

Design of Information-Sharing Media Based on Observation of Reading and Writing Behavior on Message Boards within Large Organizations

The 16th International Conference of Advances in Computer-Human Interactions, ACHI2023

Kanayo Ogura (Iwate Prefectural University) Ryotaro Hoshi (Quick Corporation)

E-mail: ogura_k@iwate-pu.ac.jp



Hello! I am Kanayo Ogura



Title: Senior Lecturer (Ph.D.)

Affiliation: Faculty of Software and Information Science, Iwate Prefectural University

Details:

http://souran.iwate-pu.ac.jp/html/200000020_en.html



Topics of research interest

- Computer-Mediated Communication(CMC)
 - I designed some communication tools.
 - CHATEL <u>https://dl.acm.org/doi/10.1145/1125451.1125670</u>
 - Kairos Chat <u>https://dl.acm.org/doi/abs/10.1145/1753846.1754045</u>

Behavioral Informatics
 Behavior Change Design

I am particularly interested in system design based on the analysis of user behavior.

Research background

- There are people around us who have already solved their own problems.
- Casual conversations with those people often contain useful information.

However...

We do not have many opportunities to share information with people outside of our own community.



We need to provide <u>a space for casual conversation</u> and information sharing across the organization.

Related works(1/3)

<u>Nishimoto et al.[1]</u> proposed a method to promote the sharing of information through dialogue arising from chance encounters.



O Similar points:

- To seek information for an unspecified number of people
- To use within a large organization

Issues for improvement:

Psychological resistance to talking to someone you have never talked to before

We apply an **asynchronous conversation** environment

Related works(2/3)

<u>Greenberg et. al.[2]</u> proposed "The Notification Collage", which is an information sharing system used within small communities. This system treats information and findings as

shared



O Similar points:

- Information is directed to the entire community
- Information is arranged like a real bulletin board

Issues for improvement:

–Psychological resistance to posting under real names

- There is a possibility of flame wars if used anonymously
- <u>Offline</u>, there is a possibility of avoiding flaming even if anonymous ⁶

Related works(3/3)

What is needed to facilitate information sharing within organizations based on these related works ?

- Asynchronous conversations
 Can be viewed by many people
 Keeps information fresh
 Anonymity
- Can be used offline



Bulletin boards in public places

We set up a whiteboard to design an electronic bulletin board that encourages information sharing

Observation Study

We set up an information sharing space using a **whiteboard in our university** (Figure 1).

- for about <u>2 months</u>
- to examine the requirements for an electronic bulletin board that encourages information sharing.

Ifter the observation, we conducted a <u>questionnaire</u> <u>survey</u>





Observation Results (1/3) : Influence of format

Users replied more when we put a "Q" (question) and <u>A (answer) in each grid</u> (Figure3) than when free description was allowed (Figure2).



Firuge2. free description condition



Firuge3. Q and A condition



Observation Results (2/3) : deleting posts

We periodically deleted posts

- because users <u>did not voluntarily delete</u> them when there was no more space (as shown in Figure2).
- when the topic was continued, the deletion period was
 <u>extended for two days</u> from the new reply.
- O They continued to receive replies <u>after more than 10 days</u> had passed.

We <u>change the deletion period</u> <u>according to the status of replies</u> to each topic.



Figure2. whiteboard with messages filled in

Observation Results(3/3) : with someone ?

- We frequently observed <u>multiple people filling</u> in the whiteboard
 - only one person was actually filling in the whiteboard, while the topic was being discussed by multiple people (as shown in Figure 4).

This situation is **difficult to achieve with online communication**

We envision an electronic bulletin board that can be set up <u>in a shared</u> <u>space instead of from individual PCs.</u>



Figure4. Multiple people writing and reading

Questionnaire Results (1/2) : less important info.

○ "Have you obtained necessary information or new findings from this whiteboard?" → "No." 58.2%

- Lots of graffiti
- Low quality of answers



We proactively deal with less important information

to limit the number of replies to only one

- so that the less important information is less noticeable to the user.
- to incorporate a feature that reflects <u>user behavior ("good"</u> <u>and "bad" button etc.) in the increase or decrease of</u>
 - posting period.

to avoid less important information being displayed for a long time.

Questionnaire Results (2/2) : Duration

We received a request to clarify when posts would be deleted.

(As already explained, we periodically deleted posts.)

Use **text color shading** to indicate the time remaining in the posting period.

because users may be confused if they are directly informed of the time remaining until deletion





Design and Development (1/3)

We designed <u>an electronic bulletin board system</u> (Figure 5) based on the results of observation study.

- to use <u>a large display</u> to allow multiple users to post and view
- users can <u>only post to our system</u> <u>by a keyboard</u> connected to the display terminal (Raspberry Pi 4).



Figure5. Our electronic bulletin board



Design and Development (2/3)

O topics are <u>clearly segmented</u> (Figure 6)

- 3×3 grid of posting areas
- the screen is <u>a single slide</u>, and the screen changes to a slide show <u>every minute</u>.
- if there is no space to post, <u>users can move to another</u> screen using the toggle buttons.
- posts and replies in pairs (Figure 7).
 - replies are displayed for **less than 12 hours**
 - replies labeled as <u>"good" by other users (using "good"</u> <u>button) are displayed first.</u>

• mars x +		
 O é board-7d12a.web.app/home 		9. g) 🛪 🧿 1
tern and and hear		
●おすすめのサークルは? Becifyer Kee	•	
● だんす - 新聞いたの 1488 - 赤 1588 7.6		
Devriets. Criv. Devriets. 44	BINTER DIVERSER	Emril: Cr. Dor78818 Emril: Cr. Dor78818
•	•	
borr28.CH-borr28.5	(##736548.8))	(REP3/104/8/3)
(MREASER)	(8093009838)3	• (8893.0343.01
Figure6. o	ur system's L	II (whole)

しました。		を非衣亦に	
2021/11/01 12:03	Posting Message		
		🎃 1	12
●引き続き学生 さい。	間の交流(情報共有)の場として	◆ 活用してくだ	9Q
●引き続き学生 さい。 担当者より ^{2021/11/01 1204}	間の交流(情報共有)の場として Reply Message	♪` 活用してくだ	2
●引き続き学生 さい。 担当者より 2021/11/01 12:04 一覧で確認する Enterで改行、Ctrl + Enter	間の交流(情報共有)の場として Reply Message	● [●] 活用してくだ	P

Figure7. Posting area (Post and Reply to post)

Design and Development (3/3)

- Our Users can react to posts and replies (one per post) by clicking the <u>"good" and "bad" reaction buttons.</u>
- O displaying period of <u>5 days</u> for each post
 - <u>"good"</u>reaction: <u>+ 12 hours</u> extension
 - replies to the post: +24 hours extension
 - <u>"bad"</u>reaction: <u>- 24 hours</u> reduction
 - the number of "bad" exceeds a threshold: **non-display**
- O a function to gradually lighten the color of the text as the end of the display period approaches (Figure 8)

Note Note <t< th=""><th>C B board-7d12a.web.app/home</th><th></th><th></th><th></th><th></th><th>Q () () () () () () () () () () () () ()</th></t<>	C B board-7d12a.web.app/home					Q () () () () () () () () () () () () ()
98	and more more					
•• ## - ## •• ## - ## •• ## - ## •• ## - ## •• ## ## ## #		100 007 . 000 day	「東南南などの地を招きて共有」たいで	A AT THE AN ANTIPATION	エイポナい	
		子前・子牛	・研究室などの样を超えて共有したいと	こいの10432個		
 * Sargaroo, Taggaroo Taggaroo		- ANNO MARY				
Non-State Non-State <t< td=""><td> 来年度から、「数学」の教員免許が取 とですが、今の一年生で「数学」の教 は、新一年生の教職科目をもう一度履 </td><td>7得できるというこ 2員免許を取るに 1修し直さなけれ…</td><td> 皆さん生協以外で文房具ってどこで買ってま 2021/12/07 1948 </td><td>にすか?</td><td>●友達募集中 2001/12/07 16:37</td><td></td></t<>	 来年度から、「数学」の教員免許が取 とですが、今の一年生で「数学」の教 は、新一年生の教職科目をもう一度履 	7得できるというこ 2員免許を取るに 1修し直さなけれ…	 皆さん生協以外で文房具ってどこで買ってま 2021/12/07 1948 	にすか?	●友達募集中 2001/12/07 16:37	
古た出海にないる情報が少ないので現在をたたりので現在 「「「」」」」、「」」、「」」、「」」、「」」、「」」、「」」、「」」、「」」	2021/12/08 10:04	eensa () #nra		115% (D.1899		0185.2 (D 117.2
Image:	まだ出回っている情報が少ないので児 関連の先生に質問してみるのが確実だ 2021/02/09 14-00	玉先生あたりの教職 と思います	 ホーマック、盛岡駅の本屋 SERVITAGE 1888 		●scratchに気をつけて! zer/riz/15/15/49	
All and all all all all all all all all all al		******	- WYING AND AND AND A	MEALO PETA		11834 . # HTA
「 「 「 「 「 「 「 「 「 「 「 「 「 」 「 」 「 」	0893X2183.0) * ((N#P3X5143.5) *	(8893X51433))
	なまた、 こことや来願文を入らてい のにパンク寸前。 ゼミの先生に何と申 か。 2011/12/08 2018	し聞きをしたもの	ンプを設置したのですが、なくなっていまし る方は返却願います。所在地を知っている方 2020/12/10/184	った。持ってい 5は、返信願…		
	のれにバンクマす為、セミの先生に何と申 か。 このための生に何と申 通びちゃだめた、選びちゃためた、選び 聞かせてシンジムになりきって乗り motivor inte 	し開きをしたもの (************************************	ングを設置したのですが、なくたっていまし ろ方は弦知識います。所在地を知っている方 American text (単つないたち) (単つないたち)	レた。持ってい 5は、返信願… ****	(8893451433	
	のだにパンパンプす前、せきの先生に向と申 か。 まだりな用いま 違げちゃだめだ、選げちゃだめだ、選 聞かせてシンジくんになりきって乗り またいかいお またま。Alforem はないかいか。 またま、Alforem はないかいか。	し開きをしたもの 「「「「」」、「」、「」、「」、「」、「」、「」、「」、「」、「」、「」、「」、	ンプを設置したのですが、なくなっていまし る力な拡張無います。所在地を知っている力 ************************************	いた。持ってい 194、返信願… ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	(80193-021-0.5.) (522) (522) (522) (80193-021-021) (80193-021-021) (80193-021-021) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-021-023) (80193-023) (801	>

Figure8. Using text shading

Experiment

We set up our electronic bulletin board in front of our university store (Figure 9).

for about <u>four months</u>

(two months were during the summer vacation)

to confirm the effectiveness of

the electronic bulletin board designed and developed to facilitate information sharing based on observation study



Figure9. electronic bulletin board and its surroundings.



Experimental Results (1/2)

70 posts and 134 replies

There were up to 14 posts per day and <u>almost no days</u> <u>without posts.</u>

Continuously used

Most posts were made at around 12:00 and 16:00.

Several people were **using our system together to avoid social embarrassment** [3].

The use of <u>a large display and posting only from</u> <u>a keyboard</u> connected to the system <u>works well.</u>



Experimental Results (2/2)

<u>80%</u> of all posts get replies.
<u>The functions to reduce less important</u>
<u>information work well</u>

Replies to posts continued for about two weeks to
 <u>one month.</u>
 A function to gradually lighten the color works well

60 "good" reactions and <u>8 "bad"</u> ones

 it was used only for specific topics and <u>thus not widely</u> <u>used.</u>

Conclusions

- We designed and implemented an electronic bulletin board system for information sharing in large organizations based on the results of observation study.
 - An environment that allows several people to post and browse while discussing
 - Features to encourage posting
 - Functions to deal with less important information

We confirmed that users are able to continuously post and reply to messages using our bulletin board system.



Our notable achievement is that we have implemented the analog advantages revealed by our observations into an IT system in the digital world.

Future works

We plan...

to further analyze the results of the experiment and add more user-friendly functions in the future

to improve our system so that users can easily post from their personal mobile devices



Thanks!

If you have any questions or comments on our study, please send me E-mail !

ogura_k@iwate-pu.ac.jp



References

[1]K. Nishimoto and K. Matsuda, "Informal Communication Support Media For Encouraging Knowledge-Sharing And Creation In A Community," International Journal of Information Technology & Decision Making (IJITDM), World Scientific Publishing Co. Pte. Ltd., vol. 6, no. 3, pp. 411-426, 2007.

[2]S. Greenberg and M. Rounding, "The notification collage: posting information to public and personal displays," CHI '01: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 514-521, 2001.

[3] R. Edelmann, "Social Embarrassment: An Analysis of the Process," Journal of Social and Personal Relationships, vol.2, no.2, pp. 195-213, 1985.

