

## EMERGING TECHNOLOGIES E-TEXTS, MOBILE BROWSING, AND RICH INTERNET APPLICATIONS

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Online reading is evolving beyond the perusal of static documents with Web pages inviting readers to become commentators, collaborators, and critics. The much-ballyhooed Web 2.0 is essentially a transition from online consumer to consumer/producer/participant. An online document may well include embedded multimedia or contain other forms of invited user interactivity such as questionnaires, annotations, pop-up windows, or animations. Adobe's recently released Adobe Digital Editions illustrates the trend, moving from static PDF's (read with the Adobe Reader) to a Rich Internet Application (RIA) in which PDF's are just one possible resource alongside many others. Apple's new iPhone sets another interesting marker in terms of accessing online documents, as it forgoes entirely any type of local file access and relies on ubiquitous network access for retrieving documents. On the other hand, electronic devices dedicated to the reading of texts have recently been introduced, taking advantage of new technologies for an improved e-book reading experience. In this column we will be looking at these and other recent developments as they pertain to accessing and experiencing electronic texts, and what these developments might mean for language learning.

### WEB TEXTS

The proliferation of authentic texts on the Web is far from enough to guarantee that language learners can profitably delve into texts they have located to help them in their language acquisition. More likely, an uninformed search will result in frustration as an overwhelming variety of texts, both useful and useless, are retrieved. Critical thinking and evaluation skills are crucial in sorting through the vast collection of readings to be found online. Learners need to be able to locate texts at the level of their language skills, but they also need to develop metacognitive strategies to be aware of how they learn and what might prove useful for improving their reading ability. Reading on a screen is itself a different experience from reading a printed page. Monitors have been steadily improving in screen resolution and contrast, which helps considerably in on-screen reading. What may still pose a challenge in online reading is unfamiliarity with the constantly evolving design options for Web pages. Styling of text through manipulation of [CSS](#) (cascading style sheets) makes it easy for Web developers/authors to add show/hide elements, use a variety of indicators for linked text (i.e., dotted lines may indicate a different kind of link from solid lines), and enlist many different options for arranging text on the page. Online reading is not nearly as straightforward as opening a book.

Most importantly for language learners, reading Web-delivered texts can be enhanced through the use of a myriad of Web functions and tools. The fact that the reader is using a network to retrieve a text means that there are other readers online who may be able to offer comprehension help or to become discussants of content. That could happen in real time through chat or instant messaging or asynchronously through posting to discussion forums, blogs, or wikis. One of the major Web developments in recent years has been the extent to which readers are becoming writers. The popularity of blogs testifies to this, as does the proliferation of social networking sites. Sites such as [Amazon](#) have long offered readers the opportunity to write personal reviews; the large number of readers who have availed themselves of this option testifies to the read/write nature of the Web today.

The online reader also has help in the form of a variety of language tools and resources, including electronic dictionaries and grammars, translation tools, and glossed texts. One of the more interesting developments in this last category is the availability of tools for the automatic glossing of texts. There

have been projects underway such as [PC-KIMMO](#) or the [Berkeley Interlinear Text Collector](#), out of which text glossaries have been developed. Recently, dedicated text glossing tools for online texts have become available. One of the easiest to use is [Gymnazilla](#). Gymnazilla uses freely accessible open-source dictionaries to create on-the-fly annotated (dual language) versions of any electronic text. The users specifies the source of the text, the original language, and the desired glossary language. The newly created glossed text maintains the layout of the original document, including any multimedia or interactivity, and adds links to glosses of words and phrases which appear when the user moves the cursor over the text.

An online [version](#) demonstrates how Gymnazilla works. There are additional features which can be added to an annotated text, including insertion of images (found through image searching) as glosses, creation of personal wordlists, and online vocabulary exercises constructed from personal wordlists. Gymnazilla is based on [XNLRDF](#), an XML-based database for multiple languages. As the database is built from open source collections, it varies in completeness and accuracy from language to language, depending on available resources. It is possible for users to add to the database, which could be helpful in improving the effectiveness of Gymnazilla as a practical tool for language learners.

### **DEDICATED E-BOOK READERS**

One of the other major new developments in the area of electronic texts has been the release of several new dedicated e-book readers, which offer significant enhancements over the previous generation of electronic book readers, none of which have been commercially very viable. There are three principal new features to these new devices: improved screen readability, expanded connectivity, and a more attractive form factor. With its soft leather case and paperback book size, the [Sony Portable Reader](#) strives to give the impression of reading a printed book. It is light (9 ounces or 250 grams), thin (1/2 inch or 1.3 cm), and features a 6 inch (15.2 cm) display. The display is what is most striking about this and other new generation readers. The text does not flicker on screen and is readable from virtually any angle and in almost any light, including sunlight. The enabling technology is called [E-ink](#), which uses electrically charged microcapsules of ink (black and white) to display the letters. It requires no backlighting and consumes power only when the page is turned, thus improving battery life. The high contrast monochrome display is very clear and because the image is stable, and in high resolution, it is less fatiguing to the eyes than a traditional LCD; it really does come close to the experience of reading a printed book.

While the Sony Reader relies on a USB connection to transfer files from a PC, the [iRex Iliad Reader](#), which also features E-ink, adds WiFi connectivity to provide wireless networking. It also integrates a WACOM sensor board, which allows for writing and drawing on the screen. Like the Iliad, the new Cybook from [Bookeen](#) runs a version of Linux. The Bookeen device features a new and improved display technology, [Vizplex](#) e-paper. This is said to overcome one of the issues with E-ink displays, a relatively slow refresh rate, which results in having to wait several seconds for a new page to appear. Vizplex also draws less power - Bookeen is claiming up to a month of use time between charges. An impending entrant to the list of E-ink readers is the [Kindle reader](#) from Amazon. Amazon's reader adds 3G cellular connectivity, with the possibility of purchasing and downloading e-books directly to the device. Amazon has had for some time an ["upgrade policy"](#) which allows users who have purchased books to obtain an electronic copy of selected texts for a minimal fee. It seems likely that the release of their e-reader hardware will result in an expansion of their e-book services.

It is uncertain whether the new e-book readers will be any more successful than their predecessors. They are not inexpensive, ranging in price from 300 to 500 USD. That's a high price for a single purpose electronic device. They might prove to be more marketable if they took greater advantage of network connectivity as well as providing the possibility to write and post. Several e-readers do feature RSS news feed capability but they do not incorporate a Web browser. They generally support traditional e-book

formats including plain text, PDF, RTF, and HTML. However, for commercial texts, they use different [DRM](#) (digital rights management) schemes that are mutually incompatible. While Sony runs its own service, [Connect](#), for use with their reader, most e-readers rely on [Mobipocket](#), a service which provides texts in .PRC format. The Sony Reader, like the other e-book devices, supports Unicode, but with some limitations. A [thread](#) on the MobileRead forums discusses the steps necessary to encode Russian texts for display on the Sony device.

## MOBILE PHONES AS E-READERS

The new e-book readers generally feature additional file storage through the use of SD (Secure Digital) cards. This allows for the equivalent of a library of up to several hundred titles to be loaded and available. A different model of accessing texts is that provided through mobile devices such as smart phones. Of course, the small screens on most cell phones work fine for short text messages but are not well suited for any kind of sustained reading. Moreover, proprietary browsers from many cell phone providers make it difficult to freely browse the Web, as they direct users to recommended sites that are cached for faster access. This makes it more difficult to find and retrieve Web texts. However, with the arrival of [Opera mini](#), users can have a browsing and reading experience closer to that of a PC's. It renders pages much better than most small browsers and at reasonable speeds. Opera mini is actually a small Java application that is loaded into the phone and which then communicates with a dedicated server, retrieving the requested page and optimizing it for the display on the mobile device. Opera mini will run on most mobile devices (including [Palms](#)) that have support for Java. Some companies, recognizing the strong public preference for an open browser, are beginning to support use of Opera mini on their phones. [T-Mobile](#), for example, is beginning to pre-load the application on their phones in some markets.

Microsoft has recently released a version of their own mobile browser, [Deepfish](#), which promises to provide a browser experience closer to that of a desktop computer, although in the currently released version neither cookies nor JavaScript are supported. Mozilla has also recently released a mobile Web browser, [Minimo](#). One of the most advanced browsers for mobile devices is the [S60 browser](#), S60 being a dedicated cell phone OS (running a version of Symbian). It is available from Nokia and other phone vendors. The browser has many sophisticated features, especially when compared to most other cell phone browsers, including visual history, support for up to 5 simultaneous browser windows, and page saving for off-line reading. You can zoom in and out of a page, and a transparent page map shows where you are. It offers both Flash and JavaScript support. It is built using the open-source [Webkit](#), which incorporates the Web display and scripting components Apple developed for use in its Safari browser.

The big news this year in the area of mobile browsing has been the release of the Apple [iPhone](#) for the US market in June. It features a version of the Safari browser that, like the browser for S60, features faithful rendering of original page design. It adds interesting new features such as two-finger zoom and support for up to 8 windows. The current version does not support Flash. As is the case with most other mobile browsers for cell phones, the iPhone does not have a file system for saving and viewing documents. This makes it dependent for the viewing of text documents on either email attachments or network retrieval. In fact, with the built-in WiFi and cellular data support, the assumption is made that storage will occur on the network, not on the device. This use of a network rather than local storage follows the trend evident in other areas such as photos ([Flickr](#)), videos ([YouTube](#)), or bookmarks ([del.icio.us](#)). This development is favorable to the use of mobile devices with limited storage capacity and seems likely to accelerate their popularity. In a recent Web [posting](#), Robert Nagle argues that the future of e-books may very well lie in online rather than local access. The new [Touch iPod](#) also features the Safari browser, although network access is only through WiFi.

Due to its unusually attractive, high-resolution screen, the iPhone has stirred a lot of interest in its potential use as an e-book reader. Several Web sites have sprung up to support the retrieval and reading of e-books on the iPhone, such as [book.app](#) and [Readdle](#). One of the more interesting is [Books on iPhone](#),

which offers an interface very similar to that of the iPhone and adds bookmarking and page-based navigation (rather the default scrolling system used by the iPhone). Currently, it offers some 30,000 open-source texts in English. Its design is similar to other iPhone Web portals which have emerged, such as [Leaflets](#). One of the hopeful developments in terms of mobile Web browsing has been the support from Apple and most other creators of mobile browsers for the use of official Web standards rather than the proprietary formats. While there are specific XHTML tags that can be used to format Web pages more [optimally for the iPhone](#) (such as "viewport"), Web pages by no means need to use these tags to display well on the device.

Unicode support is the same as provided on other WebKit browsers. It seems likely that users will embrace the full Web page view used by the iPhone and the S60 browsers. The attempt in 2006 to introduce the ".mobi" domain name as a way to have parallel, essentially dumbed-down, Web pages for mobile devices has not proven to be very successful. The iPhone and similar devices sure to arrive in the near future seem likely as well to prove to be more popular as potential e-readers than dedicated electronic text readers, which tend to use proprietary formats. The other draw of the iPhone is its intuitive user interface, which is quite different from the clunky navigation schemes used even in the newer e-book devices. This has been and, from user reports, continues to be, one of the least successful aspects of the dedicated e-book readers.

## **FROM DOCUMENTS TO APPS: RICH INTERNET APPLICATIONS**

Developers who want to create applications for the iPhone will have to design those apps to run within the Safari browser, which provides the application framework and display, thus creating a "rich internet application." Increasingly, [RIAs](#) are being used to display text more dynamically and with added options. RIAs are Web applications that have many of the attributes of desktop apps (although not the ability to access local files) and in which the processing is done on the local client (usually a Web browser) while the bulk of the data to support the app resides on a Web server. An example is the new online version of the New York Times, called the [Times Reader](#). While maintaining a basic design based on the print edition, it incorporates automatic reflow of text (including dynamic column repositioning as well as text wrapping, hyphenation and font adjustments) depending on the browser and user choices. There are multiple and flexible search options, including a topic explorer. It is built using Windows Presentation Frameworks ([WPF](#)) from Microsoft, which requires Windows Vista (or an upgrade from XP) and .Net 3.0. Since it is designed to work with Microsoft products, WPF has special features for display on a Tablet PC or Windows mobile device.

Another e-book project built using WPF is [Turning the Pages 2.0](#), which presents fifteen of the most valuable (and fragile) manuscripts and books from the British Museum. The online gallery allows users to magnify details, listen to audio commentary, and store notes. Several of Leonardo da Vinci's notebooks are available, as is the "Diamond Sutra", the world's earliest printed book. For users who do not have "Vista premium ready" hardware, Shockwave versions of most of the books are available.

While projects built with Microsoft WPF have limited compatibility across browsers and operating systems, the use of AJAX offers widespread deployment, including on mobile devices. [AJAX](#) (for asynchronous JavaScript and xml) refers to the use of a combination of technologies available on modern Web browsers, which together provide interactivity. This method of displaying Web content has evolved as one component, [JavaScript](#), has become more powerful and another, the [DOM](#) (document object model - the structure that allows access to page elements), has received more universal support in browsers. The third key component is the ability to pre-load data in the background from a Web server using [XMLHttpRequest](#). This pre-fetching allows updating of information on the Web page without the necessity of reloading, thus providing instant updating of data tables or, in the case of online reading, quicker look-up of notes or annotations. With the growing popularity of AJAX has come the development

of frameworks (such as [jQuery](#), [Dojo](#), and [Ext](#)) - essentially code libraries and ready-to-use components - to make it quicker and easier to take advantage of AJAX.

AJAX is not the only possible approach to developing rich internet applications. Microsoft has recently released the initial version of [Silverlight](#) (code-named "Windows Presentation Frameworks Everywhere"), built around a subset of WPF as an alternative to AJAX and Flash. In contrast to WPF, it runs on multiple browsers and operating systems. [OpenLaszlo](#) is another recent entrant into the field of building RIA's - it is designed to provide an open source alternative to using Flash.

[Adobe Digital Editions](#) is an RIA framework specifically designed for digital publishing. It is built around the Flash Player and Adobe Flex and runs on multiple platforms, although not yet on mobile devices. In contrast to the Adobe Reader, Adobe Digital Editions is a lightweight program (2.5 MB download) and it is specifically designed to manage and read e-books, not just PDF files. It allows creation of multiple "bookshelves", has support for bookmarking and highlighting, and allows users to write notes, which are stored in an open XML format, for possible use in social networking tools. The current version is English only but versions in multiple languages are in the works. Unicode texts are supported, but not for right-to-left languages. Adobe Digital Editions runs outside of the Web browser and is designed to do for e-books what Apple's iTunes represents for digital music. Unlike Apple's software, however, there is no store linked to Adobe's program. Adobe Digital Editions has received [mixed reviews](#), due largely to display and navigation concerns.

Another concern with Adobe Digital Editions are the formats it supports, which do not include plain HTML or text, formats used by popular text collection sites such as [Project Gutenberg](#) or the [Internet Text Archive](#). It does support PDF and the new [epub](#) specification, an open e-book standard (in zipped format). In contrast to PDF, the epub format allows for reflowable text display. Currently, authoring in epub format is supported by Adobe's [inDesign CS3](#) and a handful of [other tools](#). It appears that it is a standard that is garnering increasing support, as Sony and mobipocket have announced their support for the format. It is not clear, however, whether this new open standard will gain wide enough industry and consumer support to overcome the nagging issue of competing (and mutually incompatible) e-book encoding systems, which has long been the main stumbling block for wide acceptance of e-books. It will be interesting to see if in fact e-books fulfill the lofty vision incorporated in a recent [video](#) (in French) from editis, in which the everyday life of a couple revolves around the use of very sophisticated e-book readers, or whether e-books will remain in the category of great technology ideas that flopped, as [listed](#) recently by computerworld. The potential for language learning is considerable if one considers the possibility of networked interactive e-texts, presented within a rich internet application framework, which can be accessed with full functionality in multiple platforms with the availability of tools such as quick access glossaries/notes along with communication and collaboration services.

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## RESOURCE LIST

### Web Text Comprehension Tools

- [The Reading Matrix](#) Special issue on reading and technology
- [Babelfish](#) Online translation services
- [Using Technology to Assist in Vocabulary Acquisition and Reading Comprehension](#) From The Internet TESLJournal, by Andreea I. Constantinescu
- [Reading in a Foreign Language](#) On-line, refereed journal
- [GLOSS project](#) From lingnet
- [BRIX project](#)
- [A Goal-Oriented Foreign Language Learning System with Semantic Information Filtering Abstract](#)
- [Towards Ontologies On Demand](#) Article on text mining for building the Semantic Web

- [e-learning 2.0 - how Web technologies are shaping education](#) From the Read/Write Web
- [The Berkeley Interlinear Text Collector \(BITC\)](#) On-the-fly glossary creation
- [The Glossary Wizard](#) Tool for creating glossaries using perl
- [Gymnazilla](#) Automatic text glosser
- [Gymnazilla](#) Different implementation
- [PC-KIMMO](#) Processor for morphological analysis
- [XNLRDF](#) An Open Source Natural Language Resource Description Framework

### **E-book Readers**

- [Review of Sony's Portable Reader System](#) From zdnet
- [E-ink](#) Technology behind Sony's ebook reader
- [iLiad](#) eBook reader from iRex
- [Mobipocket](#) eBook format
- [My Blog log](#) Networking for readers
- [List of e-book format converters](#) From wikipedia
- [Possible ou probable?](#) Video (in French) exploring the future of the e-book
- [MobileRead Forums: Cyrillic](#) How to get Cyrillic to work with Sony Reader
- [TeleRead: Bring the E-Books Home](#) Good post on the future of e-books

### **Mobile Devices for reading**

- [Readdle](#) A Service for ebooks for the iPhone
- [Create ebooks on your iPod](#) Site for creating ebooks on an iPod
- [Cool Gorilla](#) Phrase book and translator for iPhone
- [Mobile Learning: The Next Step in Technology-Mediated Learning](#) By Ellen Wagner
- [Description Nokia Web Browser S60](#) S60 browser review
- [PDF's on the iPhone](#) How to read PDFs in landscape mode
- [Reading Books on the iPhone](#) By Peter Meyers
- [Books on iPhone](#) Specially formatted for iPhone
- [eBook reader for the iPhone released](#) From MacNN
- [Put Your Content in My Pocket](#) By Craig Hockenberry of A List Apart
- [Google says mobile usage has surged this summer](#) From Yahoo news
- [ZenZui](#) Tile-based app for showing mobile Web sites
- [Leaflets](#) Applications designed to run on the iPhone
- [iPhoneBooks](#) App for reading ebooks on the iPhone
- [Minimo](#) Mozilla-based mobile Web browser
- [Webkit](#) Open source project derived from Apple's Safari

### **Rich Internet Applications**

- [Adobe Digital Editions](#) Based on Flash
- [Windows Presentation Foundation](#) Microsoft system for building desktop/Web applications
- [Silverlight](#) Microsoft project for creating RIAs
- [Rich Internet Applications](#) Good intro from wikipedia
- [Turning the Pages 2.0](#) Project from the British Library
- [Injecting Life Into the Ebook: Adobe Digital Editions 1.0 Released](#) Well-informed article from Karie Kirkpatrick
- [Digital Editions](#) View of Adobe project from if:book

Rich Internet Applications (RIA) can either run within a web browser with client-side scripts (JavaScript) and a browser plug-in or execute within a secure sandbox as desktop applications (e.g., Flash applications). For example, when registering at a web site, a simple validation of the username that it is an email can be done on the browser with a Javascript script, to give an interactive experience. The development of an RIA starts with an Integrated Development Environment (IDE) such as Flash Builder.<sup>3</sup> The developer uses this IDE to develop the application using two alternate views in the IDE. The first, called a design view is used to design the layout of the application, e.g., where buttons or text boxes should be placed. Rich Internet applications (RIA) are Web-based applications that have some characteristics of graphical desktop applications. Built with powerful development tools, RIAs can run faster and be more engaging. They can offer users a better visual experience and more interactivity than traditional browser applications that use only HTML and HTTP. Early Internet users mostly exchanged text-based electronic mail messages. Those applications offer functionality that goes far beyond mere reading and browsing, and they can be served up over the Web. We call these rich Internet applications. RIA Characteristics. A number of key features differentiate RIAs from traditional Web applications. A rich Internet application (RIA; sometimes called an Installable Internet Application) is a Web application that has many of the characteristics of desktop application software, typically delivered by way of a site-specific browser, a browser plug-in, an independent sandbox, extensive use of JavaScript, or a virtual machine.<sup>[1]</sup> Adobe Flash, JavaFX, and Microsoft Silverlight are currently the three most common platforms. RIAs dominate in browser based gaming as well as applications that require access. Adobe Flash manipulates vector and raster graphics to provide animation of text, drawings, and still images.