
MindMargin: An Article-Adjacent Commenting Platform

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Abstract

Commenting systems are a popular means for facilitating conversation among readers on many websites. Reading and writing comments can increase active user engagement in information exchange, personal reflection, and lively discussion, among others. We explore how user engagement can be increased by proposing a new commenting system and interface, MindMargin. In contrast to traditional commenting systems where comments are featured below the article, MindMargin presents comments adjacent to the article. Users can post and navigate comments and replies on a horizontal infinite scroll. Comments are anchored by users to specific sections or phrases of the article. This system exposes users to a diverse and relevant array of opinions as they read.

Author Keywords

Comments; anchored; commenting systems; opinions.

ACM Classification Keywords

H.5.2. [Information Interfaces and Presentation (e.g. HCI)]: User Interfaces

Introduction

News pages, media sites, online shops, blogs and social networks support the ability to give content-related

feedback in the form of comments. Commenting systems on these sites are traditionally featured under, and separate from, the main content. This structure parallels the relationship between content and comments, as interactions with comments are markedly secondary to the primary task of reading or browsing primary content. However, studies on Fluid Documents and annotation interfaces that challenge typographic conventions, such as discussion boards and footnotes, reveal limitations in the traditional vertical interface and suggest alternative horizontal layouts [?, 6, 8, 7, ?, ?, ?].

The Fluid Documents project aims to make information added into a page easier to locate in its source document by adjusting the typography of page. One specific study found that a fluid margin interface, as opposed to a fluid interline or overlay interface, had minimal disturbance to the user, because it did not move or occlude the primary text with the secondary text [?].

The concept of anchoring annotations to references in a text has been known to qualitatively improve conversation among readers because it makes understanding the context of a comment cognitively easier [?, ?, ?]. Another study compares the four leading annotation interfaces: footnotes, interlinear commentary, “sticky-note” annotations, and marginal comments, concluding that the marginal interface is superior in minimizing distraction and enhancing visibility. The marginal interfaces studied, however, interact with the primary text. They are tagged to boxes around the referenced content to indicate where they are anchored [7].

We have thus chosen to anchor comments in MindMargin with a faint dotted line to the edge of the article that corresponds to the y-coordinate of its reference, yet still avoids disturbing the primary text.

While online commenting provides an opportunity for readers to express their views and engage in lively discussion with others, the comments section of many websites has become a popular space for flame wars. The social act of flaming, or the posting of offensive content, regularly devolves into hostile fights among multiple users, diverting a legitimate discussion topic to an unrelated and often emotionally charged digression. This behavior is examined closely in many research fields, including user interface design, communications, and psychology [?, ?, ?, ?].

Evidence in educational research, however, has shown that anchored annotated notes foster a deeper understanding of the text and facilitate more thoughtful teacher-to-student and peer-to-peer discussions [7, 8]. Studies on balancing peoples skewed opinions also suggest exposing readers to a variety of relevant perspectives so that they consider views that exist beyond a single article and authors scope [5, ?, ?].

Thus, while current commenting platforms often fail at drawing people into sensible and relevant conversation, we offer evidence to suggest a horizontal interface such as MindMargin can change peoples views and actions, and thus address this societal problem. From our evaluation and user study, it appears that people with prior exposure to the issue in the article become more moderate in their opinions, reporting less polar views than those using a traditional vertical interface.

Hypotheses

We propose two hypotheses for MindMargin’s effect on its users in comparison to the traditional vertical interface:

1. Users of MindMargin will develop more thoughtful

and nuanced opinions of an article, because MindMargin encourages readers to consider alternate views by exposing them to a greater diversity and number of comments.

2. Users of MindMargin will report a more positive impression of the existing comments because MindMargin displays anchored comments that appear alongside relevant passages of the text.

Contributions

This study presents the following novel contributions:

- A horizontally structured user interface for anchored comments on websites
- Insights into how comments can challenge readers' perspectives through
 1. Exposure to a diversity of comments
 2. Exposure to relevant comments at specific textual locations

Approach

We implemented two commenting systems. The first commenting system is MindMargin with anchored comments on a horizontal infinite scroll next to the reference medium. The second commenting system is a traditional vertical interface.

The client interfaces consist of clean user interfaces to avoid design clutter and distraction. Figure 1 shows the MindMargin system in action. The application is split into two sides: The reference media on the left and an adjacent commenting system on the right. The commenting system displays comments in a horizontal

infinite scroll. Thus, an unrestricted amount of comments can be linked to the reference media. Navigation within the infinite scroll component can be performed via mousewheel interaction (either left/right or top/down scrolling with the same effect) or by adjustment of a slider on the bottom of the right split screen.

Comments are anchored to the horizontal reference point of the media by thin dotted lines. If a comment has replies, a dropdown button appears on the comment's footer. Lighter in color, replies to comments appear vertically under their comment when the button is clicked. This arrangement optimizes horizontal real estate by reserving horizontal space for parent comments. Finally, while navigating through the infinite scroll, the reference medium remains fixed on the left for quick reference against referential comments and replies.

We have also implemented a metric to distinguish between popular and regular comments that appear separately. For greater visibility, popular comments are displayed directly adjacent to the article in the MindMargin interface and directly under the text, or first, in the traditional layout. Upvotes and downvotes indicate and impact comment popularity.

Figure 2 shows our implementation of the traditional vertical commenting system. The reference media appears first and on top of the commenting system that follows below. Navigation within the article as well as within the comments can be performed via top/down scrolling. The organization of replies and up- and down-voting is similar to the MindMargin prototype.

Experiment

Here we describe our experiment. We performed a blind user study on young adults. Participants were randomly

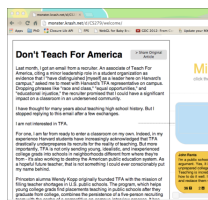


Figure 1: The MindMargin commenting system consists of a front-end (shown here) and a back-end.

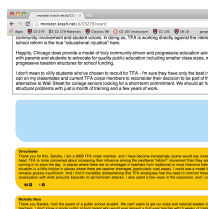


Figure 2: The traditional vertical commenting system with an ordered design.

associated to either MindMargin or the traditional commenting interface.

Participants

106 online participants landed on our page for our user study and evaluation, of which 46 proceeded to begin and complete the study (30 female). Participants were recruited online through social media and college listservs. Participants were college students, aged 18 to 25, and 68 percent from the local university. The reading frequency of news articles among participants ranged from daily to almost never.

Experimental Conditions

The two conditions in our study were MindMargin and the traditional vertical interface, seeded with 39 existing comments from a news article. We selected a recently published article from the Opinion Section of The Harvard Crimson, titled Don't Teach for America. We chose this article on the basis of its opinionated nature and its relevance both in recent news and to our anticipated participant pool. The article already had over fifty comments, from which we selected the top 39 as ranked by Disqus, the existing commenting system in The Harvard Crimson, to be used in our study. The same comments were used in both conditions. In the traditional vertical interface, they appeared in the identical order as ranked in the original article. In MindMargin, we anchored them to the article based on textual references, specific phrases, quotes, and relevant content in each comment. The comments were nevertheless written in, and intended for, the traditional vertical interface.

Design and Setup

We employed a between-subjects test, with participants assigned randomly to one of the two conditions (19 MindMargin). In order to reproduce the conditions under

which one would normally read a news article, we chose to recruit participants online and self-select themselves into reading the article of interest. In order to motivate our participants to actually read or skim the article, instead of skip it, we chose not to use monetary or other time-sensitive incentives. Instead, we chose to design the experiment around the survey question, "Do you (really) think like a [college] student?" We then asked participants follow-up questions to verify that they read the article, which included both the overall stance of the article and two pieces of supporting evidence used in the article. Participants were then asked to complete a post-experiment questionnaire and were not permitted to refer back to the article once provided the questionnaire.

Procedure

Participants were given an initial questionnaire asking basic demographics and reading frequency. Before given the article, they were also asked to provide a username or pseudonym, or to remain anonymous. During the reading of the article, participants were allotted 10 minutes. After 2 minutes, they were permitted to proceed. The 2-minute delay was to ensure reading of the article, but did not seem to prevent fast readers from proceeding as the average reading time was 3 minutes 47 seconds. In the follow-up questionnaire, reading verification questions were first asked of the article. Participants were also asked their personal stance on the article, whether they liked the article, and whether they agreed with the article. They were also asked to self-report whether they read the comments in the article and to provide two adjectives that described either their reaction to the comments or a description of the comments.

Results and Discussion

In this section, we report the findings of our user study that compare the proposed MindMargin interface against the traditional vertical commenting system. Overall, we observed a decrease in polarized views among readers who had seen or read the article previously and an increase in opinion polarization among unfamiliar readers. We also found an increase in readers' positive impressions of comments when using MindMargin. We were able to accept both of our hypotheses.

Hypothesis 1

Our first hypothesis predicted an increase in personal reflection when using MindMargin. Exposure to a range of diverse and controversial comments should result in the rethinking and revising of one's own opinions. All participants were asked their stance, from Strongly For TFA to Strongly Against TFA, on a Likert scale. Using data from participants who reported to have read the comments (see above), we computed the percentage of participants who claimed a strong stance on the article. Of those assigned to the MindMargin interface, only 16% reported to be either Strongly For TFA or Strongly Against TFA. In contrast, 26% of the participants using the traditional commenting system reported either extreme stance. The distribution of the Likert values is also normal for MindMargin and a U-shaped curve for the traditional commenting system. We performed a Shapiro-Wilk normality test ($\alpha = 0.05$) on both distributions. MindMargin rejects the null-hypothesis with $p = 0.1306$ and therefore is normally distributed. The traditional prototype accepts the null-hypothesis with $p = 0.0205$ and is therefore not normally distributed. We created Normal Q-Q plots for both (figures 3 and 4).

This reveals that despite no increase in the rate of reading

comments, the MindMargin interface was able to encourage users to consider other opinions and viewpoints. This suggests a greater user engagement with the comments with the MindMargin interface. Therefore, we have **accepted Hypothesis 1**.

Hypothesis 2

Our third hypothesis predicted an overall increase in positive impressions on comments when using the MindMargin interface. We asked participants who read the comments to input two adjectives in free-text describing either their reaction to the comments or a description of the comments. We then classified these adjectives using a three-bin classifier (Positive, Negative, and Neutral). Positive was assigned to positive reactions to comments, such as interesting, well thought-out, and engaging. Negative was assigned to negative reactions to comments, such as annoying, useless, distracting. Neutral was assigned to descriptive input about the comments, such as long and subjective. Finally, a few outliers, such as trolls and whatever, were removed.

We observed a drastic change of impressions when using MindMargin. As seen in figure 6, the majority of participants using the traditional commenting system described the comments as negative (68%). In contrast, when using MindMargin, the majority of participants described the comments as positive (48%) or neutral (48%) as seen in figure 5. Outliers were also observed only to occur in the traditional commenting system. We have therefore **accepted Hypothesis 2**.

In addition our quantitative results, we would like to quote qualitative feedback from a MindMargin user, suggesting actions he/she took beyond the scope of reading and commenting article: This article showed me a new perspective on TFA, which after doing research, I have

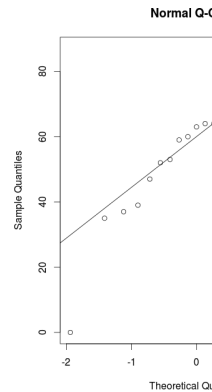


Figure 3: The personal distribution for MindMargin interface participants (normality test with $p = 0.1306$).

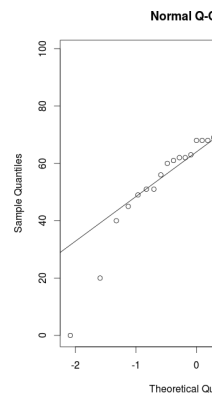


Figure 4: The personal distribution for traditional commenting system interface participants (normality test with $\alpha = 0.05$, $p = 0.0205$).



realized I agree with. No feedback suggesting actions outside the scope of the article was received from participants with the traditional commenting system.

Conclusions

In this paper, we studied how commenting systems can increase user engagement with comments while reading articles. We report quantitative evidence supporting MindMargin as an interface that depolarizes existing views and establishes new ones by exposing readers to diverse opinions in the comments and that enhances readers' overall impression of existing comments on the article. The key difference between traditional commenting systems and MindMargin is that in the latter, comments are anchored to specific passages of the reference media and are placed on a horizontal infinite scroll. We developed two commenting systems, one using the traditional vertical interface and the other using the MindMargin interface.

Then, we performed a user study for evaluation. Our key findings include that being exposed to relevant comments during reading increases personal reflection. This results in 10% less extreme positions regarding the context of the reference article. Additionally, the overall impression of comments significantly diverges. 68% of users of the traditional commenting system report comments to be negative, while only 2% of MindMargin users report comments to be negative.

Future research will include a user study without already seeded comments as well as employ a within-subjects methodology. In addition, we plan to expand the participant pool to include participants of all ages and backgrounds. We would like to explore if MindMargin causes increased difficulty for readers to leave inflamed

comments because they must choose an appropriate place to anchor their highly visible comment. Finally, we plan to pursue research on a commenting system like MindMargin, but for videos and music, that anchors comments to certain times or time-intervals within a given recording. Research into annotations on visual pieces, other than text, is also being considered.

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