

# Development of Group Discussion Support System Based on Brain Writing Method

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## Abstract

Currently, there are various kinds of problems to solve in regards to the dynamics of group discussions. In discussions, thinking various ideas and putting them into some meaningful conclusion, in other words, divergence and convergence of ideas are the main and most important processes. Importantly, the education for thinking ideas and discussing them in a group are not popular in Japan. Furthermore, in general Japanese people are not good at group discussion techniques like Brainstorming because they think too carefully about their positions in the group and evaluating their ideas harmoniously. In this paper, we will examine these problems. Brainwriting is one of the group thinking methods utilized in our research. In this method, Participants are not allowed to talk to other members but, instead, write their ideas on a piece of paper. Therefore, each member does not need to worry about their debating skill and the judgment of their ideas. We have developed a Group thinking support system based on the Brainwriting method. The proposed system supports not only the divergence stage of an idea but also the evaluation and convergence stage. We performed some experiments to evaluate the proposed system by comparing it to the original style of Brainwriting using paper sheets. As a result, it is shown that group thinking, using the proposed system, can let the subjects feel more anonymity than the original method using paper. Furthermore, the system provides the environment in which the subjects can feel free from their positions in the group and the anxiety of proposing their ideas.

## 1. Introduction

The group thinking method of Brainwriting was proposed in Germany by Mr. Holiger in 1968 [1]. Brain writing is the group thinking method which repeats the process of a participant writing a new idea based on others' ideas on a sheet of paper. This sheet of paper is referred to as a Brainwriting sheet, and is passed around the group in a circle. In Brainwriting, talking during the process is generally not accepted and the participant does not need to care about their skill of conversation or his or her position and status in the group.

In this paper, we propose to use the Brainwriting system on tablet computers. This proposed system supports the sequential contribution of group thinking and decision making based on the Brainwriting method. This system consists of 6 tablet PCs as clients and 1 mainframe computer as a server. The tablet PCs are used as the Brain writing sheets and the server controls the flow of ideas and as a result, the system can offer greater anonymity.

## 2. Decision making support system based on Brainwriting method

The proposed system supports the formation of ideas through Brainwriting and the evaluation of those ideas on a tablet PC. Figure 1 shows the outline of the system and data flow on the proposed system. In this system, a user inputs and evaluates ideas on a tablet computer by text and star mark, and the system sends the results to a server. The server performs management of the Brainwriting sheets and a running evaluation.

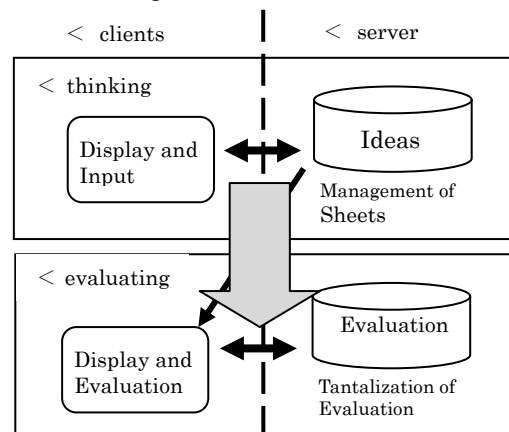


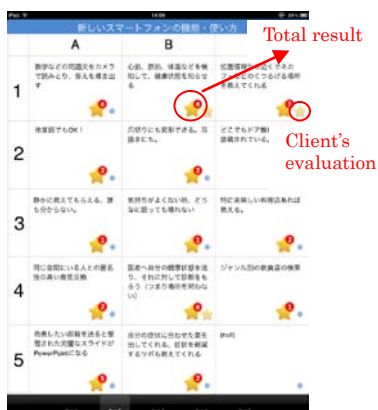
Figure 1 System configuration and data flow.

Figure 2 shows the G.U.I. of the client PC in the situation of idea input. In the original form of Brainwriting, sheets of conventional paper are passed to the next person, therefore the owner of the idea was known. In our version, because the input data is managed by the server, the anonymity of the idea is ensured.



**Figure 2 G.U.I. of client PC for thinking stage.**

All Brainwriting sheets are sent to each client PC from the server. The user can inspect all ideas at the same time and evaluate the idea by marking the good ones with a star. The evaluation data are also sent to the server and the server aggregates all members' evaluations and sends the results to the clients (see Figure 3).



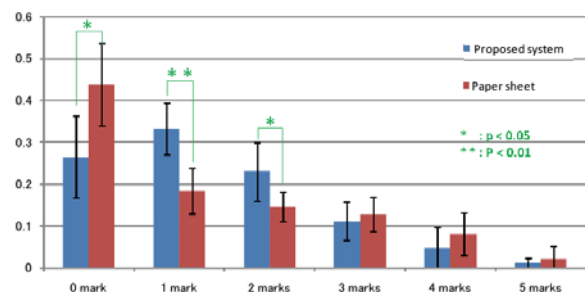
**Figure 3 G.U.I. for total result.**

### 3. Evaluating experiment by using proposed system

In the experiment, the procedure of the Brainwriting method and the computerized version were explained to the subjects. The subjects performed a series of tasks for one of the themes using the 1st medium. After a break, they did so for another theme using the 2nd medium. The subjects were made to fill out a questionnaire after each experiment. The subjects are 30 students, which were divided into 6 groups.

As a result of the experiment, the rate of the idea with the number of star to the total number of ideas in the proposed system and paper sheets method is shown in Figure 4. From this figure, the distribution of the proposed computer-assisted system versus the original

paper medium one shows a significant difference of 5%. The result of this difference is considered to originate in the method of star selection from the proposed system versus the paper sheets method. The subjects can evaluate all ideas at the same time on the display of their client PC. In the original version, they evaluate the ideas on the sheet in front of them at that time. Therefore, a subject judges the ideas while looking at others' evaluation. However, because of the anonymity provided by the proposed system, the subject evaluates all the ideas solely from his viewpoint. Thus, eliminating the influence of the other member's evaluation that occurs in the paper sheets method. There is a possibility that the influence of other's evaluation causes the difference of distribution. Moreover, the subjects tend to care about others' evaluation. Therefore, the proposed system, which can provide an impartial evaluation opportunity, is useful for decision-making in group situations.



**Figure 4 Star marked idea's rate.**

### 4. Conclusions

In this paper, a group discussion support system for Mr. Holiger's Brainwriting method using tablet PCs has been proposed. This proposed system supports the sequential contribution of group thinking and decision making based on the Brainwriting method. The tablet PCs are used as the Brain writing sheets and the server controls the flow of ideas and as a result, the system can offer greater anonymity.

We performed some experiments to confirm the system usability. Results of these experiments indicate that there isn't significant difference between the proposed method and original one. However, there is high possibility that the anonymity which is supplied by controlling the information based on the proposed method encourages the quality and quantity of group discussion and decision making.

### References

[1] Rohrbach, Bernd: "Kreativ nach Regeln – Methode 635, eine neue Technik zum Lösen von Problemen". Creative by rules - Method 635, a new technique for solving problems first published in the German sales magazine "Absatzwirtschaft", Volume 12, 1969. p73-75 and Volume 19(1969).