

Optimizing Library Content for Mobile Phones

Introduction

In “Reading Dickens Four Ways,” Ann Kirschner compares the pleasures of *Little Dorrit* as experienced on an Amazon Kindle, on an iPhone loaded with both an audio version of *Dorrit* and free eReader software showing the pages of the illustrated Penguin edition on her screen—three electronic formats, versus the formidable sentimental favorite: a beloved paperback copy of that same Penguin freighted with annotations she had scribbled 40 years earlier.

Kirschner’s uncontested choice for enjoying and engaging the novel turned out to be her telephone. Nine days before the release of the third-generation Kindle DX, the CUNY Honors College Dean wrote in *The Chronicle of Higher Education* that, “The iPhone is a Kindle killer. I abandoned the Kindle edition of *Little Dorrit* almost as soon as I read one chapter on my iPhone. Kindle...does almost nothing that an iPhone can't do better—and most important, the iPhone is always with me. Woody Allen had it right: Seventy percent [*sic*] of success in life is showing up.” (Kirschner, 2009) Kirschner praises eReader’s look and feel, extols its annotation tools, and marvels at the capacity of the iPhone itself to hold an entire shelf of books. All this and a telephone too, a device that I can carry with me everywhere I go.

It is significant that a scholar who has breathed the air of many libraries would readily understand the elegant utility of a smartphone as media platform. If Boomers can be impressed by modern telephones as instruments of learning, entertainment, and reflection, for younger

people—born digital, raised mobile—the embrace is all the more ardent. The cell phone's magnitude in *their* information landscape has grown to dimensions scarcely acknowledged by many librarians.

Even though commercial media providers have largely solved the sizeable problems of furnishing content in formats compatible with the panoply of mobile phones in use—and have seen their files welcomed by users—libraries and their vendors have made scant progress. Diverse, hardware-agnostic information delivery, traditionally a great strength of libraries, is our weakness in the mobile realm.

The commercial world is outpacing libraries in both awareness of and adoption of mobility. *The Wall Street Journal* has reported on the observed trend among U.S. business travelers to rely more on smartphones, rather than laptops, as their travel computing and information access devices (Wingfield, 2008). The magnetic appeal of networked mobile gadgets, including telephones, for entertainment and gaming is clear to most observers. Their equally attractive usefulness in the realms of instruction and information delivery remains nearly untouched by most libraries.

Cell-Ready Readings: Untapped Opportunity

What Ellen Wagner wrote in 2005 rings true five years later: "...when it comes to mobile adoption, the United States is relatively behind the curve. The broadband, multimedia connectedness now taken for granted by the typical Korean or Nordic citizen is something that

most U.S. citizens are not likely to see for some time. As a result, U.S. educators are finding themselves in the awkward position of knowing that the mobile revolution is coming, without really being able to imagine what it's going to look like or what the possibilities for mobile learning may be." (Wagner, 2005) Yet International Telecommunication Union data suggest that U.S. and Canadian phone users are following predictable paths blazed by Europeans and Asians—a few steps behind but rapidly catching up (ITU, 2009).

A spring 2009 Pew Internet & American Life survey reported that nearly a third of all U.S. adults had used a phone to go online, including more than half of those aged 18-29 (Horrigan, 2009). Two ethnic groups that comprise a tiny percentage of U.S. library professionals are leaders in handheld data access: 48% of African Americans and 47% of English-speaking Hispanics had used the Internet by telephone, compared to only 28% of Whites. Put another way, "African Americans are 70% more likely to go online with a mobile device than white Americans." (Horrigan, p. 33) The relative fluency with handheld technology demonstrated by two of American education's most notoriously underserved groups constitutes one strong argument for redoubling efforts to develop library services that support mobile learning. There are other reasons as well.

Concern about historically lower retention rates among distance learners often ascribes part of the cause to students' difficulties with unfamiliar computer hardware (Price Maffett, 2007). Interventions to increase students' comfort level with the tools of online scholarship become largely redundant when an already familiar device anchors their digital learning. The Horizon Report, a bellwether for trends in education, in 2009 placed mobile technology in a position of

primary importance. This analysis found that, “Higher education is facing a growing expectation to make use of and to deliver services, content, and media to mobile devices...As new devices continue to make content almost as easy to access and view on a mobile as on a computer, and as ever more engaging applications take advantage of new interface technologies...the applications for mobiles continue to grow. This is more than merely an expectation to provide content: this is an opportunity for higher education to reach its constituents in new and compelling ways, in addition to the obvious anytime, anywhere benefits of these ubiquitous devices.” (Johnson, et al., 2009, p. 6)

Evidence that people would welcome a library in their phones comes from many quarters. Libraries can help speed the telephone’s adoption as an instrument of study—or we can continue to slow it down.

3. E-Readings and JAR Files

A considerable obstacle to extensive academic use of cell phones is the current opacity of library resources to handheld devices. This is not a problem that we can rely upon vendors to solve for us singlehandedly, and experience has shown that many of the mobile services introduced in recent years turn out to be invisible to all but a limited number of devices.

Those developing home-grown applications should be wary of solutions that target only one or two specific platforms. It may be tempting to design services exclusively for the iPhone or perhaps a few others, but this approach serves a small subset of potential users. Despite the

iPhone's status as the most-talked-about mobile device, the fact remains that roughly 87% of U.S. cell phone subscribers in mid-2009 carried something else (Crowd Science, 2009). It bears mentioning in this context that even though the same survey found that 60% of phones in use in the U.S. are not smartphones, most are capable of accessing the Internet.

A compelling virtue of services like Feedbooks (<http://www.feedbooks.com/>) and Manybooks (<http://manybooks.net/>), two online publishers of free books and other content for mobiles, is their compatibility with a wide range of devices from the Kindle and the iPhone to the simplest of cell phones.

Take in Figure 1.

Enthusiasts around the world have developed effective means of reading on garden-variety cell phones. Malta's MobileBooks (<http://mobilebooks.net/en/>), an online publisher, is typical: "We have written all the tools to convert books to e-books that work on mobile phones and to distribute them from the servers to the mobile. The innovation was getting them to work on cheap mobiles, rather than [only on] a PDA or smartphone." (Debattista, 2006)

Many U.S. cell subscribers are unaware that their phones, basic as they may be, can be used on the web to download such texts. MobileBooks and several other publishers serve up JAR (Java Archive) files, a format compatible with nearly every cell phone in use: about three billion Java-enabled handsets are currently connected to mobile networks worldwide (Sun Microsystems, 2009). In essence, this type of JAR file is an executable reader application bundled with a text.

The files are fairly small—a user not on an unlimited data plan might, at typical current rates of one cent per kilobyte, incur about a dollar in carrier charges to download a normal book—and when mounted on a Web server can be loaded effortlessly into a phone. They then reside in the same data folder used for games and apps; opening the text's file launches the attached reader application, which runs on any Java-enabled cell phone.

The mobile reader works with simple pushbutton commands; the MobileBooks site gives straightforward instructions to orient its users. Other such readers work much the same way, and several utilities are available that facilitate creation of JAR files.

Take in Figure 2.

QiOO's free online converter (<http://handybibliothek.qiOO.de/qic.php>) instantly renders a plain text document as a JAR. Its QiC-Mobile reader is a simple and serviceable interface offering basic control over text appearance. The popular Tequila Cat Book Reader software (<http://tequilacat.org/dev/br/index-en.html>), also free, provides more file creation options. mjBook (http://www.mjsoft.nm.ru/mjbook5_en.htm) is another, with an even wider range of controls and, uniquely, the ability to include graphics when converting Word documents. Tequila Cat and mjReader, unlike QiOO, both entail installation of free software on the computer used to create JAR files, but these two platforms offer more flexibility and options that include batch processing.

The JAR files produced by all three utilities enable users to add multiple bookmarks to their texts; these are retained when the file is closed. All three also reopen to the same point where the user left off in the previous reading session.

Preparing Three Types of Mobile Texts

Let us consider the real-world problem of efficiently delivering course reserve readings to remote students on their mobile phones—which for the many in agreement with Dr. Kirschner, are firmly positioned to be among the best, most practical portable readers available.

Imagine, for example, pulling a course reserve reading from Lexis-Nexis and converting it to a JAR file using QiOO. One would bring up the desired item on a hit list, and then activate the article's checkbox and click the interface's "Download Document" icon. This opens a dialog box where one only needs to choose "Text" from a list of available formats. Clicking "Download" retrieves the file, and the last step in Lexis is to specify a local folder in which to save it. Open the file to remove or add any text if desired, resave, and then at <http://handybibliothek.qiOO.de/qic.php> upload the file and click "Create." In the next dialog box choose to save the new executable file locally. You now have a version of the article that your students can easily read on their telephones.

The JAR file is served straightforwardly: you need only upload it to a server and provide users with a link or the actual URL—protected, as appropriate, behind the usual authentication wall used for e-reserves. When a visitor accesses the URL on her Java-enabled phone's browser,

download begins automatically and the file installs in a folder, likely named Applications or Games, on the device. Opening the file launches the reader. To see this in action, point your phone to <http://www.sol-plus.net/lhtn.jar> to download a JAR of the article you are reading.

At the core of a librarian's mission is the practice of ensuring that information objects are made available in the forms that are relevant to the needs of their intended audience, and acceptable to their producers and providers. In the current diverse hardware environment a library serving up texts for cell phones would do well to follow the practice of the Internet Archive (<http://www.archive.org/>) and several e-book publishers by offering a work in many different manifestations, ideally each with its file size and type clearly identified.

A text file, like the one whose processing was described in the previous section, can also be readily converted to audio. The number of telephone handsets with MP3 players is large and continues to grow. Many students are attuned to auditory learning; also, listening to a text is often favored in situations, such as while driving, where reading is impossible. Text-to-speech (TTS) conversion suites such as AT&T Labs' Natural Voices (<http://www2.research.att.com/~ttsweb/tts/demo.php>) and the lower-priced TextAloud (<http://www.nextup.com/TextAloud/download.html>) continue to make strides. Though machine-read text leaves much to be desired, it has reached a level far beyond the comical robotic voices of yore. Many find Natural Voices convenient and utterly comprehensible for listening to email while washing the dishes, for example. An audio file of this paper's Introduction, generated with TextAloud TTS software, is at <http://www.sol-plus.net/lhtn.mp3>

A growing number of phones—and not all of them “smart”—come with good PDF (Portable Document Format) readers. The overwhelming popularity of PDF among the more than 20 options available to ManyBooks users is striking (ManyBooks, 2009).

An important drawback of JAR files is that converted pages can lose much of their original formatting and their images—problematic in research articles containing diagrams or tables. Even though the mjBook software is capable of integrating graphics with the text when one starts from a Word document, bringing native PDF documents into Word and working with each image is apt to consume more staff time than most libraries would like to invest.

PDF delivers a faithful view of the printed page: a picture of it, to oversimplify. On a phone's screen a standard page is scaled to a fraction of its original size in order to fit the handset. Phone PDF readers, like those of computers, can zoom, but expanding until the print reaches visible dimensions does not make for easy reading of documents formatted for the desktop: it extends line lengths beyond the limits of the handheld screen, compelling back-and-forth scrolling that most human readers find tiresome. For best results, a PDF for reading on a mobile handset should fill available page size nearly to the edges with a single column of roughly 20 to 25 single-spaced lines per page. For a normal 8.5”x11” sheet this corresponds to 32- to 40-point type. The article you are reading is available in this form at <http://www.sol-plus.net/lhtn.pdf>

Such formatting of articles available in plain text or HTML format is simple enough: copy the text, paste it into Word, increase the font size, narrow the margins, and “print” the document as a PDF file using an appropriate utility such as Adobe Acrobat

(<http://www.adobe.com/products/acrobatstd/>) or the free PrimoPDF (<http://www.primopdf.com/index.aspx>). When the original article is already a PDF, formatted for the desktop, other solutions must be brought to bear.

Excellent options exist to convert native PDF documents for reading on small screens. One useful in many cases is the inexpensive on-the-fly conversion tool Smart PDF Converter (<http://www.pdfdocconverterpro.com/>), capable of changing typical PDFs to Word documents; the user controls how much of the original formatting is preserved. There are, however, important collections—JSTOR among them—that present their text as image blocks rather than parsable text; this type of PDF is impenetrable to this utility, and Acrobat cannot save it as text.

Take in Figure 3.

Such articles can now be readily processed for mobile reading thanks to an altogether remarkable piece of freeware called PaperCrop (http://jupiter.kaist.ac.kr/~taesoo/projects/paperCrop/index_eng.html) that arose from the scientific community, written by Taesoo Kwon. Kwon's software also elegantly handles multi-column layouts, which flummox the SmartSoft PDF Converter, as well as tables and images.

Conclusion

The startling embrace of the cell phone as much more than an aural communication tool has been perhaps more dramatic than the revolutionary explosion of the desktop Internet. Libraries,

happily, played an important role in that IT boom; in contrast, the commercial sector has been much quicker to see opportunities in serving multimedia content to handhelds. Effective delivery of usable documents to mobile devices is within the technical grasp of every library, and it is predictable that already powerful extant tools will steadily become easier to use. From a student's standpoint, the ease of using a handheld to download and consume content while on a bus, at lunch, or in bed at the end of the day affords more flexibility than scheduling time at a computer. Now that the telephone can be used as a Web browser, a database search and retrieval interface, a calculation engine, a storage facility (for managing documents both on-board and via cloud access), a multifaceted communication tool, a reader, and more, we are left with no reason to doubt that many learners would welcome chances to use their phones for some of these purposes.

Librarians might not feel an obligation to offer mobile services, any more than a device called a "telephone" is obliged to do anything besides plug into a wall jack, sit on a desk, and ring occasionally. But those doing more will realize greater demand for what they do, and will better serve more users.

A mobile-accessible page with links to versions of this article in the three alternative file formats presented is at <http://sol-plus.net/lhtn.htm>

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Techniques for Mobilizing Library Content for Users' Phones

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