

Designing for Selective Reading with QuikScan Views

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ABSTRACT

Many people—especially knowledge workers—experience information overload, lack sufficient time to read, and therefore choose to read selectively within texts. QuikScan Views is a new Web-based reading environment that provides extensive support for selective reading. It is an enhancement of QuikScan, an empirically validated document format that employs a multiple summary approach to facilitate selective reading, enable quick access to specific ideas in the body of the document, and improve text recall. QuikScan Views provides a hyperlinked table of contents for global navigation, displays QuikScan summaries in a scrolling window (as well as within the body of the document), and adds an extra level of summarization by means of a hyperlinked structured abstract. A QuikScan Views document gives the reader choices of pathways through the document corresponding to the time the reader wishes to invest and the reader's desire to increase their recall of the document.

Categories and Subject Descriptors

H.5.4 [Information Interfaces and Presentation]: Hypertext/Hypermedia—*Navigation*; I.7.2 [Document and Text Processing]: Document Preparation—*Format and notation*

General Terms

Design, Human Factors

Keywords

Literacy, Reading, Summarization, Selective Reading

1. INTRODUCTION

Many people—especially knowledge workers—experience information overload [21, 5] and don't think they have enough time to read all the texts they think necessary to keep up with their job duties and areas of expertise [12, 11]. For these individuals reading selectively within a document is a professional survival skill [14, 11]. There are also arguments, backed by some empirical research and many anecdotal reports, that various societal changes associated with the digital age are reducing peoples' attention spans and willingness to read extended texts [3, 4, 16, 2, 15]. In other words, there may be increasing numbers of well-educated people who will read many Facebook posts and tweets but—at least under certain

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SIGDOC'12, October 3–5, 2012, Seattle, Washington, USA.
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circumstances—resist reading extended texts even if they are not pressed for time.

For centuries our medium-to-long documents have often included affordances that support selective reading, that make it easier for overworked or resistant readers to bypass certain portions of a document and focus instead on portions of greater interest. These affordances include the abstract, the table of contents, headings, appendices, and within-document hyperlinks. But now seems like a good time to devise and adopt new designs that are more effective in supporting selective reading.

QuikScan is a recently developed document format that effectively supports selective reading within documents by means of multiple within-document summaries [22, 23, see also <http://www.quikscan.org/>]. Here I introduce a new multiple summary design: the QuikScan Views reading environment. QuikScan Views is a variant of the QuikScan format optimized for the Web. While classic QuikScan texts can be published as HTML and PDF as well as print, QuikScan Views is Web-specific because it relies heavily on hyperlinking and windowing. The value of QuikScan Views is that it gives the readers more well-supported reading pathways than does QuikScan.

Below I briefly describe QuikScan, pointing out the strong experimental evidence demonstrating its value. Then I briefly describe one other design, SwitchBack, because it sheds light on the “loss of context” problem that pertains to QuikScan, QuikScan Views, and indeed all multiple summary designs. Then I turn to QuikScan Views explaining what it does, the various ways in which it benefits readers, and how it is implemented. (For an advance look at QuikScan Views, look ahead to Figure 3.)

2. QUIKSCAN

QuikScan employs numerous summaries placed strategically within a document, very often directly following a heading. As shown in Figure 1, these summaries are formatted as numbered list items that correspond to target numbers placed within the body of the document. Busy or impatient readers can read just the summaries, choose between summaries or sections of the full text depending on their level of interest, or (by using the numbers) scan quickly from an idea in a summary to the specific location in the body of the document where the idea is fully discussed. More committed readers can read the summaries as previews while they read the full text.

Empirical studies demonstrate that reading QuikScan summaries as previews impressively improves text recall, [22, 18, 19, 20], that QuikScan enables better navigation within the document [24], and is well accepted by readers [22, 18]. Furthermore, because QuikScan promotes more efficient reading, readers who read the summaries and the full text require no more reading time than readers who just read the full text [18, 19].

Procedure

- 14} Three redcedar trees were harvested. Two were limbed and their trunks were chipped. The third was chipped with branches and foliage.
- 15} The two limbed trees were used as the raw material for round wood particleboard furnish while the third tree was used for whole tree furnish. See figure 1.
- 16} We made 18 single-layer particleboard panels from the round wood furnish and 18 single-layer panels from the whole tree furnish.
- 17} Test samples were prepared based on ASTM D-1037 specifications.

{ 14 Three eastern redcedar trees with an average of 10.3-inch diameter at breast height (DBH) were harvested in Goldsby, Oklahoma. Two of the trees were limbed and only their trunks were chipped. The third tree, after being bucked into smaller segments, was chipped with branches and foliage using a commercial chipper. The chips were reduced into particles using a laboratory-type hammer mill without screening. Later, the furnish was dried to 5 percent moisture content in a 30-ft.³capacity dryer.

{ 15 The two limbed trees were the raw material for round wood particleboard furnish. The other tree was used for whole tree furnish. Both kinds of furnish are shown in Figure 1.

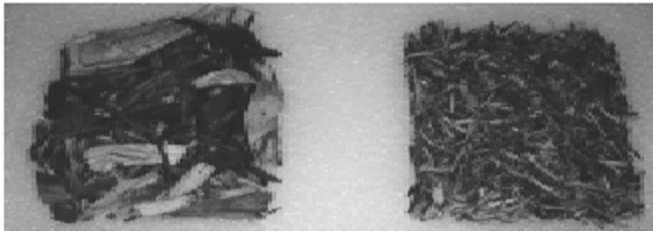


Figure 1. Whole tree and round wood furnish.

{ 16 Thirty-six single-layer mats with dimensions of 20 x 22 x 0.5 inches were manually formed in a frame prior to being pressed into particleboard panels. Eighteen mats were composed of round wood furnish and 18 were composed of whole tree furnish. Urea-formaldehyde resin with a solids content of 65.8 percent was used as binder for the panels. The furnish for each panel was mixed with 7 percent resin in a rotating-drum mixer for 5 minutes. No wax was used in this process.

{ 17 Test samples were prepared based on ASTM D-1037 specifications and conditioned at a temperature of 70 degrees Fahrenheit and 55 percent relative humidity before any tests were carried out. Modulus of elasticity (MOE) and modulus of rupture (MOR) were determined on a Titus Universal system and a Comten tensile tester was employed for internal bond strength (IB) tests.

Results and Discussion

- 18} Modulus of elasticity (MOE) values, modulus of rupture values (MOR), and internal bond strength (IB) were ascertained (Table 2). The round wood particleboard exceeded ASTD specifications. The

Figure 1. A portion of a QuikScanned document showing a QuikScan summary (gray box) and corresponding target numbers in the body of the text.

QuikScan was designed to accommodate the wide variations in formatting we regularly see in the many genres of expository texts. For example, there are four different kinds of QuikScan summaries and three different numbering systems for the list items and target numbers. Because QuikScan is a complete and flexible document specification, you can QuikScan a document with one or multiple columns, figures and tables, few or no headings, multiple levels of closely spaced headings, bulleted lists, etc. You can write a document with QuikScanning in mind or you can QuikScan an existing document. QuikScan has drawbacks, the main one being the extra work entailed in writing and formatting the summaries and adding the target numbers to the body of the document. Summaries, however, can be formatted efficiently using various shortcut techniques available in full-featured word processing applications. Also, a recent addition to the QuikScan specification makes QuikScan easier to format than it was originally (see “Simpler QuikScan” in <http://www.quikscan.org/>). Even so, because of the extra effort, QuikScan will most often be used for relatively high-value documents, such as documents that will be broadly distributed or will be the basis of important decisions.

3. SWITCHBACK AND THE LOSS OF CONTEXT PROBLEM

Selective-reading designs employing the multiple summary approach are not rare. For example, many book-length documents provide a summary before each chapter. The influential STOP format [17, 6] consists of two-page modules, each with a summary (“thesis statement”). Still another example is a BBC Website, *India-Pakistan Troubled Relations* [1]. This Website features nine pages each describing a phase in the conflict between the two nations. Each page begins with a brief abstract so that the reader can choose between the abstract and the full discussion.

While multiple summary designs give readers the choice between reading the summary or the corresponding section of the full text, they are also subject to what can be termed the “loss of context problem”: When a reader opts for a summary instead of the full text, the resulting information deficit may cause problems for that reader later on in the document.

The screenshot shows the SwitchBack interface for a document titled "The Battle of Hampton Roads". At the top left is the SwitchBack logo (a stylized 'S' and 'B' with arrows) and the text "SwitchBack". To the right are "Help" and "Search" buttons. Below the title bar, there are "Reset" and "Return to Library" buttons. The main content area is divided into two columns. The left column contains four sections, each with a "Lite" and "Study" button: "Section 1: Introduction", "Section 2: Hampton Roads Enters the War", "Section 3: The Battles", and "Section 4: Impact on Naval Warfare". The right column displays the text for the selected "Study" option, "Section 2: Hampton Roads Enters the War (Study)". The text in this column reads: "Hampton Roads enters the war. Early in the war, local troops seized Norfolk and threatened the Gosport Navy Yard. The commandant there, Captain Charles S. McCauley, gave orders to scuttle the ships in the yard and destroy its facilities. Nine ships were burned, among them the screw frigate *USS Merrimack*. One (the old frigate *Cumberland*) was towed away successfully. *Merrimack* burned only to the waterline, however, and her engines were more or less intact. The destruction of the navy yard was mostly ineffective; in particular, the large drydock there was relatively undamaged and soon could be restored. Without firing a shot, the advocates of secession had gained for the South its largest navy yard, as well as the hull and engines of what would be in time its most famous warship. They had also seized more than a thousand heavy guns, plus gun carriages and large quantities of gunpowder. With Norfolk and its navy yard, the Confederacy controlled the

Figure 2. A sample SwitchBack document showing the reading paths available to the reader and the text SwitchBack displays in response to the reader’s choices.

SwitchBack, developed by Farkas, Raleigh, and the SwitchBack Research Group at the University of Washington, is a working prototype designed to address and to explore this loss of context problem [7, see also <http://faculty.washington.edu/farkas/SwitchBack.html>]. A SwitchBack document is shown in Figure 2.

SwitchBack addresses the loss of context problem by tracking the reader's path through the document and interposing any information the author deems necessary to prevent the problem. In the figure, we can see that the reader chose to read the Lite (summarized) version of Section 1 and then switched to the Study (complete) version of Section 2. SwitchBack has interposed the prerequisite information (the goal of the Confederacy) that the reader missed by not reading the Study version of Section 1). The reader, therefore, is not hindered by the lack of prerequisite information as she reads the Study 2 component. We refer to this interposed prerequisite information as a "bridge component." If the reader had read Lite 1, Lite 2, and Study 3, SwitchBack would have interposed Bridge Components 1 and 2 (rather than just Bridge Component 1). We usually display bridge components to readers under the heading "What you missed in Study X." The essence of SwitchBack is simply this: Whenever the reader makes a switch from Lite to Study content, any prerequisite information is interposed as a bridge component. Authoring a SwitchBack document is significantly more arduous than QuikScanning. The author must (1) keep track of all the pathways a reader can follow when choosing between lite and study components, (2) write the appropriate bridge components (.txt files), and (3) upload numerous SwitchBack files to the appropriate SwitchBack folders on the server. To limit the complexity of this task, the practical limit to the number of sections in a SwitchBack document is five.

Working with both QuikScan and SwitchBack yielded insights regarding the loss of context problem in multiple summary designs. First, the likelihood and severity of the problem increase with the reader's lack of familiarity with the subject matter, the reader's discomfort with incomplete information [10], and (unless bridge components are interposed) how many times the reader chooses a summary before switching to the full text. The problem also increases when summaries are relatively short in proportion to the sections of text being summarized. Shorter summaries (say 10% or less of the length of the summarized section) enable busy readers to save more time than do longer summaries, but cause larger information deficits. We also recognized that SwitchBack is worth doing only if summaries will be short. With longer summaries (say 25% of the length of the summarized section), there are fewer instances of the loss of context problem to protect the reader from and less reason to go to the extra trouble of authoring a SwitchBack document. In the case of QuikScan, which does not interpose prerequisite information, longer summaries are advisable, and the QuikScanner should strive to write informationally rich summaries that will minimize the loss of context problem. A final insight is that while a SwitchBack or QuikScan author can do a reasonably good job in anticipating the information needs of the mainstream reader, readers with special interests (idiosyncratic information needs) will not find the information they are seeking in the summaries and bridge components and should read the full text. These insights significantly influenced the design of some interim prototypes (not discussed here) and then QuikScan Views.

4. QUIKSCAN VIEWS: MORE CHOICES FOR READERS

QuikScan Views, the culmination of this paper, is a Web-based version of QuikScan with significant enhancements. First, I explain the QuikScan Views user interface and its features. Then I explain how users benefit from the extra pathways. Then I proceed to implementation and conclude with future plans. A QuikScan Views document is shown in Figure 3. Examples are available at <http://www.quikscan.org/QuikScanViews.html>.

4.1 More Choices for Readers

A standard QuikScan document does not allow the reader to navigate instantly among the sections of the document. Instead, you turn pages or scroll linearly through the document. However, QuikScan Views' persistent table of contents (TOC), shown at the upper right in Figure 3, provides immediate access to each section of the document (global navigation).

Below the TOC is the (scrolling) QuikScan summary window. This window displays all the QuikScan summaries (along with hyperlinked headings of the document) but none of the intervening body text—very convenient if you opt to read just the summaries. Finally, there is a structured abstract [9, 13], partly visible in the upper left. Structured abstracts, like conventional abstracts, enable a reader to preview the document, but are divided into sections with headings that map to the headings of the document. The headings of QuikScan structured abstracts are hyperlinked to the headings of the document. Also, because the sections of these structured abstracts are usually just one or two sentences, the structured abstract provides an additional, more abbreviated level of summarization than do the regular QuikScan summaries.

A QuikScan Views document can be displayed without horizontal scrolling on any desktop and almost any laptop computer (even down to a net book (880 pixel requirement)). If the browser window is reduced in width for display on a tablet, the QuikScan summary window will overlap the QuikScanned document—an awkward situation. To avoid this problem, the tablet user can hide (and then restore) the summaries using the link in the TOC. In addition, the summaries can be displayed in a new browser tab. Finally, a link at the top (not visible in the figure) displays a PDF version of the QuikScanned document.

4.2 The Loss of Context Problem

QuikScan Views addresses the loss of context problem in a simpler way than SwitchBack. Just as with QuikScan, the relatively long summaries minimize the problem. Also, the reader can use the browser's Find feature to search the full document for prerequisite information he or she didn't find in a summary.

Readers who only read one or more sections of the structured abstract and then jump into the body of the full document are quite likely to experience a loss of context problem because these very short sections provide relatively little prerequisite information. But these readers stand a good chance of finding the prerequisite information they need by scrolling through the QuikScan summary window. Unfortunately, the very busy or impatient readers who opt for the structured abstract are exactly those who will be tempted to accept confusion on a point rather than taking time to find the prerequisite information. But the

convenience of the summary window may be the tipping point [8] that motivates them to resolve their confusion.

4.3 Traditional and Modified Structured Abstracts

Standard structured abstracts map only the first-level headings of the document they summarize. Because structured abstracts are especially prevalent in scientific and technical journal articles, we usually see headings such as these in structured abstracts: Background, Procedure, Results, Discussion, and Conclusion. But what if the document does not divide neatly into a limited number of first-level headings? What do we do, for example, if the document contains a large and important section introduced by a second-level heading? The QuikScan Views specification allows for one or more second-level structured abstract headings (indicated with indentation) and—as necessary—other variations from the standard structured abstract. The QuikScan Views document “War of the Poppies” (<http://www.quikscan.org/Poppies/>) is an instance in which the QuikScanner supplied headings in the body of the document (marked with brackets to show them as the QuikScanner’s additions) that were then used to write the structured abstract. If structured abstracts are going to be adopted in disciplines outside the sciences and in a wider range of genres, the general model for structured abstracts should probably be relaxed to

allow for the inclusion, when appropriate, of a document’s second-level headings.

4.4 Implementation

In most cases, it’s best to create a QuikScan Views document by first creating a QuikScan version in MS Word (or another full-featured word processing application). You can export a (filtered) HTML file from Word into any HTML editor or use Dreamweaver’s Import feature. An alternative is to build the QuikScan version directly in HTML, especially if you use Simpler QuikScan formatting (<http://www.QuikScan.org/SimplerQuikScan.html>).

Once the QuikScanned document is in HTML format, just a few hours of intermediate-level Web-building work is required—especially because QuikScan.org provides detailed instructions, fully commented sample documents, and a template which includes the simple JavaScript that hides the summary window. The only extra writing is the structured abstract, which in any case is a desirable addition to most documents. Because QuikScan, SwitchBack, and QuikScan Views are in the public domain, they can be used and modified freely.

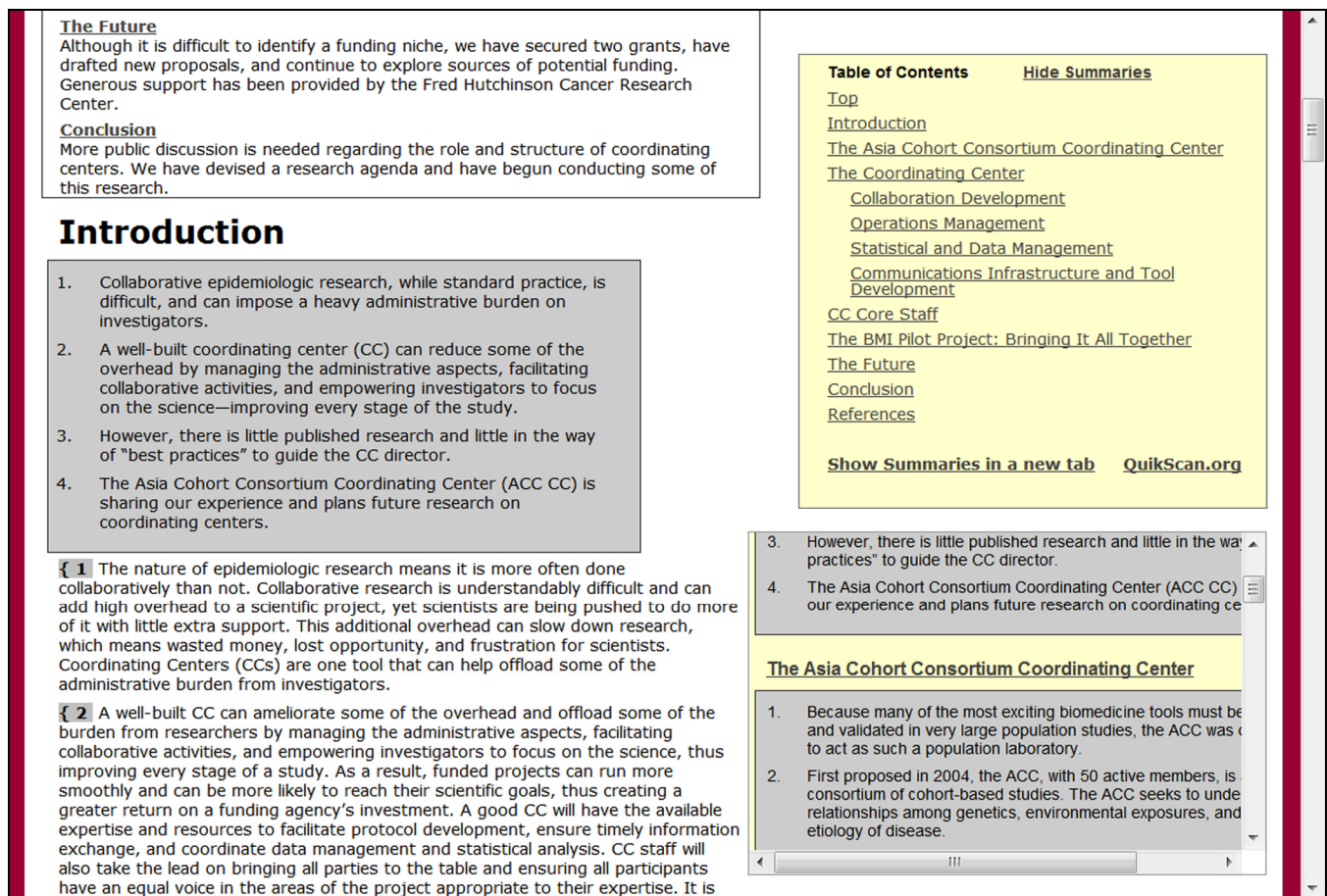


Figure 3. A QuikScan Views document as it appears on a desktop or laptop computer.

5. CONCLUSION

Because classic QuikScan documents are embedded without change within QuikScan Views, it is highly plausible that the well-demonstrated benefits of QuikScan apply as well to QuikScan Views. Direct experimental testing of QuikScan Views, however, presents significant challenges because the essence of QuikScan Views is to give readers multiple choices (pathways through the document), choices that reflect the complex pressures, motivations, and trade-offs that arise in actual use, but are hard to simulate realistically in a controlled study. A better plan is an extended observational study conducted with a group of readers who have used one or more QuikScan Views documents to achieve authentic reading goals.

With so many busy and impatient readers, it seems desirable to support selective reading through good design. Multiple summary designs are an excellent design approach, even though the loss of context problem must be addressed in some way. QuikScan, SwitchBack, and QuikScan Views each offers its own features and benefits. The special strength of QuikScan Views is that it empowers the reader by providing many more pathways through the document.

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