

Designing an Integrated Review Sheet for an Electronic Textbook

Neema Moraveji, Abigail Travis, Maura Bidinost, and Matthew Halpern
neema@cmu.com, atravis@cs.cmu.edu, maura@cmu.edu, matt@thesindicate.org
Human Computer Interaction Institute
Carnegie Mellon University
Pittsburgh, PA 15213 USA

ABSTRACT

In this paper, we present findings and design decisions arisen while designing a review sheet within the confines of a pre-existing digital textbook, AdaptiveBook. Through user studies, we found that instructors and students cited a lack of both context and integration as the major problems in current high-tech teaching and studying tools. Because research on electronic books indicates that metaphors “reduce users’ cognitive load when navigating and acquiring information” [1], our design aims to address the lack of context and integration by creating an intuitive review sheet metaphor while leveraging the power of a digital medium.

Keywords

eBook, electronic book, instructional technology

Related Work

The XLibris’s Reader’s Notebook [3] consolidates user annotations made to a collection of electronic books. The interface addresses the uniqueness of each annotation by distinguishing between ink color, marking device (e.g. pen or highlighter), and other variables. The interface presents a potentially effective unified interface for user annotations. Our design focuses on textbook annotations and features that both students and instructors require to annotate, take notes, and create review sheets.

INTRODUCTION

One arena where the potential of the digital book can be realized is in education. To better understand how the digital book can be an effective instructional tool, we conducted contextual inquiries focusing on how students and instructors currently use textbooks as well as high-technology instructional tools. In these user studies, we identified the technological obstacles that instructors and students are currently faced with. We observed that the improvement we make to the digital textbook would not be effective nor utilized if it added, rather than eliminated,

obstacles. From these user studies, we formed the concept of the integrated review sheet.

AdaptiveBook

We were presented with AdaptiveBook as a platform for the review sheet. AdaptiveBook is textbook reader software that enables users to create ‘markups’ on the textbook including highlights, annotations, and general notes. These markups can thereafter be saved and shared with other users. Our design of an integrated review sheet builds upon the AdaptiveBook ‘markup’ model.

SUBJECT FINDINGS

We conducted detailed contextual inquiries with four subjects. Two students with dissimilar studying techniques were observed, as were two instructors with vastly different approaches to instructional content creation and delivery. We observed each subject complete the actual tasks that they normally complete while creating or studying teaching content. The subjects were asked to first describe the environment and context in which they accomplished the task. Then, while they acted to complete the task, the subjects students and instructors faced.

Students

Students we observed felt frustrated by the lack of integration among their traditional tools (textbooks, handouts, notebooks, etc.) and high-tech tools (PowerPoint slides, PDF files, websites, etc.). When given additional high-tech learning tools, such as digital textbooks and course management websites, students were disappointed that dictated what they were doing and why they were doing it. As a result of these observations, we concluded that a lack of both context and integration were the major problems that these new tools still did not successfully address the integration problem. While studying, students consistently referred back to teaching material to gain context about their notes. This process became troublesome and could be streamlined by combining notes and teaching material within the same artifact.

Instructors

While communicating with students to answer questions or deliver lectures, context was an important aid. The burden of providing this context usually fell on the student to

continuously refer back to the textbook, course packet, or slides. Instructors, aware of this problem, emphasized that the integration of the content sources was important. Instructors also expressed a need to show students exactly which parts of the teaching content are most important. They wanted a way to integrate their notes with the authoritative text, thereby creating a virtual 'tour' of the teaching content.

PROTOTYPE DESIGN

The target areas of context and integration were addressed to create a cohesive solution targeted towards students and instructors. The integrated review sheet is visible as a separate panel within the textbook and can be used by students to take note or review sheets. It can also be used by instructors to create a personalized 'tour' of the textbook whereby the students can drill down to textbook content while reading the review sheet (in effect, a 'tour' guide).

Integration

The user can drag in text directly from the textbook or from other applications. When the user drags in a note from the textbook and there is an annotation associated with that text, the annotation text is inserted into the review between brackets as editable text. Conversely, annotations made in the review sheet will also be inserted into the textbook. Because the review sheet is tightly coupled with the textbook content, annotations in one will be immediately reflected in the other. As a result of this integration with the textbook, context of notes is immediately available by drilling down to the textbook content.

Copyrighted Text

Because of potential copyright issues with textbook content, notes created by dragging in content from textbooks needs to be clearly marked as un-editable. Un-editable content is blue and quoted while annotations to that text are black and are shown between brackets [Figure 1].

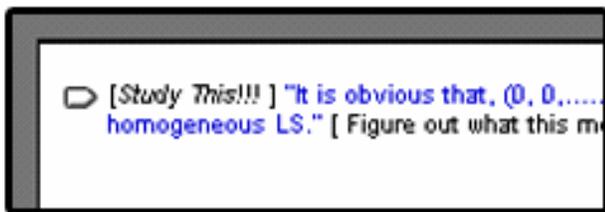


Figure 1: Copyrighted text from the textbook is within quotes and colored blue. Editable text delineated from quotes by brackets.

Automatic Review Sheet Generation

The user can press a button to automatically generate an entire review sheet from the annotations, notes, and highlights they've made to the AdaptiveBook. From contextual inquiries, we observed students making markups to the textbook and then going back through it to create a review sheet from those markups. To increase efficiency, the review sheet automates this process.

Summary View

The summary tab allows the user to see a graphical and

numerical representation of the notes in their sheet [Figure 2]. The notes are organized by section to give the user an idea of what sections they drew from the most. Students observed expressed a desire to know summative information about their notes.

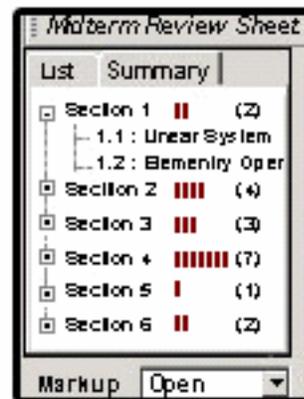


Figure 2: The Summary tab displays information about what sections or chapters are represented in the review sheet.

FUTURE WORK

User studies and evaluations should be conducted using the current iteration of the review sheet. An optimal digital review sheet will have all the capabilities of a traditional pen and paper one, while also harnessing the power of the digital format. For instance, we want to give the user the ability to draw on the review sheet. To this end, we are looking into pen-based interfaces as a more natural metaphor between traditional and digital review sheets. Drawing on the power of the computer, the review sheet should be able to automatically compare two or more review sheets to find similarities and differences, helping plug holes in students' sheets.

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