

# Discusys: Multiple user Realtime Digital Sticky-Note Affinity-Diagram Brainstorming System

William Widjaja

Human Factor Laboratory, Dept. Management Science and Technology Tohoku University  
Aobayama Campus, Aramaki Aza Aoba 6-6-10, Aoba-ku, Sendai, 980-8579, Sendai  
william.widjaja@most.tohoku.ac.jp

## ABSTRACT

Paper brainstorming using sticky notes and Whiteboard has been an integral part of the discussion session in many collaborative environment. Yet Despite the introductions of new techniques in many research institution and advances in technology, Many users still continues to use conventional paper brainstorming methods to generate, structure and communicate their ideas. Discusys is a Brainstorm Support system that aims to improves the effectiveness of brainstorming by implementing 1) Separation of Private and public dashboard during idea generation to allow users to mature their ideas without judgment of others, 2) Quick and easy attachment of sources and media to ideas to increase the validity of ideas 3) Easy navigation of multi-user's ideas and feedback system to increase recorded collaborative communication between user .4) Multi-platform sync technology that enable users to create one collaborative affinity diagram from different terminal Discusys leverages dual monitor PC client that separate private and public dashboard, Real-time network engine technology that allow different users from different terminal to interact in one discussion sandbox and Multi-touch technology to create a natural, deep and structured collaborative discussion for multiple-users..

## Author Keywords

Guides; instructions; author's kit; conference publications; keywords should be separated by a semi-colon.

## ACM Classification Keywords

H.5.1. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

See: <http://www.acm.org/about/class/1998/> for more information and the full list of ACM classifiers and descriptors. **Mandatory section to be included in your final version. On the submission page only the classifiers' letter-number combination will need to be entered.**

## General Terms

Human Factors; Design; Measurement. If you choose more than one ACM General Term, separate the terms with a semi-colon.

See list of the limited ACM 16 terms in the instructions and additional information: <http://www.sheridanprinting.com/sigchi/generalterms.htm>. **Optional section to be included in your final version.**

## INTRODUCTION

Brainstorming is one of the most effective technique for a group to enhance creativity and generate ideas (Osborn, 1953). Brainstorming also helps teams to group and link their collective thoughts into a clear and understandable structure. Most brainstorming session are conducted in a single location group situation (Sutton et al. 1996) and Diehl et al said that the numbers of ideas generated is significantly higher and wider when working in group rather than individuals (Diehl et al. 1991). In addition, Mullen, Johnson and Salas reported that the key contributing factors in reducing the effectiveness of brainstorming is 1) Fear of negative evaluation which results the participants to withhold their ideas to themselves (Mullen et al. 1991). 2) Production blocking where users do not write down their ideas fast enough during discussion as a result ideas are not longer relevant and original (Herrmann et al. 2010). 3) Weak idea output where most ideas generated are shallow and unsupported by other sources as a result it is extremely hard for others to understand and accept other person ideas (Nishimoto et. al 1999). Brainstorming activities are usually conducted using pens, sticky notes and whiteboard. However, in recent years, many institution have conducted research to find a more effective brainstorming methods using electronic system. Computer assisted brainstorm offer many advantages. Yet despite these benefits, computer-assisted brainstorming system also face many challenges yet to be solved.

## RESEARCH MOTIVATION AND DIRECTION

Brainstorming activities typically include the following iterative work flow 1) Searching and Gathering of information 2) Idea generation and 3) Refining of ideas (Perteneder et al. 2012). In this paper, we aim to introduce a system to effectively support this brainstorming work flow. Discusys is a mobile handheld-supported multi-platform brainstorming system. It aims to leverage the technologies of current generation of consumer handheld devices. Multi-touch display technology and custom network engine socket server

technology to create a multi-platform real time synchronous brainstorming system. Discusys system aims to solve some of the problem faced by traditional analog brainstorming flow by employing these design goals 1) Reducing Negative idea evaluation anxiety by separating private and common information dashboard, giving users privacy to explore their ideas first before sharing with others 2) Reducing production blocking by designing a quick input user interface system to empower users to quickly enter and edit their ideas to the system database. 3) A common interactive space that allow users to naturally manipulate group link and draw each other ideas to provide a structured conclusion of the collective ideas. In addition, Dr Hans Christian-Jetter Blended interaction framework (Jetter, Geyer, Schwarz, Reiterer, 2012) also inspire the design of private information spaces for individual interaction and public information spaces for social interaction and communication.

## NEW DIRECTION

Prepare your submissions on a word processor or typesetter. Please note that page layout may change slightly depending upon the printer you have specified.  $\text{\LaTeX}$  sometimes will create overfull lines that extend into columns. To attempt to combat this, the .cls file has a command, `\sloppy`, that essentially asks  $\text{\LaTeX}$  to prefer underfull lines with extra white-space. For more details on this, and info on how to control it more finely, check out <http://www.economics.utoronto.ca/osborne/latex/PMAKEUP.HTM>.

## Title and Authors

Your paper's title, authors and affiliations should run across the full width of the page in a single column 17.8 cm (7 in.) wide. The title should be in Helvetica 18-point bold; use Arial if Helvetica is not available. Authors' names should be in Times Roman 12-point bold, and affiliations in Times Roman 12-point. For more than three authors, you may have to place some address information in a footnote, or in a named section at the end of your paper. Please use full international addresses and telephone dialing prefixes. Leave one 10-pt line of white space below the last line of affiliations.

## Abstract and Keywords

Every submission should begin with an abstract of about 150 words, followed by a set of keywords. The abstract and keywords should be placed in the left column of the first page under the left half of the title. The abstract should be a concise statement of the problem, approach and conclusions of the work described. It should clearly state the paper's contribution to the field of HCI.

The first set of keywords will be used to index the paper in the proceedings. The second set are used to catalogue the paper in the ACM Digital Library. The latter are entries from the ACM Classification System [3]. In general, it should only be necessary to pick one or more of the H5 subcategories, see <http://www.acm.org/class/1998/ccs98.html>

## Normal or Body Text

Please use a 10-point Times Roman font or, if this is unavailable, another proportional font with serifs, as close as

possible in appearance to Times Roman 10-point. The Press 10-point font available to users of Script is a good substitute for Times Roman. If Times Roman is not available, try the font named Computer Modern Roman. On a Macintosh, use the font named Times and not Times New Roman. Please use sans-serif or non-proportional fonts only for special purposes, such as headings or source code text.

## First Page Copyright Notice

Leave 3 cm (1.25 in.) of blank space for the copyright notice at the bottom of the left column of the first page. In this template a floating text box will automatically generate the required space. Note however that the text box is anchored to the **ABSTRACT** heading, so if that heading is deleted the text box will disappear as well. You can replace the default copyright notice by uncommenting the `\toappear` block at the beginning of the document and inserting your own text, for example, for versions under review.

## Subsequent Pages

On pages beyond the first, start at the top of the page and continue in double-column format. The two columns on the last page should be of equal length.



Figure 1. With Caption Below, be sure to have a good resolution image (see item D within the preparation instructions).

## References and Citations

Use a numbered list of references at the end of the article, ordered alphabetically by first author, and referenced by numbers in brackets [2, 4, 5, 7]. For papers from conference proceedings, include the title of the paper and an abbreviated name of the conference (e.g., for Interact 2003 proceedings, use *Proc. Interact 2003*). Do not include the location of the conference or the exact date; do include the page numbers if available. See the examples of citations at the end of this document. Within this template file, use the `References` style for the text of your citation.

Your references should be published materials accessible to the public. Internal technical reports may be cited only if they are easily accessible (i.e., you provide the address for obtaining the report within your citation) and may be obtained by any reader for a nominal fee. Proprietary information may not be cited. Private communications should be acknowledged

Objects	Caption — pre-2002	Caption — 2003 and afterwards
Tables	Above	Below
Figures	Below	Below

**Table 1. Table captions should be placed below the table.**

in the main text, not referenced (e.g., “[Robertson, personal communication]”).

## SECTIONS

### LATEST ISSUE

The heading of a section should be in Helvetica 9-point bold, all in capitals. Use Arial if Helvetica is not available. Sections should not be numbered.

### Subsections

Headings of subsections should be in Helvetica 9-point bold with initial letters capitalized. For sub-sections and sub-subsections, a word like *the* or *of* is not capitalized unless it is the first word of the heading.)

### ACM

This is a new subsection of the works

#### Sub-subsections

Headings for sub-subsections should be in Helvetica 9-point italic with initial letters capitalized. Standard \section, \subsection, and \subsubsection commands will work fine.

### FIGURES/CAPTIONS

Place figures and tables at the top or bottom of the appropriate column or columns, on the same page as the relevant text (see Figure 1). A figure or table may extend across both columns to a maximum width of 17.78 cm (7 in.).

Captions should be Times New Roman 9-point bold. They should be numbered (e.g., “Table 1” or “Figure ??”), centered and placed beneath the figure or table. Please note that the words “Figure” and “Table” should be spelled out (e.g., “Figure” rather than “Fig.”) wherever they occur.

Papers and notes may use color figures, which are included in the page limit; the figures must be usable when printed in black and white in the proceedings. The paper may be accompanied by a short video figure up to five minutes in length. However, the paper should stand on its own without the video figure, as the video may not be available to everyone who reads the paper.

### LANGUAGE, STYLE AND CONTENT

The written and spoken language of SIGCHI is English. Spelling and punctuation may use any dialect of English (e.g., British, Canadian, US, etc.) provided this is done consistently. Hyphenation is optional. To ensure suitability for an international audience, please pay attention to the following:

### CONCLUSION

Dont worry about it and it makes the product much better and in order to make the product suh much better we try ensure that this is working perfectly[7]

- Write in a straightforward style.
- Try to avoid long or complex sentence structures.
- Briefly define or explain all technical terms that may be unfamiliar to readers.
- Explain all acronyms the first time they are used in your text—e.g., “Digital Signal Processing (DSP)”.
- Explain local references (e.g., not everyone knows all city names in a particular country).
- Explain “insider” comments. Ensure that your whole audience understands any reference whose meaning you do not describe (e.g., do not assume that everyone has used a Macintosh or a particular application).
- Explain colloquial language and puns. Understanding phrases like “red herring” may require a local knowledge of English. Humor and irony are difficult to translate.
- Use unambiguous forms for culturally localized concepts, such as times, dates, currencies and numbers (e.g., “1-5-97” or “5/1/97” may mean 5 January or 1 May, and “seven o’clock” may mean 7:00 am or 19:00). For currencies, indicate equivalences—e.g., “Participants were paid 10,000 lire, or roughly \$5.”
- Be careful with the use of gender-specific pronouns (he, she) and other gendered words (chairman, manpower, man-months). Use inclusive language that is gender-neutral (e.g., she or he, they, s/he, chair, staff, staff-hours, person-years). See [6] for further advice and examples regarding gender and other personal attributes.
- If possible, use the full (extended) alphabetic character set for names of persons, institutions, and places (e.g., Grønbæk, Lafrenière, Sánchez, Universität, Weißenbach, Züllighoven, Århus, etc.). These characters are already included in most versions of Times, Helvetica, and Arial fonts.

### PAGE NUMBERING, HEADERS AND FOOTERS

Please submit your anonymous version for reviewing with page numbers centered in the footer. These must be removed in the final version of accepted papers, as page numbers, headers, and footers will be added by the conference printers. Comment out the \pagenumbering command at the top of the document to remove page numbers.

### PRODUCING AND TESTING PDF FILES

We recommend that you produce a PDF version of your submission well before the final deadline. Your PDF file must be ACM DL Compliant. The requirements for an ACM Compliant PDF are available at: <http://www.sheridanprinting.com/typedept/ACM-distilling-settings.htm>.

Test your PDF file by viewing or printing it with the same software we will use when we receive it, Adobe Acrobat Reader Version 7. This is widely available at no cost from [1]. Note that most reviewers will use a North American/European version of Acrobat reader, which cannot handle

documents containing non-North American or non-European fonts (e.g. Asian fonts). Please therefore do not use Asian fonts, and verify this by testing with a North American/European Acrobat reader (obtainable as above). Something as minor as including a space or punctuation character in a two-byte font can render a file unreadable.

### BLIND REVIEW

For archival submissions, CHI requires a “blind review.” To prepare your submission for blind review, remove author and institutional identities in the title and header areas of the paper. You may also need to remove part or all of the Acknowledgments text. Further suppression of identity in the body of the paper and references is left to the authors’ discretion. For more details, see the submission guidelines and checklist for your submission category.

### CONCLUSION

It is important that you write for the SIGCHI audience. Please read previous years’ Proceedings to understand the writing style and conventions that successful authors have used. It is particularly important that you state clearly what you have done, not merely what you plan to do, and explain how your work is different from previously published work, i.e., what is the unique contribution that your work makes to the field? Please consider what the reader will learn from your submission, and how they will find your work useful. If you write with these questions in mind, your work is more likely to be successful, both in being accepted into the Conference, and in influencing the work of our field.

### ACKNOWLEDGMENTS

We thank CHI, PDC and CSCW volunteers, and all publications support and staff, who wrote and provided helpful comments on previous versions of this document. Some of the references cited in this paper are included for illustrative purposes only. **Don’t forget to acknowledge funding sources as well**, so you don’t wind up having to correct it later.

### REFERENCES

1. Adobe Acrobat Reader 7.  
<http://www.adobe.com/products/acrobat/>.
2. Anderson, R. E. Social Impacts of Computing: Codes of Professional Ethics. *Social Science Computer Review* December 10, 4 (1992), 453–469.
3. How to Classify Works Using ACM’s Computing Classification System.  
[http://www.acm.org/class/how\\_to\\_use.html](http://www.acm.org/class/how_to_use.html).
4. Klemmer, S. R., Thomsen, M., Phelps-Goodman, E., Lee, R., and Landay, J. A. Where do web sites come from?: capturing and interacting with design history. In *Proc. CHI 2002*, ACM Press (2002), 1–8.
5. Mather, B. D. Making up titles for conference papers. In *Ext. Abstracts CHI 2000*, ACM Press (2000), 1–2.
6. Schwartz, M. *Guidelines for Bias-Free Writing*. Indiana University Press, 1995.
7. Zellweger, P. T., Bouvin, N. O., Jehøj, H., and Mackinlay, J. D. Fluid annotations in an open world. In *Proc. Hypertext 2001*, ACM Press (2001), 9–18.