E-Book Functionality White Paper

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# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Classified Arrangement of E-Book Functionalities</td>
<td>6</td>
</tr>
<tr>
<td>Studies &amp; Surveys of E-Books and Related Topics</td>
<td>15</td>
</tr>
<tr>
<td>Classified Arrangement of E-Book Functionalities Cross-Referenced to Pertinent Studies</td>
<td>29</td>
</tr>
<tr>
<td>Summaries of E-Book Functionality Findings by Study</td>
<td>35</td>
</tr>
</tbody>
</table>
Section 1: Introduction

The purpose of this white paper is to summarize existing studies about the functionalities of e-books and human use of the functionalities, and to attempt to classify the various functionalities. These categories functionalities focus not only on the reader, but also on the functionalities that are required and/or desired by libraries as a kind of distributor of e-books. This white paper is meant to be an initial step to better understand what users and libraries want, need and expect from e-books and to communicate this broadly with the other stakeholders in the e-book industry.

The authors undertook a fairly comprehensive review of e-book specific studies and a less inclusive review of the vast body of literature that deals with broad electronic text issues, such as annotation, marginalia and screen presentation.

Types of e-books:
An e-book, like a paper-based book (p-book or tree-book), is a combination of content and the physical object (and associated technology) that “bears” the content. For e-books, the three basic elements are hardware, software, and content. Some e-book providers sell, lease, or distribute only the content. They rely on existing software (usually a web browser) and the hardware supplied by the end-user (e.g., desktop, laptop, tablet PC, PDA, cell phone) to serve as the presentation vehicle for the content. Other e-book providers distribute both content and software; while still others distribute all three essential components, typically for use as dedicated reading devices. This white paper examined functionalities that apply to all types of e-books, as well as those that specifically address certain types, such as battery life for e-book devices.

The “affordances” of print and electronic books:
One way to think about the functionalities of e-books (or any technological device, for that matter) is in terms of what the hardware/software devices afford or encourage. Any type of tool or device privileges certain types of activity and discourages others. For example, hammers encourage hammering and discourage sawing. In their recent book about the value of paper-based documents in a variety of work-related situations, Sellen and Harper (2002) describe these as affordances:

An affordance refers to the fact that the physical properties of an object make possible different functions for the person perceiving or using that object. In other words, the properties of objects determine the possibilities for action. (p. 17)

Sellen and Harper articulate the four basic affordances of paper-based documents in work-related situations (pp. 101-2):

1. Tangibility: When we read a paper book, we experience the text using both our eyes and our hands. “When a document is on paper, we can see how long it is, we can flick through the pages to see how long it is, we can bend over a corner while searching for a section elsewhere.”
2. Spatial Flexibility: Paper-based documents allow the reader to interact with more than one text simultaneously. Several documents can be arranged on a desk in close proximity.

3. Tailorability: It is easy for readers of a paper documents to annotate and add jottings to the text.

4. Manipulability: Readers often are in the process of writing a new document as they read. “With paper, individuals have no difficulty moving back and forth between the document they are reading and the document they are writing.”

Sellen and Harper also explore the affordances of the digital alternatives to printed documents. The authors of this white paper (Gibbons, Peters & Bryan) have expanded upon what Sellen and Harper articulated.

1. Storing and accessing large amounts of information- as Clifford Lynch has noted earlier, what we call e-books are actually mini e-libraries. Regardless of the form factor, nearly all e-book devices can carry more than one book and the carrying of this extra content does not mean additional weight. (Sellen and Harper)

2. Displaying multimedia documents- in general, e-books devices afford new forms of viewing multimedia content. (Sellen and Harper)

3. Fast full-text searching- keyword searching allows readers to quickly find specific information in large documents. (Sellen and Harper)

4. Quick links to related materials- embedded links enable instant jumps to other related material in the document being read, another document on the e-book device, or on a Web site. (Sellen and Harper)

5. Dynamically modifying or updating content- it is easy for authors and readers to annotate, mark-up, alter, and enhance an e-book. The distinction between the author and the reader may blur as mutable texts are shared among reading and learning communities. (Sellen and Harper, as well as Gibbons, Peters, and Bryan)

6. Replicability- it is relatively easy and cheap to make many perfect copies of an e-book. (Gibbons, Peters, and Bryan).

7. Distributability- it is easy, cheap, and quick to distribute an e-book. (Gibbons, Peters, and Bryan)

8. Scrubability- it is easy to return an e-text to its “pristine” condition. This is the functional antidote to what happens to an e-text because of its essential mutability. (Gibbons, Peters, and Bryan)
Numerous studies reviewed by the authors suggest the broad-level conclusion that users and libraries expect e-books to possess the same affordances of paper books, while offering the additional ones made possible by the digital medium. For example, Marshall and Ruotolo (2002) conclude that “…student adoption of the Jornadas [a brand of PDA] will depend on the outcome of a series of trade-offs. These trade-offs weigh the advantages of reading on such a small factor device (smaller than most books, and certainly more compact than the collection of readings for a course) and the unique functionality of reading on a computer (the ability to search, for example, and the ability to follow hypertext links) against the affordances of paper, in particular in the areas mentioned above [i.e., ease of annotations, ready navigation, and the flexibility of spatial layout and juxtaposition].”

**A classified arrangement for e-book functionalities:**

Rather than simply list all known and proposed functionalities for e-books, the authors of this white paper decided to attempt to classify the functionalities. Some—if not most—of the functionalities serve more than one broad category. We have attempted to place each function in its dominant category. Our tentative classification scheme currently contains eight broad categories:

1. Functionalities that help the human reader interact at the physical level with the content-bearing device, whatever form it may take.

2. Functionalities that are designed primarily to help the reader read the content, where “reading” is understood as a blanket term to cover all visual, audible, olfactory, and tactile interaction with the content.

3. Functionalities that enhance the e-book, thereby making its content richer than the typical printed book.

4. Functionalities that help the reader to place the content in one or more contexts.

5. Functionalities that help the reader to possess, modify, and expand the content.

6. Functionalities that support library-related e-book activities, such as “circulation” of a piece of content to an authorized user for a specified “loan” period.

7. Functionalities that support or manage legal and contractual aspects of e-books.
Section 2: Classified Arrangement of E-Book Functionalities

1. Human interaction at the physical level
Because each text requires a text-bearing device, humans interact with the text through physical interaction with the text-bearing device, which could be a desktop computer, laptop, PDA or a dedicated e-text device. Sight, touch, and sound are the primary sensory tools used for this task, but smell and taste may have some role to play. For example, some readers profess a fondness for the smell of a printed book. This category also includes functionalities that can encourage the immersive reading process. For instance, frequent concerns about the need for battery recharging and worries about the fragility of the device can interfere with the immersive reading process.

1.1 Customizable rendering of the e-content
This functionality includes the ability to adjust the font size and color of the text and the size of display screen. The ability to customize the rendering of the text is a significant benefit to those who are visually impaired.

See: [Bellaver & Gillette, 2002] [Henke, 2002] [CDL, 2001] [Dillon, 2001] [Gibbons, 2001a] [Schcolnik, 2001] [Schilit, 1999] [Schilit, et al., 1999] [Wearden, 1998b]

1.2 Easy to Use and Easy to Access
This category includes diverse aspects of ease of use and ease of access, including the basic discoverability and obtainability of an e-book and usability-tested, intuitive interfaces and designs.

See: [Morrill, 2002] [Wilson, 2002] [CDL, 2001] [Schcolnik, 2001] [Selvidge, et al., 2001] [Landoni, et al., 2000] [Summerfield, 1999]

1.3 Readability
This deals primarily with eye comfort and strain, perceived legibility, backlighting and resolution issues.


1.4 Accessible by the disabled
E-book systems should be at minimum, ADA compliant. At best, they should include means for adjusting the rendering of the content (see functionality 1.1 above), be compatible with accessibility systems, such as text-to-speech systems, and provide alternative navigation means (keyboard alternatives to mouse clicks).

See: [CDL, 2001]
1.5 Good Ergonomics
This category of functionality applies primarily to the device (desktop PC, laptop, PDA, cell phone, dedicated reading device, etc.) that bears and delivers the e-content. This can include the size and placement of buttons and the weight and feel of the device.


1.6 Ability to return to the page where the reader left off
Movement and placement within an e-text is often difficult because of the lack of physicality. The function of returning the reader to the place in the text where he/she left off was found to be highly desirable in a few studies.

See: [Henke, 2002] [CDL, 2001]

1.7 Pagination features
Functionalities within this category include issues such as scrolling vs. paging through text, optimal page layouts and size, and landscape vs. portrait display.


1.8 Durability
This functionality applies primarily to the portable devices that bears and delivers the e-content and includes issues about the fragility of the device and appropriate locales for use (safe to use in the tub or on a beach?)

See: [Bellaver & Gillette, 2002] [Wilson, 2002] [Wilson, et al., 2002]

1.9 Portability
This category does not exclusively deal with hardware devices. For instance, does the online e-book system support off-line reading?

See: [Gelfand, 2002] [Morrill, 2002] [Schcolnik, 2001] [Schilit, 1999] [Wearden, 1998b]

1.10 Long Battery Life
This function touches on the need to balance sufficient battery life of an e-book device with the overall weight of the device.

See: [Bellaver & Gillette, 2002] [Gibbons, 2001a] [Messing, 1995]

1.11 Contains Embedded Help, Instruction, and Trouble-Shooting Information
This functionality deals with the ease of which help can be obtained for using the e-book system. For instance, is on-line help context sensitive?

See: [Bellaver & Gillette, 2002] [CDL, 2001] [Henke, 1998]
2. Read and understand the text
Reading and understanding the text is a cognitive process that co-develops with the physical interaction. This category includes functionalities that assist the reader in understanding what content/information is contained within the text and where.

2.1 Intratextual Searchability
The e-book should be searchable both within the text and across other texts (see 4.3 below). As Marshall and Ruotolo (2002) note, searching can be used for two different purposes: for navigational purposes within a text or across several texts, and for research and textual analysis purposes.

See: [Bellaver & Gillette, 2002] [Gelfand, 2002] [Henke, 2002] [Wilson, et al., 2002] [CDL, 2001] [Henke, 2001] [Knowledge Systems & Research, 2001] [Summerfield, 1999] [Schilit, 1999] [Schilit, et al., 1999] [Henke, 1998] [Wearden, 1998b]

2.2 Intratextual Browsability
This popular functionality includes features such as hyperlinked table of contents, indexes, footnotes and endnotes. How easy is it to get a feel for the content of the text without reading it in its entirety?


2.3 Easy to Navigate/Sense of Place
The texts must be sufficiently marked-up and structured so that a sense of the content (i.e., the divisions, sections, and overall structure of the text) can be easily acquired, as well as the reader’s current placement within the overall text at any given time, such as through a thickness indicator and pagination.


2.4 Header information on each screen
For example, book title, chapter title, and page number could be included to could provide content and context clues to the reader. This could be particularly helpful context clue when the e-book contains links to external documents.

See: [Henke, 2002] [Wilson, 2002] [Henke, 2001] [Henke, 1999] [Schcolnik, 2001] [Selvidge, et al., 2001] [Selvidge & Philips, 2000] [Wearden, 1998b]

2.5 Print and electronic version are identical
Particularly for educational purposes, it is important that the pagination, placement of illustrations, etc. in the print and electronic versions of the text be identical so that user can easily move between both versions.

See: [CDL, 2001]
2.6 Include embedded reference tools
This functionality includes hyperlinked dictionary or glossary. More enhanced reference tools would include aural (e.g., spoken pronunciations) and non-verbal (e.g., illustrations) functionalities.
See: [Bellaver & Gillette, 2002] [Gelfand, 2002] [Henke, 2002] [Wilson, et al., 2002] [Henke, 2001] [Schcolnik, 2001] [Simon, 2001] [Schilit, 1999] [Schilit, et al., 1999] [Wearden, 1998b]

3. Make the e-text richer than the typical printed book
This category of functionalities focuses on what authors and content creators, perhaps more so than end-users, want to do with e-books. It focuses on the functional components of e-books that will extend and enhance the toolset available to authors and content creators. It also addresses the assumptions of some users that an electronic version of a text should have “enhanced” features. Ultimately, the existence and use of these new tools may lead to new “genres” and forms of published human communication.

3.1 Include Multimedia
This functionality deals with the inclusion of multimedia elements, such as audio, video, pop-ups, and 3D modeling within or linked to the text. This presupposes that the e-book software and/or hardware are capable of rendering these multimedia elements.
See: [Gelfand, 2002] [Henke, 2002] [Wilson, 2002] [Henke, 2001] [Schlit, 1999] [Summerfield, 1999] [Wearden, 1998b]

3.2 Supports Text-to-Speech
An important functionality, particularly for the visually disabled population. Also a useful educational tool for learning disabled and English-as-a-second-language students.
See: [Henke, 2002] [Hill, 2001]

3.3 Links to data upon which research has been conducted and reported
This functionality assists in the verification of findings, as well as fosters further research.
See: [Summerfield, 1999]

3.4 Personalized recommendations
Based on what e-books or sections of e-books the user has read, the system could generate personalized recommendations for further reading.
See: [Henke, 2002] [Schilit, 1999]

3.5 Inclusion of forms
Functionality deals with the inclusion of context sensitive forms within the e-book to assist users in a number of activities, such as ordering a paper copy, obtain permission to copy/quote and send comments/errata to authors.
See: [Henke, 2002] [Henke, 2001] [Summerfield, 1999]
3.6 Connect to bulletin boards/chat rooms to discuss text with others
Methods by which a virtual community can be built around a particular e-book or collection of e-books.
See: [Henke, 2002] [Henke, 2001]

4. Place the text in one or more contexts
This category of functionalities focuses on how an individual text relates to others, in both the opinion of the author and reader.

4.1 Provides Contextual Information
This functionality suggests the inclusion of biographical information about the author, lists/links to other works written by the other or other works within the publication series.
See: [CDL, 2001]

4.2 Linkable to other e-books and e-content
The ability to link from one e-text to related e-text. Mechanisms to facilitate this movement between e-texts could include DOI or Open URL syntax. Potential documents to which to link include citation and reference documents, book reviews and other texts by the author.

4.3 Intertextual Searchability
(See also 2.1 above) This is the ability to search for terms or phrases across several texts, selected by the user.
See: [Wilson, et al., 2002] [CDL, 2001] [Summerfield, 1999] [Schilit, 1999]

4.4 E-Bookshelves
End-users, whether readers or libraries, should be able to organize a collection of e-books along a variety of parameters (e.g., author, title, subject, publication date, classification scheme), including user or library-defined parameters.
See: [Henke, 2002]

5. Possess, modify, and expand the text
Reading can be a very active, complex set of human cognitive, emotional, and motor behaviors. Marshall (1998) succinctly states, “Readers don’t just read. They commune with their documents. They wander, collect, organize, interpret, mark in, and mark on what they gather.” The ability (sometimes still latent) of the reader of an e-book to possess, modify, and expand the text intimates the power struggle between the author, copyright holder, and the reader to control the text. Henke (2002) notes that, in addition to marking up and annotating e-books, people want to add content. “Adding content should not be viewed as simply creating an annotation or note but adding content that becomes part of the book and incorporated into the table of contents and index.”
5.1 Annotations and Other Mark Ups
This category of functionality includes more traditional types of annotating (e.g., underlining, highlighting, attaching notes, doodling in the margins) as well as new forms (e.g., encoding and attaching tags to various parts of the e-text). The ability to export one’s annotations and/or index them is included in this functional category.


5.2 Bookmarking
The ability to place and save bookmarks within an e-text is a frequently requested/expected functionality.

See: [Bellaver & Gillette, 2002] [Henke, 2002] [CDL, 2001] [Henke, 2001] [Scholnik, 2001] [Simon, 2001] [Landoni et al., 2000] [Henke, 1999] [Schilit, 1999] [Summerfield, 1999] [Henke, 1998] [Messing, 1995]

5.3 Printing
There are a variety of reasons to need/desire to print portions of the e-text, including:
- Paper copy for off-line/off-screen reading
- Paper copy that can be marked-up and annotated
- Personal copy for future reference
- Paper copy that is portable

See: [Henke, 2002] [Gibbons, 2001b] [CDL, 2001] [Summerfield et al., 2000] [Henke, 1999] [Schilit et al., 1999] [Summerfield, 1999] [Henke, 1998] [Messing, 1995]

5.4 Cut and Paste
This functionality is of great interest to the academic audience of e-books. This includes the ability to cut and paste portions of the e-text into other documents, as well as the added functionality of automatic creation of citations and bibliographies.

See: [Henke, 2002] [CDL, 2001] [Schilit, 1999] [Summerfield, 1999] [Henke, 1998] [Messing, 1995]

5.5 Electronic Updates
The functionality deals with the potential for e-texts to be automatically or semi-automatically updated with items such as errata, new findings and authors’ clarifications. However, this would need to be balanced with privacy issues.

See: [Henke, 2002] [Schilit, 1999]

6. Library-related Functionalities
In order for e-books to become a feasible material type for libraries, e-books must become more “library-friendly.” This category of functionalities includes how e-books can be integrated into the current practices and policies of libraries, as well as meeting the needs of library patrons, which often differ from individual users.
6.1 Ability to be loaned
This is a technical functionality, distinct from policy. Libraries need the ability to provide e-books to patrons who wish to read and interact with the text both within the library, as well as on loan from the library. In order to do this, the e-book’s digital rights must include the ability to move/transfer the text from one text-bearing device to another—this is the movement of a single copy of the text from device to device; not the creation of multiple copies of the text. (See also 6.6 below)
See: [CDL, 2001] [Gibbons, 2001a]

6.2 Circulation & Discovery
The vast majority of libraries have very sophisticated integrated library systems (ILS) that manage, among other things, the circulation of materials. The ideal e-book system would be able to work in conjunction with a library’s existing ILS so that it is not necessary to maintain several circulation systems: one for each e-book collection and one for everything else in the collection. In addition, a core function of the library’s catalog is to serve as a discovery mechanism for items the library’s collection. Therefore, in order to ensure that e-books are represented in the catalog, ideally e-book collections should come with MARC records (Machine-Readable Cataloging record).
See: [CDL, 2001] [Dillon, 2001] [Gibbons, 2001a] [Gibbons, 2001b] [Summerfield, 1999]

6.3 Easily Scrubbable
The ability to return an e-text to its pristine state (e.g., by removing user-added annotations and other types of mark-up). For libraries, the ability to scrub all texts loaded on a single computing device (after being “returned” by a patron) with a single command would be very useful. The "scrubbable" function should also set the title(s) back to first page (even if there were no markups) so that the new user of the e-book is placed at the beginning of the text and not where the last user left off.
See: [Schcolnik, 2001]

6.4. Preserves the privacy and confidentiality of individual users
Libraries have a strong tradition, and in some states a legal requirement, to preserve the privacy and confidentiality of their patrons. Therefore, although e-book system usage statistics can and should be collected (see 6.5 below), those statistics should erase any ties between individual titles and individual patrons.
See:

6.5 Provides a variety of aggregated usage statistics
Aggregated usage statistics is one of a variety of means by which libraries judge the value and use of the material within their collections. Usage statistics can be very useful in determining which resources and services should continue to be funded when there is a budget shortage—which is a chronic condition for many libraries.
See: [CDL, 2001] [Gibbons, 2001b]
6.6 Downloading to the hardware device of choice
Patrons should be able to come to the library and borrow e-books by temporarily downloading them to the text-bearing device of their choice. The numerous reasons for this include:

- Libraries do not want, and often cannot afford, to be in the business of purchasing, circulating and maintaining e-book devices
- Patrons do not want an additional device to carry—they want the e-books to reside on devices that they are already carrying

For this to be possible, e-books must be in non-proprietary formats or there is consistent interoperability between e-book systems. Some e-books have digital rights management systems that tie the text to a single, unique device-- this is a very significant barrier to the adoption of e-book for libraries.

See: [Gelfand, 2002] [Morrill, 2002] [CDL, 2001] [Dillon, 2001] [Hill, 2001]
[Knowledge Systems & Research, 2001] [Wearden, 1998b]

6.7 Contains a title page and bibliographic information
With some e-texts, it is difficult to determine who wrote it, when it was published or last revised, and who controls the intellectual property rights. Including an old-fashioned title page in all e-books would be a good first step. Libraries, in particular, use the title page and bibliographic information to catalog the text, as well as determine the relationship of that text with similar ones in their collection (is the e-book the same edition as the paper editions in the collection?)

See:

6.8 Segmentable
The ability to segment e-book texts can be of great value to libraries, particular those serving higher education. Most academic libraries support “course reserve” services whereby faculty can place books or portions of books, among other material, on reserve at the library specifically for students in his/her class. Usually, the book on course reserve is in great demand for a short period of time. The ability to segment e-book would permit libraries to place only those portions of the text needed on reserve. In addition, if segments of e-book could be purchased, some libraries could purchase several copies of the required segment of the text, where they likely could not afford to purchase several copies of the text in its entirety.

See: [Summerfield, 1999]

7. Legal and Contractual Functionalities
U.S. Copyright law provides libraries and the public with certain rights in regards to copyrighted materials. With regards to Fair Use activities and the Right of First Sale, e-books should behave no differently that paper books.

7.1 Ability to engage in Fair Use activities related to an e-text.
Use of a copyrighted text “purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright.” (U.S. Code, Title 17 “Copyright,” Chapter 1, Section 107.)
No section of an e-book’s digital rights management system should interfere with Fair Use activities.

See:

7.2 Ability to engage in Right of First Sale activities related to an e-text.
The Right of First Sale provides libraries, among other things, with the ability to loan texts that it owns to patrons. Libraries expect these same rights to apply to e-books. Therefore, libraries need the ability to purchase ownership of the e-book (not just lease them) and have digital rights management system that permit loaning of e-books (see 6.1 above). Moreover, the library patrons want the ability to donate e-books to their local libraries.

See: [Henke, 2002]
### Section 3: Studies & Surveys of E-Books and Related Topics

<table>
<thead>
<tr>
<th>General E-Books</th>
<th>E-Books on Devices</th>
<th>E-Book Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Book Subscription/Online Services</td>
<td>Textbook/Classroom Use</td>
<td>General e-Text Use</td>
</tr>
<tr>
<td>Annotation &amp; Marginalia</td>
<td>Hyptertext</td>
<td>Layout &amp; Fonts</td>
</tr>
</tbody>
</table>

#### General E-Books:

- **Spring 2002.** "Ebook Reader Survey" by KnowBetter.com and eBookWeb.org. Abstract from Web site: Through the months of March, April, and May of 2002, KnowBetter.com, with the help of eBookWeb.org, conducted a survey of ebook readers. The intent of this first survey was to not only establish a foundation of basic market information that we could use to develop more specific surveys in the future, but to also provide some useful data about the ebook reading market. [Full survey results are available for purchase price of $149.95.](#)

- **March 2002.** "Survey on Electronic Book Features" by Harold Henke. Abstract: Results of an Open eBook Forum sponsored survey to help assess what users desire and expect from ebooks. 163 electronic surveys were collected from individuals who were familiar with current ebook technology. The most desirable feature was that the ebook opened to the last page viewed. [Henke, 2002](#)

- **2001.** Electronic Books and ePublishing: A Practical Guide for Authors. By Harold Henke. London: Springer Verlag. Abstract from publication: Research has shown that if an electronic book uses the best features of a paper book then people are more likely to use it. This book shows how to use a paper book metaphor in the design of an eBook and looks at proven and tested new features that can be incorporated to enhance ePublishing. [Henke, 2001](#)

- **2001.** "The Magic of Reading" by Bill Hill. Redmond, Washington: Microsoft. Abstract from executive summary: This report is a new study of reading, how it works, and how to achieve that mysterious state referred to as "readability." It's targeted in the first instance at electronic books but is also relevant everywhere else that text is read. If the ideas in this document work-and there are very strong signs that they will-they will change the world. That's a grandiose claim. But reading is a core human task. We were not ready to implement the much-hyped "Paperless Office" in the 1970s and 1980s. The main obstacle to that vision was: How can you have a paperless office, when reading on the computer screen is so awful? We are about to break through that barrier. And everything will change when we do. I've read around 12,000 pages of research papers, books, and articles over the past several months. The (hopefully logical) case that follows is almost an exact reversal of the discovery process that took place. [Hill, 2001](#)

- **March 2001.** "Report: California Digital Library Joint Steering Committee for Shared Collections Ebook Task Force". Abstract: The charge to the Task Force was as follows: 1) Define operating guidelines and desirable features that will make e books most useful for instruction and research in the University of California. 2) Evaluate the
ongoing experiences at UC campuses (specifically at UCB and UCSD and their netLibrary experiments). 3) Examine other academic library e-book experiments (other institutions, other content providers). 4) Identify potential Universitywide or multi-campus strategies that should be pursued or explored further. (CDL, 2001)


- **2000.** "From the Visual Book to the WEB Books: The Importance of Design" by M. Landoni, R. Wilson & F. Gibb. The Electronic Library, 18:6, pp. 407-19. Abstract from publication: This paper presents the results of two studies into electronic book production. The Visual book study explored the importance of the visual component of the book metaphor for the production of more effective electronic books, while the WEB book study took the findings of the Visual book and applied them to the production of books for publication on the World Wide Web (WWW). Both studies started from an assessment of which kinds of paper book are more suitable for translation into electronic form. Both also identified publications which are meant to be used for reference rather than those which are read sequentially, and usually in their entirety. This group includes scientific publications and textbooks which were both used as the target group for the Visual book and the WEB book experiments. In this paper we discuss the results of the two studies and how they could influence the design and production of more effective electronic books. (Landoni, et al., 2000)

- **2000.** "Industry Survey: E-Books: Awareness, Usage & Attitudes- Executive Summary" for Seybold Seminar by Advantage Business. (full report available for purchase $295). Abstract from Web site: Based on 2,880 attendees at the past year's Seybold events in Boston and San Francisco, the industry survey asked publishing professionals about their attitudes towards e-books, and their usage of e-book products. Because Seybold attendees are highly aware of e-book products (91 percent have heard or read about e-books and 81 percent have heard or read about e-book reading devices), this group represents one that has intimate knowledge of e-book products. While the results do not reflect the general public's views, the findings reveal insights on the potential growth of the e-book market.

- **April 1999.** "A Study of the Use of Book Metaphors in the Design of Electronic Books" by Harold A. Henke from the Designing Electronic Books workshop held in conjunction with the CHI99 Conference. Abstract from publication: Research conducted by Henke (1998) has shown that users are dissatisfied with electronic books and the applications used to view them. One reason for user dissatisfaction may be the lack of familiar book metaphors embedded into the electronic books. In Henke's study, user satisfaction could have been improved had more detailed indexes and table of contents been incorporated in the electronic books as users preferred using hyper-text linked table of contents and indexes to find information instead of using a search tool. (Henke, 1999)

- **Summer 1998.** "Landscape vs. Portrait Formats: Assessing Consumer Preferences" by Dr. Stanley Wearden. Future of Print Media. Summary from publication: ...we found no research that assessed media consumers’ preferences for portrait or landscape screen
orientation when reading documents, nor did we find any research on some of the concomitant issues, such as page-based design and scrolling. For these reasons, the Kent IDL research team, which included associate professor Ann Schierhorn, assistant professor Carl Schierhorn and myself, initiated two studies of display orientations and formats in 1997 and 1998 as part of its ongoing investigations into the human factors and cultural biases associated with the document form. [Wearden, 1998a]

- **Fall 1998.** "Electronic Books: A Study of Potential Features and Their Perceived Value" by Dr. Stanley Wearden. *Future of Print Media.* Summary from publication: Clearly, if electronic book ventures are to succeed, they must successfully add value to the experience of reading, either from the printed page or from a conventional desktop computer screen. To do so, they must have some indication of how the market defines added value, what the market wants in value-added features and what the market is willing to pay for such features. Earlier this year, the Information Design Laboratory at Kent State University set out to begin answering some of these questions in a survey of 276 students at Kent State University. [Wearden, 1998b]


**E-Books on Devices:**

- **2002.** "A user-centered approach to e-book design" by Ruth Wilson, et al. *The Electronic Library, 20:4,* pp. 322-30. Abstract from publication: This paper considers the Electronic Books ON-screen Interface (EBONI) Project's research into the importance of the user when designing electronic textbooks. The results of the Visual Book and the WEB Book experiments, which explored design aspects of e-books and provide a backdrop to EBONI's research, are presented. EBONI's methodology and evaluations, involving over 200 students, lecturers and researchers in UK Higher Education, are describes, and the findings discussed. IT is proposed that, while aspects of paper books such as table of contents, indexes and typography should be retained, books delivered electronically should also adapt to fit the new medium through use of hypertext, search engines and multimedia. In terms of the design of e-book hardware, issues such as size and weight, display technology and functionality are of primary importance to users. [Wilson, et al., 2002]

- **2002.** "Reading-in-the-Small: a study of reading on small form factor devices" by Catherine C. Marshall and Christine Ruotolo. *Proceedings of the Second ACM/IEEE-CS Joint Conference on Digital Libraries,* pp. 56-64. Abstract from publication: The growing ubiquity of small form factor devices such as Palm Pilots and Pocket PCs, coupled with widespread availability of digital library materials and users' increasing willingness to read on the screen, raises the question of whether people can and will read digital library materials on handhelds. We investigated this question by performing a field study based on a university library's technology deployment: two classes were conducted using materials that were available in e-book format on Pocket
PCs in addition to other electronic and paper formats. The handheld devices, the course materials, and technical support were all provided to students in the courses to use as they saw fit. We found that the handhelds were a good platform for reading secondary materials, excerpts, and shorter readings; they were used in a variety of circumstances where portability is important, including collaborative situations such as the classroom. We also discuss the effectiveness of annotation, search, and navigation functionality on the small form factor devices. We conclude by defining a set of focal areas and issues for digital library efforts designed for access by handheld computers. [Marshall & Ruotolo, 2002]

- 2002. "Reading from a Palm Pilot Using RSVP" by Mark Russell et. al. *Usability News*, 4.1. Abstract from publication: This study is a continuation of our ongoing research into the feasibility of using the text presentation method known a Rapid Serial Visual Presentation (RSVP) as a possible means of reading on small screen interfaces. The current study presents data on reading efficiency using RSVP on a hand-help device. We compare performance between RSVP conditions at three reading speeds to a traditional text presentation format used by Palm Reader. [Russell, 2002]

- October 2001. "A Study of Reading with Dedicated E-Readers Dissertation" by Miriam Schcolnik. Abstract: Given the prediction that in the future our reading could be mainly digital and the fact that e-readers are one of the emerging technologies, we need to understand what these devices are suitable for. This study answered the following questions: What strategies do adult users of e-readers apply to reading in the new medium? Does the new medium lend itself more to certain purposes of reading? What kinds of texts do users read in dedicated e-readers? What characteristics should texts for e-reading have? Data were gathered using a web survey in which 105 people participated, and a case study in which five subjects were observed and interviewed. The findings of the research help clarify the strategies used in the e-reader medium, as well as preferred uses, types of texts, and e-reader characteristics. [Schcolnik, 2001]

- 2001. "The technology and applications of the new generation of electronic books" by Heilmann, Jali and Hannu Linna. *Proceedings of the Technical Association of the Graphic Arts*, pp. 581-90. Abstract from publisher's Web site: Following the publication of the first electronic books at the end of 1998, VTT Information Technology has carried out several studies to evaluate the technical and commercial potential of electronic book technology. This research compares the latest models of electronic books with the first generation of e-books and the conventionally printed products. The technical comparisons include, for example, the image quality factors affecting text quality. The readability and usability of electronic books are evaluated and expectations regarding the technology are investigated. Several pilot projects have also been launched for applying electronic book technology to new publishing processes. This paper will describe the initial experiences with e-book publishing in different environments, such as universities and libraries.

- 2001. "The Revolution starts next week: the findings of two studies considering electronic books" by James Dearnley and Cliff McKnight. *Information Services & Use*, 21:2, pp. 65-78. Abstract from publication: "This paper reports on two pilot studies undertaken in May and December 2000 at Loughborough University and Market Harborough public library. The first study... considered student and staff evaluation of
two electronic reader products—NuvoMedia's Rocket eBook and Glassbook Inc's Glassbook. A second study...used a focus group... to consider potential usage of the Rocket eBook for lending services." [Dearnley & McKnight, 2001]

- 2001. "Ebooks: Some Concerns and Surprises" by Susan Gibbons. portal: Libraries and the Academy, 1:1, pp. 71-5. Abstract from publication: Many of those libraries that wish to include ebooks in their collections are hesitating, in part because of a number of assumptions concerning the reactions of patrons to this new technology. For instance, there is a general assumption that patrons would be dissatisfied with the low resolution of the ebook readers and the lack of color and pictures. Or, the fragile nature of the reader apparatus would lead to many damaged devices. Or, when given the option, people simply would rather read from the traditional ink-on-paper format than on the small screen of an ebook reader. Several libraries in the Rochester, New York, area were provided the opportunity to test these assumptions and discovered that, in many cases, these assumptions were not supported by the results. [Gibbons, 2001a]

- 2001. "Should You Check In Your Textbooks and Check Out an eBook?" by Paula Selvidge, et al. Usability News, 3.1. Methodology from publication: Six participants (3 male, 3 female) completed tasks that are typical for traditional book reading, such as annotating, underlining, book marking, and searching. In addition, eBook related tasks, such as changing the size and orientation of the text, checking battery status, adjusting the backlight, and keyboard input were also completed. The Rocket eBook™ from Nuvomedia, which is now known as the Gemstar eBook™, was the brand of eBook used in the evaluation. The dependent measures included task difficulty, task success, and satisfaction with the eBook. The task difficulty items were presented on a 5-point Likert scale with 1 being “Very Difficult” and 5 being “Very Easy” to complete. [Selvidge, et al., 2001]

- 2001. "Designing e-Books for Legal Research" by Catherine C. Marshall et al. Proceedings of JCDL 2001 (Roanoke, VA, June 23-27), ACM Press, pp. 41-8. Abstract from publication: In this paper we report the findings of a field study in a first-tier law school and on the resulting redesign of Xlibris, a next-generation e-book. We characterize a work setting in which we expected an e-book to be useful, and explore what kinds of functionality would bring value to this setting. [Marshall, et al., 2001]

- 2000. "E-Books: Are We Going Paperless?" by Paula Selvidge and C. Phillips. Usability News, 2.1. Abstract: If the electronic book is intended to replace the paper medium, it is important to explore whether differences exist in comprehension and reading speed from reading on an electronic book or paper. To examine this question, we administered the Nelson-Denny Reading Comprehension Tests (Form E and Form F) in two modes to sixteen participants, on a Rocket eBook™ from NuvoMedia and on paper. The presentation mode was varied within-subjects, with one test presented on the e-book and the other test on paper. The font size (10 pt.), font style (Times New Roman), and amount of information per page were identical for both paper and e-book. [Selvidge & Philips, 2000]

- Spring 1999. "Why e-Read? Finding Opportunities In the Merger Of Paper and Computers" by Dr. Bill Schilit. Future of Print Media. Conclusion from publication: Before reading appliances become successful, they need to be made more usable, more useful, and more valuable. Towards the usability goal, human factors researchers at our
laboratory and elsewhere are analyzing the benefits of paper documents and understanding how to design paper-like computers that share paper’s user-friendliness. Inventing reading appliances that are more useful than paper remains a challenge; we have provided a number of examples of features that may prove useful. Finally, the value for a reading appliance product needs to outweigh its costs and deficiencies. It is likely that the first truly successful reading appliance will be targeted at analytic readers, such as analysts, lawyers, or corporate decision-makers, whose time is extremely valuable.

[Schilit, 1999]

- **January 1999.** "As We May Read : The Reading Applicance Revolution" by Bill N. Schilit, et al. *Computer,* 32:1, pp. 65-73. Abstract from publisher's Web site: In the 1970s, Alan Kay and his colleagues at Xerox PARC envisioned a dynamic, interactive electronic book. Now, nearly 30 years later, that vision has become a reality. A new kind of personal information appliance—the reading appliance—is emerging as a tool for serious readers. But is the world ready for reading appliances? The authors believe that these appliances are indeed viable. Advances in mobile hardware have made it possible to build the necessary hardware. Additionally, the Web has created a market for online reading by introducing millions of people to it, and books, magazines, newspapers, advertisements, and other printed matter can be produced and read at very low cost. Network based digital libraries increase the availability of information, but people still tend to print the documents to work with them. Electronic book and document readers will neither replace paper nor will they replace desktop computers. Instead, they will occupy their own unique and valuable role in our lives, bringing the paper and computer worlds closer together. [Schilit, et al. 1999]

- **1999.** "Introducing a digital library reading appliance into a reading group" by Catherine C. Marshall, et al. *Proceedings of ACM Digital Libraries 99,* ACM Press, pp. 77-84. Abstract from publication: How will we read digital library materials? This paper describes the reading practices of an on-going reading group, and how these practices changed when we introduced XLibris, a digital library reading appliance that uses a pen tablet computer to provide a paper-like interface. We interviewed group members about their reading practices, observed their meetings, and analyzed their annotations, both when they read a paper document and when they read using XLibris. We use these data to characterize their analytic reading, reference use, and annotation practices. We also describe the use of the Reader's Notebook, a list of clippings that XLibris computes from a reader's annotations. Implications for digital libraries stem from our findings on reading and mobility, the complexity of analytic reading, the social nature of reference following and the unselfconscious nature of readers' annotations. [Marshall, et al., 1999]

E-Book Software:

- **2001.** "The Revolution starts next week: the findings of two studies considering electronic books" by James Dearnley and Cliff McKnight. *Information Services & Use,* 21:2, pp. 65-78. Abstract from publication: "This paper reports on two pilot studies undertaken in May and December 2000 at Loughborough University and Market Harborough public library. The first study... considered student and staff evaluation of two electronic reader products--NuvoMedia's Rocket eBook and Glassbook Inc's
Glassbook. A second study...used a focus group... to consider potential usage of the Rocket eBook for lending services. [Dearnley & McKnight, 2001]


**E-Book Subscription/Online Systems:**

- April, 2002. "[Wisconsin Public Library Consortium netLibrary User Evaluation](#)" by Joshua H. Morrill. Abstract from executive summary: The evaluation of netLibrary use was conducted in two stages. The initial stage surveyed registered users of netLibrary. The second stage involved training new users, and surveying their experiences after two-weeks. [Morrill, 2002]

- 2002. "User Input: Experiences in Assigned Reading from E-Books - One netLibrary Experience" by Julia Gelfand. *Library Hi Tech News*, 19:1, pp. 17-8. Abstract from publication: The University of California, Irvine (UCI) Libraries wanted to have an e-book experience to learn how users respond to the medium and the delivery mechanism. In order to have as much freedom as possible with this new effort, it was decided that the libraries would conduct a one-year calendar trial with netLibrary. At the submission of this article, the trial is now about over and the future of netLibrary remains uncertain, as the company suffers from lack of financial security. Nevertheless, e-books are likely to be around and libraries will continue to consider how best to incorporate them. [Gelfand, 2002]

- September, 2001. "[netLibrary eBook Usage at the University of Rochester Libraries](#)" by Susan Gibbons. Abstract from publication: Two studies were conducted over the Spring 2001 (January - May) semester regarding the use of netLibrary ebook titles. The first was to examine the user of the overall netLibrary ebook collection and compare that to the use of the paper editions of those same titles. The second study focused on the user of ebooks for course reserves. [Gibbons, 2001b]


reactions to online books in the scholarly world and the cost profiles of print and online books. Scholars appreciated the opportunity to use the online format to locate a book and to browse it. However, they sought a print copy for extended reading. Incremental costs of online books are small for publishers. Libraries' life-cycle costs are lower for online books than for print books. [Summerfield, et al., 2000]

- **May 1999 (last updated).** "Online Books: What Roles Will They Fill For Users Of The Academic Library?" by Mary Summerfield. Columbia University Libraries. Abstract from publication: As the Libraries and Academic Information Systems at Columbia University have proceeded with a pilot project to provide the Columbia community with a substantial collection of online books and to evaluate the reactions of scholars to those books, it has become clear that a basic understanding of how scholars interact with various classes of traditional print-on-paper books is necessary for optimal design of the various facets of a system for intellectual and physical access to online books, for assessing the value of various components to the academic community, and for successful selection of books to be included in online collections. However, the library-related literature on the use of books by scholars has focused largely on issues related to the overall demand for collections rather than on how scholars select books to review or read or ultimately employ books in their work. Similarly, the psychological and ergonomic literature on how people read has focused on concepts which have little to do with the place of books in scholars' work or how scholars manipulate books in that work. [Summerfield, 1999]

**Textbooks & Classroom Use:**

- **2002.** Simon, EJ. "An experiment using electronic books in the classroom". *Journal of Computers in Mathematics and Science Teaching, 21:1, pp. 53-66.* Abstract from publisher's Web site: Electronic books are single-purpose hand-held computer devices designed to store and display reading material. The introduction of e-books into the classroom has been anticipated for years, but the technology has never quite been up to the task. This article will describe an experiment in which e-books were distributed to college introductory biology students in place of the traditional textbook. Student responses to anonymous questionnaires showed that the e-books were easy to use and offered several advantages over traditional texts. Data will be presented on initial learning curves, reading habits of e-book users, advantages and disadvantages of the electronic format, and overall levels of satisfaction. While some shortcomings were revealed, the results of this study suggested that students who used an e-book were eager to adopt this new technology on a larger scale.

- **August 2002.** "The Usability of eBook Technology: Practical Issues of an Application of Electronic Textbooks In a Learning Environment" by Richard F. Bellaver and Jay Gillette. Abstract from publication: Testing on “learning” and usability of electronic books (eBooks) for college students took place during the Spring Semester 2002 at Ball State University. Graduate students used a textbook and also conducted other environmental and human factors tests on two versions of eBooks. Results indicate that “learning”, evaluated through taking quizzes, was not affected by using eBooks. Students were not impressed with the use of the eBooks primarily because a poor representation of the text was converted. It appears that if the full capability of the current eBooks was utilized, they could be a viable and acceptable storage medium for college
textbooks. The article also defines further testing to be conducted. [Bellaver & Gillette, 2002]

- May 2002. "EBONI: Designing Effective Electronic Textbooks" by Ruth Wilson. Library Hi Tech News, 19:4, p. 41-3. Abstract from publication: Electronic books are beginning to appear in the UK marketplace, in an array of shapes and sizes: e-book hardware ranges from small and light to large and bulky; e-book software presents content in a number of formats and offers a variety of features; and books published online differ greatly in appearance. EBONI (Electronic Books ON-screen Interface) (http://eboni.cdlr.strath.ac.uk) is investigating which aspects of the design of these electronic textbooks are most successful in terms of the usability requirements of students and academics throughout the UK. [Wilson, 2002]

- 2002. "Electronic Textbook Design Guidelines". EBONI (Electronic Books ON-screen Interface) Project. Abstract from publication: The on-screen design guidelines are primarily intended to be applied to books published on the Web, but the principles will be relevant to ebooks of all descriptions and, in certain cases (e.g. Guideline 16: Provide bookmarking, highlighting and annotating functions), it is possible that only commercial ebook software companies will have the resources to comply at their disposal. They simply reflect the results of our user evaluations, and it is recognized that they will be implemented at different levels by different content developers. [EBONI, 2002]

- Winter 2001. "Electronic Textbooks: A Pilot Study of Student E-Reading Habits" by Dr. Eric J. Simon. Future of Print Media. Abstract from publication: The college classroom is an obvious target for e-book implementation because college students typically embrace new technologies and also purchase a high volume of expensive, cumbersome and rapidly discarded books. Few studies have yet been conducted, however, of what effects replacing standard textbooks with e-books would have on students’ study habits. In order to better understand the e-reading habits of college students, a pilot study was conducted to test which e-book features students used and valued. [Simon, 2001]


- November 2001. "Academic Libraries Take an E-Look at E-Books" by Tom Peters and Lori Bell. Abstract: Report on the E-Book Grant-Funded Project at Spoon River College and Eureka College. The objective of this project was "to learn what happens when a college library provides pre-loaded course-related content on handheld, portable e-book devices directly to the hands of undergraduate students and their professors for their use in actual course-related readings." This report contains the project's findings and recommendations.

- 2001. "Electronic Books for Children in UK Public Libraries" by Sally Maynard & Cliff McKnight. The Electronic Library, 19:6 pp. 405-23. Abstract from publication: This article describes a survey investigating the opinions of children's librarians on the subject of electronic books. A questionnaire was sent by post to those responsible for
public library services for children at each of the 208 local government authorities in the UK. The response rate was 77 per cent. Notable conclusions include the fact that there was a positive attitude towards including electronic books as part of the children's library service, and a high proportion of libraries offered access to them, the majority through main libraries. A small majority of libraries were offering electronic books for reference use within the library, rather than lending them out like printed books. Many of the librarians believed that electronic books can attract new members to the library, and that offering electronic books will change their role. Respondents believed that electronic books are durable, and can exist alongside the printed items within the library.

- **2000.** "Learning by Interacting: Comparing the Effectiveness of an Interactive Tutorial with a Standard Electronic Book Interface" by Jeni Paay and Leah O'Brien. ASCILITE 2000 Online Conference Papers. Abstract from publication: This study performed a summative design-evaluation of two types of interfaces, an electronic book and an interactive tutorial. The experiment compared the effectiveness of using the interfaces for web-based computing teaching at tertiary level and determined user reactions to each interface.

- **1995.** "Measuring Student Use of Electronic Books" by John Messing. ASCILITE 1995 Online Conference Papers. Abstract from publication: This paper considers issues for the design of electronic books as teaching materials in the light of student use, including the problem of how such use can be measured. [Messing, 1995]

General e-Text Use:

- **2002.** The Myth of the Paperless Office. by Abigail Sellen and Richard Harper. Cambridge, MA: MIT Press. Abstract from publication: In The Myth of the Paperless Office, Abigail Sellen and Richard Harper use the study of paper as a way to understand the work that people do and the reasons they do it the way they do. Using the tools of ethnography and cognitive psychology, they look at paper use from the level of the individual up to that of organizational culture. Central to Sellen and Harper’s investigation is the concept of "affordances"--the activities that an object allows, or affords. The physical properties of paper (its being thin, light, porous, opaque, and flexible) afford the human actions of grasping, carrying, folding, writing, and so on. The concept of affordance allows them to compare the affordances of paper with those of existing digital devices. They can then ask what kinds of devices or systems would make new kinds of activities possible or better support current activities. The authors argue that paper will continue to play an important role in office life. Rather than pursue the ideal of the paperless office, we should work toward a future in which paper and electronic document tools work in concert and organizational processes make optimal use of both. [Sellen & Harper, 2002]

- **2001.** "The Magic of Reading" by Bill Hill. Redmond, Washington: Microsoft. Abstract from executive summary: This report is a new study of reading, how it works, and how to achieve that mysterious state referred to as "readability." It's targeted in the first instance at electronic books but is also relevant everywhere else that text is read. If the ideas in this document work-and there are very strong signs that they will-they will change the world. That's a grandiose claim. But reading is a core human task. We were not ready to implement the much-hyped "Paperless Office" in the 1970s and 1980s. The
main obstacle to that vision was: How can you have a paperless office, when reading on the computer screen is so awful? We are about to break through that barrier. And everything will change when we do. I've read around 12,000 pages of research papers, books, and articles over the past several months. The (hopefully logical) case that follows is almost an exact reversal of the discovery process that took place. [Hill, 2001]


- 2001. "Towards a new generation of information environment for the use of e-documents" By Chern Li Liew, Schubert Foo and K.R. Chennupati. Journal of Information Science, 27:5, pp. 327-42. Abstract: This research examines how electronic documents (e-documents) such as electronic journals (e-journals) could be enhanced in the electronic environment to make them more valuable to end-users. In particular, it investigates how a wide range of information searching, analysis and communicating tasks involved in interacting with e-documents could be supported within a single user interface (UI) environment, using e-journals as an example of e-documents. The research tasks completed in the study include the elicitation of user needs and wants, a comprehensive review of latest research developments in electronic publishing and e-documents, derivation of a new set of information and interaction properties that are necessary for a new digital environment to support enhanced access and value-adding to e-documents, and the design of a platform (PROPIE) to demonstrate the use of various features and functionality to support creative and effective e-document use.

- 1997. "A Comparison of Reading Paper and On-Line Documents" by Kenton O'Hara and Abigail Sellen. CHI 97, pp. 335-42. Abstract from publication: We report on a laboratory study that compares reading from paper to reading on-line. Critical differences have to do with the major advantages paper offers in supporting annotation while reading, quick navigation, and flexibility of spatial layout. These, in turn, allow readers to deepen their understanding of the text, extract a sense of its structure, create a plan for writing, cross-refer to other documents, and interleave reading and writing. We discuss the design implications of these findings for the development of better reading technologies. [O'Hara & Sellen, 1997]

Annotation and Marginalia:

- **2002.** "From Personal to Shared Annotations" by Catherine C. Marshall and A.J. Bernheim Brush. *Conference Extended Abstracts on Human Factors in Computer Systems, 2002.* ACM Press. Abstract: Preliminary results obtained by comparing personal annotations on paper with shared annotations made on-line show that only a small fraction of personal annotations are used in initiating and responding to related on-line discussions. The personal annotations that are shared tended to correspond to eliciting marginalia; much effort is still put into rendering both the content and anchors of these annotations intelligible to others. [Marshall & Brush, 2002]

- **2001.** *Marginalia: Readers Writing in Books.* by H.J. Jackson. New Haven, Connecticut: Yale University Press. Abstract: For hundreds of years, readers have talked to other people in the margins of their books - not only to authors, but also to friends, lovers, & future generations. Jackson explores the history of marginalia, the forms they take, the psychology that underlies them, & the reactions they provoke.

- **1998.** "Toward an ecology of hypertext annotation" by Catherine C. Marshall. *Proceedings of ACM Hypertext '98*, Pittsburgh, PA (June 20-24, 1998), pp. 40-9. (winner of 1998 Engelbart Best Paper Award) Abstract: Annotation is a key way in which hypertexts grow and increase in value. This paper first characterizes annotation according to a set of dimensions to situate a long-term study of a community of annotators. Then, using the results of the study, the paper explores the implications of annotative practice for hypertext concepts and for the development of an ecology of hypertext annotation, in which consensus creates a reading structure from an authorial structure.

- **1998.** "The Future of Annotation in a Digital (Paper) World" by Catherine C. Marshall. *Proceedings of The 35th Annual GSLIS Clinic: Successes and Failures of Digital Libraries*, University of Illinois at Urbana-Champaign (March 24, 1998). Abstract: If order-making in the large is part of the institutional mission of libraries, then order-marking in the small - the informal work of annotating and organizing materials collected in service of particular, day-to-day work or pleasure - is part of the business of library patrons. This paper focuses on just such activities, activities that stem from readers' engagements with texts, and possibly with each other, against the backdrop of real-world settings and practices. [Marshall, 1998b]

- **1998.** "Student Reader's Use of Library Documents: Implications for Library Technologies" by Kenton O'Hara et al. *Proceedings of CHI '98*. Abstract: We report on a study of graduate students conducting research in libraries, focusing on how they extract and record information as they read. [O'Hara, et al., 1998]

- **1997.** "Annotation: from paper books to the digital library" by Catherine C. Marshall. *Proceedings of the ACM Digital Libraries '97 Conference*, Philadelphia, PA (July 23-26, 1997). Abstract: Readers annotate paper books as a routine part of their engagement with the materials; it is a useful practice, manifested through a wide variety of markings made in service of very different purposes. This paper examines the practice of annotation in particular situation: the markings students make in university-level textbooks. The study focuses on the form and function of these annotations, and their status within a community of fellow textbook readers. Using this study as a basis, I
discuss issues and implications for the design of annotation tools for a digital library setting.

- **1972. How to Read a Book.** by Mortimer J. Adler and Carl van Doren. New York: Simon & Schuster. Abstract: This classic explains how to approach and analyze various kinds of reading material such as stories, plays, and poetry.

**Hypertext:**

- **2001. "Reading Hypertext and the Experience of Literature"** by David S. Maill and Teresa Dobson. *Journal of Digital Information, 2:1.* Abstract: Hypertext has been promoted as a vehicle that will change literary reading, especially through its recovery of images, supposed to be suppressed by print, and through the choice offered to the reader by links. Evidence from empirical studies of reading, however, suggests that these aspects of hypertext may disrupt reading. In a study of readers who read either a simulated literary hypertext or the same text in linear form, we found a range of significant differences: these suggest that hypertext discourages the absorbed and reflective mode that characterizes literary reading. [Maill & Dobson, 2001]


**Layout & Fonts:**

- **2002. "Reading online news: a comparison of three presentation formats"** By Ryan Baker, et al. *Usability News, 4:2.* Abstract: This study addressed the question of how information should be presented within a news-style web page. For example, should all the information related to a single article be presented on one page, or should the newsletter contain a page that lists only the link titles that relate to each specific article, and which is presented on another page? Moreover, if the newsletter presents initial information in the form of link titles, should they present supplementary information that provides a general overview of the entire article, along with the link title? [Baker, et al., 2002]

- **2002. "The effects of line length on children and adults' online reading performance"** by Michael Bernard, et al. *Usability News, 4:2.* Abstract: The purpose of this study was to examine the effects of line length on online reading performance by both adults and children. Unfortunately, little research has been conducted investigating line length and online reading with respect to both actual and perceived reading efficiency, as well as preference; and, to date, no research has included children in its investigation. [Bernard, et al., 2002b]


- **2001. "Determining the Best Online Font for Older Adults"** by Michael Bernard, et al. *Usability News, 3:1.* Abstract: This study sought to examine older adult online reading by studying the legibility, reading time, as well as the general font preference for two
types of serif (Georgia and Times) and sans serif (Arial and Verdana) fonts at 12- and 14-point sizes. [Bernard, et al., 2001a]

- 2001. "Which Fonts Do Children Prefer to Read Online?" by Michael Bernard, et al. *Usability News*, 3:1. Abstract: This study sought to examine four types of fonts at 12- and 14-point size to help determine the font combination that is perceived as most readable on computer screens and most preferred by children. [Bernard, et al., 2001b]

- 2001. "A comparison of popular online fonts: which is best and when?" by Michael Bernard, et al. *Usability News*, 3:2. Abstract: This study examined the most popular font types at 12-point size (the size used by a majority of websites) for differences in effective reading speed, as well as perception of font legibility. [Bernard, et al., 2001c]

- 1998. "Exploring the Effect of Layout on Reading from Screen" by Mary C. Dyson and Gary J. Kipping. *Lecture Notes in Computer Science*, 1375. Abstract: This paper briefly examines the nature of information available to people designing for the screen and proposes that applied research into factors that affect the legibility of text on screen is required. Comparisons of reading from paper and screen do not identify the optimal typographic conditions for reading from screen, and it may be more fruitful to abandon such comparisons. A series of experiments that investigate the effect of typographic layout on reading from screen are summarized. The description aims to be accessible to practitioners and therefore to provide a basis for informed design decisions. The inappropriateness of formulating simple guidelines is illustrated by the results of these experiments. Peoples' subjective views of what are the easiest layouts to read are not those read fastest. [Dyson & Kipping, 1998]

### Section 4: Classified Arrangement of E-Book Functionalities Cross-Referenced to Pertinent Studies

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<th>Functionality</th>
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<td>1. Human Interaction at the Physical Level</td>
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<td>1.1 Customizable rendering of content (change font size, color, etc.)</td>
<td>Bellaver &amp; Gillette, 2002</td>
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<td>Henke, 2002</td>
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<td>CDL, 2001</td>
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<td>Dillon, 2001</td>
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<td>Gibbons, 2001a</td>
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<td>Schcolnik, 2001</td>
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<td>Schilit, 1999</td>
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<td>Schilit, et al., 1999</td>
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<td></td>
<td>Wearden, 1998b</td>
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<td>1.2. Easy to Use and Easy to Access (includes basic discoverability and obtaining of e-book, usability-tested)</td>
<td>Morrill, 2002</td>
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<td></td>
<td>Wilson, 2002</td>
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<td>CDL, 2001</td>
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<td>Feature</td>
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<td>Interface and design, etc.)</td>
<td>Schcolnik, 2001</td>
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<td>Selvidge, et al., 2001</td>
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<td>Landoni, et al., 2000</td>
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<td></td>
<td>Summerfield, 1999</td>
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<td>1.3 Readability (primarily in terms of eye comfort and strain;</td>
<td>Bellaver &amp; Gillette, 2002</td>
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<td>perceived legibility; back lighting; screen resolution, etc.)</td>
<td>Bernard, et al., 2002a</td>
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<td>Gelfand, 2002</td>
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<td>Wilson, 2002</td>
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<td>Wilson, et al., 2002</td>
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<td>Bernard, et al., 2001a</td>
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<td>Bernard, et al., 2001b</td>
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<td>Henke, 2001</td>
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<td>Landoni, et al., 2000</td>
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<td>Selvidge &amp; Philips, 2000</td>
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<td>Schilit, et al., 1999</td>
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<td>Summerfield, 1999</td>
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<td>1.4 Accessible by the Disabled</td>
<td>CDL, 2001</td>
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<td>1.5 Good ergonomics (particularly applies to hardware devices</td>
<td>Bellaver &amp; Gillette, 2002</td>
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<td>including the weight of the device, size and placement of</td>
<td>Wilson, 2002</td>
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<td>buttons, etc.)</td>
<td>Wilson, et al., 2002</td>
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<td>Dearnley &amp; McKnight, 2001</td>
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<td>Gibbons, 2001a</td>
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<td>Schcolnik, 2001</td>
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<td>Selvidge, et al., 2001</td>
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<td>Schilit, et al., 1999</td>
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<td>Wearden, 1998b</td>
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<td>Messing, 1995</td>
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<td>1.6 Return reader to page where reader left off</td>
<td>Henke, 2002</td>
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<td></td>
<td>CDL, 2001</td>
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<td>1.7 Pagination functionalities (fixed page layout, landscape or</td>
<td>Baker, et al., 2002</td>
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<td>portrait, sufficient text on screen, scrolling, etc.)</td>
<td>Bellaver &amp; Gillette, 2002</td>
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<td>Bernard, et al., 2002b</td>
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<td>Gelfand, 2002</td>
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<td>Wilson, 2002</td>
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<td>Russell, 2002</td>
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<td>Wilson, et al., 2002</td>
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<td>Dearnley &amp; McKnight, 2001</td>
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1.8. Durability (particularly applies to hardware devices)
- Bellaver & Gillette, 2002
- Wilson, 2002
- Wilson, et al., 2002

1.9. Portability (including off-line reading)
- Gelfand, 2002
- Morrill, 2002
- Schcolnik, 2001
- Schilit, 1999
- Wearden, 1998b

1.10. Long Battery Life (particularly applies to hardware devices)
- Bellaver & Gillette, 2002
- Gibbons, 2001a
- Messing, 1995

1.11. Contains embedded help, instruction and troubleshooting
- Bellaver & Gillette, 2002
- CDL, 2001
- Henke, 1998

2. Read and Understand the Text

2.1 Intratextual searchability
- Bellaver & Gillette, 2002
- Gelfand, 2002
- Henke, 2002
- Wilson, et al., 2002
- CDL, 2001
- Henke, 2001
- Knowledge Systems & Research, 2001
- Summerfield, 1999
- Schilit, 1999
- Schilit, et al., 1999
- Henke, 1998
- Wearden, 1998b

2.2 Intratextual browsability (hyperlinked TOC, index, list of illustrations, etc.)
- Bellaver & Gillette, 2002
- Gelfand, 2002
- Henke, 2002
- Wilson, 2001
- Wilson, et al., 2002
- CDL, 2001
- Schcolnik, 2001
- Landoni, et al., 2000
- Henke, 1999
2.3 Easy to Navigate/Sense of Place (sufficiently marked up and structure so sense of content and placement can be acquired; thickness indicator)

- Bellaver & Gillette, 2002
- Henke, 2002
- Morrill, 2002
- Wilson, 2002
- Wilson, et al., 2002
- Henke, 2001
- Schcolnik, 2001
- Selvidge, et al., 2001
- Landoni, et al., 2000
- Schilit, et al., 1999
- Wearden, 1998b
- O'Hara & Sellen, 1997

2.4 Header information displayed on screen (book title, chapter title, page number, etc.)

- Henke, 2002
- Wilson, 2002
- Henke, 2001
- Henke, 1999
- Schcolnik, 2001
- Selvidge, et al., 2001
- Selvidge & Philips, 2000
- Wearden, 1998b

2.5 Printed and electronic version are identical (same pagination, same page layout, etc.)

- CDL, 2001

2.6 Embedded reference tools

- Bellaver & Gillette, 2002
- Gelfand, 2002
- Henke, 2002
- Wilson, et al., 2002
- Henke, 2001
- Schcolnik, 2001
- Simon, 2001
- Schilit, 1999
- Schilit, et al., 1999
- Wearden, 1998b

3. Make the e-text richer than the typical printed book

3.1 Include multimedia (audio, video, 3D modeling, etc.)

- Gelfand, 2002
- Henke, 2002
- Wilson, 2002
- Henke, 2001
- Schlit, 1999
- Summerfield, 1999
- Wearden, 1998b

3.2 Supports text-to-speech

- Henke, 2002
- Hill, 2001
| 3.3 Links to data set upon which research has been conducted | Summerfield, 1999 |
| 3.4 Personalized recommendations (based on what you are reading and have read, suggest other readings) | Henke, 2002  
Schilit, 1999 |
| 3.5 Inclusion of forms (order a paper copy of the book, obtain permission to copy/quote, comment forms, etc.) | Henke, 2002  
Henke, 2001  
Summerfield, 1999 |
| 3.6 Connect to bulletin boards/chat rooms to discuss text with others | Henke, 2002  
Henke, 2001 |
| **4. Place the test in one or more contexts** | |
| 4.1 Provide contextual information (bio of author, etc.) | CDL, 2001 |
| 4.2 Linkable to other e-books and e-content (e.g. use DOI to make references hotlinks; link to book reviews, etc.) | Henke, 2002  
CDL, 2001  
Henke, 2001  
Wearden, 1998  
Marshall, et al., 1999  
Schilit, 1999  
Schilit, et al. 1999  
Summerfield, 1999 |
| 4.3 Intertextual searchability (search across many e-books) | Wilson, et al., 2002  
CDL, 2001  
Summerfield, 1999  
Schilit, 1999 |
| 4.4 E-Bookshelves (ability to organize a collection of e-books) | Henke, 2002 |
| **5. Possess, modify and expand the text** | |
| 5.1 Annotations and other mark ups (including the exporting of them; index of user notations, etc.) | Bellaver & Gillette, 2002  
Gelfand, 2002  
Henke, 2002  
Marshall & Brush, 2002  
Marshall & Ruotolo, 2002  
Wilson, et al., 2002  
CDL, 2001  
Gibbons, 2001b  
Henke, 2001  
Schcolnik, 2001  
Selvidge, et al., 2001  
Simon, 2001  
Landoni, et al., 2000  
Henke, 1999  
Marshall, et al., 1999  
Schilit, 1999  
Schilit, et al., 1999  
Summerfield, 1999 |
| 5.2 Bookmarking          | Bellaver & Gillette, 2002 | Henke, 2002 |
|                         | CDL, 2001                 |              |
|                         | Schcolnik, 2001           |              |
|                         | Simon, 2001               |              |
|                         | Landoni, et al., 2000     |              |
|                         | Henke, 1999               |              |
|                         | Schilit, et al., 1999     |              |
|                         | Summerfield, 1999         |              |

| 5.3 Printing           | Henke, 2002               | Gibbons, 2001b |
|                       | CDL, 2001                 |              |
|                       | Summerfield, et al., 2000 |              |
|                       | Henke, 1999               |              |
|                       | Schilit, 1999             |              |
|                       | Summerfield, 1999         |              |
|                       | Henke, 1998               |              |
|                       | Messing, 1995             |              |

| 5.4 Cut and paste      | Henke, 2002               | Schilit, 1999 |
|                       | CDL, 2001                 |              |
|                       | Schilit, 1999             |              |
|                       | Summerfield, 1999         |              |
|                       | Messing, 1995             |              |

| 5.5 Electronic updates (erratum, etc.) | Henke, 2002 | Schilit, 1999 |

### 6. Library-Related Functionalities

| 6.1 Ability to loan e-books (technical functionality, distinct from policy) | CDL, 2001 |
|                                                                         | Gibbons, 2001a |

| 6.2 Circulation & Discovery(integrates with existing library checkout systems--don't need a parallel system, provides MARC records) | CDL, 2001 | Dillon, 2001 |
|                                                                                                                                   | Gibbons, 2001a |
|                                                                                                                                   | Gibbons, 2001b |
|                                                                                                                                   | Summerfield, 1999 |

| 6.3 Easily scrubbable (return e-text to pristine state by removing all user markings) | Schcolnik, 2001 |

| 6.4 Preserves the privacy and confidentiality of individual users | |

| 6.5 Provides a variety of aggregated usage statistics | CDL, 2001 | Gibbons, 2001b |
| 6.6 Downloadable to hardware device of patron's choice (non-proprietary formats, interoperability, etc.) | Gelfand, 2002  
CDL, 2001  
Morrill, 2002  
Dillon, 2001  
Hill, 2001  
Knowledge Systems & Research, 2001  
Wearden, 1998b |
| 6.7 Contains a title page with full bibliographic content |  |
| 6.8 Segmentable | Summerfield, 1999 |

**7. Legal and Contractual Functionalities**

7.1 Ability to engage in Fair Use activities related to an e-text

7.2 Ability to engage in Right of First Sale activities related to an e-text  
Henke, 2002
Section 5: Summaries of E-Book Functionality Findings by Study  
(alphabetical by reference notation)

Cross-Referencing Notation: [Baker, et al., 2002]
Title: Reading online news: a comparison of three presentation formats
Author(s): Ryan Baker, Michael Bernard and Shannon Riley
URL: http://psychology.wichita.edu/surl/usabilitynews/42/depth.htm
Abstract: This study addressed the question of how information should be presented within a news-style web page. For example, should all the information related to a single article be presented on one page, or should the newsletter contain a page that lists only the link titles that relate to each specific article, and which is presented on another page? Moreover, if the newsletter presents initial information in the form of link titles, should they present supplementary information that provides a general overview of the entire article, along with the link title?

Functionality Notes (S. Gibbons):
21 participants, ages 18 to 47 read content from the New York Times website on a 17” monitor with resolution of 1024 x 768 in 3 formats: full text, link titles plus abstracts and link titles only. The full text consisted of 12 full articles in two columns on one long page. The summary screen had the 12 titles plus two to three sentence summary presented in 2 columns one long page. The title only screen had just the 12 titles as links on a single page in two columns. Participants were asked to search for information using all three formats.

Results:
- Task completion time: although no significant differences, the mean time for the summary format was the lowest.
- Perception of ease of finding info: participants perceived summary format to be the easiest to find info
- Perception of best format for comprehension: participants perceived summary format to the most conducive to comprehension
- Satisfaction with site: most satisfied with summary format
- Looks profession: summary format perceived to be most professional-looking
- Layout preference: 4 participants selected the full layout; 15 selected summary and 2 selected links.

Overall, although no significant differences in search time, the summary format was perceived most favorably by participants. Full condition was least preferred.
Abstract: Testing on “learning” and usability of electronic books (eBooks) for college students took place during the Spring Semester 2002 at Ball State University. Graduate students used a textbook and also conducted other environmental and human factors tests on two versions of eBooks. Results indicate that “learning”, evaluated through taking quizzes, was not affected by using eBooks. Students were not impressed with the use of the eBooks primarily because a poor representation of the text was converted. It appears that if the full capability of the current eBooks was utilized, they could be a viable and acceptable storage medium for college textbooks. The article also defines further testing to be conducted.

Functionality Notes (R. Bryan):

• Text was specially prepared for this study, with no pictures/diagrams included, and B&W text used on all units
• Little difference in quiz results in eBook users (mean average score 29) vs. non-eBook users (mean average(s) 28.9/28.5)

Results

• User manual
  • Color unit (REB 1200) manual more difficult
  • Overall manual considered "straightforward", but many found ""too complex"
  • Neutral opinion about helpfulness of manual

• Climate/environment
  • Extreme heat and cold have a significant imapct on performance of eBooks. Some heat can be positive, cold and pressure are very negative factors
  • Units reliable under normal use

• Navigation
  • eBooks shown NOT to be easier, or just as easy, to use than textbooks
  • Findings imply user expectations based on familiarity (use of regular textbooks)
  • Functions considered most difficult were:
    • Reviewing previously read passage
    • Finding a chapter*
    • Returning to important page (bookmark)*
    • Finding appendices*
    (*Found to be serious issues with color (1200) unit)

• Features of REB1100 (B&W)
  • Perceived usefulness of unit not dependent on actual usefulness of features
  • Considered useful and easy: backlight, contrast, date and time, font size, and modem settings
Considered difficult were: book-marking, word lookup, and search. Most found that "important" features were difficult or did not offer enough options.

Features of REB 1200 (Color)
- Useful and easy to use: highlighting, book-marking, word search, note taking, erasing, adjusting brightness and contrast, adjusting fonts.
- The harder a feature is to use, the less often it is used.
- Highlighting and battery life were considered useful.
- 7 of 12 features deemed "somewhat useful" or "not useful".

Downloading material to eBook
- Overall opinion was that the process was not intuitive.

Overall Usability
- Tedious tasks: moving from page to page, finding a specific chapter or specific word.
- Issues with size of reading area, irregularly shaped screens and glare.
- Users overall preferred paper textbook.

Recommendations to improve usability

Menu
- Make the menu selections more descriptive of the tasks they perform.
- Redesign the eBook menu system to clearly delineate where to download existing eBook material vs. newly purchased eBook material.
- Place a PowerPoint like button sticker on the cover of new eBooks to facilitate simple, initial use.
- Change the menu term ‘lookup’ to ‘dictionary’ or ‘define’ on the B&W.

User Manual
- Provide a paper version of the user manual that covers all possible tasks in detail.
- Create shortcut button to manual for easy access.

Functionality
- Provide ability to page up or down more than one page at a time.
- Label icons clearly and specifically.
- Provide more font sizes.
- Incorporate a drag and drop option for the book marking feature.
- Incorporate a spelling help feature onto the word search function.
- Implement page numbers instead of percentage of text on the B&W.
- Ensure page numbers remain constant regardless of the font size or text orientation.

Physical Specifications
- Increase screen size to 6” x 8.5” for easier readability.

Conclusions
- Although 100% of B&W users and 50% if Color users would not recommend eBook use to others, the authors felt that results were influenced heavily by poorly converted text, and that eBook devices have potential for use by college students.
- Further research with data converted to take better advantage of the eBook platforms.
is planned

- Further details of the findings of this study are available from authors.
Cross-Referencing Notation: [Bernard, et al., 2001a]
Title: Determining the Best Online Font for Older Adults
Author(s): Michael Bernard, Corrina Liao and Melissa Mills
URL: http://psychology.wichita.edu/surl/usabilitynews/3W/fontSR.htm
Abstract: This study sought to examine older adult online reading by studying the legibility, reading time, as well as the general font preference for two types of serif (Georgia and Times) and sans serif (Arial and Verdana) fonts at 12- and 14-point sizes.

Functionality Notes (S. Gibbons):
Legibility, reading time and general font preference of 27 adults between the ages of 62 and 83 were studied. Serif fonts (Georgia and Times) and sans serif (Arial and Verdana) in both 12- and 14-point were used. The participants read passages in all 8 font types and sizes on a computer screen with horizontal margins set at 640 pixels with black text on white background. 10 randomly placed substitution words were inserted into the text to test reading accuracy.

Results:
- font legibility- 14-point significantly great reading efficiency than 12-point
- reading time- 14-point serif was quickest to read, followed by 14-point sans serif, 12-point sans serif and 12-point serif.
- Perception of font legibility- 14-point was perceived to be significantly more legible than 12-point
- Font preference- 14-point sans serif fonts were significantly preferred to all serif and sans serif 12-point fonts.

The study recommends the use of 14-point fonts for presenting online text to older readers. If speed of reading is most important, then serif is recommended. If font preference is important, than sans serif is recommended.
Cross-Referencing Notation: [Bernard, et al., 2001b]

Title: Which fonts do children prefer to read online?

Author(s): Michael Bernard, Melissa Mills, Talissa Frank & Jan McKown


URL: http://psychology.wichita.edu/surl/usabilitynews/3W/fontJR.htm

Abstract: This study sought to examine four types of fonts at 12- and 14-point size to help determine the font combination that is perceived as most readable on computer screens and most preferred by children.

Functionality Notes (S. Gibbons):

27 participants between the ages of 9 to 11 years participated in an experiment to study font preference for online reading among children. Texts were read on a 17” monitor with resolution of 1024 x 768 in both 12- and 14-point size in Times, Courier, Arial and Comic Sans MS. To test accuracy of reading, 10 substitution words were randomly placed within the text and participants were asked to identify them.

Results:

- Perceptions of font ease of reading- 14-point font was favored over 12-point. Arial and Comic were found to be easier to read than Times and Courier
- Perceptions of reading faster- font type was not found to be a factor, but 14-point size was found to be faster to read than 12-point
- Perceptions of font attractiveness- 14-point font was perceived to be more attractive than 12-point. Times font was perceived to be significantly less attractive than Comic.
- Desired font type and size for schoolbooks- 14-point Comic was the most desired font type and size for schoolbooks

Studies conclusions were that 14-point was considered the quickest and easiest to read for children. Comic font type was perceived as being easier to read and more attractive than the other font sizes.
Cross-Referencing Notation: [Bernard, et al., 2001c]

Title: A comparison of popular online fonts: which is best and when?

Author(s): Michael Bernard, Melissa Mills, Michelle Peterson & Kelsey Storrer


URL: [http://psychology.wichita.edu/surl/usabilitynews/3S/font.htm](http://psychology.wichita.edu/surl/usabilitynews/3S/font.htm)

Abstract: This study examined the most popular font types at 12-point size (the size used by a majority of websites) for differences in effective reading speed, as well as perception of font legibility.

Functionality Notes (S. Gibbons):
The study consisted of 22 participants, ages 20 to 44, that read text in 12 font types (Agency FB, Arial, Comic Sans MS, Tahoma, Verdana, Courier, Georgia, Goudy Old Style, Century Schoolbook, Times, Bradley, and Corsiva) on 17” monitors with resolution setting of 1024 x 768. To ensure accuracy of reading, 15 randomly placed substitution words were placed into each text and participants were asked to identify them.

Results:
- Font legibility by means of reading efficiency- no significant font type effects
- Reading time- relatively small differences between reading speeds, with the largest difference (40 seconds) between Tahoma (quickest) and Corsiva (slowest)
- Perceived font legibility- significant differences in perceptions of font legibility. Courier, Comic, Verdana, Georgia and Times were perceived significantly more legible than Agency, Goudy, Bradley and Corsiva.
- Font personality types conveyed- Times has significantly lower perception of personality than Comic, Bradley and Corsiva
- Elegant font type- Corsiva and Bradley were found to be considered the more elegant font types
- Youthful & fun font types- Comic was found to be perceived most youthful and fun
- Business-like font types- Times and Courier were perceived most business-like in appearance
- Font preference- by examining 1st and 2nd choices, Verdana, Comic and Arial were found to be most preferred. Agency was least preferred, followed by Corsiva, Bradley, Times, Goudy and Courier.
Cross-Referencing Notation: [Bernard, et al., 2002a]

Title: A comparison of popular online fonts; why size and type is best?

Author(s): Michael Bernard, Bonnie Lida, Shannon Riley, Telia Hackler and Karen Janzen


URL: http://psychology.wichita.edu/surl/usabilitynews/41/onlinetext.htm

Abstract: Study of on screen reading by comparing 8 font types at 10-, 12- and 14-point sizes.

Functionality Notes (S. Gibbons):
60 participants ranging in age from 18 to 55 read texts in 8 font types (Schoolbook, Courier, Georgia, Times, Arial, Comic, Tahoma and Verdana) and in 3 sizes (10-, 12- and 14-point) on a 17” monitor with resolution of 1024 x 768.

Results:
- Reading efficiency- no significant differences in font type or size.
- Reading time- reading time (irrespective of their accuracy) had significant differences in type and size. Time and Arial were read significantly faster than Courier, Schoolbook and Georgia. 10-point size fonts were read significantly slower than 12-point font size.
- Perceived legibility- At 14-point size, only Arial was significantly perceived as being more legible than fonts at other sizes. “It is thus possible that, in general, increasing text size does not add to perceived legibility of fonts (at least at these sizes).” Overall, Arial and Courier were found to be most legible and Comic least.
- Perceived attractiveness- Times and Georgia were considered attractive—perhaps because of their widespread use.
- Font preference- Verdana was the most preferred and Times the least preferred at 10-point size. At 12-point size, Arial was the most preferred and Times was the least. At 14-point size, Comic was the more preferred and Times was the least.

Overall, Times was the least preferred font and Verdana was the most preferred. “Of the fonts studied, Verdana appears to be the best overall font choice. Besides being the most preferred, it was read fairly quickly and was perceived as being legible.”
Cross-Referencing Notation: [Bernard, et al., 2002b]
Title: The effects of line length on children and adults’ online reading performance
Author(s): Michael Bernard, Marissa Fernandez and Spring Hull
URL: [http://psychology.wichita.edu/surl/usabilitynews/42/text_length.htm](http://psychology.wichita.edu/surl/usabilitynews/42/text_length.htm)

Abstract: The purpose of this study was to examine the effects of line length on online reading performance by both adults and children. Unfortunately, little research has been conducted investigating line length and online reading with respect to both actual and perceived reading efficiency, as well as preference; and, to date, no research has included children in its investigation.

Functionality Notes (S. Gibbons):
40 participants (20 adults ages 18 to 61 and 20 children ages 9 to 12) participated in a study to determine the effects of line length on online reading performance. Texts were read on a 17” monitor with 1024 x 768 resolution in 3 formats: full-length (930 pixels wide); medium-length (550 pixels wide) and narrow-length (330 pixels). The narrower the passage, the more scrolling necessary. To test accuracy in reading, 15 randomly placed substitution words were placed in the text and participants were asked to locate them.

Results:
- Reading time and effectiveness: no significant differences in reading time for each length. “It is possible that the benefits of reduced scrolling for wider condition was offset by its increased line length and, thus, negating any positive effects due to the decrease in its line length.” No significant differences in reading accuracy.
- Adults’ perceptions of reading efficiency: full-length format was perceived as being more optimal than medium- and narrow- length. Narrow-length was perceived as promoting easier concentration. Medium-length was perceived to be the most optimally presented
- Childrens’ perceptions of reading efficiency- No significant perceived differences between any of the line-length formats.
- General preference- first-choice preferences show that medium-length was most preferred by adults and narrow-length was most preferred by children.
Cross-Referencing Notation: [CDL, 2001]
Title: Report: California Digital Library Joint Steering Committee for Shared Collections Ebook Task Force
Author(s): Karen Coyle, Mary Engle, Anna Gold, Rosalie Lack, Lucia Snowhill, Milt Ternberg
Publication: March 17, 2001
URL: [http://www.cdlib.org/libstaff/sharedcoll/jsc/ebook/charge.html](http://www.cdlib.org/libstaff/sharedcoll/jsc/ebook/charge.html)

Abstract: The charge to the Task Force was as follows: 1) Define operating guidelines and desirable features that will make ebooks most useful for instruction and research in the University of California. 2) Evaluate the ongoing experiences at UC campuses (specifically at UCB and UCSD and their netLibrary experiments). 3) Examine other academic library ebook experiments (other institutions, other content providers). 4) Identify potential University-wide or multi-campus strategies that should be pursued or explored further.

Functionality Notes (S. Gibbons):
Report outlines many of the current barriers to ebook adoption in academic libraries. These include the lack of standards to ensure interoperability, the limit of “first sale” rights by DRMs and the integration of ebooks into libraries’ current access and discovery systems.

Appendix F outlines the following features as ideal of ebooks for libraries:
- Portable format- not hardware specific; able to use the text in other applications; versatility of access options (online, download to computer/handheld, dedicated reader, etc.)
- Technology/Interface- no bandwidth issues; not required to be connected to Internet at all times during usage; ADA compliant; complete and helpful documentation; interface adheres to usability heuristics
- Content- should be “true to the original”; include all charts, figures, illustrations with color; display pages with original page numbering
- Navigation tools- Table of Contents and Index hyperlinked to text; page forward and back feature; “Jump to” feature; browse capability
- Delivery options- download; email
- Usage functions- print (variety of print options and at high quality); copy to clipboard
- Tools/services- advanced searching; search results (with highlighted terms found in context); bookmarking; highlighting; annotations tools (post-it notes); zooming in on text and pictures; increase font size; interactive dictionary and thesaurus; produces citations and bibliography in user’s format choice; remembers last page and returns reader to that spot
- Links to associated info- author bio; book reviews; citation indexes; other works by authors; cited courses
- Library system requirements- integration with local system (link from OPAC to ebooks; provide MARC records; complete and easily accessible usage statistics.
Cross-Referencing Notation: [Dearnley & McKnight, 2001]

Author: James Dearnley and Cliff McKnight

Title: The revolution starts next week: the findings of two studies concerning electronic books

Publication: Information Services and Use, 21 (2001), pp. 65-78

Abstract: This paper reports on two pilot studies undertaken in May and December 2000 at Loughborough University and Market Harborough public library. The first study was conducted at Loughborough University in May 2000. It considered student and staff evaluation of two electronic reader products – NuvoMedia’s Rocket eBook and Glassbook Inc.’s Glassbook. A second study conducted in December 2000 used a focus group at Market Harborough public library to consider potential usage of the Rocket eBook for lending services.

Functionality Notes (S. Gibbons):
Two studies were conducted in 2000. The first, at Loughborough University, considered staff and student evaluations of Rocket eBook and Glassbook. The 2nd was a focus group at Market Harborough Public Library that considered potential library uses of Rocket eBook devices. Overall, although the participants were generally in favor of the ebook concept, they did not like reading with the ebook technology presented to them. The Rocket ebook device was preferred over the Glassbook software, largely because the Glassbook texts had to be read on the computer monitor of a desktop. The Rocket ebook device was found to be too heavy and complaints were made about the limited about of text on the screen. Some commented that they were unable to become immersed in the reading because they were always conscious that they were reading off of a screen.
Cross-Referencing Notation: [Dillon, 2001]

Author: Dennis Dillon
Title: E-books: the University of Texas Experience, part 1

Abstract: This article describes the e-book program of the University of Texas, surveys the state of the e-book market and e-book technology, provides e-book usage statistics for three different consortia, and offers guidelines for e-book acquisitions, as well as e-books issues to be considered.

Functionality Notes (S. Gibbons):
Dillon reports on the early experiences with ebooks (netLibrary and ITKnowledge) at the University of Texas at Austin. He reports the following stumbling blocks to the use of ebooks at the libraries:

- Collection development- limited knowledge to support bibliographers in identifying which types of books users may want in the ebook format
- Discovery mechanisms- can be difficult to obtain and load MARC records into a library catalog
- Interoperability- libraries should stick with non-proprietary formats to ensure that their patrons would have the most options as to how to access and read ebooks

Dillon suggests the following principles for libraries’ adoption of ebooks:

- No proprietary hardware or software should be required to read or access the ebook
- ebooks should be able to be integrated with other electronic content within a single window and cross-linked
- ebooks should be persistent in both content and network accessibility
- ebooks should be user-friendly and not require special knowledge or skills for use
- ebooks should be library-friendly and not require unusually local authorization procedures, configurations, client or excessive disruptions to existing technology infrastructures
- ebooks should be able to be read both offline and online

Ebooks should have value-added features for supporting readers with disabilities (enlarged fonts, read via special devices or text-to-speech); supporting data-mining (searching) and providing an alternative to carrying around many or bulky paper-based texts.
Cross-Referencing Notation: [Dyson & Kipping, 1998]

Title: Exploring the Effect of Layout on Reading from Screen
Author(s): Mary C. Dyson and Gary J. Kipping
Publication: Lecture Notes in Computer Science, 1375

Abstract: This paper briefly examines the nature of information available to people designing for the screen and proposes that applied research into factors that affect the legibility of text on screen is required. Comparisons of reading from paper and screen do not identify the optimal typographic conditions for reading from screen, and it may be more fruitful to abandon such comparisons. A series of experiments that investigate the effect of typographic layout on reading from screen are summarized. The description aims to be accessible to practitioners and therefore to provide a basis for informed design decisions. The inappropriateness of formulating simple guidelines is illustrated by the results of these experiments. Peoples' subjective views of what are the easiest layouts to read are not those read fastest.

Functionality Notes (S. Gibbons):
Three experiments were conducted to determine how the amount of text displayed on screen and movement through text (scrolling or paging) impacted reading comprehension and speed. Comprehension was determined by the number of correct answers given in response to questions about the content of the text. Participants were also asked their views and opinions about ease of reading. All text was read in Arial 10 point on 12 point interlinear spacing on a Compaq Prolinea 575 computer with a Sony Multiscan 15sf color monitor.

Experiment 1: 48 subjects read six documents of at least 800 words with 6 different line widths (25, 40, 55, 70, 85 and 100 characters). Half navigated through the text by scrolling and half by paging. The experiment found that the text with the widest line widths (100 characters) was read faster than all other line widths. In addition, those scrolling read faster than those paging through the text.

Experiment 2: This experiment compared single and multi-column layouts to test the suitability of magazine-type layout for online reading. 18 subjects read three document formats: single column with scrolling, single column with pagination and three columns with pagination. A single column page was read significantly faster than either the one column page with scrolling or the three-column page, but there were no differences in comprehension.

Experiment 3: This experiment tested the impact of the volume of text by changing the window height. 24 subjects read six documents of about 700 words displayed in windows containing 15, 25 and 35 lines. The line length was fixed at 55 characters per line. Half of the documents were scrolled and half were paged. The results found no significant reading rate or comprehension differences between window heights.
Cross-Referencing Notation: [EBONI, 2002]

Title: EBONI Electronic Textbook Design Guidelines

Author(s): Ruth Wilson and Monica Landoni

Publication: published in .pdf, .doc and .html on 3/23/02

URL: http://ebooks.strath.ac.uk/eboni/guidelines/index.html

Abstract: Based on a series of several experiments that studied design and usability issues of textbook presented on the Web, the EBONI (Electronic Books ON-screen Interface) project presents a series of 22 guidelines for the design of electronic textbooks.

Functionality Notes (S. Gibbons):
The purpose of the EBONI Electronic Textbook Design Guidelines is to “provide advice on preparing material for a specific audience of academics and students in Higher Education, and incorporate this audience’s special requirements.” Although the guidelines are specifically directed towards books published on the Web, many of them can be applied to the design of ebook software, hardware and services.

Guidelines were the result of evaluations of ebooks involving over 100 students, faculty and researchers in UK Higher Education. These experiments included:

- WEB book experiment (see Landoni, et al., 2000)
- Evaluation of three textbooks in psychology published on the Web
- Evaluation of Hypertext in Context (McKnight, Dillon & Richardson) in 3 formats: print, and two electronic versions
- Comparison of three electronic encyclopedias: Encyclopedia Britannica, The Columbia Encyclopaedia, and Encarta
- Comparison of a geography title (New Frontiers of Space, Body and Gender) in 3 formats: MobiPocket Reader, Adobe Acrobat Ebook Reader and Microsoft Reader
- Study of usability issues of portable ebook devices (HP Jornada with Microsoft Reader, Franklin’s eBookMan, PalmPilot with PalmReader, Rocket eBook and SoftBook)

The following guidelines address two main factors affecting ebook interface design: 1) on-screen appearance of information (guidelines 1-15) and 2) look and feel of ebook hardware (guidelines 16-22).

1. Cover your book: inclusion of textbook cover adds enjoyment, reinforces perception of a cohesive unit and provides a visual cue when returning to the book. Book cover of the paper version should be used when available; otherwise a cover should be designed. All book covers should include author and title and a link to the table of contents.

2. Include a table of contents: do not replace the table of contents and index with a search engine. Readers skim the TOC to get a feel for the content of the book and to obtain a sense of the book’s structure. Very useful feature is to create hyperlinks between TOC and chapters/sections.

3. Include an index: As with TOC, the index assist in locating information within the book, as well as give a sense of the book’s content. Index should be hyperlinked into the text and made prominent.

4. Provide a search tool: supplement TOC and index with a search tool. Include simple and advanced search options.
5. Treat book as a closed environment: book should contain no links to external sources, unless clearly labeled. Assists user to understand the book as a single, complete unit, avoid confusion about what is and is not part of the book and prevents reader from getting lost.

6. Use hypertext to enhance navigation and facilitate cross-referencing: incorporate hypertext between structural elements (i.e. TOC, index, endnotes). Provide a very clear navigation system. Separate glossary and references from main text. Guidelines also recommend creating TOCs for each chapter, using standard link colors, using only easy-to-interpret icons and not to rely on the functionality of the browser (such as back and forward buttons).

7. Design typographical aspects carefully: keep line length similar to that of printed page. Left-justify paragraphs and provide plenty of white space to keep from looking cluttered.

8. Use short pages: Strike balance between pages so long that lots of scrolling is needed and pages too short that there is constant page turning. Suggest using page lengths similar to paper pages. Also recommend links between pages.

9. Provide content clues: provide content summaries (such as abstracts, keywords, TOC) at the top of each page.

10. Provide orientation clues: provide indication of place within the book with page numbers and thickness indicators. These should be very visible and accurate.

11. Choose a readable font: fonts need to be large enough for long-term, comfortable reading. If possible, let users determine the font style and size themselves. Use sans serif for small text, a text color that stands out from background and avoid italics.

12. Use color to create a consistent style and aid scannability: carefully use a few color and keep meaning of colors consistent. Use plain backgrounds, but avoid “pure white” as it can cause eyestrain.

13. Break text into short chunks: break text into short chunks to improve scannability. This can be done by including meaningful sub-headings, indentation, bulleted lists, color and interspersing diagrams

14. Use non-text items with care: intersperse text with non-text items, such as pictures and diagrams. Use only high quality, clear images. Center non-text items so they stand out from text and provide means by which larger, more detailed versions can be opened in a separate window

15. Use multimedia and interactive elements to engage users: users perceive the incorporate of multimedia as a main advantage of electronic medium. This can include audio, video, interactive quizzes. Provide textual equivalents so important information is not lost behind a multimedia element.

16. Provide bookmarking, highlighting and annotating functions: ebook systems should include bookmarking, highlighting and annotation functions, but they must be power and simple to use.

17. Enable customization: readers appreciate ability to customize the text. This can include changing font size, style and color. Customizable settings should be savable for future use.

18. Employ high quality display technology: Display technology should have high resolution, high contract, backlighting and color displays.

19. Balance lightness and portability against legibility: need to balance weight, portability and ergonomics of device with the need to have legible screens of decent size.
20. Design devices for comfort: devices should be easily held in one hand and the use of a stylus kept to a minimum
21. Use buttons and dials to improve page turning: carefully design the physical navigation buttons and dials. Users found page turning easier with a dial than buttons. If buttons are used, they should be large and very intuitive
22. Make devices robust: ensure devices are durable enough to be used in a wide range of situations and environments. Consider including a hard cover and rubber edges.
Cross-Referencing Notation: [Gelfand, 2002]

Author: Julia Gelfand
Title: User Input: Experiences in Assigned Reading from E-Books: One netLibrary Experience

Abstract: The University of California, Irvine conducted a one-year trial with netLibrary. As part of this trial, an undergraduate class was required to read a title within the netLibrary collection. 14 of the 17 students in the class submitted essays about the experience.

Functionality Notes (S. Gibbons):
After reading a text within a netLibrary collection for a class’ required assignment, 14 students submitted essays about the experience. Students expressed a discomfort about reading an entire text online. Student also struggled with access issues—students did not have high-speed access from home; they wanted to study off-line, such as at coffee shops; they did not want to carry their laptops around (connectivity problems, theft) and digital divide issues. Reading on computers was found to be very distracting because of incoming emails, games, instant messaging, etc. Several student experience eyestrain from extensive reading on the computer screens. Students indicated that they did not like scrolling and would have preferred a complete page of text on the screen.

Students appreciated the built-in dictionary, searching and multimedia options. They found the netLibrary interface to be very intuitive and liked the hyperlinks between table of contents and index into the text. Students were frustrated that the netLibrary Reader was only compatible with Windows platforms.

Students offered the following recommendations:
- make system available cross-platform, including WebTV and PDAs
- maintain the dictionary, searching and FAQs
- improve connectivity so that there isn’t a significant delay when turning pages.
Abstract: Many of those libraries that wish to include ebooks in their collections are hesitating, in part because of a number of assumptions concerning the reactions of patrons to this new technology. For instance, there is a general assumption that patrons would be dissatisfied with the low resolution of the ebook readers and the lack of color and pictures. Or, the fragile nature of the reader apparatus would lead to many damaged devices. Or, when given the option, people simply would rather read from the traditional ink-on-paper format than on the small screen of an ebook reader. Several libraries in the Rochester, New York, area were provided the opportunity to text these assumptions and discovered that, in many cases, these assumptions were not supported by the results.

Functionality Notes (S. Gibbons):
Rocket eBook and Softbook devices were circulated at public, academic and school libraries in the Rochester, NY region. Surveys and focus groups were conducted with patrons and barriers to library use were documented. Overall patrons enjoyed reading on the devices (when asked in what format they wanted to read their next book, 35% said ebook and 23% said no preference). Patrons particularly liked the following features:

- Backlighting
- Adjustable fonts
- Ability to carry numerous titles on a single device

However, patrons cited the following as features they did not like:

- Devices are too heavy and/or awkward
- Battery life insufficient

Librarians were very frustrated by the experience. Most libraries, particularly public and school, do not have credit cards for purchases, therefore, it was not possible or easy to purchase ebook titles with purchase orders. It is very difficult to register the devices as an institution, rather than an individual. Also, downloading is done over analog phone lines, when most institutions have digital phone lines. Cataloging is extremely difficult because of the fact that ebook titles are tied to the devices.
Cross-Referencing Notation: [Gibbons, 2001b]

Title: netLibrary eBook Usage at the University of Rochester Libraries

Author(s): Susan Gibbons

Publication: September 2001

URL: [http://www.library.rochester.edu/main/ebooks/studies/analysis.pdf](http://www.library.rochester.edu/main/ebooks/studies/analysis.pdf)

Abstract: Two studies were conducted over the Spring 2001 (January – May) semester regarding the use of netLibrary ebook titles at the University of Rochester. The first was to examine the use of the overall netLibrary ebook collection and compare that to the use of the paper editions of those same titles. The second study focused on the use of ebooks for course reserves.

Functionality Notes (S. Gibbons):

The first of two studies examined the use of a 3,613-title netLibrary collection to which the University of Rochester Libraries shares ownership with sixty-two other libraries within New York state. The study found that once the MARC records for the collection were loaded into the Libraries’ online catalog, use of the collection went up by 755%.

The study found that the types of usage statistics provided by netLibrary were inadequate to fully understand how patrons were using the netLibrary ebook titles and to assess the value of the collection. The study recommends that usage data include duration of access, number of unique patron accesses, number of unique pages viewed and the type of search that led the patron to the title.

Although the IT titles within the collection were heavily used, netLibrary’s pricing and usage models do not make IT titles attractive to libraries. Libraries struggle with IT collections because they cannot keep enough copies of the titles on the bookshelves, but because the editions become obsolete so quickly, purchasing several copies of a title cannot often be justified. The ideal IT ebook collection would support multiple, simultaneous users and include new editions of the titles as published, neither of which netLibrary currently supports.

63% of users had difficulties using netLibrary. This was due, in part, to frequent browser crashes, slow loading time, inappropriate copyright violation notices and difficulties navigating through the text. 29% reported reading large portions of the text, while the majority just browsed or read short passages.

In the second study, the focus was on a small collection of 17 ebook monographs on reserves for ten courses. The ebook versions were used 3 to 1 over the same titles in paper. The students were generally split about their stated preference for reading material in ebook or paper format. Those who preferred paper did so because:

- of the need for having a personal copy in class for quick reference
- no eye strain from reading on a computer screen
- did not require ownership of a computer and fast Internet connection
- the ability to highlight and annotate the texts.

Those who preferred the ebook format often cited the benefits of remote access.
The study concluded that the ideal ebook system for course reserves would be one that would allow for simultaneous users or had a pricing model that would permit multiple copies to be rented for the semester. In addition, printing must be possible to allow students to have a personal copy that they could annotate and take to class.
Cross-Referencing Notation: [Henke, 1998]

Title: Are electrons better than papyrus? (Or can Adobe Acrobat Reader files replace hardcopy?)

Author(s): Harold Henke

Publication: Proceedings of the 16th annual international conference on Computer documentation, pp. 29-37

Abstract: In this paper, the author describes the results of a usability test and a usability survey conducted by the IBM Printing Systems Company to determine the effectiveness of softcopy (pdf file) documentation. The usability test was used to determine if users could perform tasks using a softcopy User's Guide from a CD-ROM. The usability survey measured satisfaction of Customer Engineers using a softcopy (pdf file) Service Guide from a CD-ROM.

Functionality Notes (S. Gibbons):
The paper discusses two studies: 1) usability test with five people to determine whether they could perform certain tasks regarding use and installation of a printer, using a User’s Guide in pdf format; 2) usability survey with 73 customer engineers who used a pdf version of a Service Guide to perform maintenance tasks. The pdf files were viewed on a computer screen using Adobe Acrobat Reader, Version 3.0.

In the first study, the users were able to complete all of the tasks using only the online version of the User’s Guide. Satisfaction levels were between “satisfied” and “neutral.” Difficulties were experienced when trying to locate the User Guide itself on the CD-Rom and using Adobe Acrobat Reader’s Find function. The Find function problems were a result of the lack of proximity and Boolean searches and that the label of “Find” was not as intuitive as the label of “Search” would have been. Based on the usability tests, the author makes the following recommendations:

- increase the number of index entries- users scanned the hyperlinked index and then jumped to the related tasks. The hyperlinked index helped users overcome the limitations of the Find function
- consider adding a link to the index at the beginning of the book- since users found the hyperlinked index so useful, a link to it should be made readily available
- include a “How to Use Acrobat Reader” with the ebook

The usability survey found that 75% used the Find function, 85% used the hyperlinked index and 97% used the Table of Contents. Some participants (21%) reported problems viewing illustrations and 45% preferred using the paper copy over the ebook copy of the text. Based on the usability survey, the author makes the following recommendations:

- publish documents in landscape format- landscape format presents more information on a computer screen and lessens the need for scrolling
- improve quality of illustrations- make sure illustrations have been optimized for viewing

Based on these two studies, the author shares the following tips and techniques:

- provide hypertext Table of Contents
- provide hypertext index
- display info in landscape format for complex documents that require users to view chunks of info on one page or screen display
• determine how users will view the info and then display info in landscape or portrait—if going to print, use portrait; if going to be translated (with often causes a 25 to 50% increase in text) use portrait
• use color, but only if mostly viewing online. If printing, use color sparingly as important info could be lost when translated into monochrome print
Cross-Referencing Notation: [Henke, 1999]

Author: Harold Henke
Title: A study of the Use of Book Metaphors in the Design of Electronic Books: A Proposed Topic for the Designing of Electronic Books Workshop
Publication: Designing Electronic Books workshop held in conjunction with the CHI99 Conference, April 28, 1999
URL: [http://www.fxpal.com/ConferencesWorkshops/chi99deb/submissions/henke.htm](http://www.fxpal.com/ConferencesWorkshops/chi99deb/submissions/henke.htm)

Abstract: Research conducted by Henke (1998) has shown that users are dissatisfied with electronic books and the applications used to view them. One reason for user dissatisfaction may be the lack of familiar book metaphors embedded into the electronic books. In Henke’s study, user satisfaction could have been improved had more detailed indexes and table of contents been incorporated in the electronic books as users preferred using hyper-text linked table of content and indexes to find information instead of using a search tool.

Functionality Notes (S. Gibbons):
Henke examined the debate between those who believe that ebooks will be most successfully if they adhere to the paper book metaphor and those who believe that adherence to the paper book metaphor limits the potential of electronic books. At IBM, Henke conducted two surveys in 1998 and 1999 to try to determine “whether the inclusion of book metaphors… improved design and user satisfaction.” In the first survey, users stated that they wanted an ebook that supported online viewing but also permitted the printing of hardcopies. Users wanted various paper book metaphors such as page numbering, table of content and index included in the ebook design. In the second survey, users ranked the 58 ebook design requirements gathered from the first survey. The article includes an incomplete list of the rankings, as follows:

- #2- print range of pages or selected text
- #4- provide detailed table of contents with hypertext links
- #11- provide detailed index with hypertext links
- #15- ability to create bookmarks
- #18- provide page numbers
- #24- provide table of figures with hypertext links
- #33- ability to create annotations

Henke’s conclusion is that users want ebooks to contain navigation devices found in paper books and want to personalize it (with bookmarks and notations) as they do paper books. Therefore, ebooks should adhere to the paper book metaphor.
Cross-Referencing Notation:  [Henke, 2001]
Title:  Electronic Books and ePublishing: A Practical Guide for Authors
Author(s):  Harold Henke
Publication:  London: Springer-Verlag, 2001
URL:  http://www.chartula.com/pebook.htm
Abstract: Research has shown that if an electronic book uses the best features of a paper book then people are more likely to use it. This book shows how to use a paper book metaphor in the design of an eBook and looks at proven and tested new features that can be incorporated to enhance ePublishing.

Functionality Notes (S. Gibbons):
Chapters 1 and 2 outline a brief history of books from papyrus to ebooks and detail some of the early ebook products. Chapter 2 provides a very good summary of some of the major ebook research work through 1999.

Chapter 3 of the book provides data and results from a usability study and survey that focused on how users used e-books and what features were important. These are the same two studies that were reported in the article “Are electronics better than papyrus” [Henke, 1998] so the information will not be repeated here.

Chapter 4 includes the results of an “unscientific survey” that the author conducted at the NIST eBook Conference: Changing the Way We Read. The survey was completed by 17 “experts” who were asked to rank the features they would most want in their own ebooks. The 35 features were ranked as follows by survey participants:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search</td>
<td>100%</td>
</tr>
<tr>
<td>Annotations</td>
<td>85.2%</td>
</tr>
<tr>
<td>Audio</td>
<td>85.2%</td>
</tr>
<tr>
<td>Bookmarks</td>
<td>85.2%</td>
</tr>
<tr>
<td>Chapter headings</td>
<td>85.2%</td>
</tr>
<tr>
<td>Highlight</td>
<td>85.2%</td>
</tr>
<tr>
<td>Division headings</td>
<td>76.4%</td>
</tr>
<tr>
<td>Glossary</td>
<td>76.4%</td>
</tr>
<tr>
<td>Index</td>
<td>76.4%</td>
</tr>
<tr>
<td>External links</td>
<td>55.8%</td>
</tr>
<tr>
<td>Figure captions</td>
<td>55.8%</td>
</tr>
<tr>
<td>Footers</td>
<td>55.8%</td>
</tr>
<tr>
<td>Headers</td>
<td>55.8%</td>
</tr>
<tr>
<td>ISBN identifier</td>
<td>55.8%</td>
</tr>
<tr>
<td>Table of contents</td>
<td>55.8%</td>
</tr>
<tr>
<td>Title page</td>
<td>55.8%</td>
</tr>
<tr>
<td>Front cover</td>
<td>50%</td>
</tr>
<tr>
<td>Headings</td>
<td>50%</td>
</tr>
<tr>
<td>Application link</td>
<td>38.2%</td>
</tr>
<tr>
<td>Page numbers</td>
<td>38.2%</td>
</tr>
<tr>
<td>Table captions</td>
<td>38.2%</td>
</tr>
<tr>
<td>Video</td>
<td>38.2%</td>
</tr>
<tr>
<td>Internal link to external sources</td>
<td>29.4%</td>
</tr>
<tr>
<td>Lists</td>
<td>29.4%</td>
</tr>
<tr>
<td>Thickness indicator</td>
<td>29.4%</td>
</tr>
<tr>
<td>Attachment</td>
<td>23.5%</td>
</tr>
<tr>
<td>Back cover</td>
<td>23.5%</td>
</tr>
<tr>
<td>Book review</td>
<td>8.8%</td>
</tr>
<tr>
<td>Bulletin board</td>
<td>8.8%</td>
</tr>
<tr>
<td>Form</td>
<td>8.8%</td>
</tr>
<tr>
<td>Watermark</td>
<td>8.8%</td>
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<tr>
<td>3-D effect</td>
<td>8.8%</td>
</tr>
<tr>
<td>E-mail</td>
<td>2.9%</td>
</tr>
<tr>
<td>Stamp</td>
<td>2.9%</td>
</tr>
<tr>
<td>Spine</td>
<td>0%</td>
</tr>
</tbody>
</table>

Features suggested by the “experts” that were not included in the survey were:
- Boolean and/or natural search
- Copyright page
- Exportation of annotations
- Graphical indexes
- Ranked searches
- Reflowable text
- Search annotations
• Time bombs- trial periods and then content is lost
• Wireless access

The remainder of the book focuses on issues of ePublishing, such as metadata, DRM, and publishing economic models.
Cross-Referencing Notation: [Henke, 2002]

Title: Survey on Electronic Book Features.

Author(s): Harold Henke

Publication: Open eBook Forum (March 17, 2002)

URL: http://www.openebook.org/surveys/eBookSurvey/downloads.asp

Abstract: Results of an Open eBook Forum sponsored survey to help assess what users desire and expect from ebooks. 163 electronic surveys were collected from individuals who were familiar with current ebook technology. The most desirable feature was that the ebook opened to the last page viewed.

Functionality Notes (T. Peters):
An electronic survey was designed to be deployed via the Internet, with the responses stored in a database. The goal of the survey was "...to gather information to identify features that you, as a current or potential electronic book user, would like included in the design of an electronic book, which is defined as content which can be read electronically on a device such as a dedicated reading device, a laptop, personal digital assistant, or workstation.... the purpose was to focus on the design of the electronic book content." The survey listed 48 features "...derived from an extensive literature review and from a review of the survey by experts in the electronic book industry." Each feature was defined in the online survey. A five-point Likert type scale, ranging from "not important" to "very important", was used. The survey was posted on the OEBF website for a two-week period. 163 respondents participated in Henke's survey of e-book features. The responses were not analyzed along demographic variables such as age, sex, education, or type of content being read.

The top ten features were: open to last page viewed, title page, text search, bookmarks, table of contents, page number, bookshelf, electronic updates, personalization, and progression bar. Henke notes, "Comparing the ratings of people who read fiction versus reference materials may well provide a different top ten list of features." Henke (2002) found that "people are not yet interested in extending the design of the electronic book too far from the paper book...." Henke (2002) found that readers want to "...personalize' their electronic book reading experience by changing the fonts, typefaces, and margins, moving illustrations and tables around the page, sizing images differently than text, and so on." Henke (2002) notes that, in addition to marking up and annotating e-books, people want to add content. "Adding content should not be viewed as simply creating an annotation or note but adding content that becomes part of the book and incorporated into the table of contents and index." Regarding the right of first sale, Henke (2002) notes, "...people want 'rights' to donate a book to a library, lend the book to a friend, or sell the book. But these 'rights' are difficult to manage given that while they could not donate, lend, or sell the same paper book at the same times, it would be possible to do all three simultaneously with an electronic book." Henke asserts that e-books are more about content than hardware (and software, too, I assume). "The 'eBook industry' must reinforce the message that electronic books are content and dedicated reading devices are tools that enhance the person's reading experience of electronic books." Henke (2002) notes, "...people want to control electronic books in a way that was not feasible in the past." Henke (2002) also notes that people want portability of e-book content across multiple hardware
platforms. "People also want to read the electronic books they purchase on many devices such as their personal digital assistant, their laptop, and their workstation." Henke (2002) was surprised that the e-bookshelf functionality ranked high seventh among the desired features. "The simple description of an electronic bookshelf is the ability to organize a collection of electronic books into a bookshelf and then be able to search by keyword, topic, and so on all of the electronic book in the bookshelf."
Cross-Referencing Notation: [Hill, 2001]

Title: The Magic of Reading

Author(s): Bill Hill

Publication: Redmond, Washington: Microsoft


Abstract: This report is a new study of reading, how it works, and how to achieve that mysterious state referred to as "readability." It's targeted in the first instance at electronic books but is also relevant everywhere else that text is read. If the ideas in this document work-and there are very strong signs that they will-they will change the world. That's a grandiose claim. But reading is a core human task. We were not ready to implement the much-hyped "Paperless Office" in the 1970s and 1980s. The main obstacle to that vision was: How can you have a paperless office, when reading on the computer screen is so awful? We are about to break through that barrier. And everything will change when we do. I've read around 12,000 pages of research papers, books, and articles over the past several months. The (hopefully logical) case that follows is almost an exact reversal of the discovery process that took place.

Functionality Notes (T. Peters):

Hill (1999) and Sellen and Harper (2002) can be seen as complementary texts. While Hill studied the basic mechanics of reading and the technologies that support immersive reading, Sellen and Harper were studying and thinking about how people use documents in work environments.

Hill reports on a study of the mechanics of reading, with an eye towards making e-books readable. The main obstacle to the vision of a paperless office is the realization that, at present, reading on a computer screen is an awful experience (10). The main conclusions include:

- pattern recognition is a basic behavior of all animals; humans have developed visual pattern recognition to a high degree; pattern recognition is key to the development of language; writing and reading systems depend entirely on pattern recognition; a book is a complex technological system to optimize serial pattern recognition (OSPREY); OSPREY can be optimized algorithmically for e-books and computer screens generally, if two new technologies (ClearType font-display technology and an OSPREY reading engine) described in this report are developed and deployed (10-11).

Hill sees readability as the "biggest single challenge" e-books must overcome to become acceptable alternatives to p-books (13). "The paperless office is now a real possibility. We can make it a reality." (14) When we read a book, the physical book disappears, because reading is an immersive experience (15). Hill sees a generalist approach as "the key to understanding the phenomenon of immersive reading." (16) Hill speculates that something deep, mysterious, and primal happens to a human when he or she reads (17). The printed book, which has developed over millennia, is "a complex and sophisticated technology for holding and capturing human attention." (17) Hill sees the book as an extreme case of reading. Reading is a skill we use constantly in our daily lives, even when we are not reading a proper book (18).

Hill seems to be particularly interested in immersive reading. "A reader who becomes 'lost' in a book is in a conscious state that is closest to hypnotic trance." (24) When viewed as a system, the task of reading is "simply serial pattern recognition." (36)
Cognitive loading ("a way of measuring the demands that the reading process makes on our attention") should be the focus of further research once a finely tuned OSPREY system has been built (27).

E-book functions that Hill (1999) addresses include: transparently switching between reading a display and listening to a text (28); maximizing the interoperability of a document when read on more than one device through "...the implementation of 'adaptive document technology' which will automatically reformat documents to be read on any device while still adhering as closely as possible to OSPREY principles within device constraints." (29)

Hill asserts that ludic reading (i.e., reading for pleasure) is "clearly the most relevant form of reading to the eBook." (41) The difference between ludic reading and work-related reading is the intrusive evaluative demands made during work-related reading (43). Hill cites reading research that suggests that "any external attempt to present information at a pre-determined speed is doomed to failure...."(46) Because ludic reading follows a pattern of arousal followed by relaxation, reading is especially enjoyed before falling asleep. Thus a backlit e-book, with no need for a separate light source, is a positive benefit of the new reading technologies (49).

"The book is designed to capture human attention" (58)
Cross-Referencing Notation: [Knowledge Systems & Research, 2001]
Title: Online User Panel: Electronic Book Perceptions
Author(s):
Publication:
URL: [http://www.ksrinc.com/research/pdfs/ebook_WEB.pdf](http://www.ksrinc.com/research/pdfs/ebook_WEB.pdf)
Abstract: Based on responses from 1,461 online users in January 2001.

Functionality Notes (S. Gibbons):
The survey of 1,461 online users had the following results:
- 4 out of 10 Internet users have positive attitudes towards concept of ebooks
- 1 in 10 have either purchased or intent to purchase an ebook as a gift
- Business and investing books were found to be more commonly purchased or received in ebook format than in paper format
- 1 in 5 users are somewhat (17%) or very (5%) likely to purchase an ebook within the next 6 months
- ebook software is more than twice as prevalent as hardware
- 1 in 4 likely to purchase an ebook device at the $100 level, much lower likelihood for prices above $100
- ¾ expect the ebook price to be less than or equal to the paper book
- users cited fast access/acquisition, searching and no physical space needed as the major advantages of ebooks
- following reasons were cited for preventing ebook purchase: need to purchase hardware or software; multiplicity of formats means need to purchase multiple devices/software and need to read via proprietary ebook reader format
Cross-Referencing Notation:  [Landoni, et al., 2000]
Title: “From the Visual book to the WEB book: the importance of design”
Author(s): M. Landoni, R. Wilson and F. Gibb
Abstract: This paper presents the results of two studies into electronic book production. The Visual book study explored the importance of the visual component of the book metaphor for the productions of more effective electronic books, while the WEB book study took the findings of the Visual book and applied them to the production of books for publications on the World Wide Web. Both studies started from an assessment of which kinds of paper books are more suitable for translation into electronic form. Both also identified publications which are meant to be used for reference rather than those which are read sequentially, and usually in their entirety.

Functionality Notes’s (S. Gibbons) Summary:
The article describes two studies. The first, Visual book experiment, was a study of the application of the book metaphor to the design and production of ebooks. These findings were then applied to the WEB book experiment, which had the goal of measuring the usability of a textbook published on the WWW.

The Visual book is a representation of a book in electronic form that conveys visually many aspects of the paper book, such as dimensions, thickness, page form and design style. “Emphasis is placed on preserving the book’s appearance in order to draw upon the familiarity the reader already has with books in general.” Scientific publications were selected for use in the Visual book format because they tended not to be read in their entirety and the readers of this genre tend to be generally familiar with computers and therefore “in a better position to appreciate the additional features and functionalities offered by electronic publication.” Essential features of the book metaphor that were incorporated into the features of the Visual book include:

- bookmarking
- notes in margins
- highlighting
- easy access to pages which are frequently consulted by different visual cues
- information about how much has been and is left to be read
- control of the reading progress
- browsing and scanning for interesting sections

Users engagements with the Visual book were in part evaluated on the users:

- sense of directness- degree of feeling users have that changes on the screen are the results of their actions. Illusion that the displayed image of the text is in fact a physical object which they can manipulate
- sense of engagement- level of interest and engagement. “One source of engagement is the fun of seeing the system react and is related to the novelty of the system”
- sense of text- feeling users have about the structural and spatial disposition of the text. Able to recall position of passages within the text

Results of the Visual book experiment stressed the importance of a good index and table of contents because “access to importance is still the main requirement and future design of
electronic publications will have to consider this primary need.” Comment suggestion from subjects was the inclusion of a intelligent search function.

WEB book project consisted of converting Chapter 5 of van Rijsbergen’s *Information Retrieval* (1979) textbook into a browser-based electronic text. The experiment tested the following hypotheses:

1. Users of the WEB book version of the chapter will make fewer errors on tasks than will users of the original, paper version
2. Users of the WEB book version will report higher subjective satisfaction with the site than will users of the original, paper version
3. When measures from the first two hypotheses are combined into an overall usability score, the WEB book version will have a higher usability score than the original, paper version.

Experiment subjects consisted of 18 people from the IR community, since they would be most familiar with the subject matter. 8 read the original, paper version and 10 read the WEB version. All subjects were asked to complete a series of tasks, such as hunting for specific facts within the text. After completing the tasks, subjects filled out questionnaires about their experiences. Percentage of task errors and subjective satisfaction were the two major measures used to calculate overall usability.

Results were 150% fewer task errors made by users of the WEB version and 45% higher subjective satisfaction. “Combined, this means an increase in overall usability of 92%.”

Based on these experiments, the authors recommend:

- Page metaphor be respected
- Logical structure of the book has to be considered
- Book template has to be used strictly to present information which is book related, and not any other kind of material, as the result would be a heterogeneous system which could confuse users
- Titles, pagination, typographical aspects have to be designed carefully to enhance text readability and scannability
- Visual clues have to be adapted to exploit the potential medium where the book is published.
Cross-Referencing Notation: [Marshall, 1998b]

Title: The Future of Annotation in a Digital (Paper) World

Author: Catherine C. Marshall


URL: [http://csdl.tamu.edu/~marshall/uis-paper-complete.pdf]

Abstract: If order-making in the large is part of the institutional mission of libraries, then order-marking in the small – the informal work of annotating and organizing materials collected in service of particular, day-to-day work or pleasure – is part of the business of library patrons. This paper focuses on just such activities, activities that stem from readers’ engagements with texts, and possibly with each other, against the backdrop of real-world settings and practices.

Functionality Notes (T. Peters):
Marshall (1998b) articulates several dimensions for annotations, which are not created equal or for the same purpose. The formal/informal dimension covers everything from authoritative, standards-based metadata records to informal jottings in the margins. It may be possible to extract formal descriptions from informal annotations. The explicit/implicit dimension describes how well non-authors of the annotation can interpret its meaning. For example, a check mark in a margin could mean many things. The writing/reading dimension gets at the role readers play in the communication process. They could be a force that decenters the authority of the author, or they may plan a more traditional role of an engaged audience. Marshall, following Moulthrop (1993), sees this tension about the role of the reader as bearing directly on the ultimate value of the annotations in relation to the text being annotated. The extensive/intensive dimension of annotating gets at the type of reading being done. Extensive reading tends to roam across multiple texts, while intensive reading involves deep engagement with a single text. Some annotations are intertextual, while others are intratextual. The permanent/transient dimension reveals the longevity of the usefulness of the annotation. In general, e-annotations may be more permanently useful, because they can be easily separated from the document or transferred from one digital copy of the text to another. The published/private dimension of annotations explores how over time initially private annotations may become published (or at least viewable by another reader). In the realm of e-books, it will be ease to scrub our private annotations off of a text before passing the pristine text along to someone else. Finally, the institutional/workgroup/individual dimension refers to the intended audience for an annotation. Group annotation activities could be additive.

Marshall (1998b, p. 7) also notes that, as we have gone digital, we generally have lost the ability to record ad hoc, partial, or ambiguous interpretations of a document. "It is these lightweight classifications that we need to reclaim in our digital library reading machines."

Marshall (1998b, p. 13) notes that the annotation functionalities for e-texts requires much more work and development. "We have neither the practices nor the tools for fluidly marking on digital materials in all the ways we mark on paper. Yet we often desire to do so."

Marshall also lists the "notable strategies" people use as they annotate. Usually annotators use whatever writing implement that is at hand. Marshall noted a small number of complex coding schemes that annotators had developed for themselves, but the consistency of these schemes
rarely lasted throughout the reading of a textbook. Also, the forms of annotations follow the textbook genre and expected disciplinary practices.

Marshall warns that, whatever we end up doing with the annotation functionality in a digital world, we must respect the fact that they are a private form of writing, made public only with an assumption of anonymity.

Marshall (1998b, 16) notes that, based on a sentence-by-sentence analysis of seven annotated copies of a particular textbook, it appears that readers "achieve some level of consensus about where the key passages are in each chapter of the book."

Marshall (1998b, 16) also cautions, "Annotation spans a huge range of activities, activities that may include proofreading and writing commentary to an audience. Can all these forms of annotative activity be supported by a single type of reading machine? Can they be subsumed by a general architecture?"
Cross-Referencing Notation: [Marshall & Brush, 2002]

Author: Catherine C. Marshall and A.J. Bernheim Brush

Title: From Personal to Shared Annotations

Publication: to appear in CHI2002 Extended Abstracts


Abstract: Preliminary results obtained by comparing personal annotations on paper with shared annotations made on-line show that only a small fraction of personal annotations are used in initiating and responding to related on-line discussions. The personal annotations that are shared tended to correspond to explicit marginalia; much effort is still put into rendering both the content and anchors of these annotations intelligible to others.

Functionality Notes (S. Gibbons):

A study was conducted with 11 students over 4 weeks to try to understand the relationship between personal annotations and those made in an on-line collaborative environment. Far more annotations were made on paper (84%) than online. The majority (82.1%) of paper annotations were highlighting, underlining or circling. 7.5% were a note with an anchor to the text and 4.6% were just a note without any anchor to the text. Personal annotations tended to be much more cryptic, while the on-line, collaborative annotations were most likely anchor to the text and in complete sentences. There was little correspondence between the personal annotations and the on-line annotations, indicating that personal annotation did not contribute directly to on-line annotations.
Cross-Referencing Notation: [Marshall & Ruotolo, 2002]
Title: Reading-in-the-Small: a study of reading on small form factor devices
Author(s): Marshall, Catherine C., and Christine Ruotolo.
Publication: Joint Conference on Digital Libraries 2002 (July 13-17)
URL: [http://portal.acm.org/citation.cfm?doid=544220.544230](http://portal.acm.org/citation.cfm?doid=544220.544230)

Abstract: The growing ubiquity of small form factor devices such as Palm Pilots and Pocket PCs, coupled with widespread availability of digital library materials and users' increasing willingness to read on the screen, raises the question of whether people can and will read digital library materials on handhelds. We investigated this question by performing a field study based on a university library's technology deployment: two classes were conducted using materials that were available in e-book format on Pocket PCs in addition to other electronic and paper formats. The handheld devices, the course materials, and technical support were all provided to students in the courses to use as they saw fit. We found that the handhelds were a good platform for reading secondary materials, excerpts, and shorter readings; they were used in a variety of circumstances where portability is important, including collaborative situations such as the classroom. We also discuss the effectiveness of annotation, search, and navigation functionality on the small form factor devices. We conclude by defining a set of focal areas and issues for digital library efforts designed for access by handheld computers.

Functionality Notes (T. Peters):
Marshall and Ruotolo performed field studies in higher education classrooms at the University of Virginia to learn whether people can and will read digital library materials on handheld computers. They wanted to learn more about what utility small, more general purpose handheld computing devices could bring to the higher education classroom and to the e-content in higher education. The functionalities this report focuses on are annotating and searching.

HP Jornadas running MS Reader software were used to carry and display specially-prepared digital library materials, such as class reading assignments and background materials listed on the syllabus. « The technology was used on a voluntary basis in two different humanities classes that required a substantial amount of reading, writing, and classroom participation. »

The two researchers asked several questions related to the e-book functionality of PDAs, « What kinds of materials will students choose to read on small form factor devices? Which functionality is useful (and indeed practical) to support reading these materials? They also wondered, « Can digital library materials be used effectively in the collaborative situation of the classroom, given our reading technologies? »

The preloaded PDAs were loaned to students for the duration of the courses. The authors note, « A few students borrowed the cradles...to download other reading materials, games, and software, although this practice was less common and more obstacle-prone. » The researchers conducted semi-structured, open-ended interviews with ten students from the two courses, the two professors, the TA for the undergraduate course, and with a programmer and a mark-up specialist from the UVA E-Text Center.

They note (p. 59) that « mobility is key to reading ». They found « that handhelds were a good platform for reading secondary materials, excerpts, and shorter readings; they were used in a
variety of circumstances where portability is important, including collaborative situations such as the classroom (abstract). » « In general, people seem to choose to read different materials on the screen than they read on paper, and when they read on the screen, they read with a different set of purposes in mind. » The two authors note that « ...what the students, staff, and faculty do with materials on the handhelds blurs all distinctions among reading, browsing, and searching. » « In general, students, faculty, and Electronic Text Center staff members (in both classes) with few exceptions preferred to read shorter articles and excerpts and secondary materials for classes on their Jornadas. »

They found that the undergraduate class made extensive in-class use of their Jornadas, but the graduate class did not. Wireless access to the Internet via handheld devices would make in-class use even more valuable. Using infrared beaming functionality to beam documents occupies an interesting conceptual space partway between what we do with physical documents and digital documents.

Frequency of annotating (notes, bookmarks, and highlights) was low on the Pocket PCs. One annotating functionality that the students regretted not being able to do in MS Reader was marking (e.g., asterisks, stars, checks) in the margins to indicate important or difficult passages. « A combination of highlight facilities and a simple vocabulary of marks might work especially well on the smaller devices. » « The inability to export highlighted passages or text notes for use in writing papers was singled out as a particular disincentive to annotating on the Jornada. » Taking in-class notes on the Jornada probed to be too slow, compared to handwritten notes on paper.

Students didn't print out many of the digital documents, even though free printing was available. Many expressed environmental concerns about printing out, then throwing away or recycling the prints at the conclusion of the semester. When they did print, they chose to print primarily locally created documents, including their own work.

The authors also note two functional opportunities that may be unique to digital library reading technologies : "the opportunity to conduct serendipitous on-the-spot research using materials on the device as references ; and the opportunity to imbue digital documents with some type of physicality. »

« Reading is an unselconscious orchestration of many things: successful introduction of digital library reading technologies like the Jornadas depends on seeing their role in a larger system of documents, technologies, and reading-related activities. »
Cross-Referencing Notation: [Marshall, et al., 1999]

Title: Introducing a digital library reading appliance into a reading group

Author(s): Catherine C. Marshall, Morgan N. Price, Gene Golovchinsky, Bill N. Schilit


URL: [http://seattleweb.intel-research.net/people/schilit/mar99a.pdf](http://seattleweb.intel-research.net/people/schilit/mar99a.pdf)

Abstract: How will we read digital library materials? This paper describes the reading practices of an on-going reading group, and how these practices changed when we introduced Xlibris, a digital library reading appliance that uses a pen tablet computer to provide a paper-link interface.

Functionality Notes (S. Gibbons):

“What are the implications of [the paper’s] finding for designing interfaces and appliances for reading digital library materials?”

- Readers are mobile, so too should be the reading material
- Designers should focus on readability, document layout and physical comfort [ergonomic of the appliance]
- Reference following is an important activity—need tools to support this, such hyperlinks to reference materials or to their citation metadata
- Support annotations
- Support ability to return to key material and extract it.
Cross Referencing Notation: [Marshall, et al., 2001]
Title: Designing e-books for legal work
Authors: Catherine C. Marshall, Morgan N. Price, Gene Golovchinsky & Bill N. Schilit
URL: [http://www.fxpal.com/PapersAndAbstracts/papers/mar01a.pdf]
Abstract: In this paper we report the findings of a field study in a first-tier law school and on the resulting redesign of Xlibris, a next-generation e-book. We characterize a work setting in which we expected an e-book to be useful, and explore what kinds of functionality would bring value to this setting.

Functionality Notes (S. Gibbons):
Purpose of the study was to explore the potential of ebook devices as they support the typical research activities of knowledge workers. This study focused on legal work using Xlibris. Law students participating in an annual Moot Court competition at a first-tier law school served as study subjects. Research methods included interviews, observations and analysis of student and faculty documents (source material and legal briefs).

The law students were found to be “research-centered mobile” meaning that they work in various locations in order to access the resources (computers, network connections, printers, databases, people, etc.) needed.

During legal research, full-text searching

NEED TO FINISH
Cross-Referencing Notation: [Messing, 1995]
Title: Measuring Student Use of Electronic Books
Author(s): John Messing
Publication: ASCILITE 95 Proceedings
Abstract: This paper considers issues for the design of electronic books as teaching materials in the light of student use, including the problem of how such use can be measured.

Functionality Notes (S. Gibbons):
Two studies were conducted at Charles Sturt University in New South Wales focusing on student use of homegrown electronic books (online study guide for Foundations of Programming and multimedia system for Grape and Wine Production). The ebook programs automatically monitored all user interaction and recorded them to a log file. In addition, students kept a manual logbook of their study activities, completed surveys and participated in interviews.

Student reactions to on-screen reading were mixed. Some reported printing large sections of text for reading, while others found computer screen displays to be quite readable. Annotations were difficult because there was no way to distinguish the original text from student annotations. When annotations were not possible, students reported that this was a deficiency. Because the texts were tied to specific desktop computers, access was a serious barrier to use, particularly for distance education students who would read in less-conventional places, such as commuter trains, during breaks at work, etc.

As part of one of the classes, students had access to a set of 20 fully worked programming problems. The ability to copy and paste portions of the code into their own editors/compilers was a significant advantage. However, those students that retyped the code, rather than copy and paste it, found it to be a much better learning experience because it reinforced their understanding of the code and syntax.
Cross Referencing Notation: [Miall & Dobson, 2001]
Title: Reading Hypertext and the Experience of Literature
Authors: David S. Maill and Teresa Dobson
URL: [http://jodi.ecs.soton.ac.uk/Articles/v02/Miall/](http://jodi.ecs.soton.ac.uk/Articles/v02/Miall/)

Abstract: Hypertext has been promoted as a vehicle that will change literary reading, especially through its recovery of images, supposed to be suppressed by print, and through the choice offered to the reader by links. Evidence from empirical studies of reading, however, suggests that these aspects of hypertext may disrupt reading. In a study of readers who read either a simulated literary hypertext or the same text in linear form, we found a range of significant differences: these suggest that hypertext discourages the absorbed and reflective mode that characterizes literary reading.

Functionality Notes (S. Gibbons):
Two studies were conducted to determine the impact that the presence of hypertext has on the speed and quality (in terms of comprehension and enjoyment) of reading. In the first study, the text of the modernist short story “The Demon Love” by Elizabeth Bowen was read in two formats: linearly (series of nodes connected by a next button) and in hypertext (series of nodes connected by 3 hyperlinked words or phrases within the text). The layout and content of the text was identical with both conditions, because each of the hypertext links led to the same subsequent node. The 70 participants ranged in ages from 17 to 28. Subjects took over 4 seconds longer on average to read each node of the hypertexted version. Hypertext readers indicated that they often felt confused and/or believed they missed portions of the text. 75% of hypertext readers reported varying degrees of difficulty following the narrative compared with only 10% of linear readers.

A second experiment was done with Sean O’Faolain’s “The Trout.” This text was shorter than the first and considered more “accessible” to modern readers. 60 students read the story as linear nodes connected with a next button or as nodes linked by hypertext. Again, readers took longer on average to read the hypertext version. Readers’ comments about their reading experiences were taped, transcribed and tagged for content analysis. It was determined that those who read the hypertext version made only generalized comments about the text, while those who read the linear version made more specific and emotionally engaged comments. Hypertext readers found the story to be more confusing and incomplete.

The authors admit that the fact the short stories used were not intended for hypertext reading may have had a bearing on the results. However, they still believe that “as a vehicle for the experience of literary reading itself, hypertext appears to promote processes of attention that inhibit the engagement and absorption that are its most characteristic aspects.”
Cross-Referencing Notation: [Morrill, 2002]
Title: Report: Wisconsin Public Library Consortium netLibrary User Evaluation
Author: Joshua H. Morrill
Publication: April 30, 2002
URL: [http://www.scls.lib.wi.us/sca/netlibeval.pdf](http://www.scls.lib.wi.us/sca/netlibeval.pdf)

Abstract: The evaluation of netLibrary use in a study conducted in two stages. The initial stage surveyed all WPLC users of netLibrary, the second involved training new users and assessing their experiences after two weeks. Two concerns consistently emerged, usability of the website and the size of the collection.

Functionality Notes (R. Bryan):
This study investigated perceptions and usage trends of netLibrary. Young adults were identified as an underserved user population, and the evaluation gives support to the possibility of netLibrary serving this population. Usability factors such as navigability of the site, complexity of the interface, and downloadable text (to PC or PDA) were identified as important.

The survey of currently registered netLibrary users found:
- Supports the idea that "netLibrary's value lies in its ability to serve as a source online for patron reference from home."
- 32% indicated better training would cause them to use netLibrary more
- "Perception of the Web site drastically influences their perception of netLibrary as a valuable resource"
- Most found the site easy to navigate, but those who did not indicate a potential for improving the interface
- "Patron interface of netLibrary and the available collection…play in perceptions of overall usefulness"
- "Library employees are more positive than the patrons about netLibrary use
- "netLibrary should be taking steps to simplify its interface and increase usability of its site.

The controlled cohort section of the study found:
- The younger population seems more receptive to adopting this technology when compared to adults, they find what they want more often and find the web page easier to navigate
- Initial experiences with netLibrary influence attitudes of overall usefulness
- "a significant portion of library patrons would use and benefit from the reinstatement of a reader that would allow offline reading"
- More than half of the participants would not view the ability to download netLibrary to a portable device as a benefit
- Specific suggestions regarding interface included:
  - Less cluttered interface
  - Countdown clock for check out period
  - Labeling of fiction and non-fiction resources
  - Nearly 90% of participants would choose to purchase a paper copy of a book for the library's collection rather than a netLibrary eBook
Cross-Referencing Notation: [O’Hara & Sellen, 1997]

Title: “A Comparison of Reading Paper and On-Line Documents”

Author(s): Kenton O’Hara and Abigail Sellen

Publication: CHI ’97, pp. 335-343

Abstract: Report on a laboratory study that compares reading from paper to reading on-line. Critical differences have to do with the major advantages paper offers in supporting annotation while reading, quick navigation, and flexibility of spatial layout. These, in turn, allow readers to deepen their understanding of the text, extract a sense of its structure, create a plan for writing, cross-refer to other documents, and interleave reading and writing. We discuss the design implications of these findings for the development of better reading technologies.

Functionality Notes (S. Gibbons):
The study aimed at discovering how reading from paper compared to reading online in order to better design on-line reading tools. 10 volunteer staff from the authors’ laboratory were asked to read and then summarize a 4-page article from a general science magazine. Authors decided to use reading and summarization so that the reading would have to be done at a comprehensive level that would make demands upon the text’s medium. In addition, text summarization is a commonly observed task that knowledge workers carry out.

The on-line text was presented on a “typical workstation running a commonly used word processing application.” Two additional blank on-line documents were offered for use for reading notes and the summarization piece. The paper text was presented on 4 separate pieces of paper, with additional paper given for reading notes and on which to compose the summarization piece. All 10 sessions were video recorded and then shown to the subject, during which time the subject was extensively interviewed about his/her experience.

Annotation and note taking were found to be important tasks because they assisted in deepening reading comprehension, as well as directly supported the task of summarization. Subjects using the paper text all made annotations directly to the text. Only 1 of the 5 subjects using the on-line text used the features of the word processing system to annotate the text, although all indicated that they would have annotated the text had it been in paper form.

The tasks of reading and summarization required a great deal of movement within the 4-page text, as well as between the text and summarization piece. This movement was used in order to develop an overall sense of the text’s structure and to check facts and verify understanding. Movement with the paper text was characterized by its “speed and automaticity,” and these subjects developed a great knowledge of the fixity or placement of information with respect to the physical text. Navigation with the on-line text was found to be “irritatingly slow and distracting,” particularly since it was difficult to view a single, entire page of text at one time.

Differences were also experienced with regards to spatial layout—the way the subjects laid out the documents in space. Spatial layout is important because it helps readers gain a sense of overall structure, is useful for cross referencing (“need to lay pages close to each other in order to check on or to relate specific pieces of information across pages”) and to interleave the reading and writing process. With the paper text, all of the subjects removed the paper clip and spread...
the documents out in front of them. For the on-line text, subjects expressed a great deal of concern about the inability to see all of the pages at once.

Authors believe that this study has shown that “in support of reading for the purpose of writing… the benefits of paper far outweigh those of on-line tools.” They suggest that developers of on-line reading tools recognize:

- that annotations can be an integral part of reading and build support for these processes
- the need to support quicker, more effortless navigation techniques
- the need to support more flexibility and control in spatial layout.
Cross-Referencing Notation: [O’Hara, et al. 1998]
Title: Student Readers’ Use of Library Documents: Implications for Library Technologies
Author(s): Kenton O’Hara, Fiona Smith, William Newman & Abigail Sellen
Publication: Proceedings of CHI ‘98
Abstract: We report on a laboratory study that compares reading from paper to reading on-line. Critical differences have to do with the major advantages paper offers in supporting annotation while reading, quick navigation, and flexibility of spatial layout. These, in turn, allow readers to deepen their understanding of the text, extract a sense of its structure, create a plan for writing, cross-refer to other documents, and interleave reading and writing. We discuss the design implications of these findings for the development of better reading technologies.

Functionality Notes (S. Gibbons):
The library research recordings activities of 25 PhD students in the arts and humanities at Cambridge University were examined. Each subject kept a dairy of their document-related activities and was interviewed at the end of the day. The results were findings about the nature of the information they recorded; the methods of recording and a summary of the function of information recording.

Nature of information recorded- 4 types.
1. paraphrasing done by note-making
   • ensure concentration and engagement with the text
   • future memory aid for material not likely to be remembered
   • convert content into language that was clearer
   • usually recorded in personal shorthand
2. verbatim information through notes and photocopies
   • usually interspersed with paraphrased material
   • done in anticipation of quoting in own work
   • for future revisiting
3. readers’ remarks
   • interspersed with paraphrased and verbatim
   • recorded readers’ thoughts, ideas and critical views
   • style and meaning of readers’ remarks were very personalized
   • very distinct from author’s text through color, asterisks, etc.
   • often in margins of photocopies as single words or incomplete phrases
4. bibliographic information
   • bibliographic info of what was currently being read
   • bibliographic info of useful sources cited in the text

Method of recording information- 3 types
1. annotation
   • time efficient way to focus reader’s concentration
• usually with reference to text using pointers
• “continuous” with reading of text
• easily distinguished from text and therefore easy to relocate
• with library material, text was often photocopied incurring financial and temporal costs

2. note-making
• encouraged dialogue with text; encouraged deeper processing of information
• time consuming
• less costly then photocopying

3. photocopying
• time efficient method for recording large amounts of info
• not suitable for small extractions
• financial and temporal costs

Summary of Functions of Information Recording
• to focus attention and facilitate encoding
• for clarification and interpretation
• for mapping our directions for literature review
• later review and reuse
• personal, portable resource
Cross Referencing Notation: [Piolat, et al., 1997]
Title: Effects of Screen Presentation on Text Reading and Revising
Authors: Annie Piloat, Jean-Yves Roussey and Olivier Thunin
Abstract: Two studies using the methods of experimental psychology assessed the effects of two types of text presentation (page-by-page vs. scrolling) on participants’ performance while reading and revising text. Greater facilitative effects of the page-by-page presentation were observed in both tasks.

Functionality Notes (S. Gibbons): 
This study consisted of two experiments to determine “whether different screen dynamics influence the two-dimensional mental representation of the text built by users, and consequently, the actions they carry out during reading and revising.” Scrolling and page-by-page were the two types of text presentation used.

Experiment 1: the hypothesis of this experiment is that reading performance would vary with page and scrolling modes. 54 undergraduate psychology students served as subjects, none of who used computers on a regular basis. After reading texts in page and scrolling modes, subjects were asked to locate specific sentences within the text and then required to write a short summary of the text, which were graded by 4 judges for the inclusion of important ideas and details. The results found no significant difference between the reading time with the page and scroll modes. However, using the page mode, subjects had a significantly higher degree of accuracy in locating sentences. The summaries for the texts read with page mode contained significantly more details than those from texts read in scroll mode.

Experiment 2: This experiment tested the hypothesis that when using page mode writers should be able to “a) build a better representation of the text and be more efficient at diagnosing the problems it contains and b) more effectively correct coherence errors.” 26 undergraduate psychology students with limited familiarity with word processors served as subjects. The subjects were asked to correct mistakes within the text displayed in either page or scroll mode. Corrections consisted of moving and replacing words. The time it took to modify the text did not significantly differ between page and scroll mode. Subject did not make significantly different modifications in page or scroll mode, but the number of coherence modifications (modified the meaning of the text, for which all passages where coherence was being assessed could not be simultaneously displayed) was significantly higher with page mode than scroll.

The study concludes that a page-based system is better than a scroll-based system because it allows readers to build a better “sense of text.”
Cross-Referencing Notation: [Russell, 2002]

Author: Mark C. Russell, Marilyn James & Andrea Cohlmia

Title: Reading from a Palm Pilot Using RSVP


URL: [http://psychology.wichita.edu/surl/usabilitynews/41/rsvp_palm.htm](http://psychology.wichita.edu/surl/usabilitynews/41/rsvp_palm.htm)

Abstract: The study presents data on reading efficiency using Rapid Serial Visual Presentation (RSVP) on a held-held device. We compared performance between RSVP conditions at three speeds to a traditional text presentation format used by Palm Reader. Reading comprehension, user satisfaction and preference were examined as dependent variables.

Functionality Notes (S. Gibbons):
The study included 20 college students with 20/20 or 20/20 corrected vision. Users read excerpts from short stories ranging from 127-269 words in length on a Palm in RSVP format and using the traditional, page-like format using the Palm Reader. RSVP automatically scrolls the text at a set rate—during this study, 3 rates (250, 450 and 650 wpm) were tested. There was no significant difference in comprehension between the Palm Reader and RSVP at 250wpm. However, RSVP at 450 and 650 had considerably lower comprehension scores.

Users were most satisfied with the easy of reading, ability to concentrate while reading and comprehension with the Palm Reader, followed by RSVP at 250wpm. Users perceived significantly less eyestrain when using Palm Reader format over all of the RSVP formats.
Cross Referencing Notation: [Schcolnik, 2001]

Title: A Study of Reading with Dedicated E-Readers Dissertation

Author: Miriam Schcolnik

Publication: April 2001


Abstract: Given the prediction that in the future our reading could be mainly digital and the fact that e-readers are one of the emerging technologies, we need to understand what these devices are suitable for. This study answered the following questions: What strategies do adult users of e-readers apply to reading in the new medium? Does the new medium lend itself more to certain purposes of reading? What kinds of texts do users read in dedicated e-readers? What characteristics should texts for e-reading have? Data were gathered using a web survey in which 105 people participated, and a case study in which five subjects were observed and interviewed. The findings of the research help clarify the strategies used in the e-reader medium, as well as preferred uses, types of texts, and e-reader characteristics.

Functionality Notes (R. Bryan):

This study wanted to "discover if the features of e-readers somehow influence the process of reading and in what way, what users do, what they choose to e-read, and how they do it." Using previous research in both reading methodology and e-book use and functionality as a starting point, Schcolnik prepared a study to investigate how the features of an e-book effect reading strategies and the reading process in general.

The study, conducted in Israel, consisted of a Web survey and a case study, focusing on use of dedicated e-reader devices. Since the web survey used only adult e-book readers who volunteered and met the requirement of already being e-book users, the case study of observing and interviewing five subjects new to e-books was used to balance possible bias in the results. Appendices include survey, observation criteria and results, reference list.

Summary of Survey Results:

What People E-Read

- Fiction is preferred choice for reading on e-readers
- The present generation of devices lends itself more for reading for pleasure

What People Do When they E-read

- When e-reading for information paging forward and backward is the most used strategy
- Cross referencing with other materials and note-taking on paper were the least used, and annotation on the device was used sparingly
- When e-reading for pleasure, navigation is almost exclusively linear, with the paging feature used most. The process is closer to the process of reading a print book.
- Cross-referencing, note taking and annotation hardly ever used. Table of contents searching and use of hyperlinks are used less frequently than when reading for information

Why People E-Read

- More than half read for information ("staying informed")
- Higher percentage e-read for pleasure ("enjoyment or pleasure", "mental escape")

How People Like to E-Read

- 90% prefer portrait
- 90% prefer paging over scrolling
What E-Texts Should Be Like
- Table of contents is most important
- Hyperlinks and illustrations/graphics next most important
- Other features thought to be important are page numbers, headings and highlighting capability
- Length of text not important
- Least needed characteristic is two columns

How People Feel About E-Reading
- Positive, both in general and about respondents personal e-readers
- Most prefer e-reader over PC, for comfort, resolution and readability

What E-Reading Devices Should be Like
- Most important
  - Legibility
  - Portability
  - Easy navigation
  - Ample storage
  - Ease of Use
- Least important
  - Two display surfaces

Case study results Summary
- Mostly similar attitudes and choices to survey
- Dictionary look-up used by four out of five
- Three found glare a problem
- All felt characteristics (features) of device helpful, "nice size", "big fonts", rotation, paging, changing position easily
- Features may influence process of reading
  - Dictionary option induces strategy of dictionary lookup, but interrupts flow of reading
  - However, the medium allows immersed "lucid" reading and effortless paging. Interruptions become less frequent as user becomes more used to medium, and device becomes transparent.

Overall Conclusions
- Off line e-reading is a new habit for e-readers, but is easily adopted due to comfort and ease of use.
- Reading for pleasure being most popular cannot be clearly attributed to availability of reading material or characteristics (and limitations) of current e-readers
- Purposes of e-reading in order are: pleasure, escape, staying informed, review and study
- Future e-reader studies can follow up on reasons for reading material preferences and why navigation strategies are used more than study strategies
Cross-Referencing Notation: [Schilit, 1999]
Title: Why e-Read?: Finding Opportunities in the Merger of Paper and Computers
Author(s): Bill Schilit
Publication: Future of Print Media Journal, April 4, 1999
URL: http://www.futureprint.kent.edu/articles/schilit01.htm
Abstract: Before reading appliances become successful; they need to be made more usable, more useful, and more valuable. Towards the usability goal, human factors research at our laboratory (FX Palo Alto) and elsewhere are analyzing the benefits of paper documents and understanding how to design paper-like computers that share paper’s user-friendliness. Inventing reading appliances that are more useful than paper remains a challenge; we have provided a number of examples of features that may prove useful. Finally, the value for a reading appliance product needs to outweigh its costs and deficiencies. It is likely that the first truly successful reading appliance will be targeted at analytic readers, such as analysts, lawyers or corporate decision-makers, whose time is extremely valuable.

Functionality Notes (S. Gibbons):
The author discusses 6 advantages that reading appliances introduce to reading.

1) Distribution: electronic distribution of text is more cost efficient and timely, and reading appliances can help with the protection of intellectual property by incorporating decryption keys, for example.

2) Mobile information access: reading appliances make it far easier to carry around large amount of texts. If connected to a network, reading appliance provide access to dynamic and up-to-date info.

3) Organizing: Full-text searching means less need to spend time organizing information. Metadata, such as creation and access dates, can help to filter documents. E-Text can be in multiple places at once. Annotated clipping can bring together pieces of various texts into a single document.

4) Full-text searching: Readers can query across multiple documents. Further reading lists generated from the reader’s personal annotations.

5) Supporting Different Modes of Reading: Increasing font size to make the text less tiring on the eyes. Access to dictionary definitions or foreign language translations. Tools to help with skimming, such as highlighting key terms.

6) Integrating the Paper and Computer Worlds: Incorporation of hypermedia and multimedia with traditionally paper-based text.
Cross-Referencing Notation: [Schilit, et al., 1999]

Title: As we may read: the reading appliance Revolution

Author(s): Bill N. Schilit, Morgan N. Price, Gene Golovchinsky, Kei Tanaka, Catherine C. Marshall


URL: [http://seattleweb.intel-research.net/people/schilit/sch99.pdf](http://seattleweb.intel-research.net/people/schilit/sch99.pdf)

Abstract: In the 1970s, Alan Kay and his colleagues at Xerox PARC envisioned a dynamic, interactive electronic book. Now, nearly 30 years later, that vision has become a reality. A new kind of personal information appliance-the reading appliance-is emerging as a tool for serious readers. But is the world ready for reading appliances? The authors believe that these appliances are indeed viable. Advances in mobile hardware have made it possible to build the necessary hardware. Additionally, the Web has created a market for online reading by introducing millions of people to it, and books, magazines, newspapers, advertisements, and other printed matter can be produced and read at very low cost. Network based digital libraries increase the availability of information, but people still tend to print the documents to work with them. Electronic book and document readers will neither replace paper nor will they replace desktop computers. Instead, they will occupy their own unique and valuable role in our lives, bringing the paper and computer worlds closer together.

Functionality Notes (S. Gibbons):
The paper asks two questions: 1) Which, if any, of paper’s qualities must reading appliances imitate to be successful? and 2) What are the advantages of reading online and how can computers help people read?

In answer to the first question, the authors suggest that the following ergonomics of reading paper must be carried over into electronic text:

- Light-weight, hand-held display
- High resolution
- Fixed page layout to promote spatial memory
- Mechanism for annotations
- Text must be physically mobile
- Can work with multiple pages and/or text simultaneous
- Text can be shared

In answer to the second question, authors cite the following advantages to reading electronic texts:

- Can carry numerous documents without the physical weight
- Searching
- Organization of texts
- Links to other materials
- Adjustable fonts
- Highlighting of phrases and words to improve scanning or skimming of text
Cross-Referencing Notation: [Selvidge & Philips, 2000]
Title: E-Books: Are We Going Paperless?
Author(s): Paula Selvidge and C. Phillips
URL: [http://psychology.wichita.edu/surl/usabilitynews/2W/ebook.htm](http://psychology.wichita.edu/surl/usabilitynews/2W/ebook.htm)

Abstract: If the electronic book is intended to replace the paper medium, it is important to explore whether differences exist in comprehension and reading speed from reading on an electronic book or paper. To examine this question, we administered the Nelson-Denny Reading Comprehension Tests (Form E and Form F) in two modes to sixteen participants, on a Rocket eBook™ from NuvoMedia and on paper. The presentation mode was varied within-subjects, with one test presented on the e-book and the other test on paper. The font size (10 pt.), font style (Times New Roman), and amount of information per page were identical for both paper and e-book.

Functionality Notes (S. Gibbons):
This study consisted of 16 participants to examine differences in reading comprehension and speed of identical text in paper and ebook format. The ebooks were read on a Rocket eBook device.

No differences were found between the two in terms of reading speed and comprehension. Also the users rated the reading task difficulty about the same for both. In terms of preferences, 9 of 16 preferred reading on paper, citing familiarity with the paper format, less eye strain, less glare and they felt more in control. Those who preferred ebooks liked the page up and page down buttons, thought the ebook was easier to manipulate than sheets of paper and enjoyed the backlighting. The main complaints about the Rocket eBook device were that it was too heavy and caused eyestrain.

Participants noted the following improvements would increase the usability of the Rocket eBook device:

- Decrease the weight of the device
- Increase screen resolution
- Provide page numbers of each page
- Improve the scrolling feature
- Offer screen display with variable levels of contrast
- Incorporate more functionality, such as PDA functions and Internet access
Cross-Referencing Notation: [Selvidge, et al., 2001]  
Author: Paula Selvidge, Angie Fryman, Shannon Riley  
Title: Should You Check In Your Textbook and Check Out an eBook?  
URL: [http://psychology.wichita.edu/surl/usabilitynews/3W/ebook.htm](http://psychology.wichita.edu/surl/usabilitynews/3W/ebook.htm)  
Abstract: If the eBook is to be considered a viable alternative to the traditional book, then it is important to explore the usability of the device. This study examines the usability of the Rocket eBook.

**Functionality Notes (S. Gibbons):**  
A small study (n=6) comparing typical paper book reading tasks and some ebook related tasks on a Rocket eBook device. The most difficult tasks were found to be:

- finding how many pages in the book or a specific page #
- locating and using on/off button
- adding annotations

Based on the results of this study, the authors recommend the following features to improve the usability of the Rocket eBook:

- page numbers displayed on each page without requiring users to perform any additional actions
- move location of on/off button so that it is more visible from the front of the interface.
- same button should not control power on/off and backlighting. Each function should have a separate control.
- size of keyboard for creating annotations should be increased and handwriting recognition program should be improved.
- size of scroll bar should be increased to improve accuracy, visibility and control.
Cross-Referencing Notation: [Simon, 2001]

Title: Electronic Textbooks: A Pilot Study of Student E-Reading Habits

Author(s): Eric J. Simon

Publication: Future of Print Media Journal, Winter 2001

URL: [http://www.futureprint.kent.edu/articles/simon01.htm](http://www.futureprint.kent.edu/articles/simon01.htm)

Abstract: The day when students can trade their 30-pound book bags for lightweight portable reading devices no longer seems far in the future. Several companies are now marketing appliances that may be suitable for use in education and textbook publishers are cautiously converting some of their print title into e-book formats. While few doubt the willingness of students to trade atoms for bits, little is known about how they might use e-books and the value digital technologies might add to the reading and learning experience. A few enterprising educators have begun conducting pilot studies to address these questions. The author shares the results of one e-textbook study.

Functionality Notes (S. Gibbons):
Author conducted a study to test which “e-book features students used and valued.” Study was conducted at Fordham College during the fall 1999, spring 2000 and summer 2000 semesters using Rocket eBooks.

Students indicated that the features they believe to be most important were:
- Glossary/dictionary look-up
- Bookmarking
- Highlighting
- Annotation

Students also wanted the ability to add entries into the dictionary, as the general-purpose dictionary was insufficient to help with very discipline-specific terminology.
Cross-Referencing Notation: [Summerfield, 1999]

Title: Online Books: What Roles Will They Fill for Users of the Academic Library?

Author(s): Mary Summerfield

Publication: Columbia University Libraries, March 1996 (last updated 1999)


Abstract: As the Libraries and Academic Information Systems at Columbia University have proceeded with a pilot project to provide the Columbia community with a substantial collection of online books and to evaluate the reactions of scholars to those books, it has become clear that a basic understanding of how scholars interact with various classes of traditional print-on-paper books is necessary for optimal design of the various facets of a system for intellectual and physical access to online books, for assessing the value of various components to the academic community, and for successful selection of books to be included in online collections. However, the library-related literature on the use of books by scholars has focused largely on issues related to the overall demand for collections rather than on how scholars select books to review or read or ultimately employ books in their work. Similarly, the psychological and ergonomic literature on how people read has focused on concepts, which have little to do with the place of books in scholars’ work or how scholars manipulate books in that work.

Functionality Notes (S. Gibbons):

Columbia University Libraries conducted several evaluation projects in order to better understand how “scholars interact with various classes of tradition print-on-paper books is necessary for optimal design of the various facets of a system for the intellectual and physical access to online books.” The study included focus groups and interviews with faculty and graduate students.

The faculty and graduate student in the study identified the following features as desirable for online books:

- Searching- across a collection to find relevant texts; within a text for pertinent info (stresses the need to be able to move smoothly from search results into the text itself)
- Browsing- hyperlinked TOC and index; page smoothly through the book to scan
- Printing- be able to download or print section
- Reading- text display does not cause eye strain; high quality of images
- Enhanced reading- annotations; bookmarking; saving or following interesting citations; links to datasets; links to related e-content; multimedia
- Access- doesn’t require high bandwidth
Cross-Referencing Notation: [Summerfield, et al., 2000]

Title: The Potential for Scholarly Online Books: Views from the Columbia University Online Books Evaluation Project

Author(s): Mary Summerfield, Carol Mandel and Paul Kantor

Publication: Publishing Research Quarterly, Fall 2000, pp. 39-52

Abstract: The Columbia University Online Books Evaluation Project sought to understand both user reactions to online books in the scholarly world and the cost profiles of print and online books. Scholars appreciated the opportunity to use the online format to locate a book and to browse it. However, they sought a print copy for extended reading. Incremental costs of online books are small for publishers. Libraries' life-cycle costs are lower for online books than for print books.

Functionality Notes (S. Gibbons):

Columbia University’s Online Books Evaluation Project studied the use of online books for academic work from 1995 to 1999. The project looked at:

- scholars’ behavior and reactions to online books (see below)
- lifecycle costs of traditional print books and online books for publishers and libraries
- marketplace reactions to the concept of online books

Using server logs, surveys and interviews, the study found that online reference works were used more than their print counterparts. Monographs and humanities text had only modest use, but the use was growing over the period of the study. In general, users were not reading the books online. Rather, they browsed online and then printed out the relevant portions for reading. The online versions were helpful in tracking down a quotation or citation. For students, in spite of the availability of an online version of their text, the students’ personal print copy of the text remained the most preferred method an assignment.
Cross-Referencing Notation: [Wearden, 1998a]

Author: Stanley Wearden
Title: Landscape vs. Portrait Formats: Assessing Consumer Preferences
URL: http://www.futureprint.kent.edu/articles/wearden01.htm

Abstract: Nearly all documents we routinely use in our day-to-day lives – newspapers, magazines, books, reports, brochures, letters— are portrait-oriented (taller than they are wide). On the other hand, television and movie screens, designed primarily for viewing pictures, are landscape-oriented (wider than they are tall). In recent years, the TV-based landscape format has become the de facto standard for computer displays. But Dr. Wearden’s analysis of research recently conducted as Kent suggests this is not the format preferred by media consumers for electronically displayed publications.

Functionality Notes (S. Gibbons):
In 1997 and 1998 field experiments were conducted with over 200 people at an Ohio shopping mall and a series of four focus groups were conducted with Kent State University students to determine their preference for either landscape or portrait formatting for e-texts. The studies found that the majority of people have a strong cultural bias for portrait format for periodicals. For books, the preference was portrait with 2 columns or landscape with facing pages. When an identical text was compared in newspaper format, a scrolling web-edition and a portrait-oriented, page-based electronic edition, the majority preferred the portrait-oriented, page-based electronic edition—most wanted to avoid the scrolling of the web-edition.
Cross-Referencing Notation: [Wearden, 1998b]
Title: Electronic Books: A Study of Potential Features and Their Perceived Value
Author(s): Stanley Wearden
Publication: Future of Print Media Journal, Fall 1998
URL: http://www.futureprint.kent.edu/articles/wearden02.htm
Abstract: Portable display devices designed for reading electronic editions of books and journals have been anticipated for several decades, yet little market research has been published to assess what prospective users may want and what added value they lay attach to various potential features. The Information Design Lab in the School of Journalism and Mass Communication at Kent State University recently conducted a survey of students in an effort to begin answering some of these questions.

Functionality Notes (S. Gibbons):
The paper focused on the perceived added value of ebooks. The study consisted of a survey of 276 students at Kent State University. Students rated items regarding navigation, searching, product compatibility and annotations to be the most important. Least important were multimedia features and links to websites.

Features in ranked important (high to low)
- Visually display your location within the text and makes it easier to move to a specific part of the text
- Embedded dictionary or glossary
- Search for words or phrases
- Compatibility- can move text from one device to another
- Visually display chapter headings
- Pull together annotations, notes and highlighting and save/print them
- Pull together results of searchers and save/print passages containing search strings
- Portability
- Highlighting
- See entire page without scrolling
- Annotations
- Multimedia
- Links to websites
Cross-Referencing Notation: [Wilson, 2002]

Author: Ruth Wilson

Title: EBONI: Designing Effective Electronic Textbooks


Abstract: EBONI (Electronic Books ON-screen Interface) is investigating which aspects of the design of electronic textbooks are most successfully in terms of the usability requirements of students and academics throughout the UK… the project is identifying and comparing the variety of methods which have emerged in the design of electronic textbooks for higher education, in order to determine the most effective ways of representing educational material electronically.

Functionality Notes (S. Gibbons):
The EBONI project is conducting a series of studies to determine some best practice guidelines in the design of electronic textbooks. Two main themes have emerged from the data:

- the legacy of the paper book metaphor
- different set of requirements for reading in the digital medium

The following on-screen design considerations have emerged:

- cross-referencing within the book, such as the text and the index and table of contents
- clear pagination to enhance readability
- inclusion of multimedia
- sense of place within the book
- breaking text into smaller chunks to enhance scannability
- quality of images, diagrams, etc. to be of print book quality

Research during the summer of 2001 included the evaluation of 5 devices (HP Jornada with Microsoft Reader; Franklin’s eBookman, Palm with Palm Reader; Rocket eBook; Softbook) to study issues about portable ebooks. Results show that the following elements deserve careful consideration in the design of ebook devices:

- high resolution displays with high contrast, low glare and backlighting
- finding optimal balance between size and weight of device with the amount of content that can be displayed on the screen
- designed for comfort (not too heavy) so that can be held with one hand. Limit the required use of a stylus
- careful design of mechanisms for page turning
- durable devices so that use is not limited to only “safe” situations
Cross-Referencing Notation: [Wilson, et al., 2002]
Title: A user-centered approach to e-book design
Author(s): Ruth Wilson, Monica Landoni and Forbes Gibb
Publication: The Electronic Library, 20:4, pp. 322-330
Abstract: This paper considers the Electronic Books ON-screen Interface (EBONI) Project's research into the importance of the user when designing electronic textbooks. The results of the Visual Book and the WEB Book experiments, which explored design aspects of e-books and provide a backdrop to EBONI's research, are presented. EBONI's methodology and evaluations, involving over 200 students, lecturers and researchers in UK Higher Education, are describes, and the findings discussed. It is proposed that, while aspects of paper books such as table of contents, indexes and typography should be retained, books delivered electronically should also adapt to fit the new medium through use of hypertext, search engines and multimedia. In terms of the design of e-book hardware, issues such as size and weight, display technology and functionality are of primary importance to users.

Functionality Notes (S. Gibbons):
Experiments for the EBONI project found 2 central themes for e-book design considerations: 1) legacy of the paper book metaphor, and the wisdom of adhering to this, where appropriate, in the construction of the electronic book. 2) The different set of requirements arising when the reader interacts with the new electronic medium.

Suggestions for continuing the paper book metaphor:
- Inclusion of a book cover—reinforces perception of a cohesive unit
- Indicator of place within book- how far into it text, how far to end of chapter, etc.
- Inclusion of table of contents- sense of structure, relevance of material to own inquiries, navigation tool
- Inclusion of index—better if hyperlinked
- Fixed page layout- uniform page sizes and layout
- Method to make images, formulas and diagrams as easy to see and use as in print
- Annotation and highlighting of text

Different requirements because of the electronic medium:
- Ways to increase scanability - additional headings, highlights of key words, etc.
- Full-text searching
- Cross-referencing throughout the text
- Inclusion of multimedia elements

If text is displayed on a device, the device should:
- Not be too heavy
- Be or appear to be durable
- Intuitive navigation— not needing a stylus and with buttons sufficiently large
- Screens can’t be so small that can only view short portions of text, thus constantly “turning the page”
- Search function across all texts on device
- Hyperlinking throughout and between texts
- Easy access to dictionary
- Backlit