys. Vol. 20, No. 2, 1988, pp. 115-146.

Mintzberg, H. "The Fall and Rise of Strategic Planning." Harvard Business Review. January-February, 1994, pp. 107-114.

Nunamaker, J., Applegate, L., and B. Konsynski. "Facilitating Group Creativity: Experience with a Group Decision Support System." Proceedings of the Twentieth Annual HICSS. pp. 422-429, 1987.

Nunamaker, J., Briggs, R. and N. Romano. "Meeting Environments of the Future," unpublished working paper, 1993.

Patton, M. Qualitative Evaluation and Research Methods. Newbury Park, California: Sage Publications, 1990.

Post, B. "Building the Business Case for Group Support Technology." Unpublished working paper, 1992.

Teng, J. and K. Ramamurthy. "Group Decision Support Systems: Clarifying the Concept and Establishing a Functional Taxonomy." INFOR. vol. 31 no. 3, August 1993, pp. 166-185.

Valacich, J., Dennis, A. and J. Nunamaker. "Electronic Meeting Support: The GroupSystems Concept." Man-Machine Studies. Vol. 34. 1991, pp. 261-282.

Ventana Corporation. GroupSystems V Basic and Advanced Tools reference manuals. 1993.

Vogel, D., et al. "Group Decision Support Systems: Determinants of Success." Proceedings of the 7th International Conference on Decision Support Systems. June 8-11, 1987.

Vogel, D., and J. Nunamaker. "Group Decision Support System Impact: Multi-Methodological Exploration." Paper presented to MIS Workshop, University of Minnesota. April 1988.

Walsham, G. Interpreting Information Systems in Organizations, John Wiley & Sons, 1993.

Yellen, R. "Introducing Group Decision Support Software (GDSS) in an Organization." The Journal of Systems Management. October 1993, pp. 6-8.

BIBLIOGRAPHY

Dickson, G., Partridge, J. and L. Robinson. "Exploring Modes of Facilitative Support for GDSS Technology." MIS Quarterly. Vol. 17, No. 2, June 1993, pp. 173-194.

Donelan, J. "Using Electronic Tools to Improve Meetings." Management Accounting. March 1993, pp. 42-45.

Fijol, Y. and M. Woodbury. Group DSS and Decision Outcome Measures: A Comparative Study in Distributed Versus Non-Distributed Settings. Masters Thesis, Naval Postgraduate School, Monterey, California, March 1987.

Gallupe, R. and W. Cooper. "Brainstorming Electronically." Sloan Management Review. Vol. 35 No. 1, Fall 1993, pp. 27-36.

Gilley, B. Group Decision Support Systems and Bilateral Negotiations. Masters Thesis, Naval Postgraduate School, Monterey, California, March 1991.

Hafner, A. "Group Decision Support Systems." Program Manager. Vol. 23, No. 1, January-February 1988, pp. 14-19.

Haupt, K. Acquisition Group Decision Support System. Masters Thesis, Monterey, California, Naval Postgraduate School, June 1990.

Hsu, J. and T. Lockwood. "Collaborative Computing." Byte. March 1993, pp. 112-121.

Huber, G. and R. McDaniel. "The Decision-Making Paradigm of Organizational Design." Management Science. Vol. 32, No. 5, May 1986, pp. 572-587.

Jarke, M., ed. Managers, Micros and Mainframes: Integrating Systems for End-Users. New York: John Wiley & Sons, 1986.

Marca, D. and G. Bock, eds. Groupware: Software for Computer-Supported Cooperative Work. Los Alamitos, California: IEEE Computer Society Press, 1992.

Olaniran, B. "Group Performance in Computer-Mediated and Face-to-Face Communication Media." Management Communication Quarterly. Vol. 7, No. 3, February 1994, pp. 256-281.

Olsen, F. "Electronic Meetings Save Army Big Bucks on Travel." Government Computer News. April 1992, p. 31.

Rao, V. and S. Jarvenpaa. "Computer Support of Groups:

Theory-Based Models for GDSS Research." Management Science. Vol. 37, No. 10, October 1991. pp. 1347-1362.

Sengupta, K. and D. Te'eni. "Cognitive Feedback in GDSS: Improving Control and Convergence." MIS Quarterly. Vol. 17, No. 1, March 1993, pp. 87-109.

Wolfe, M. and K. Moen. "A Hypertext Framework for Group Support Systems." Technical Report, Wright-Patterson AFB, Ohio. November, 1992.

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