Mobile Technology: Searching in the Academic Library

Research & Innovative Services Proposal
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Executive Summary

Research Question

Should OSU Libraries (OSUL) develop a mobile application for searching the Libraries' available resources?

Rationale for Building a Mobile Search

A mobile search application could support learning by making library resources more ubiquitous, could bring new users to the library by increasing accessibility to the OSU Libraries' resources, and could create a new way to enhance connections between students, instructors and librarians. "There are now estimated to be eight times as many mobile phones as fixed lines, three times as many mobile phones as personal computers, and nearly twice as many mobile phones as TV sets" in the developing world alone (Denison quoting Hamdi, 2009). The increased use of mobile phones provides an untapped resource for delivering library resources to patrons. Adding search applications will save mobile users' time, increase satisfaction of their mobile experience by reducing excessive scrolling, and increase find-ability and discover-ability of more and different types of content. The search applications could also continue OSUL's tradition of providing innovative approaches to increase library literacy by maximizing accessibility and convenience for students. Some example use cases for a mobile search application are: looking up call numbers and checking the availability of items in the library stacks; delivering electronic resources and learning objects (e.g. mp3s, video clips, and e-books) to students at their point of need; and offering searchable materials for course or subject specific information to make learning available anywhere, anytime.

Arguments Against a Mobile Search Application

A mobile search application presents several challenges. The first is implementing an application to function and display properly on a variety of mobile device platforms including handheld PCs, web-enabled cell phones, and PDAs. Mobile devices also have speed and cost-related bandwidth issues. Mobile technologies are rapidly changing and a mobile application faces problems in terms of testing and maintenance. A relatively small number of academic libraries have implemented mobile catalog searches, although a growing number do have mobile Web sites, and little research has been published on the success of mobile applications or what level of service to provide to academic library patrons. Maybe most importantly, OSUL is currently considering switching from Innovative Interfaces Inc. (III) to an OCLC WorldCat platform for the catalog interface, making the feasibility of creating an application to search the catalog via mobile devices somewhat questionable at this time.

Recommendations

We believe evidence and trends point toward increased levels of user dependence on mobile devices now and in the foreseeable future; therefore, the technical challenges that crop up while creating and maintaining a mobile catalog will be minor when compared with the potential benefits and goodwill from our users when we create and provide user-centered services like a mobile catalog.

Full Report

Background

Over the past several years at library conferences and in library blogs there has been considerable chatter about mobile technologies; more specifically, about mobile phones. While there has been a lot of talk, libraries have only just begun to make library Web sites easily accessible to the growing number of users who access online information via their phones. A growing number of libraries are creating mobile Web sites and applications. The trends in providing mobile services within libraries include presenting information about library services and collections, offering a library catalog search, and exhibiting information, subject guides, e-journals, and library hours. According to Joan Lippincott, "As with most technology developments, this one is fast-moving. This is not a time to sit on the sidelines as other campus units are developing services for mobile users...Academic libraries should make conscious choices about what they want to offer in this arena and act accordingly" (2008, p. 4).

How many people are using mobile phones to access data and information? According to a Pew Studies Memo from 2008, "58% of adult Americans have used a cell phone or personal digital assistant to do at least one of ten mobile non-voice data activities, such as texting, emailing, taking a picture, looking for maps or directions, or recording a video." The July 2008 edition of *Library Technology Reports, On the Move with the Mobile Web: Libraries and Mobile Technologies*, noted that Generation Y are heavy users of mobile phones and wireless devices: 74% send or receive text messages, 44% send or receive pictures, 24% send or receive emails, and 23% use instant messaging. This same report noted that 40% of mobile users, ages 15 to 24, send more than 10 text messages a day (Kroski, 2008).

The *Library Technology Report* also summarizes the functionality of several major university libraries' mobile websites. According to the Report, the University of Richmond Library offers a catalog search, real-time laptop and PC availability information, and ask-a-librarian services by email, SMS, or IM. University of Virginia Libraries' mobile Web site provides news and events, information about library exhibitions, directions, library hours, and a text-only version of their entire Web site. Boston University Center Medical Library made mobile versions of their subject guides, and made their e-books, e-journals, databases, and library site searchable. New York University Libraries, with the Arch mobile portal, allows searching of their electronic resources by title, subject, or format, and includes basic library information.

The only peer-reviewed article that has been published regarding mobile devices and libraries was a case study at Ball State University Libraries (West, Hafner, and Faust, 2006). Their Libraries' mobile site offers library patrons a catalog and journal search, videos about the libraries, information about collections, services such as ILL and course reserves, and quick links to mobile reference Web sites. The study found, "(1) library Web sites can be adapted to the limited power, memory, small screen size, and bandwidth of mobile devices, and (2) small screen mobile devices are acceptable for showing Web services that are easy to read, easy to navigate, and that provide timely information."

In addition to the aforementioned library mobile Web sites, there are many other academic and public libraries with mobile sites including American University, Cal Poly Pomona, Calvin College (includes a mobile catalog) Hanover College, Harvard, University of Illinois at Urbana Champaign, and North Carolina State (includes a mobile catalog), St Johns University/College of St. Benedict, Yale Medical, The District of Columbia Public Library, Harris County Public Library, and Midlothian Public Library.

Both III and OCLC have implemented a mobile search application. AirPAC is a III module specially designed for wireless mobile devices. Users can browse the library catalog, check due dates, request materials, and view their patron records using their mobile devices. Examples of libraries that use the AirPAC mobile search include Nashville Public Library, Westerville Public, Cuyahoga Public, Multnomah County Library, Wayne State University, and Hennepin County Library. OCLC is currently offering a mobile search application pilot, WorldCat Mobile, (http://www.worldcat.org/mobile/) and an iPhone search app (http://mobileworldcat.org/). AirPAC also has an iPhone app in the works. The WorldCat mobile search does not currently offer customized views for WorldCat local. Their Web site states, "The WorldCat Mobile pilot allows users to search for and find books and other materials available in their local libraries through a Web application they can access from a PDA or a smartphone."

Given the overwhelming use of mobile phones by Generation Y, the high interest in mobile technology by libraries and librarians, and the lack of research and innovation in libraries related to mobile search, it makes sense for the OSUL to consider future projects in this area. This report will consider:

1) Developing a mobile search application for the library catalog, course reserves, room reservation system and multi-media holdings.

2) Developing a mobile search application for course guides, subject research guides, learning objects, and library information.

PART 1: Library Catalog

In March the OSUL will unveil a mobile library Web site. The mobile site includes information about library hours, book borrowing policies, and floor maps, but does not include searching of the Libraries' Web site, catalog, or databases.

A typical mobile catalog search is a barebones tool that allows users to look up an item by keyword, title, author, or ISBN. Mobile users have different search requirements than desktop users and a mobile search should be more than a scaled down version of the main search. Attention should be paid to the types of tasks patrons would perform with a mobile search and in what context they are using the search. The mobile use context increases the importance of item location and item availability; therefore, a mobile search application should emphasize the display of call numbers and locations.

Web searching is often seen as a solitary activity. Data from an ongoing study of virtual reference services indicates that even when people are physically in the library they may prefer to use chat reference rather than seek out a face-to-face encounter (OCLC, accessed March 1,

2009). An innovative search application can make use of the mobile device's communication option to connect patrons to librarians without needing to leave the stacks. A mobile search application can also use a mobile device's native applications, such as Google Maps, direct-dial, email, SMS, and patron calendars to add value to mobile search results. "On mobile phones, search needs to be made social and results need to be made actionable" (taptu, 2008, p. 14).

A study conducted by the Department of Communication at Cornell University solicited student feedback regarding existing and potential computing technologies and features in a library setting (Jones, L. et. al, 2000) Cornell students singled out the catalog as "the most important feature." Based on this feedback, Cornell developed a prototype mobile application and tested it with students. "Users were especially enthusiastic about the ability to access the online catalog remotely from the stacks. Users could see themselves using such a function in order to overcome the common frustration of having to leave the stacks in order to look up references using the online catalog." Similar to Cornell, at OSUL the catalog is also an important technology to patrons as shown through the OSUL Web statistics which ranks the catalog search as one of the highest used resources; therefore, we can also assume OSU students would find a mobile catalog application useful. Many mobile users view their devices as integral to their daily lives and take them everywhere. A mobile search can "provide a seamless flow of study" by integrating tasks, context and functionality (Lippincott, 2008, p.2).

"As libraries consider their re-tooling for mobile users and mobile devices, they should examine the consequences of mobility and the opportunities for innovation in the areas of content, systems and tools, services, and environments, both physical and virtual" (Lippincott, 2008). Mobile applications are the new "Web 2.0" for many innovators and Web entrepreneurs and because of the ubiquity of mobile devices and applications, there is a wealth of development techniques for mobile applications. Mobile development concerns do not really differ from regular software development. Mobile search is big business and all the major players, such as Google, Yahoo!, Wikipedia, and Ask, have mobile search options.

The cost of being innovators and early adopters is higher maintenance needs. Currently the standards for the mobile web are relatively non-existent and those that do exist are ever-changing. By paying attention to trends we can work to reduce maintenance issues. In addition to changing standards, testing is often an issue in mobile application development. While there are mobile device emulators that mimic a wide variety of phones, they are often lacking and not fully functional. However, the variety of mobile phones is somewhat diminished when considering mobile browsers, screen size, and basic functionality. By targeting a smaller subset of mobile devices to test we should be able to achieve reasonably good test results. The mobile libraries working group is assuming there is a wide variety of mobile devices among OSUL staff that could be used for testing purposes.

The paucity of research on mobile devices and applications within an academic library context offers OSUL an opportunity to be pioneers in mobile applications. The lack of peer-reviewed research also provides an excellent avenue for publishable works. By starting small (implementing a basic catalog search) and staying agile we can conduct focus groups and surveys to gauge our own students' interest in various functionality to add to the mobile search, in addition we can explore the social aspects of using mobile devices.

The most important consideration in implementing a mobile catalog search is the uncertainly of what catalog interface OSUL will be using and the timeline of possible changes. **Here are two possible solutions for both options currently under consideration**:

1) If OSUL continues using the III interface, the Libraries could choose to purchase and add the AirPac module. This would be a quick solution with a significant impact on OSUL mobile presence, which could provide a valuable service to our patrons. However, OSUL would be limited to AirPac's interface decisions and could not add functionality to the application. The AirPac interface is basically a scaled down version of the regular search interface. AirPac developers have not sufficiently explored the special needs of searching in a mobile context. For example, it takes four clicks after a search to view an item's call number.

2) Our other catalog interface option, OCLC's WorldCat mobile application, is currently in the pilot project stage and is not available for local use. With WorldCat mobile OSUL would have no customization options, the tool it is still buggy, and finding call numbers is difficult. However, the interface does have nice functionality like Google Map integration for finding a library, smart prefix search and auto completion.

The common problem with both these search solutions is the lack of customization and feature enhancement, and interfaces that are not as sensitive to mobile users as they could be. **Therefore, we propose a third option**, which is to implement a lightweight search application that uses screen scraping techniques to harvest search results for the catalog and to reformat the results in a digestible format optimized for mobile devices. Screen scraping is a technique in which an application uses server side technologies to call a service, e.g., the catalog, pull content from the application, and return the results to the calling application. That application can then display the information in a new format. This would give us control over the interface and features to the fullest extent. Screen scraping can be seen as a burden to servers, in this context and considering the price of the software, we can consider it a necessary evil. We are currently using screen scraping techniques in the Library a la Carte project to pull course reserves into ICAPs, and this system is working well. The benefit of this solution is that the basic idea works for whichever catalog we end up using. OSUL staff is already familiar with the screen scraping technique, so it could be quickly implemented for the current catalog, and if we end up switching catalog interfaces the application could be contributed to the broader library community. Adoption of the application for a different catalog could be straightforward if implemented correctly.

Part 2: Library Learning Objects and Help Guides

"The MUSIS project was designed to explore, identify and develop a number of innovative mobile services with rich multimedia content to be distributed over wireless networks in university campuses." Ten librarians at Vaxjo Public library (http://www.vaxjo.se/bibliotek) were equipped with Nokia 6630 smart phones with 128MB and with GPRS access (free of charge) to the MUSIS channels for four weeks. Data was gathered through questionnaires, interviews and observations. "The librarians regarded the Smartphone and the MUSIS services as interesting tools that have the potential to assist them in their work and communication with their readers." In a focus group the librarians came up with the idea of creating a repository of audio clips containing material related to book reviews. They created the material and tested the

project with 41 students from two different courses at Vaxjo University during a period of 3 months. "Focusing specifically on the question of whether students would find a mobile phone useful for supporting their learning, and in particular whether mobile services would be suitable for supporting learning." The educational material included small "micro lectures" in video format, voice based course information and assignments, and specific information related to the different courses. "Students perceived MUSIS' mobile services as something useful, dynamic and integrated in their everyday life." The students' feedback showed that there is a clear need for providing institutional support of educational mobile services; in particular, course related content and timetabling information. It was considered highly important that the content be mobile-optimized content, and there was a clear request from students that more resources be made available in a mobile format. "All mobile services related to course information, video micro-lectures and scheduling issues were highly ranked among users and they were perceived as very useful when it comes to support their daily activities, both social and intellectual" (Milrad, Jackson, & Bergman, 2005).

OSUL has a wealth of library resources available on the web. Some of the content has already been ported into an easy-to-use mobile Web site. However, there are types of content that don't lend themselves to minimization (the process of retrofitting existing content into a mobile formatting). For example, there are over 35 subject research guides that consist of content modules on a wide range of information literacy topics, research information, and embedded widgets. Instead of shrinking the guides we can let patrons search the content modules and provide a mobile view of the content. We can provide useful "see also" information and connect patrons to librarians. Subject research guides are not the only type of content we can mobilize, (the process of creating mobile context aware applications). Course pages, learning object movies, and a FAQ are also potentially useful for supporting new learning avenues. By making the content on the mobile site searchable, we are aiding discoverability and providing a great service to mobile users with small screens.

While the same technical issues are still relevant for a search application for library materials, the same solutions apply as well. An added benefit is that this type of content is mostly stored in databases. Because of this we can use a variety of search possibilities. Plus, the search functionality can be re-purposed outside of a mobile context, for example if we implement a search for ICAPs and SRGs we can also use the search in the tool's interface. Additionally, this content is already created and could easily be converted to a mobile display. Another content type we could consider searching are databases. While we could easily provide a mobile search for the Databases of Databases information, there are a limited amount of database providers that have a mobile application. Usability experts agree that a leading usability consideration for mobile application is linking to non-mobile content.

Conclusion

We believe evidence and trends point toward increased levels of user dependence on mobile devices now and in the foreseeable future; therefore the technical challenges that crop-up while creating and maintaining a mobile catalog are minor when compared with the potential benefits for and goodwill from our users when we create and provide user-centered services like a mobile catalog. OSUL staff possess the knowledge to proceed with the exploration of providing mobile services and the overall resource demands are low. Considering the needs of mobile technology

users will help to position us to provide access to information in the increasing variety of formats users expect.

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Mobile Library & Catalog Sites:

Ball State Libraries http://www.bsu.edu/libraries/mobile/
University of Richmond http://oncampus.richmond.edu/academics/library/mobile/
Calvin College http://library.calvin.edu/guides/mobile
DCPL http://dclibrarylabs.org/projects/iphone/

Mobile Library Sites:

University of Virginia http://mobile.virginia.edu/library.php
Boston University Medical Center Library http://med-libwww.bu.edu/mobile/index.cfm
New York University Libraries http://archive.library.nyu.edu:8000/mobile/
American University http://www.library.american.edu/mobile/
Cal Poly http://www.csupomona.edu/~library/mobile/
Hanover College http://library.hanover.edu/mobile/mhome.html
Harvard http://hcl.harvard.edu/mobile/
University of Illinois Urbana http://hades.grainger.uiuc.edu/nikki/Mobile/Version1/index.htm
NC State http://www.lib.ncsu.edu/m/
St. John's & St. Benedict http://www.csbsju.edu/library/mobile/
Yale Medical http://www.med.yale.edu/library/m/
Harris County Public Library http://pda.hcpl.net/
Midlothian Public Library http://www.midlothianlibrary.mobi/

AirPAC Mobile Sites:

Nashvill Public Library http://waldo.library.nashville.org/airpac/jsp/airpacIndex.jsp
Multnomah Public Library http://www.multcolib.org/catalog/airpac.html
Wayne State University http://elibrary.wayne.edu:6060/airpac/
Hennepin County Library http://mplwebcat.mplib.org/airpac/