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# A COMPARISON OF ELECTRONIC POOLWRITING AND GALLERY WRITING MEETINGS

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## Abstract

*Many studies have compared oral brainstorming and electronic poolwriting meetings, but few have investigated other brainwriting techniques. One alternative, electronic gallery writing, might be superior. A study of students in 12, 10-member groups using manual and electronic versions of these two brainwriting methods shows that gallery writing was preferred in part because of its ability to show all public comments at any one time and over the course of the meeting. Although more raw comments were generated with poolwriting, there was no significant difference in the number of relevant comments. These results support findings from earlier laboratory experiments and case studies.*

## Introduction

Although it is not always clearly stated, the vast majority of GSS research uses the electronic poolwriting (EPW) technique (typically called “electronic brainstorming” in the literature) (Martz, et al., 1992). At least five of the 13 most productive researchers and three of the top four universities in the area have used the same GSS software - GroupSystems (Pervan, 1998). In the early 1990s, this software had been used by at least 30,000 people in 80 universities and 400 other sites (Chen, et al., 1994) and had 45% of the GSS market (Butterfield, et al., 1992). The GSS has at least four group idea generation programs, but the “electronic brainstorming” program (based upon EPW) was used approximately 72% of the time by 60 groups in 69 non-experimental meetings over three years (Aiken and Carlisle, 1992) and even more in experimental meetings. Other software and brainwriting methods such as the nominal group technique (NGT), electronic blackboards, and Delphi have been used, but relatively few attempts have been made to compare them with each other (Briggs, et al., 1998).

Some researchers have stressed the importance of technology and the group idea generation technique in experiments (Benbasat and Lim, 1993). The choice of technique can dramatically affect meeting processes and outcomes (Dennis, et al., 1988). In one of the few studies to compare designs, researchers investigated electronic blackboard, networked workstations, and an oral, face-to-face meeting and found that decision quality was best for groups communicating with the electronic blackboard, second best for networked groups, and worst for face-to-face groups (Jarvenpaa, et al., 1988). In other studies, researchers found that 12-member EPW groups generated more ideas than 12-member NGT groups (Dennis and Valacich, 1993) but found no significant difference in the number of ideas using four-member groups (Gallupe, et al., 1991). Other researchers have found that group members developed better solutions using one GSS design, but generated more unique alternatives with the other, although they were both based, in part, upon EPW (Easton, et al., 1990).

## Brainwriting Techniques

Group idea generation techniques can be classified as either brainstorming (oral communication) or brainwriting (written communication) (VanGundy, 1992). Brainstorming accommodates social interaction and encourages a high level of group cohesion, but because communication is oral, participants must take turns. This serial communication becomes a greater problem

as the size of the group increases. Further, brainstorming groups could have disruptive interpersonal conflicts and unequal participation. Because of the various limitations of the technique, oral brainstorming has been recommended for small groups (typically six or less) while brainwriting has been recommended for larger groups.

Brainwriting overcomes many of the disadvantages of brainstorming. Because brainwriting techniques are characterized by silent, written communication, participants do not need to take turns (everyone can be writing at the same time), all ideas are recorded, and a high degree of anonymity usually is preserved. In addition to its applicability in large groups, brainwriting might be preferred over brainstorming when a skilled facilitator or leader is not available, group members are not trained in brainstorming, one or a few group members dominate oral discussions, and/or conflict exists among group members. Because brainwriting group members can generate ideas simultaneously in parallel, they can participate more and produce a greater number of ideas than when brainstorming.

### **Poolwriting**

In the brainwriting pool or individual poolwriting technique (PW), group members individually (Geschka, et al., 1981): 1) write down ideas about the problem on a sheet of paper, 2) place their sheets in the center of the table or pool and exchange it for another one, 3) read the ideas on the new sheet and use them to stimulate new ideas, 4) write down any new ideas on the sheet and exchange it for a new sheet from the pool when they need additional stimulation, and 5) continue writing down ideas and exchanging sheets for the duration of the meeting. Because the papers are not signed, a large amount of anonymity is preserved which reduces participants' inhibitions or evaluation apprehension. Some anonymity can be lost, however, if a group member sees who put the last paper into the pool or recognizes handwriting. Further, all group members can write comments at the same time (there is no turn-taking), and all ideas are permanently recorded. The major advantage of PW is that a large number of comments can be generated during the meeting because participants are required to write a comment before exchanging the paper with another one in the pool.

One disadvantage of PW is that the group members are unable to see all of the comments during the course of meeting. At the end of the meeting,  $N$  comments ( $N$  = number of group members) will have been unseen by all except the person who wrote the comment and the person who has the paper last. One comment will have been unseen by all except the person who wrote it (the paper in the pool at the end). Therefore, a complete transcript is usually disseminated after the meeting.

A second disadvantage is that, at any one time, everyone in the group is looking at a completely different subset of comments. If someone starts laughing or remarks orally about what he or she read, nobody else in the group knows what comment the person is looking at on the paper.

A third disadvantage is that superfluous comments can be generated. Because all participants write on different files, it is more difficult to monitor what has already been written. As a consequence, the number of redundant ideas or non-topic ideas (also called "buffoonery") can increase.

Electronic individual poolwriting or the electronic brainwriting pool technique (EPW) is based upon the manual technique and substitutes disk files for pieces of paper. That is,  $N + 1$  files are exchanged in a computer network instead of paper. The typed comments are even more anonymous than the handwritten comments because it is difficult to know who wrote on the file that was just submitted to the pool. In addition, swapping files is faster than swapping paper, especially when the group size is large. As in the manual version, groups using EPW cannot see all comments in the meeting and see only a subset of comments at any one time.

### **Gallery Writing**

The gallery method or gallery writing (GW) involves the following steps: 1) Large sheets of paper are attached to the walls of a room, 2) Group members silently write down their ideas on the sheets of paper, and 3) Group members wander around the room, read others' ideas, and write additional comments on the sheets of paper.

Thus, instead of moving papers around, people move around using GW. The advantages of this technique over PW are that all participants are able to write and view comments simultaneously, possibly increasing group cohesion. However, anonymity is reduced because participants are able to see what other group members are writing.

The electronic version of gallery writing (EGW) substitutes one file for the many sheets of paper posted on the wall in the manual version. However, EGW preserves anonymity because group members write their comments on their private computer screens. Using EGW, participants can submit typed comments and view all other group members' submitted comments at any time. Because all information is shared, group members spend more time reading others' comments than when using EPW (and less time writing new comments).

One argument offered for the use of EPW is that participants might be overwhelmed by too many comments on their computer screens. By breaking up the comments into subsets with an average of  $(total\ number\ of\ comments) / (group\ size + 1)$  comments each, participants can take more time pondering the ideas. However, based upon our experiences conducting over 100 meetings with 2000 participants, we believe that most group members using EGW can scan comments quickly and are better able to get a feel for what the group is thinking when all comments are available to them. Even with EGW groups of up to 50, participants have never complained about too much information being presented to them. Although EGW group members spend more time reading comments than do EPW group members, and EPW group members spend more time writing comments, the possible disadvantage of "information overload" is probably outweighed by the advantage of seeing everything written by the group.

Therefore, if the goal of a meeting is to generate the greatest number of comments (even if many are redundant or not task-related), EPW might be best. If the goal of the meeting is a high degree of information sharing among participants, electronic gallery writing is probably the best choice.

## The Study

### Subjects

Sixteen groups of 10 undergraduate business students each participated in the experiment for credit as one of many classroom assignments. Subjects were randomly assigned to groups and treatments (four groups per treatment).

### Treatment

After a brief introduction to the experiment, subjects discussed "How can we improve the parking problem on campus?" (used in many other studies) for 10 minutes using either manual gallery writing (GW), electronic gallery writing (EGW), manual poolwriting (PW), or electronic poolwriting (EPW). All groups used the same meeting room at different times.

The user interface for the EPW and EGW programs (locally developed) was exactly the same. Public comments were displayed in a window at the top of the user's screen, and new comments were written in an edit window at the bottom. The new comments were submitted by pressing the *Insert* key. EGW subjects were allowed to read new comments without submitting new ones by pressing the *ENTER* key while the screen focus was in the public window. EPW subjects were not able to see a new comment unless they submitted a new comment. Blank comments were not allowed - the software required that at least three characters were entered in the edit window. GW subjects wrote comments on the blackboard at the front of the room, and PW subjects wrote comments on sheets of paper that were then exchanged.

After the experiment, subjects were asked to complete a questionnaire developed and tested in earlier experiments on EPW and oral groups. Two raters counted the number of unique, relevant and unique, irrelevant comments generated by each group. Substantial agreement between the two (89%) indicated adequate inter-rater reliability.

### Results

Paired T-tests with questionnaire median values showed that subjects wanted to see comments at the same time ( $T = 5.04, p < .001$ ) and over the course of the meeting ( $T = 5.66, p < .001$ ). Subjects were satisfied with the meeting process (with the exception of the GW group) ( $T = 7.05, p < .001$ ), thought that communication was fairly easy ( $T = 6.87, p < .001$ ), had little evaluation apprehension ( $T = 7.27, p < .001$ ), and preferred their meeting technique over an equivalent oral meeting ( $T = 6.60, p < .001$ ). Finally, the subjects thought the quality of the comments was good (with the exception of the EPW group) ( $T = 4.09, p < .001$ ).

There were several significant, positive correlations. Subjects who wanted to see comments at the same time generally also wanted to see comments over the course of the meeting ( $R = .586, p < .001$ ). Satisfied subjects generally thought the quality of the comments was good ( $R = .466, p < .001$ ), communication was easy ( $R = .542, p < .001$ ), and preferred their meeting technique rather than an oral discussion ( $R = .389, p < .001$ ). Subjects who had less evaluation apprehension generally thought the quality of comments was better ( $R = .353, p < .001$ ) and thought communication was easier ( $R = .267, p < .001$ ).

ANOVA showed that subjects using EGW were more satisfied with the meeting technique ( $F = 7.70, p < .01$ ) and thought the quality of the comments was better than subjects using EPW ( $F = 3.71, p < .03$ ). EGW subjects were also more satisfied than GW subjects ( $F = 44.9, p < .01$ ) and experienced less production blocking ( $F = 8.39, p < .01$ ). Automating the meeting techniques was a significant factor in process satisfaction ( $F = 31.01, p < .01$ ) and production blocking ( $F = 7.62, p < .01$ ), and the technique was a significant factor in evaluation apprehension (GW has little anonymity) ( $F = 5.83, p < .02$ ).

Finally, there was a significant difference among the treatments in terms of the number of relevant comments and irrelevant comments generated. EGW subjects wrote significantly more relevant ( $F = 8.76, p < .02$ ) and irrelevant comments ( $F = 42.79, p < .01$ ) than did GW subjects and more relevant comments than did PW subjects ( $F = 14.36, p < .01$ ). There was no significant difference, however, between EGW and EPW subjects in the number of relevant ( $F = .20, p < .66$ ) and irrelevant comments ( $F < .01, p < 1.00$ ) they typed.

## **Conclusion**

This study has shown that electronic gallery writing is more satisfying than and preferred over electronic poolwriting, the predominant electronic idea generation technique currently in use throughout the world. Numerous studies have shown that EPW is superior to oral meetings, but this study demonstrates that EGW is even better.

This study found no significant difference in the number of comments generated with EGW and EPW, but EPW was rated lower in satisfaction because of the subjects' frustration dealing with multiple files instead of one shared file. Subjects wanted to see others' written comments simultaneously, and they wanted to feel included by seeing all of the comments generated during the course of the meeting.

We believe it is important in meetings for participants to share information widely and uniformly. In oral brainstorming, all receive the same information, but individuals have problems providing information simultaneously (people must take turns to speak). In PW and EPW meetings, all can provide information easily (by writing or typing at the same time), but have problems receiving it (nobody is looking at the same comments at the same time and over the course of the meeting, everyone cannot see all comments). GW allows participants to receive and provide information easily. Anyone in the group can at any time see what the group has written and can provide a new comment to the transcript without the need for turns. This also accommodates social interaction needs and encourages greater group cohesion than when using other brainwriting techniques.

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