

Using the Cell Phone for Class Content: An Exploration

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Abstract: This paper describes a project that involved converting reading material for student access through their cell phones. Cell phones can be used for sending electronic versions of reading materials to students in three formats: audiobook, web book, and Java book. The different formats were compared for class use and the Java book format was found to be the most efficient for student use. Conversion tools for creating documents were evaluated along with student ease of use. This pilot project found that cell phones can be effective as electronic readers. For readability it is important to choose software that will create cell phone documents that can be displayed with variable text sizes, increasing reading ease.

While cell phones seem to be in nearly every hand on any college campus, cell phones and classes are not usually associated together, at least not in a good way. Instead most instructors view them as an irritant as the phones ring during class time. This form of technology has undergone great leaps and improvements, and today's cell phones have a number of functions and abilities beyond voice communication which can be used to support class content. Through constant technology growth, today's better cell phones actually have the computing power of a mid 1990's personal computer (Prensky 2004). Additionally, a number of cell phones also have the ability to use removable memory cards, which can be used both in the phone and in a computer. Almost all cell phones can send and receive text messages, do note-taking (as voice or text), have calendars, and have the ability to play games – which means that they can run additional software programs. Some phones have additional abilities which are becoming more common, such as being able to browse the Internet or play MP3s. This paper describes a pilot project's first steps that were done in incorporating cell phones as a tool for students, providing required course reading materials to students as documents for display on the cell phone.

Access

Today's incoming students are known as "digital natives," and are also known as members of the Millennial Generation. Today's average high school student spends time differently from previous groups. Students now on a weekly basis spend more time on the internet (16.7 hours) than watching television (13.6 hours), and still find time for talking on the phone (7.7 hours) each week (Yahoo 2003). To them the cell phone has always existed. In 2003, over 43% of school aged children (K-12) owned at least one wireless device (Patrick 2004). At that time 70% of middle and high school students and 61% of upper elementary students had cell phones (Branigan 2004), and since then the numbers have grown. In 2004 90% of college students (ages 18-30) had a cell phone, up from 33% in just four years (Kinzie 2005). An analysis of the author's own classes the author, showed that 100% of his current undergraduates have cell phones, and most of phones having some advanced features, such as digital cameras, internet browsing, and removable memory.

Formats

For this pilot project in providing electronic versions of reading materials to students' cell phones, the presentation of reading materials fell into three basic formats: audiobook, web book, and Java book.

Phones that can play MP3 files can be used to play audio versions of readings. Depending on the availability, it may be possible to find MP3 versions of books that can be purchased. If purchase of audio files is not possible audio versions of the required readings can be created using desktop computer software such as by having a text-to-speech engine reading the content and create an audio file, or by having a person read the material aloud while being

recorded. These recordings can then be placed online for distribution, downloaded to the phone, and then played in the phone when the user wants to listen. Already a number of projects on numerous campuses are underway using the podcasting concept to distribute course content to be played on student MP3 players (Flynn & Dastbaz 2006), which now could include cell phones. For this project, since only a minority of phones currently supported this audio feature, audio files were not selected for use with students.

Web books for cell phones are actually web pages displayed either in standard HTML or in WAP (Wireless Application Protocol) format. WAP uses WML (Wireless Markup Language), a language based on XML and intended for narrowband devices such as cell phones and PDAs. When designing for students to access the material in either format the pages should be designed for: 1) Small display and limited user input facilities; 2) Narrowband network connection; 3) Limited memory and computational resources (Cover 2002). Creating a web resource in WML includes the additional concern that WML cannot be run on all web hosts. To create books for this format, the text will need to be converted to html, then set for a WAP or limited display, and then placed online. (For more information on WAP and mobile web best practices visit <http://www.w3.org/TR/mobile-bp/>). For this project, creating pages or cards for phone display was considered, but not chosen because of the additional per-minute expenses that most students have to pay for online time in order to access and read the material.

The format that was chosen for the pilot was the Java book. In this format, the book has been incorporated into part of a small Java program which runs in the phone to display the book on the screen (see Figure 1). This format was selected for classes to use for text reading activities because it does not require the reader to be connected to the internet, thereby avoiding per minute charges for being online. The Java book is downloaded to the phone and is available for use usually in either the phone applications or games menu. There are a number of programs and websites that will convert text material to the Java book format. Students then read their material by running the program, which will cause the book to be displayed on the cell phone screen. Students can control the display, such as by changing font size, colors, and scrolling by use of the number pad and menu buttons.

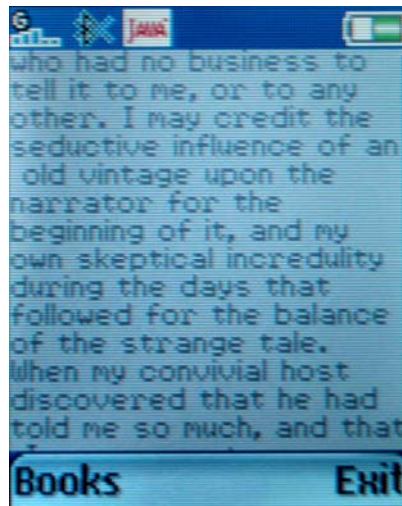


Figure 1: Cell phone displaying reading material on its screen.

The Project

This project attempted to determine how cell phones can be effectively used in providing course reading material to students. Consider that students are already reading their phones: texting, messaging, or text messaging has become a common tool for students. In Japan an author self-published a book titled Deep Love, which was targeted to students, serialized, and distributed through cell phones. Within three years the Deep Love site had accumulated over 20 million hits (Steuer 2004), indicating that students were willing to read from their phones.

Depending on the course content, there may already be a wide variety text available for student access though cell phones, such as for a literature class. A number of online libraries and sites currently distribute text content which includes non-fiction, poetry, graphic novels, short stories, and whole novels.

In this pilot, a course instructor evaluated differing formats of creating and delivering textual information to students which was to be read from the cell phone. For the project four different programs were evaluated for creating Java books: *BookReader*, *ReadManiac*, *mjBook4*, and *t41 Readme* (see Table 1). Each of these programs requires that users first convert the documents to plain text (.txt) versions of the content with no images or tables, which can be converted into the Java format, for users to install in their cell phones and use as an electronic reader (see Figure 2). Of the four programs only *t41 Readme* is available as an online service. The other three programs must be installed on a computer to work. Some of the programs allowed for options such as adjustable font types and sizes (*ReadManiac* and *BookReader*), while others did not. This feature was found to be an important issue in trials because of the small screen size. Having additional font sizes, especially larger font sizes, made reading from the cell phone screen considerably easier. The *mjBook4* program had an additional application of creating slideshow versions for playback on cell phones. While each of the programs was effective in converting the reading content into the desired format, the improved readability of the materials created along with the program controls in the *BookReader* program made it the choice for continuing the project (see Figure 3).

	<i>BookReader</i>	<i>ReadManiac</i>	<i>mjBook4</i>	<i>t41 Readme</i>
Program	Windows	Windows	Windows	Online
Cost	Free	Free	Free	Free
Multiple fonts	Yes	Yes	No	No
Background colors	Multiple	Multiple	One	One
Key controls	Adjustable	Preset	Preset	Preset
Scrolling	Yes	Yes	Yes	Yes
File origination	RTF, PDF, DOC, PDB, Text (.txt)	Text (.txt)	Text (.txt)	Text (.txt)
File creation	.jar & .jad	.jar & .jad	.jar & .jad	.jar & .jad

Table 1: Comparing features of different programs used to create Java books.

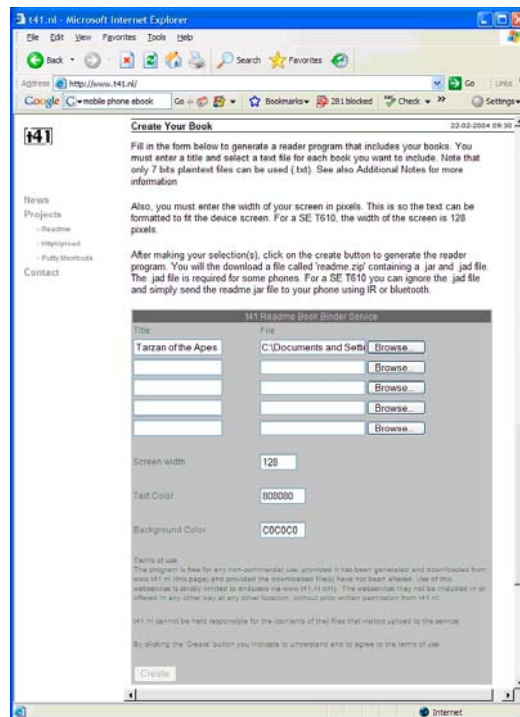


Figure 2: *t41 Readme* web site provides online software that creates Java book versions from text files.

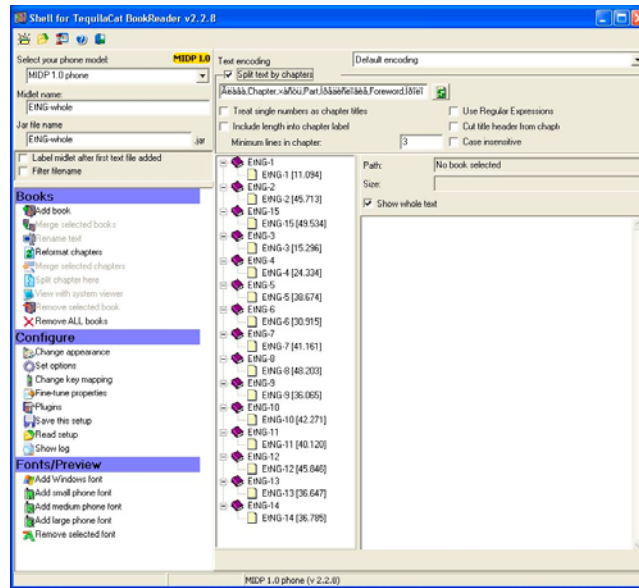


Figure 3: *BookReader* program being used to convert a course textbook to a Java book version.

The next step in the project involved creating course syllabi and schedules for the instructor's classes. Files had to be converted from standard formats, such as MS Word documents into text versions. These documents were then converted for display on a cell phone and put on a web page for student access. Within their classes, and in the online course environment, students were instructed on how to access the service, download the files, and methods for transferring the files to their cell phones.

Additionally one course's textbook was also converted for cell phone display. Students had the option of accessing the information through the online course space, but were also encouraged to use their cell phones, providing them increased access to the text.

Distribution

Getting material into a cell phone is a skill that many students already have, but others needed assistance. In this project the Java reading material was placed on a web site, with the expectation that students would download and install the file into their cell phones. While it is possible to use the cell phone to browse to the class web site to download the program, most students indicated having problems with this process. Easier was to download the file to a computer and then through a phone synchronizing cable move the file to the phone. Files were also shared by using infrared transfer between phones with similar capabilities. In the future a Bluetooth access point will be set up in the classroom for student use in transferring the files to their cell phones. Using infrared a teacher could share, by beaming, the book to a few students, who could then share it with more students, in a pass-along format as they keep the book and give it to someone else, too.

Advantages and Disadvantages

With this technology, as with any technology, there will be pros and cons concerning the implementation and application. Some of the technical issues with using a cell phone as an electronic reader include limitations on the screen and the controls. Cell phone screen resolutions are commonly less than 320 by 240 pixels, making them less than half the pixel screen size of old computers. In reviewing the various programs, it was found that there are no standards for keyboard controls, so different programs use different buttons to control the displayed text information. For example, with the text created in some programs, the number nine key is used to move go down a

page, while in others it is used to search. The button size is another issue; for some people find the buttons and controls are so small on cell phones that typing in numbers can be a challenge.

This technology also has a number of benefits. First, this technology is already available to most students, so there maybe no additional cost. Using this device as a reading tool will just be one more application added to those our students already regularly use. The computing power of the cell phone is more than sufficient for the display needs, creating crisp, clear displays of the information. The file size of the created material is relatively small, and with the increased storage capacity of cell phones, this means that it is easily possible to store a large number of documents for easy access on a cell phone.

Conclusion

Using the cell phone as a tool for document distribution can be an effective strategy for class use. In evaluating the use of the cell phone as a tool for reading support, it is important to choose methods that will create cell phone documents that can be displayed with variable text sizes, so while less text is displayed on the screen, the words shown are larger and easier to read. Additionally the Java books can be set to automatically scroll for the reader, eliminating the need to repeatedly press buttons when reading. Users in the project indicated no problems in reading the material on their cell phones, but did prefer electronic reader formats that allowed them control for varying font sizes and contrast. Cell phones may have become the most ubiquitous computing device. It is important that teachers look for ways to use the technology at hand for the student.

Cell phone Book Resources:

Software for creating Java books:

BookReader by Tequilacat <http://tequilacat.nm.ru/dev/br/index-en.html>

ReadManiac <http://www.deep-shadows.com/hax/ReadManiac/index.htm>

mjBook4: <http://www.mjsoft.nm.ru/booke.htm>

Online service for creating Java books

t41 readme: <http://www.t41.nl/>

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