Improving the Web-based eBook Reading Experience on a Mobile Device

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ABSTRACT

In this paper we describe Margin Tonic, a web-based application that aims to improve eBook reading on a mobile device. Margin Tonic leverages the Internet and social media to enhance the user experience of reading a piece of literature or article on a mobile device. The application explores user-submitted comments written in the margins of a traditional book, while keeping some key features of a traditional book. We describe a brief user-testing process, and analyze the results in order to evaluate the effectiveness of the solution. A live version of Margin Tonic can be found at: http://margintonic.framba.ch.

INTRODUCTION

Although the Internet has greatly improved accessibility of literature and academic articles, physical copy still maintains advantages over digital media. Users are able to engage with physical material more freely than its digital counterpart. Paper books and articles afford handwritten modifications, highlighting, and flexible bookmarking. Digital media has the advantage over paper of being relatively cheap to produce, replicate, and share, but this is not useful if extensions to works are hindered.

We explored the design space allowed by tablets and e-readers in order to improve the overall user experience when engaging with such digital literature. Additionally, we leverage the Internet and social media by allowing the user to flexibly "write in the margins" and share their thoughts. Popular features common in current eBook reader systems are included as well – a dictionary and library are available.

Margin Tonic is our web based application targeted at mobile devices. Margin Tonic allows users to sign in with Twitter accounts and comment on books. The user is able to view comments their friends make on the book they are currently reading. Comments are displayed in the left margin of the text, emulating handwritten notes in the margin in a physical book.

The book and comments are juxtaposed, allowing the user to quickly identify sections with popular comments. The book is not paginated – it scrolls from beginning to end – applying the normal process of skimming a text to this digital representation.

RELATED WORK

Current eBook readers such are Kindle and Nook support dictionary look-up[1] while a user is reading some material. Although the interfaces are different, the presence of the lookup feature is both standard and trivial to implement.

Web based note taking has been shown before in the project Note to Self[6] which is a web based tool for taking short notes. The Kindle features Public Notes[2], which allows users to share their thoughts and notes on a given piece of literature with other users. The social aspects of this functionality is explored by Rosta Farzan[3].

Other projects such as ScentHighlights[4] provides the means to highlight text while a user is skimming a document. This is to allows the user to direct their attention to the most important elements in the text while they skim through a document. Comments use a high-contrast scheme to gain the users' attention.

FeedMe[5] is a Google Reader project which allows the user to share content with interested friends or colleagues. This feature is integrated within the reader itself.

MARGIN TONIC

This section describes the considerations when building the system and the interface and how we were able to overcome specific challenges in developing a web application to be used on touch screen mobile devices.

Implementation Details

Margin Tonic is a web-based application. The front-end is built with HTML, CSS, and JavaScript (including the JQuery library). The back-end is built with PHP and MongoDB. User authentication relies on Twitter.

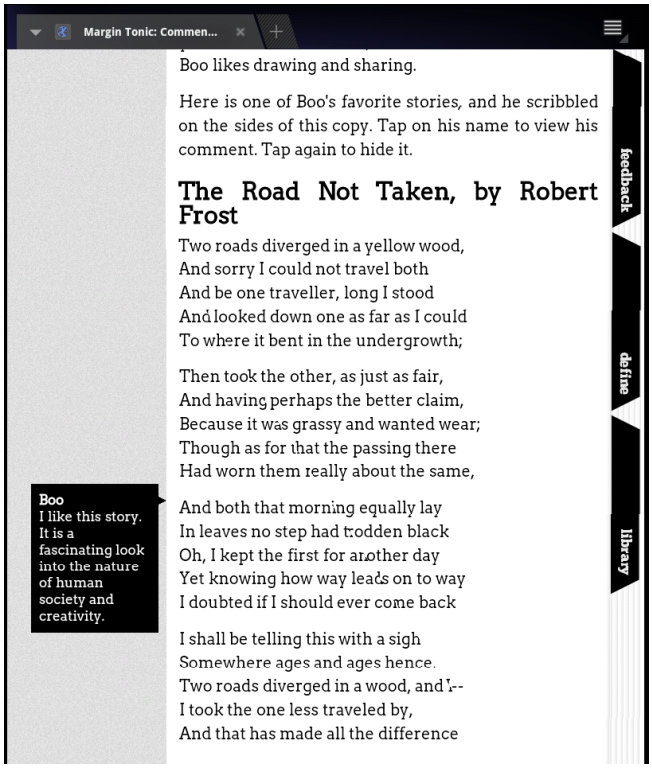


Figure 1. Margin Tonic book reading interface on Android 3.0

Interface Design

The key focus of the interface is simplicity and high contrast. **Figure 1** shows the completed interface.

Mobile devices are often used outdoors, in bright light conditions. High contrast enables reading on mobile devices even when in bright light conditions.

The menu tabs are placed on the right-side of the screen, and the resulting content (dictionary pane, comments) are placed on the left-side. This results in collusion avoidance, and reduces noisy, cluttered areas.

As the book is the focus of the interface, only blocking input operations will be able to overlap that content. A popup appears for comment input, library selection, and user feedback. **Figure 2** shows the popup interface.

The comments appear as speech bubbles to give an initial visual cue that these are comments, and not part of the original book. The clustering of these comments allow users to identify important or interesting areas of the book. The comments themselves initially display with the commenter name and expand when tapped or clicked.

Mobile Device Considerations

When developing for a mobile device, we had to take into account a number of features that differ from creating a web interface for desktop applications. The smaller resolution of mobile devices was one of the major concerns. The aspects of touching to interact with the interface of the device presents further challenges. Mobile browsers on these devices also vary greatly in their capabilities when compared with their desktop counterparts.

The application itself was designed to scale easily on many different resolution devices. Most of the layout is specified in percentages to scale well on these displays.

When handling interface interactions such as touch or scrolling, we implement long-press for interactions. This involves pressing in the margin area for a brief period of time to add a comment. Long-pressing on the text defines a word. Simple single taps were used for the menu tabs, as the assumption was that users would be scrolling over the body of text or over the comments.

Many mobile browsers do not support the scrolling of items in the `<div>` tag. As such our design had to work around these restrictions. Furthermore, since these devices do not come with many font faces, we made use of CSS3 support and embedded the font face within the site itself.

Social Media and Internet Integration

In order to utilize existing social media on the web, Margin Tonic allows the users to log in with their existing Twitter accounts. Comments come from the friends they have on Twitter that may also use the service. Not only does this allow the users to instantly use the service without creating a separate account, but they are automatically connected to their friends and do not have to worry about finding them again.

When a user clicks the “define” tab, they are presented with a textbox, to search for the definition of a word. Margin Tonic makes use of a Google “define” request and returns the results to the user within the website. This generally will include a dictionary definition of a word, along with any relevant Wikipedia entries. Since the application itself is within the browser, it’s easy for the user to click on the link and follow up with more information without waiting for a separate application to launch; this can take quite a bit of time on mobile devices.

USER STUDY

A user study was conducted in order to evaluate Margin Tonic. Ten users interacted with a brief body of text, which explained Margin Tonic's purpose and interface, and prompted them to explore and perform some interactions. The sample consisted of eight males, ages 21-43 and two females, ages 20 and 55. Three users used an iPad, five used an Android Tablet, one used an Android Phone, and one used a desktop computer.

The users were asked to fill out a feedback survey after a brief interaction. The survey consisted of the following questions graded on a Likert Scale. Implementation of the survey was trivial, as it is hosted by Google Docs. The users are asked if they disagreed (one) or agreed (five) with the statements:

1. Margin Tonic is easy to use.
2. Margin Tonic has every important feature I need.
3. I liked being able to see what people were saying.
4. I liked being able to define words.
5. In the future, I'd use Margin Tonic to read books.

They were then asked to complete three open ended questions to provide more specific feedback. The questions were as follows:

1. What did you like about Margin Tonic?
2. What did you not like about Margin Tonic?
3. What would you like to see added to Margin Tonic in the future?
4. Other comments.

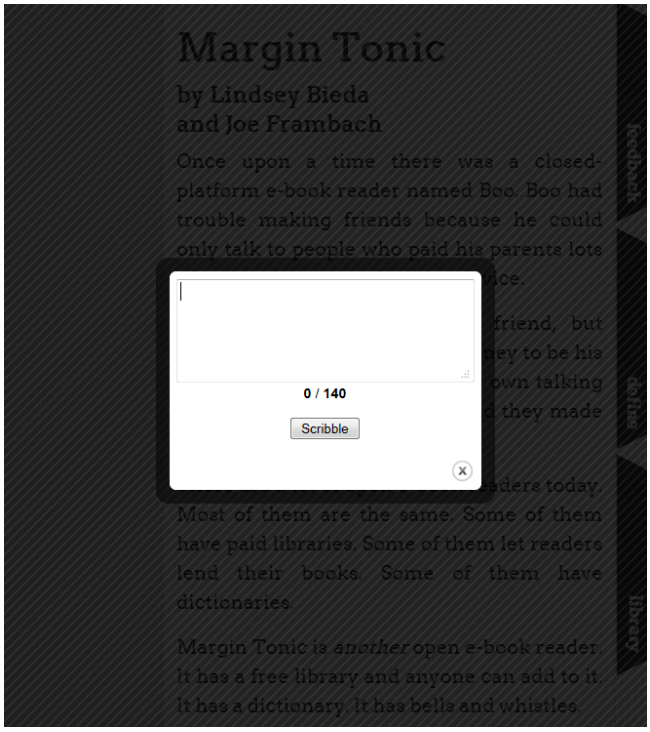


Figure 2. Adding a comment in Margin Tonic

User Study Results

Concluding that users agree or disagree with a given statement requires a statistically significant result. For a sample size of ten users, a one-sample t-test around μ=3.0 with 90% confidence yields a p-value of 1.383. Concluding that users agree with a statement requires a t-value greater than 1.383, and concluding that users disagree with a statement requires a t-value less than -1.383.

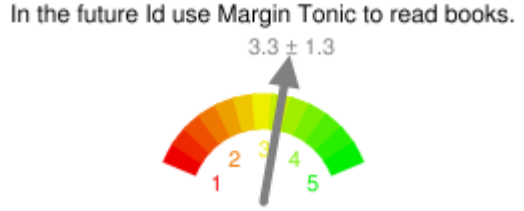
"*Margin Tonic is easy to use*," received a mean response of 3.6 with a standard deviation of 0.8. The resulting t-value is 2.37. Margin Tonic is easy to use.

"*Margin Tonic has every important feature I need*," received a mean response of 2.9 with a standard deviation of 1.1. The resulting t-value is -0.29. It is not conclusive that Margin Tonic has every feature the user needs.

"*I liked being able to see what people were saying*," received a mean response of 3.9 with a standard deviation of 0.8. The resulting t-value is 3.56. Users liked being able to see what people were saying.

"*I liked being able to define words*," received a mean response of 3.3 with a standard deviation of 1.0. The resulting t-value is 0.95. It is not conclusive that users liked being able to define words.

"*In the future, I'd use Margin Tonic to read books*," received a mean response of 3.3 with a standard deviation of 1.3. The resulting t-value is 0.73. It is not conclusive that in the future, users would use Margin Tonic to read books.



The overall result shows that Margin Tonic is easy to use, and users liked being able to see what people were saying.

Many of the users commented on the user interface, while others noted that some mobile-based browsers experienced difficulty handling the site. On the Android Phones and Android Tablets, many of the users found the site sluggish or had issues getting the hardware to respond.

One user said, "I do like the idea of being able to make notes in books" then later added that a feature she would like to see is the ability to write (physically, with a stylus) directly onto the tablet or phone in order to add comments to the book. Many other users commented on the sheer difficultly of entering in a large amount of text on a touch interface.

Another commonly requested feature is the ability to open and read PDFs in the system.

One of the users noted, "Excellent idea, definitely necessary for [eBook] readers to hold any value to me." Where the feedback to the other questions suggests that not all the features were found to be as useful to all of the users. It's clear in this case that in incorporation of a way to turn off and on specific features is essential to many users so they can customize their exact experience.

One user noted a major flaw in the interface that we hope to correct. On the Android browser and many of the other mobile browsers, the `<button>` element is not styled at all, so it just appears as text. However, on the desktop browsers where much of the development took place, the element appears as a button with a different background color and border. During testing, many of the users encountered difficultly with figuring out how to save a comment.

FUTURE WORK

Based on the feedback from the users and the many ideas that we did not have time to implement, we have a number of ideas for future work. We would like to see the ability to read and import PDFs into Margin Tonic for users to be able to make notes on them.

Due to the lack of capabilities in mobile browsers and the related speed issues, it would probably be valuable to move away from a web application to an installable application and allow for users to be able to highlight and actually "write" text.

We would also like to enable users to share and suggest content using the already plugged in social media and provide other social media outlets for which users are able to utilize in the system.

CONCLUSION

We presented Margin Tonic, a web based eBook reading application for mobile devices. We evaluated the effectiveness of the interface and the provided functions, and determined that note taking in books and other read content was something that the users were looking for and enjoyed using.

ACKNOWLEDGMENTS

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