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GSS for presentation support

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Supercharging the Audience:
Simultaneous Discussions during Presentations Using Group
Support Systems

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Introduction

Presentations are an ubiquitous feature of organisational life. They are a key method for achieving a clear understanding of complex ideas among large groups of people. However, there is often little time for genuine interaction among presenters and their audiences. Imagine a presentation where the entire audience jumped into a lively debate as soon as the presentation began. Imagine that the presenter continued unconcerned, that everybody heard the presentation without losing the thread of the discussion in the audience. Imagine that the participants could report the discussions months later with complete accuracy. With standard methods this would be impossible, yet with Group Support Systems (GSS) this scenario can be realised fairly easily.

A GSS is a suite of software tools for focusing and structuring group deliberation, while reducing the cognitive costs of communication and information

access among teams making a joint cognitive effort towards a goal [3]. GSS participants simultaneously type their contributions into a network of computers. The software immediately makes all contributions available to the other participants. If the team feels it appropriate, the GSS allows for anonymous input.

A GSS may have tools for collaborative idea generation and organisation, electronic polling, simultaneous document authoring, and multicriteria decision-making, among others. Each tool creates a different kind of group dynamic. One may encourage participants to diverge from customary thought patterns, while another may cause them to converge quickly on key issues. One may encourage them to contribute in great depth and detail, while another may move them to a broader, big-picture view.

In this article we rethink the traditional presentation-and-discussion structure, exploring means that may enhance its value for both audiences and presenters. The following section explains why GSS might improve learning during presentations. The next describes three field investigations involving GSS support for presentations, focusing on participation, distraction, digression and the perceived value of the event. The final section synthesises the lessons learned from extensive field experience into recommendations for groups who wish to employ GSS technology to support presentations.

Potential Effects of GSS for Presentation Support

A substantial literature details the benefits arising from the use of GSS for team problem solving [4] and for non-lecture based collaborative learning [1, 2, 5]. Several of the key benefits (see Table 1) identified in the GSS literature may well carry over to the use of GSS in presentation environments.

Increased Discussion Time. GSS eliminates the need to divide available airtime among potential speakers because participants may contribute simultaneously. The parallel, non-oral communication channels afforded by a GSS multiply the available airtime by the number of computers available to the audience. Because they are communicating online, the participants may interact with one another during the actual presentation, which further multiplies available airtime.

Increased Participation. The anonymity allowed by a GSS may reduce concerns about negative repercussions from contributing unpopular, critical, or new ideas. This, combined with increased available airtime, should lead to increased participation in discussions.

Table 1: Potential Effects of GSS on Presentation-Style Meetings	
Positive	Negative
<ul style="list-style-type: none"> • More time for discussion 	<ul style="list-style-type: none"> • Distraction
<ul style="list-style-type: none"> • More even participation 	<ul style="list-style-type: none"> • Digression
<ul style="list-style-type: none"> • Increased participation in discussions 	<ul style="list-style-type: none"> • Flaming
<ul style="list-style-type: none"> • More feedback to presenters 	<ul style="list-style-type: none"> • Loss of social cues
<ul style="list-style-type: none"> • Permanent record of discussions 	
<ul style="list-style-type: none"> • Long-term post-session dialogue 	

More Equal Participation. Since GSS provides many parallel communication channels, loud or strong personalities cannot dominate the discussion. Unlike oral discussions, the amount contributed by one person is independent of the amount

contributed by others. This should lead to a more equal distribution of discussion among the group.

Permanent Record of Discussion. The GSS captures a permanent electronic transcript of the online discussion. Both participants and presenters can therefore access the details long after the discussion is over.

Improved Feedback To Presenters. With unrestricted airtime for audience members, and a permanent record of their discussion, presenters should receive more comments and questions, and may also receive more-detailed arguments and dialectics. Because contributions can be anonymous, presenters may receive more unfiltered critical analysis of their work.

Improved Learning. The GSS may also reduce attention blocking - the loss of attentiveness to the presentation caused by trying to remember what one wants to say in the post-presentation discussion. Working in parallel, participants may record their ideas as soon as they occur, then return their attention to the presentation. With more discussion time, reduced attention blocking, increased participation, improved feedback, and a permanent record, GSS users may find they retain more knowledge from a presentation than do people using conventional methods.

Remote and Asynchronous Participation. People who do not attend the presentation may still benefit by reading and contributing to online discussion after the event. However, we do not advocate replacing all face-to-face conferences and presentations with distributed online interaction. Many people find the casual conversations in the hallways and over meals to be at least as valuable as the formal content of the presentations.

Potential Negative Effects. Despite the anticipated benefits, we were concerned that online discussions during presentations might be a mixed blessing.

Human attention resources are limited, so online discussions might distract the participants to the point where they lose the thread of the presentation. Such distractions could outweigh other benefits. Further, it is possible that online discussions could digress from the concepts of the presentation, or even devolve into flaming. The anonymity of online discussion could hinder the evolution of a social community among the participants. We therefore studied these potential negative outcomes in addition to potential benefits.

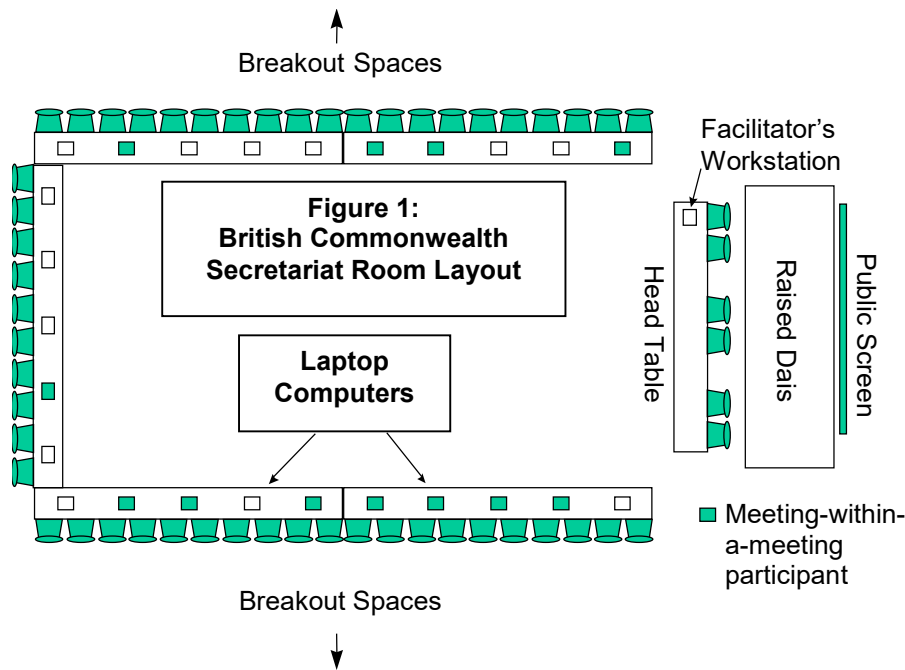
Field Investigations

Creating National IT Policy

In October 1995 we used GSS to support a group of fifty officials from 24 British Commonwealth countries at a 3-day conference in Malta. They met to develop recommendations to their heads-of-state about creating national IT policies. They heard briefings from twenty nations, and participated in several evening workshops.

We arranged twenty-five laptop computers around a large U-shaped table in a hotel ballroom (see Figure 1). We gave a ten-minute introduction to the GSS¹, then sent the participants a stack of electronic comment cards on their screens, one for each presentation (Figure 2). At the start of each day, we encouraged the participants to enter any comments or questions that occurred to them as the presentations unfolded. All comments would be anonymous, unless the participants chose to identify themselves.

¹ Throughout this study, we used the Topic Commenter tool from GroupSystems for Windows (v.1.1), developed by researchers at the University of Arizona and commercialised by Ventana Corporation.



Over the three days of the conference, there were some twenty presentations, but no presentation received more than six electronic comments. At the end of each presentation, five minutes were allowed for oral discussion. At no time did anyone refer to the contents of the electronic discussion, even though this information was permanently displayed on a public screen at the front of the room (see Figure 2).

We hypothesised at first that the participants might be reluctant to use GSS under any circumstances. However, they attended evening breakout sessions where they used the GSS extensively and enthusiastically for generating, organising and prioritising IT policy issues. The conference organiser asserted that the hour-long evening sessions were more productive than all the day-time sessions combined. This suggested that the participants were not reluctant to use GSS in general, but only during the presentations.

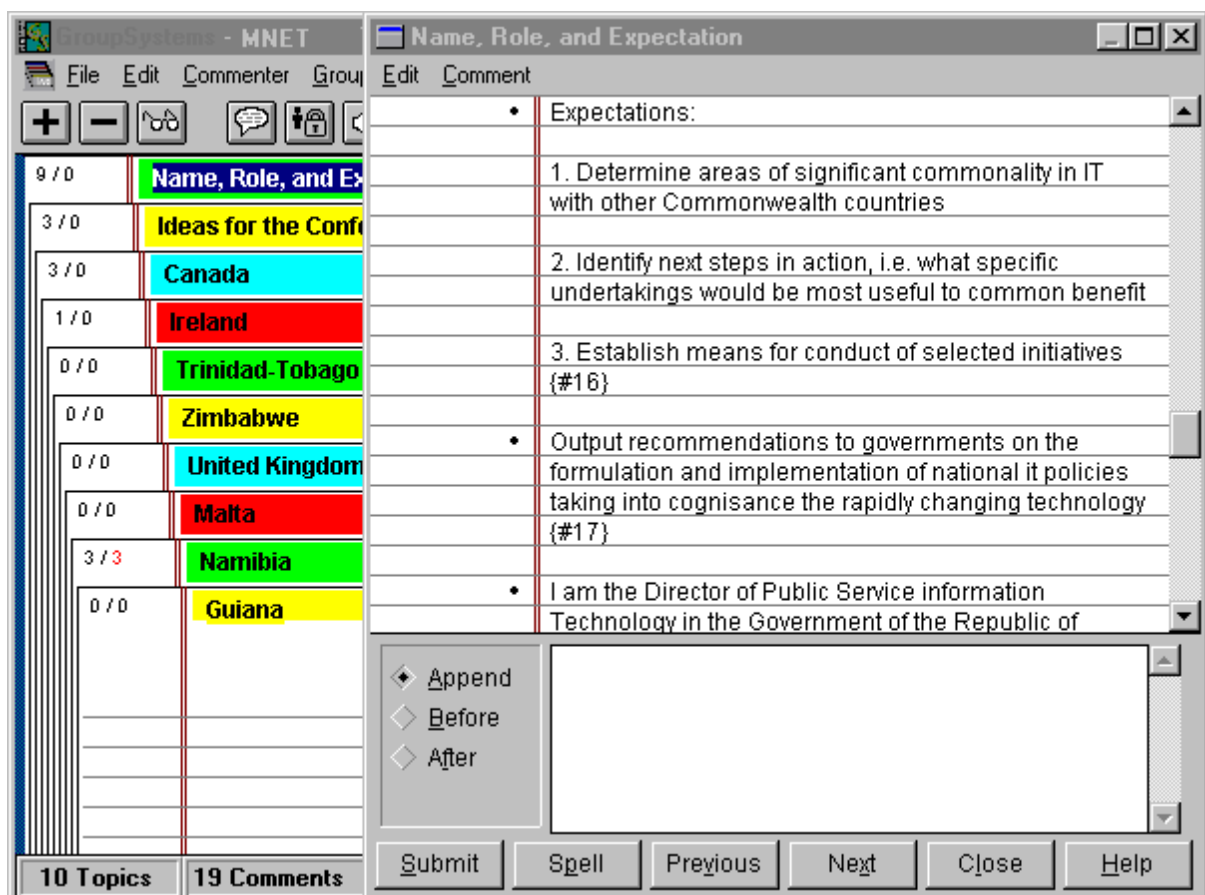
Informal interviews revealed that many people feared that the presenter and the other participants might regard typing as an impolite distraction. However, a

critical event suggested that this fear might be unfounded. On the second afternoon, a twelve-member steering committee had a strong need for a planning meeting, yet they also wanted to hear the scheduled presentations. They decided to use the GSS to hold a meeting-within-a-meeting. The committee members were in the main hall scattered among the audience at large, typing, organising, and discussing ideas on their laptops.

Figure 2: The GSS used in the British Commonwealth Secretariat conference

Note the stack of electronic comment cards, one for each presentation.

One is open, revealing contributions from the audience.



None of the other participants showed any awareness that the online meeting had occurred. There were no glares, no pointed comments, no signs of discontent,

although the steering committee meeting spanned several presentations. This suggested that despite their fears, GSS use during a presentation would not be an impolite distraction. We therefore sought ways to overcome this social misperception.

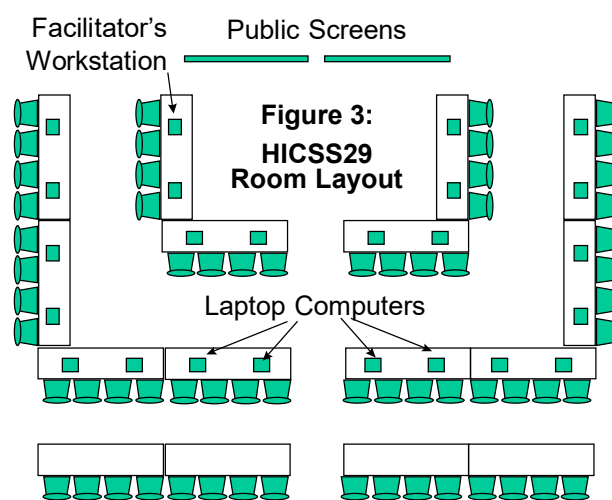
Academic Conference

In January 1996, as part of the 29th Hawaii International Conference on System Sciences (HICSS29), 43 participants attended a three-hour tutorial on business process reengineering. We placed 24 laptops around two sets of tables (Figure 3), with two public screens showing PowerPoint slides for the presentation and the contents of the electronic discussion. To overcome concerns about politeness, the presenter expressed great interest in audience feedback, and stated that he considered typing while he spoke to be both polite and desirable. However, only eight comments were submitted over the course of the three hours. Similarly low levels of participation occurred in two later ninety-minute paper presentation sessions. Again, informal interviews revealed a widespread fear-of-rudeness.

We hypothesised that because people had never experienced using GSS during a presentation, they might not imagine how non-intrusive it could be. We also hypothesised that participants might not realise how easy the software was to use. The following day, we used the GSS for three ninety-minute sessions. Each session had three paper presentations.

As each session began the moderator asked participants to use the GSS to respond to the question, "What are the most pressing research issues facing the technology-supported learning research community?" He asked everyone to contribute one idea, then to respond on line to an idea contributed by someone else.

The first presenter told the group that the oral discussion following the presentations would draw ideas from the online discussion. Two subsequent speakers asked for online responses to specific questions. All others asked for critical feedback about their presentations. As soon as the first speaker started presenting, members of the audience began typing, and continued to do so throughout the rest of the conference.



Participants contributed 275 comments during the three sessions, ranging from 20 to 54 per presentation. About 94% of comments were presentation-related, and there were no instances of flaming. Furthermore, during other sessions with no GSS, oral contributions to the post-presentation discussions came from no more than four people. Observations in the GSS-supported sessions showed that contributions came from all over the audience.

Our experience at HICSS29 suggested that GSS might be a useful tool for presentation support, but that our techniques needed honing. From the moderator's point of view, these three sessions were a clear success, with broad and deep communication between participants. Participants were still concerned that the

speakers might regard the GSS as an impolite distraction, although feedback from the speakers revealed that the opposite might be true. For example, one speaker reported that he was nervous that he might be boring the audience until he said something that provoked a rush of typing, which he interpreted as evidence that he had engaged their interest.

During another presentation the audience argued online about an issue that seemed only tangentially related to the paper being presented. Nonetheless, the presenter was pleased by the arguments, and reported that he would incorporate them into a future version of the paper.

At the final session we used the GSS to elicit feedback about the GSS experience. From that feedback we drafted a questionnaire which we pilot tested by e-mailing it to 71 presenters and audience members several weeks after the conference.

Twenty-one of the 71 people responded. Although this was too small a sample to draw meaningful conclusions, some interesting patterns emerged, and we used the data to substantially improve the survey instrument. Many of the respondents to the pilot questionnaire reported feeling somewhat distracted by the GSS, and about a third of them reported that the distraction might be a problem during a presentation. After the conference we calculated that despite their active participation, the participants only used slightly less than 5% of the available person-minutes for reading and contributing to the GSS. The rest of the time they spent listening, talking, or doing other things. We suspected that this relatively low consumption of person-minutes would not constitute a major distraction from the presentation, particularly since it might be offset by a reduction in attention blocking. We therefore recrafted the questionnaire so we could measure whether people in

GSS supported sessions would report more distraction than would people in sessions without GSS.

Observations of the presentation process suggested that people were more willing and able to participate in the discussion than in non-GSS supported presentations. Most of the respondents agreed that GSS encouraged participation and slightly more than half said that they were more willing to participate as a result of the availability of the technology. Most reported feeling the technology was valuable to the presenter and participants. They rated the GSS-supported sessions as more stimulating and of higher quality than unsupported sessions at the same conference. One participant, in an upbeat vein typical of others, commented "*I was able to present, develop and argue my own points in the electronic discussion in much more depth than I would have in the traditional forum. I would have lost the floor before the argument was finished without the technology*".

About half the respondents thought they learned more by using the GSS, but about a third were undecided. Seven respondents were less than satisfied with having the GSS in the audience, and five reported that they would not want to use the software for their own presentations in the future. Because the contributions were anonymous, presenters were not able to follow up with contributors. When presenters ran over time, there was no time for oral discussion. Under these circumstances the anonymity created another concern. One participant observed: "*One of the things I like about a conference is that I can figure out who is a sharp cookie and who is a blow-hard. I get to know my colleagues by the way they handle themselves in the discussion time. This time I really couldn't tell*".

To deal with this issue we conducted more pilot tests using the GSS with identified comments at several other conferences. The level of participation dropped

immediately and substantially when comments were identified. The comments became bland and shallow, (*"Nice presentation, Jim. Interesting work. Have you seen Smith's '94 paper on this subject?"*). No online argumentation and no critical analysis emerged. We therefore switched back to anonymous contributions, but rigorously enforced the time boundaries of each presentation to ensure participants had sufficient time for oral discussion, and could get to know one another as they discussed the issues. This seemed to alleviate the problem.

Academic Conference II

Over the following year we refined both our GSS methods and our questionnaire instrument by supporting presentations at a variety of educational, business, and government functions. We then undertook to conduct a more rigorous follow-on study at the 30th Hawaii International Conference on System Sciences in January 1997 (HICSS30).

The study addressed three primary research questions:

1. What effect would GSS have on participation and perceived learning?
2. Would the GSS be perceived as a detrimental distraction?
3. What effect would GSS use have on the perceived value of the presentations and discussions?

At HICSS30 we arranged 34 laptops in a configuration designed to enable participants sitting at the sides of the room to have a clearer view of the public screen (Figure 4). All GSS-supported sessions began with a brief hands-on activity that was related to the topic of the session. A moderator invited online participation at the beginning of each presentation. Most presenters added their encouragement. Participants were urged to raise key issues from the on-line discussions during the

post-presentation discussions. We distributed paper questionnaires to all participants at the end of each session.

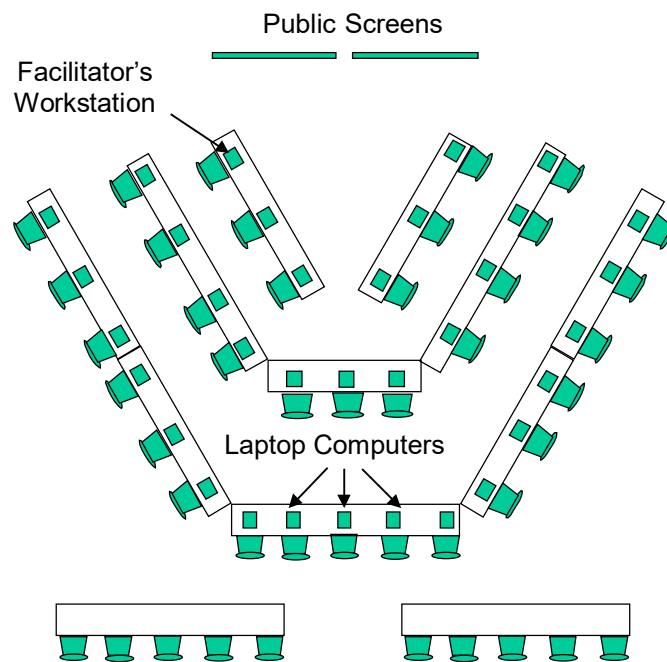


Figure 4: HICSS30 Room Layout

We received data from 173 participants. Of those, 73 reported having used GSS, while 70 reported that they did not use it. Of those, 40 were from sessions where GSS was not available. Thirty people did not report on their GSS use, and so were excluded from most subsequent analysis. The thirty excluded data sets did not appear to differ significantly from other data sets.

Table 2 compares the perceptions of GSS users with those of non-GSS users based on the multi-item scales contained in the questionnaire. (All scales had an inter-item reliability α of 0.80 or higher).

Table 2: Perceptions of GSS and Non-GSS Users				
A higher value indicates a more positive perception				
	GSS Users	Non-Users	F	Sig
	MEANS	MEANS		
Willingness to Participate	4.07	3.47	6.76	**
Participation	3.58	3.00	4.11	*
Distraction / Focus	4.08	3.93	0.56	-
Frequency of Digressions	3.65	3.75	0.29	-
Value of Digressions	3.90	3.95	0.01	-
Value of Tools and Methods	4.40	4.55	0.92	-
Value of Discussion and Feedback	4.40	4.40	0.00	-
Value of Papers	4.40	4.52	0.78	-
Value of Sessions	4.40	4.51	0.45	-

** Indicates significance at the 0.001 level. * indicates significance at the 0.05 level

Participation and Learning

GSS users were significantly more willing to participate in the discussions than were non-GSS users, and they reported doing so at significantly higher levels (Table 2). Direct observation confirmed the reports: the participants in both the GSS-supported and standard presentations had equal opportunity to contribute to oral discussions, and did so at approximately equal rates. However, the participants who used GSS also contributed hundreds of comments to the online discussion, so their overall

participation was substantially higher. Further, a much higher percentage of the audience got involved in the GSS discussion than in the oral discussion.

Eighty-four percent of GSS users reported that communication was easy and efficient, while only 58% of non-users found it so. Regression analysis revealed significant linear relationships between ease-of-communication and willingness-to-participate; between willingness-to-participate and reported-participation; between willingness-to-participate and perceived-learning; and between reported-participation and perceived-learning (Table 3).

Table 3: Relationships Among Key Perceptions			
Linear Regression Analyses			
Independent Variable	Dependent Variable	F	Sig
Ease of Communication	Willingness to Participate	18.97	**
Willingness to Participate	Reported Participation	152.72	**
Willingness to Participate	Perceived Learning	9.80	*
Reported Participation	Perceived Learning	14.76	**
Frequency of Digressions	Value of Digressions	18.32	**

** Indicates significance at the 0.001 level. *indicates significance at the 0.05 level

Thus, it appears that the GSS may have accomplished its primary purpose: to increase participation and learning. But at what cost? The next two sections examine the distractions GSS might have introduced, and the possible effects of GSS on the perceived value of the conference experience.

Distraction and Digression

Overall, participants were comfortable with the degree of distraction and digression in the sessions (Table 4). There were no differences in these perceptions based on the use or non-use of GSS (Table 2). Only three GSS users and four non-GSS users reported negative distractions that mattered to them, too few for meaningful statistical analysis. Thus, GSS did not appear to have created widespread perceptions of undue distraction or digression.

Direct observations supported these results. As in previous investigations, there were no instances of online flaming, and nearly all of the online contributions were relevant to the presentations. Content analysis of online transcripts suggested that participants had achieved a good grasp of the key concepts in the presentations, which is further evidence that the GSS did not unduly distract them from the oral delivery of information. It is interesting to note that there appears to be a direct linear relationship between the perceived frequency of digressions and their perceived value (Table 3). As more digressions occurred, so discussions were perceived to be both more enlivening and better understood. Clearly, digressions need not diminish the value of discussions.

Value of Sessions, Papers and Discussions

Overall, respondents reported positive perceptions of the value they derived from the conference sessions and the methods used in those sessions. They were also positively disposed towards the content of those sessions: the paper presentations, and the discussions (Table 4). This suggests that the GSS enabled the groups to increase the quantity of something they valued - discussions and feedback - without reducing its quality. Many participants opted to take electronic copies of the

transcripts with them at the end of each session, others downloading transcripts from the Internet. Thus the value derived from the discussion was extended beyond the walls of the presentation hall.

Table 4: Overall Perceptions of Distraction and Digression				
Higher Means indicate a more-favourable perception				
One-sample t-tests of difference-from-neutral				
	Mean	Neutral	t	Sig
Distraction / Focus	4.05	3.00	11.41	**
Frequency of Digression	3.76	3.00	8.87	**
Did Digressions Matter?	0.72	0.50	3.28	**
Value of Digressions	3.98	3.00	9.61	**
Value of Tools and Methods	4.47	3.00	20.37	**
Value of Discussion and Feedback	4.41	3.00	21.45	**
Value of Papers	4.47	3.00	22.74	**
Value of Sessions	4.51	3.00	20.79	**

** Indicates significance at the 0.001 level

Conclusions and Recommendations

The results of these three investigations suggest that there is substantial value to be derived from using GSS to support presentation-style meetings. The expected benefits of more time for discussions, increased participation in discussions, more equal participation, and increased understanding of the presentations appear to be attainable without undue distraction or digression, and with no discernible loss of

value from sessions, presentations or discussions. The methods described above are some of the simplest possible with GSS, yet they appear to be intensely useful. The GSS functions that were most important to the success of this study were simultaneous input, instantaneous viewing of submissions, and anonymity, yet these are only a fraction of the capability available in GSS. Future research must explore the untapped potential of this technology.

Subsequent to this investigation, the use of GSS for presentation-style meetings has become standard practice in a growing number of organisations. For example, the U.S. Navy uses this approach for its annual Flag Summit at the Naval Postgraduate School in Monterey, for a semi-annual Command Ship summit, for Federated Battle Lab Directors' meetings, and for meetings of the senior leadership team of Navy Special Warfare (the SEALs) among other purposes. These and other groups consistently report high satisfaction and benefit from their GSS experiences.

We could not have guessed at the start how important the hands-on warm-up exercise would be for overcoming the initial reluctance to type while someone else is speaking. Yet so it seems to be. The warm-up exercise need not be extensive - a single contribution and a single follow-up comment seem to be sufficient. Topics may be related to the meeting, or may be humorous asides. One moderator we know always asks, *"What did you think when you first walked in and saw all these computers"*. The levity of the online responses often breaks the ice for the group, in addition to easing their distraction concerns. Another always asks "What do you hope to accomplish in this meeting?". The groups then refer to their responses throughout the rest of the meeting.

Further work is certainly called for, both in extending the support of presentations to different environments, and for examining different leadership techniques, different GSS tools, and their effects on group interaction and learning.

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Appendix: Survey Instrument used at HICSS30

GSS SUPPORT FOR CONFERENCE PRESENTATIONS - A SURVEY FOR HICSS

1. In this session I: Presented Listened to presentations Both

2. The **methods and tools** used in today's session were:

Detrimental to the speaker	1	2	3	4	5	Valuable to the speaker
Detrimental to the audience	1	2	3	4	5	Valuable to the audience
Detrimental to me	1	2	3	4	5	Valuable to me

3. In **today's session** I:

Learned Little	1	2	3	4	5	Learned much
Got no new ideas	1	2	3	4	5	Got many new ideas
Did not enter discussions	1	2	3	4	5	Discussed a great deal

4. **Feedback and discussion** in today's session was:

Ineffective	1	2	3	4	5	Effective
Inefficient	1	2	3	4	5	Efficient
Unimaginative	1	2	3	4	5	Creative
Tedious	1	2	3	4	5	Stimulating
Low quality	1	2	3	4	5	High quality
Impoverishing	1	2	3	4	5	Enriching
Uninformative	1	2	3	4	5	Informative
Unrewarding	1	2	3	4	5	Rewarding
Detrimental	1	2	3	4	5	beneficial
Uninspiring	1	2	3	4	5	Inspiring

Comments about discussion:

5. **Communicating** in this session was:

Difficult	1	2	3	4	5	Easy
Ineffective	1	2	3	4	5	Effective

Inefficient 1 2 3 4 5 Efficient

Comments about communication:

6. In today's **discussion**, I felt:

Unwilling	1	2	3	4	5	Willing to raise questions
Unwilling	1	2	3	4	5	Willing to answer questions
Side-tracked	1	2	3	4	5	Kept on track by issues raised
Distracted	1	2	3	4	5	Focused by others' comments
Distracted	1	2	3	4	5	Focused by the tools and methods

7. If you found the discussion distracting or side-tracking, did that matter to you?

Yes No

Why or why not? _____

8. **Digressions** from the main concepts raised by presenters:

Happened a lot	1	2	3	4	5	Rarely happened
Deadened the session	1	2	3	4	5	Enlivened the session
Reduced meaning	1	2	3	4	5	Improved meaning

9. The **papers** presented in this session were:

Not central to my interests	1	2	3	4	5	Central to my interests
Unsatisfactory	1	2	3	4	5	Satisfactory
Dull	1	2	3	4	5	Interesting
Low Quality	1	2	3	4	5	High quality

10. Today's **session** :

Did not fulfil my needs	1	2	3	4	5	Fulfilled my needs
Was not valuable to me	1	2	3	4	5	Was valuable to me
Did not satisfy me	1	2	3	4	5	Satisfied me

11. Did you use a **computer** to discuss/argue issues raised by the presenters? Yes
No