Effects of Focusing Tools on Collocated Brainstorming

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ABSTRACT
We present a study of collocated brainstorming output using SMART Ideas, a software application designed to enhance focus in group activities. The tool was studied using a within-subjects test with 20 individuals participating in groups of 3-4. Although SMART Ideas was found to improve focus compared to a whiteboard, participants were more engaged and satisfied when using the whiteboard.

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General terms: Design, Human Factors

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INTRODUCTION
Much of the existing CSCW literature revolves around using computer-supported collaboration tools to improve performance in group meetings. These tools are generally designed to support either collocated meetings (all participants are in the same space) or remote meetings (some people participate from a distance).

Prior research on group work dynamics have focused on participation levels, primarily balancing the input from multiple users [1]. Strategies have included using visual displays of meeting status to facilitate a sense of equal participation. Other attempts have been made to ‘visualize’ conversations to enable knowledge sharing in groups [2].

Our study was designed to investigate whether CSCW tools could improve participants’ focus during a meeting, and additionally to determine whether improved focus would increase participants’ engagement and satisfaction with the results of the meeting. Unlike most existing studies on brainstorming tools, we were more interested in investigating the effects of the tools on the participants, rather than analyzing the quality of the ideas produced during the meeting.

METHODOLOGY
We conducted six simulated meetings using Stanford University students as participants. Each meeting contained 3-4 participants, for a total of 20 participants over six meetings.

Many of the participants were already acquainted with each other before the meetings. To encourage open discussion and deliberation, we began with a warm-up task, by asking the participants to chronologically order photographs of nine United States presidents.

After the warm-up task, the participants were asked to engage in two brainstorming activities of 15 minutes each. The first activity was to brainstorm low-cost methods of improving the customer experience at a fictional airline. The second activity was to brainstorm ideas for a high-tech shopping experience at The Gap.

Participants were seated around a table with a whiteboard at the front of the room, and computer equipment on the table. As a control condition, participants used a whiteboard with multiple markers for one activity. The experimental condition involved the computer equipment: participants used a computer system with SMART Ideas software, an LCD projector, and input devices for each person.

The groups were counterbalanced so that half of the groups participated in the control condition first, and half participated in the experimental condition first. The participants were given no directions on how to use the whiteboard, except that they should record all their ideas on the whiteboard. They were given a short demonstration of the SMART Ideas software, specifically including a demonstration of the focusing feature, and they were asked not to use any of the other features of the software.

After each brainstorming task was complete, students were given a questionnaire asking their feelings and their satisfaction with the process and the ideas generated. They were also asked to record all the ideas their group generated which they could remember in 60 seconds. At the end of the study session, subjects were also given a short post-questionnaire. The sessions were also videotaped and reviewed later to obtain qualitative observations about the groups’ methodology and use of technology.
RESULTS

Quantitative Results
Most importantly, participants remembered fewer main topics of conversation in the experimental condition. On average, participants remembered 7.60 ideas in the whiteboard condition, compared to 5.65 ideas in the experimental condition. (σ = 0.144.) Participants also felt more at ease and more comfortable when using the whiteboard. (σ = 0.039 and 0.036 respectively.)

No statistically significant difference was found in the responses to many of the other survey questions that were asked. In particular, there was no significant difference in the participants’ satisfaction with the ideas their groups generated, in their satisfaction with the process used by their groups, or in their perception of group focus during the meetings.

Qualitative Results
We developed conversation maps for each of the 12 brainstorming sessions, as shown below.

These maps indicate a general trend toward more lengthy discussions and deeper conversations about single topics when using the computer and the SMART Ideas software. Thus we concluded that the experimental condition did increase group focus, although at the expense of participant comfort and engagement.

FUTURE WORK AND CONCLUSION
In results of the video analysis, 5 of the 6 groups informally selected a “driver” who performed nearly all of the whiteboard writing or computer input. (The driver was not usually the same person in both conditions.) Particularly when using the focusing tool, the driver was the main factor in determining how much time the group would spend on a particular idea. For example, one driver said “Let’s go deeper into this” and focused the computer system on a particular topic. The group only shifted focus when the driver decided to exit the topic-specific visualization.

In some instances, focusing of conversation was more subtle and presented minimal effort on the driver’s part to organize thoughts on a single topic. We believe the simple ‘double-click to focus’ feature of SmartIdeas made this possible and presents itself as a suitable path for tool design. For instance, by lowering the barrier of changing focus and reorganizing content, a group could possibly maintain common ground during the extent of the meeting.

For future work in this area, we conclude that investigating the relationship of the “driver” and the software tool is critical for understanding the effect of focusing tools on group dynamics.

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REFERENCES