

E-book acceptance: what will make users read on screen?

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Abstract:

While the publishing industry is developing new business and delivery models for electronic titles, libraries are experimenting with the integration of these titles into their collections and services. A major issue, however, is the reluctance to read large textual titles on current screen technology. This paper reports on research that is identifying issues associated with the acceptance of electronic textbook materials. Comparison is made between different digital formats to determine if these alter acceptance of reading textbook material on screen. These preliminary findings suggest a reluctance to move to digital textbooks unless the digital files provide incentives through better or easier access to the content itself.

I remember when I was completing my undergraduate degree. The best tool that we had was the photocopier. Students would queue at the closed reserve or journal collection, borrow material for short-term loan and photocopy the contents. Today, many of the library resources are, obviously, provided digitally. However, have you watched students use full text journal resources, such as those aggregated by vendors like ProQuest, Informit or Gale? Observation tends to show that students search the bibliographic databases, possibly skim-reading the content, and then they usually print the articles of interest. What has changed – is the printer the new photocopier?

As well as providing digital journal collections, libraries are also starting to provide digital book collections through vendors such as netLibrary, Proquest's Safari book collection and RMIT Publishing's Informit Library collection. As libraries move to these collections, there is the need to determine whether there are differences in use of a digital textbook, as against a digital journal. We may need to determine what the new patterns of use are with these collections, as the digital textbook has the inherent problem of representing a large body of text that needs to be suitably accessed.

The e-book publishing process has been a varied experience, with publishers, individual writers and software developers experimenting with processes for making digital texts available. In September 2003, Barnes and Noble announced that they would no longer be providing e-books to their customers. Daniel Blackman, vice president and general manager of Barnes & Noble.com, states a belief on the potential of e-book sales, but that it is not currently commercially viable as "consumers haven't embraced the technology" (Associated Press 2003). This paper is part of an ongoing research process that aims to determine issues associated with reading and interacting with digital textbook material. The main focus of this research is to try and determine "what will motivate students to read electronic textbooks?" Writers and researchers associated with usability studies for the web, such as Jakob Nielsen (2000) and Steve Krug (2000), have identified various areas of difficulty in current screen technology for reading of electronic content. Their studies suggest that the reading process is 25% - 40% slower on screen than from the printed page and that we tend to skim read on screen textual material instead of reading the detailed textual content. In relation to writing web-based content, suggestions are made that fewer words should be used than are used for paper; that a 'journalistic' approach to writing be developed (that is that key concepts are introduced in the leading paragraphs); and that content should be "chunked" or broken down into smaller sections so that it is easier to skim read.

While these processes have tended to be adopted for web-based design, there seems to be an anomaly when we consider the publishing process for screen-based books. In general, e-book content tends to be a digital republication of an original print-based book. This will change as new content is only published electronically, but at this point in time, it seems that electronic content aggregators are primarily gaining digital rights to existing print titles. This means that readers are interacting with text that has been prepared for print delivery and not for screen-based delivery. Readers must engage a large body of electronic textual material and must be able to navigate and comprehend material that has initially been written as a linear work spanning multiple chapters or sections.

Brown (2001) suggests that our reading styles may change as we interact with digital text. He acknowledges that different reasons for reading can lead to different reading styles – for example reading for pleasure compared to reading for information. He suggests that we may interact with electronic text in different ways (for example searching for key terms and

skim-reading the occurrences of the terms from multiple documents) and could possibly start to 'read' in a new style (reflected in the younger generation that use multimedia based information gathering). While these advantages exist, we are currently faced with the issue of trying to engage with text that has not been specifically designed for the screen.

Exploring the process of engagement

This paper presents a summary of an ongoing exploration of the issue of 'what will make students engage with electronic textbooks?' As implied, this is focusing on the use of large textual material by university-based students. During 2003 the investigation has attempted to gather background data on how students currently engage with or perceive their use of digital text. The first part of this was a questionnaire administered to postgraduate students seeking their impressions of electronic textbooks. The results of this questionnaire have been reported in the conference proceedings of the "Future of the book" (Mercieca 2003). It found that there has been little use of electronic textbooks by the survey sample; that there was a reluctance to use electronic textbooks, due to perceived difficulty in reading electronic text; that they were reluctant to purchase electronic textbooks, but would consider using them through a library-based collection (but primarily if there was no alternative printed texts).

This questionnaire suggested a reluctance to engage with electronic textbooks through screen reading. The question then needs to focus on what would change this reluctance? If university libraries are making textbooks available electronically, what will foster ongoing interaction with these types of collections?

To gather some initial directions on what may lead to engagement with the text, permission was gained from a publisher to digitise some of the chapters from a prescribed textbook for a Master's course. Selected chapters were made available in different electronic formats. A focus group of the participating students was used to evaluate their use of these formats and to determine how they read and interact with digital content and to determine what would make them engage further with electronic textbooks. This focus group investigation is part of a process to continue to identify issues relating to reading screen text; preferences in design of screen text; and preferences in content integration with the learning environment. This will lead to further refinement of the investigation so as to determine how textual content should be presented for learners.

This paper outlines the results from the focus group discussion.

Focus group findings

During September 2003 a focus group was held with students completing their Master of Business in Information Technology (MBIT) to determine their use and impression of electronic textbooks. While it is acknowledged that this focus group represents a selective participant age group (ie mature ages students) it was assumed that masters students would have a need for electronic texts for their coursework and research and thus could form a potential user group for electronic textbook content. Fourteen students participated in this focus group.

The focus group was asked to compare three presentation formats for online textbook content. These presentation formats included PDF, Microsoft e-book reader format and online HTML formats. The PDF and Microsoft e-book reader formats provide access to selected chapters from a textbook prescribed for one of their courses. The hardcopy textbook was scanned, with permission from the publisher, and converted to OCR text. This text was then reformatted for each of the interface formats. Each chapter was approximately equivalent to fifteen pages of A4 text. The PDF version represented a direct duplication of layout from the actual printed textbook. Heading styles and other formatting from the printed textbook were mimicked in this PDF document. The aim of this was to provide as direct a duplication of the printed text as possible, which is usually how PDF documents are created. The book content and the mimicked PDF chapters were presented as single column text. While not directly designed for screen layout, this did mean that the readers were not being forced to read A4-based columned text on screen. Scrolling and movement through the PDF document was easy, as the reader could simply scroll forward or use the page-forwarding navigation built into the Acrobat PDF reader.

The chapters created for the Microsoft e-book reader used the reader's default conversion processes. This meant that while the content was a direct duplication from the printed text, the formatting was based on that prescribed for the readability processes of the e-book reader. As the reader's pages are based on a screen-by-screen presentation (that is one screen equating to one page), the textual material was published over a larger number of 'electronic pages'. A chapter of fifteen A4 page equivalents became an e-book reader document of approximately twenty-two screen pages. It had originally been the intention to use the Adobe E-book reader as the delivery interface, however with the recent release of Adobe Acrobat 6 the e-book functionality has now been incorporated into the PDF reader interface. The Microsoft reader was, therefore used as a comparison with the PDF interface.

The HTML format was based on a review of the presentation format used by Proquest for their Safari e-book content. RMIT Library has been testing this aggregated e-book collection and it provided the opportunity to evaluate a publishing process that has chunked the published books into screen-based HTML content.

It is acknowledged that the results from this focus group discussion can only suggest trends and issues that seem to be emerging in regard to electronic textbook use. These trends, however, will continue to form the basis for ongoing exploration of the adoption and use of such electronic publications.

Print or Digital

The focus group was asked how they manipulated the content for reading; specifically did they read the content on screen. The chapter made available in PDF did not have any security restrictions placed on it in relation to copying and printing of the content. All students printed the content and read the chapter(s) from the printed pages. This seems to be a common action with PDF delivery of content and mimics that of the use of an aggregated database that provides PDF versions of journal articles.

The common responses for printing the content included:

“It is easier to read from paper”

“I could highlight the text”

”I could carry the paper with me and read it when I wanted to”.

Statements such as these are not necessarily new for research related to screen-based readability. However they continue to indicate the perceived reluctance for screen reading at a time when more ‘textbook’ material is being provided online by educational institutions.

While the students had resorted to the printed page as their main way to read the text, they acknowledged that they had tried to start to read the PDF document on screen. Of the fourteen students, five indicated that they had intended to read the PDF document initially from screen. They had persisted in reading three or four pages, but then found that they started to “suffer from eye strain”. This initial strain in reading seemed to stem from the font size (11 point) used for the body text of the PDF document. The readers reported that this was difficult to read on screen; however the students did not attempt to adjust the text size through the Acrobat reader zoom function. This would have increased the size of the displayed text on screen.

The response to the PDF chapters seems to reinforce the concept that PDF is a delivery technology for documents that will be read from print. As Jakob Nielsen suggests, straight conversion of textual material to PDF makes that material difficult to read on screen and that the main function of a PDF document is that of digital distribution and not of digital publication (Nielsen 2003).

The chapters in Microsoft reader format forced the readers to read on screen. There was no functionality built into the conversion of the selected chapters that allowed the readers to directly print the chapter. Thus, the students’ first preference for printing and reading from paper was hindered by this format.

Comparing the PDF chapters with those delivered through the Microsoft reader, the students acknowledged that the Microsoft Reader chapters were easier to read on screen. The default setting for the conversion had been used, but these settings meant that:

- Line lengths were approximately 8-10 word in length
- Font size and spacing was clearer than the mimicked print page of the PDF document
- Line spacing, especially in relation to the use of ‘white space’ around the text, made it easy to scan the text
- Each page equated to one screen, thus limiting the need for scrolling.

The students suggested that this format led to less eyestrain than the PDF chapters and that they tended to read all or most of the chapters from the screen. However, one student did circumvent the onscreen reading by cutting and pasting each page of text into MS Word and then printing the resulting Word document. This allowed the student to read the chapter from printed pages as her first preference for reading the content.

While the other students read the chapter from screen, they indicated that this was because they did not have other options. Unless they re-engineered the text into another document,

they could only read from the screen. Even though the actual screen reading was 'relatively easy', they were reading on screen because 'they had to'. There did not seem to be an advantage of reading the text from screen over reading it from the printed page. While the students suggested that paper-based reading assisted in their content interpretation because they could highlight and annotate the text, none of them used the electronic equivalents made available through the Microsoft reader interface. The Microsoft reader interface uses minimum interface icons for the screen, thus aspects of the functionality such as book marking pages and highlighting text are not obvious at first glance of the interface. The students were not aware that they could, for example, electronically highlight the text. When made aware of these functions during the focus group discussion, they did not show enthusiasm for the use of such annotation processes. There appeared to be a mindset of acceptance of print as being the main way to engage with the textual content.

As a comparison, the focus group was shown the original Adobe Acrobat reader interface. In making a comparison between the two interfaces, the group showed preference for some of the functionality that was available in the Acrobat reader. Specifically they recognised the ability to view two pages at a time; use the page navigation bar as an indication of where they are in the text and to be able to rotate the page so that it is possible to read an A4 page through a notebook computer held to its side. Adobe, as a process to bring together their PDF and e-book initiatives, have imbedded the e-book viewing and management processes into the latest version of Adobe Acrobat reader (version 6). This integration of the e-book functionality into the PDF reader means that some of the original e-book interface options are no longer available. This new version needs further exploration, as it seemed that navigation aspects, such as the progress bar on what has been read, seemed favourable to potential users.

The focus group were also presented with the HTML interface used by Proquest for their Safari e-book collection. While Safari represents an aggregation of electronic versions of existing print-based textbooks, this interface represents some common web-based features, including:

- The ability to search across the collection or across a individual e-book
- Internal book navigation presented on the left side of screen
- Chunking of the content into chapters and subsections.

As such features are found in other aggregated textbook/e-book collections (such as Informit library and Netlibray) the evaluation of the Safari interface is also applicable to these other products.

The focus group acknowledged the advantage of the content chunking of the Safari collection as a means to assist in the screen reading of the collection. The screen-by-screen breakdown of the various books is based on chapter division as well as section breaks within the chapter. The respondents suggested that the Safari navigation provided the easiest way to move between sections of the title. The navigation acted as a form of contents page that was permanently available on the screen. As the Safari collection included primarily technical and computer books, the respondents saw the interface as a quick means to access specific information needs, such as how to complete a particular task on selected software. They saw this as being different to the need to read whole chapters or whole books, such as the one that was part of their course work.

Format versus content

As an indication of their acceptance of electronic textbooks, the focus group were asked to consider whether they would purchase the electronic versions of the prescribed textbook.

The participants were asked, “If the content of the textbook was made available in either a printed textbook or as an electronic textbook and both formats were the same price, which would you purchase?” All members of the focus group indicated that they would purchase the printed textbook. Issues related to portability, ownership and interaction with the text (i.e. underlining and annotating the text) were offered as reasons for the preference of the printed textbook.

When asked whether they would purchase the electronic content if it were cheaper, the focus group indicated yes, but only if it was at approximately one third of the cost of the printed text. The respondents implied that “form outweighed content”. That is, even though they realised that the actual content would be the same between digital or print delivery the actual format made an impact on their decision to purchase this content. There remains the ongoing preference for access to the printed page for textbook material and, in the case of this focus group; there was a sense that a ‘straight’ digital duplication of a printed text did not add value to the text. Instead, a straight digital version of the text (whether PDF or HTML) seemed to be seen as a detriment to the actual content.

One student suggested that he had used a number of e-book titles from the Safari collection for his research work. However, this student’s preferred reading format was from print and therefore he had copied the displayed pages into MS Word, so that he could print off the required textual material for reading at his leisure. Printing the content directly from the web page would have resulted in some loss of the content reading due to the left hand navigation pushing the content off the right hand of an A4 page. The student, therefore, copied the content screen by screen into word so that it could be printed. Without entering into debate about the licensing issues for doing this action, it continues to suggest that even with content that is suitably ‘chunked’ or granulated, there is the reluctance to rely on a digital version of the content.

Assisting the onscreen reading

The focus group were then asked to consider ‘what would make them read the content on screen?’ This focus is part of an ongoing investigation to try and determine what will change the perceived reluctance for current students to read textbook type material from the screen.

The two key criteria that became apparent from this focus group were that of ‘saving money’ and of ‘content integration’. The group had already suggested that if the electronic version of the text was considerably cheaper than the printed copy, then that would motivate them to migrate to the digital version of the textbook. This motivation was reinforced by discussion on selected purchase of content. That is, having the ability to purchase selected chapters from a range of books, if that was cheaper than purchasing all of the required textbooks.

Integration of the textual material into the learning environment seemed to be the main motivation for onscreen reading. The three e-book formats that were presented (PDF;

Microsoft e-book reader and HTML) were seen as ways to provide a direct duplication of the printed content. There was no sense that the electronic media had been used to enhance the content, but was only seen as being a new distribution medium for the content. This meant that the focus group participants did not see major advantage in reading the text from screen as opposed to reading it from the printed page.

What would change this opinion would be if there were perceived advantages to the use of the digital text. At its simplest level, these advantages could be additional material that uses the electronic environment to explain the textual material. For example: animations of key concepts or the inclusion of other media to support the content. Such content enhancement would need to be at the discretion of the original and digital publishers and the investment in this process would be considerable. Responsibility for the development of such content may rest with the original author (as part of their writing and content development), or the publisher may commission other authors or media developers to prepare support material to complement the writer's content.

Content integration, however, could be based on the direct linking between course content and the e-book content in a manner similar to the direct linking to articles from aggregated online journal collections. The user licence for the safari collection supports aspects of this linking and the search interface provides permanent URLs so that links can be made to page/screen level content.

Course and instruction websites vary in how they are developed, from being simply electronic distribution sites for course lectures to fully online learning environments. The focus group suggested that the course learning environment should form the main navigation through the e-book content. That is, making links between the academic theory, practical exercises, discussion and readings provides added value to the e-textbook and provides a reason for reading the material from the screen. Academic staff, in association with the university libraries and copyright permissions experts, have been using this approach to develop full online course material. E-reserve collections have been developed for remote and online learning; links are made directly to electronic journals and permissions are sought for deep linking to general web-based content.

This approach forces elements of content chunking or granularity, as the course developer takes on aspects of the "publishing processes" by drawing links between the various learning components, including the selected parts of the electronic textbook(s). It is acknowledged that in such an environment the readers are a 'captive audience', that is they are forced to read the content online.

However, the focus group indicated that this approach would:

- Draw direct links between the electronic textbook and the learning environment
- Mean that the electronic textbook was not seen as an 'addition' to the learning environment, but would be read in association with other electronic material
- Provide a suggested navigation through the content. Students could read the textbook in its entirety or they could follow the course structure provided by the integration of the textbook chapters or sections into the other online elements.

While the focus group had not experienced full integration of the electronic chapters into the online course work, they did acknowledge that having the chapters posted on a weekly basis eased the perceived conceptual difficulty of reading a 'whole book online'. While they would still prefer to print the content, they felt that by having the material made available on a weekly basis (that is a new chapter each week) this meant that they were being guided in their interaction with the e-book. They needed to focus only on the section of the book being used during that week. They would have shown further reluctance to read the textbook if it was simply one of the texts on a service such as Safari.

Issues for libraries

As suggested, the results from this focus group form part of an ongoing investigation into the perception and use of electronic textbook material. However the preliminary trends that are emerging suggest that:

- The library environment (in relation to this study the Academic library environment) may form a key part of the process of developing acceptance of electronic textbooks. When purchasing textbooks, there seems to be a preference for the printed book. However, if the content is made available through other means, such as a library collection, then students have suggested that they will overcome the issues of screen readability and experiment with the electronic content.
- The usage and reading patterns for online textbooks needs further investigation as this may impact on the licensing models that are required for aggregated e-book collections. The current trends suggest that students would prefer to use these collections as an electronic distribution process and not as an electronic reading process. That is, they would want to use the electronic textbook collection in a similar manner to an aggregated journal collection – search digitally and then produce a printed copy for the actual reading. If this is the case, then concurrent user-based subscription models could be applied, as the usage is one of search and retrieval, while the reading is done offline. However, as students start to accept online reading, then it is perceived that their time within the aggregated collection will increase and the reading time becomes part of their usage. Limited, shared concurrent user models will need to be applied at a per title level, not on the total collection (as seems the case with some aggregated e-book collections).
- Licensing issues for the integration of e-book collections into online learning environments are of importance to libraries and educational institutions. The initial use of the web for some publishers was to support their print textbooks with online support material that could be incorporated into learning shells such as WebCT and Blackboard. As the text itself becomes the online content, licensing should support the ability for academics to integrate this material with their own learning materials. The focus group feedback suggests that e-book integration into the online learning environment may assist in the acceptance of the onscreen reading of e-books.

Further research

This initial comparison of the presentation of electronic textbooks was based on the use of standard formatting for PDF, Microsoft e-book reader and HTML. Further presentations of the textbook content will be developed so that additional textual layout, navigation and interface can be tested. This will continue to determine how the textual presentation may assist in the acceptance and adoption of screen reading.

The focus group represented postgraduate students who acknowledged their preference for printed textual content. Further investigation is needed to determine the differences in screen reading between age groups. By administering the data gathering processes to younger participants we will be able to determine if the younger generation of readers are more amenable to onscreen textbook content. If this is the case, then the return on investment of electronic textbook collections becomes evident as new generations of students engage with this content.

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