Mobile Technologies in ARL Libraries: Status and Prospects

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Agenda

• Background
• Trends in mobile use
• Options for mobile website/app development
• Current status ARL libraries
• Examples
• Discussion
Background

Mobile Technologies, Mobile Users: Implications for Academic Libraries

by Joan K. Lippincott, Associate Executive Director, Coalition for Networked Information

Introduction

More and more Americans are using devices such as cell phones to seek information, not just to communicate. At the National Endowment for the Humanities (NEH) Office of campus communities are highly dependent on mobile technologies. The 2008 survey by the EDUCAUSE Center for Applied Research (ECAR) reported that 82% of students on the campuses participating in the survey own a laptop. About one quarter of students
### Mobile data and communications activities: by Age

(Those who have a cell phone or personal data assistant who have done one of listed activities on a typical day)

<table>
<thead>
<tr>
<th>Activity</th>
<th>18-29</th>
<th>30-49</th>
<th>50-64</th>
<th>65+</th>
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</thead>
<tbody>
<tr>
<td>Send or receive text messages</td>
<td>60</td>
<td>32</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Take a picture</td>
<td>31</td>
<td>14</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Play a game</td>
<td>16</td>
<td>8</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Send or receive email</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Access the internet for news, weather, sports, or other information</td>
<td>14</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Record a video</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>**</td>
</tr>
<tr>
<td>Play music</td>
<td>16</td>
<td>6</td>
<td>2</td>
<td>*</td>
</tr>
<tr>
<td>Send or receive instant messages</td>
<td>9</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Get a map or directions to another location</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Watch video</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Percent who have done at least one of these activities</td>
<td>73%</td>
<td>57%</td>
<td>23%</td>
<td>9%</td>
</tr>
<tr>
<td>Median number of activities done on typical day</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number of cases</td>
<td>311</td>
<td>616</td>
<td>456</td>
<td>310</td>
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</table>

## 2007 data

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<th></th>
<th>2002</th>
<th>2006</th>
<th>2007</th>
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<tr>
<td>Cell phone</td>
<td>38%</td>
<td>43%</td>
<td>51%</td>
</tr>
<tr>
<td>Internet</td>
<td>38</td>
<td>38</td>
<td>45</td>
</tr>
<tr>
<td>Television</td>
<td>47</td>
<td>44</td>
<td>43</td>
</tr>
<tr>
<td>Landline telephone</td>
<td>63</td>
<td>48</td>
<td>40</td>
</tr>
<tr>
<td>Email</td>
<td>35</td>
<td>34</td>
<td>37</td>
</tr>
<tr>
<td>Blackberry or wireless email device</td>
<td>6</td>
<td>22</td>
<td>36</td>
</tr>
</tbody>
</table>

*Source: Pew Internet & American Life Project Surveys.*

Lippincott 2008: Key Points

• increasing use of cell phones as information discovery tools
• mobile devices can be effective learning support tools for Millennial students
• changing landscape offers opportunity for academic libraries to play leadership role on campus
Call to action

• “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 and licensing content for mobile devices. Academic libraries should make conscious choices about what they want to offer in this arena and act accordingly.”

— Joan Lippincott, CNI
Mobile Internet: Upward trend continues

• In December 2007, 24% of Americans said they had at some point used the internet on their mobile device.
• By April 2009, 32% of Americans said they had at some point used the internet on their mobile device.

• In December 2007, 11% of Americans said they had yesterday accessed the internet on their mobile.
• By April 2009, 19% of Americans said they had yesterday accessed the internet on their mobile.

• In 2009, 69% of all adult Americans said they had ever done at least one of the ten activities versus 58% who did this in late 2007.
• In 2009, 44% of all adult Americans said they had done at least one of the non-voice data activities on the typical day, up from 32% in 2007.

Source: John Horrigan, Wireless Internet Use, Pew Internet, July 2009
Global mobile penetration 2010-2015

• By year-end 2010, **1.2 billion people** will carry handsets capable of rich, mobile commerce, providing a rich environment for the convergence of mobility and the Web.

• by 2013, **mobile phones will overtake PCs** and the most common Web access device worldwide. The combined installed base of smartphones and browser-equipped enhanced phones will exceed 1.82 billion units.

• By 2014, there will be a **90% mobile penetration** rate and **6.5 billion mobile connections**.

• By 2015, **context** will be as influential to mobile consumer services and relationships as search engines are to the Web.

source: Gartner ([http://www.gartner.com/it/page.jsp?id=1278413](http://www.gartner.com/it/page.jsp?id=1278413))
In 2010, nearly 1.3 billion mobile phones will ship globally, and 250 million of them will be smartphones.

In the US, where smartphone growth is robust, virtually all phones sold will be smartphones within 5 years.

Smartphone will continue to be the most vital computing/communication device people carry in 2010.

Smartphones won’t be the only computing devices we have or use.

Smartphone displays will never be large enough or clear enough to use for hours of reading or video viewing.
In the developed world, mobile computing has become an indispensable part of day-to-day life in the workforce, and a key driver is the increasing ease and speed with which it is possible to access the Internet from virtually anywhere in the world via the ever-expanding cellular network.

Key Findings

♦ More than half of respondents (51.2%) owned an Internet-capable handheld device and another 11.8% planned to purchase one in the next 12 months. One-third of respondents (35.5%) did not own such a device and did not plan to purchase one in the next 12 months.

♦ Internet use among device owners varies widely: Although nearly a third (29.0%) said they use the Internet from their device daily, another third (35.4%) said they never use the Internet from their device.

♦ Among those who never use their Internet-capable handheld device to access the Internet, more than three-quarters (76.0%) selected cost of the data service as one of the three reasons that limit their use.

♦ Half of all respondents (49.9%) chose “Plenty of other ways to access the Internet” as one of three reasons that kept them from using the Internet, or using it more often, from a handheld device.

♦ The top Internet activities performed from a handheld device were checking information such as news, weather, and sports (76.7%); accessing e-mail (75.1%); using social networking websites (62.5%); and using maps, finding places, getting directions, or planning routes (58.7%).

♦ Almost a third of respondents (32.2%) agreed or strongly agreed with the statement “While in class, I regularly use my cell phone or handheld Internet device for non-course activities.”

♦ Almost three-quarters (73.7%) of respondents who currently own and use the Internet from a handheld device said they expect their use will increase or greatly increase in the next three years.

♦ Just under half (44.5%) of respondents agreed or strongly agreed that in the next three years they expect to do many things on a cell phone or handheld Internet device that they currently do on a laptop or desktop computer.

♦ When asked to select three institutional IT services they are most likely to use from an Internet-capable handheld device, if available, respondents who owned a handheld device and used the Internet from it selected these as the top three: e-mail system (63.4%), student administrative services (46.8%), and course or learning management system (45.7%).
Options for mobile development

• Native app.
  • application built for specific device, e.g., iPhone
  • can take advantage of hardware features (e.g., accelerometer)
  • proprietary distribution channel (e.g., iTunes)

• Mobile web
  • website customized for access from mobile browser
  • often built with tools from MIT Mobile Web Open Source Project
  • standard web technologies, e.g., XHTML, CSS, JavaScript, AJAX

vs.
Native mobile apps – development environment is complex

<table>
<thead>
<tr>
<th>Platform development environment</th>
<th>Programming Language</th>
<th>Debuggers available</th>
<th>Emulator available</th>
<th>Integrated Development Environment available</th>
<th>Cross-Platform Deployment</th>
<th>Installer Packaging Options</th>
<th>Development Tool Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>AirPlaySDK</td>
<td>C, C++ but no threads</td>
<td>Debugger available</td>
<td>Emulator available</td>
<td>Visual Studio, Mac OS SDK</td>
<td>BREW, Android, iPhone, Windows Mobile</td>
<td>The native distribution format of each platform</td>
<td>Commercial licenses available</td>
</tr>
<tr>
<td>alohaVue</td>
<td>Java</td>
<td>Debugger integrated in Visual Studio, Eclipse or XCode</td>
<td>Emulator is available in corresponding IDE</td>
<td>Visual Studio, Eclipse, XCode</td>
<td>BREW, Android, iPhone, Windows Mobile</td>
<td>The native distribution format of each platform</td>
<td>Commercial licenses available</td>
</tr>
<tr>
<td>Android</td>
<td>Java but portions of code can be in C, C++</td>
<td>Debugger integrated in Eclipse, Standalone debugging menu also available</td>
<td>Free Emulator</td>
<td>Eclipse, Android (Plugin for NetBeans)</td>
<td>Android only, because of Dalvik VM (marshmallow)</td>
<td>apk</td>
<td>Free</td>
</tr>
<tr>
<td>Blackberry</td>
<td>Java</td>
<td>Yes</td>
<td>Yes</td>
<td>Eclipse</td>
<td>Java ME, BREW, BlackBerry, iPhone, PSP, DS, Android, Windows Mobile, Palm</td>
<td>The native distribution format of each platform</td>
<td>Commercial licenses available</td>
</tr>
<tr>
<td>Blueprint (programming language)</td>
<td>XML routed through Yahoo Mobile servers and displayed in native browser</td>
<td>None beyond a scheme check</td>
<td>N/A, translates to web or mobile as needed</td>
<td>Visual Studio 6.0, Visual Studio 2003, Visual Studio 2005</td>
<td>No Emulator for the target ARM code has a simulator for the x86 testing code.</td>
<td>Combined config uploaded at Yahoo with self-hosted dynamic XML</td>
<td>Any XML editor</td>
</tr>
<tr>
<td>BREW</td>
<td>C (the APIs are provided in C with a C++-style interface)</td>
<td>Debugger support for the native ARM target code can use Visual Studio to debug the x86 testing code.</td>
<td>N/A, any XML editor</td>
<td>Visual Studio 2003, Visual Studio 2005</td>
<td>No Emulator available for the target ARM code.</td>
<td>OTA</td>
<td>Any XML editor</td>
</tr>
<tr>
<td>IDE (Apple)</td>
<td>Objective-C</td>
<td>Debugger integrated in Xcode IDE</td>
<td>Free Emulator, Sun Java Wireless Toolkit, pmpowerplayer</td>
<td>Xcode</td>
<td>Yes although many VM implementations have device specific bugs necessitating separate builds</td>
<td>Only via App Store requires review and approval by Apple Inc.</td>
<td>Free</td>
</tr>
<tr>
<td>Java ME</td>
<td>Java</td>
<td>Yes</td>
<td>Yes</td>
<td>Eclipse, J2ME, Mobile Pack</td>
<td>Yes although many VM implementations have device specific bugs necessitating separate builds</td>
<td>Jacklil packaging, PRC files under Palm OS</td>
<td>Free</td>
</tr>
<tr>
<td>Lazaar</td>
<td>Object Pascal</td>
<td>Yes</td>
<td>Can debug on the IDE via Antimatter for Windows CE</td>
<td>Lazarus IDE, including integrated GUI designer and debugger</td>
<td>Compiled language available for Windows CE, Linux-based devices and a SymbianOS port is under development</td>
<td>The native distribution format of each platform</td>
<td>Free</td>
</tr>
</tbody>
</table>


http://en.wikipedia.org/wiki/Mobile_application_development#Platforms_supporting_devices_by_multiple_manufacturers
What to mobilize?

• What services are currently available?
• What services are applicable on a mobile device?
• What services translate well to the mobile environment?
• What tools can be created easily?
• What would be fun to see?

source: David Woodbury, NCSU
Guidelines for mobilizing

• Don’t mobilize everything
• Mobile is not just shrinking the page
• Use only essential, relevant content
• Reduce options, simplify
• Limit data to mobile context, e.g.,
  – for time-oriented date, assume current day/time
  – assume action oriented
• Provide tools appropriate to user’s context
• Expose hidden, useful content

source: David Woodbury, NCSU
## Mobile web in ARL: current status

<table>
<thead>
<tr>
<th>Institution</th>
<th>University Website</th>
<th>University Mobile Website</th>
<th>Mobile Status</th>
<th>Library Website</th>
<th>Library Mobile Website</th>
<th>Mobile Status</th>
<th>Notes</th>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
ARL Libraries + Mobile: Current State

- number ARL libraries with mobile sites/apps: **58 (47%)**
- Most frequent services:
  - Hours (46)
  - Ask a librarian/chat (27)
  - Search (25)
  - News (20)
  - Locations (18)
  - Databases (18)
ARL Libraries + Mobile: Current State

• Number ARL campus with mobile sites/apps: 41 (33%)
• Most frequent services:
  – Athletics (32)
  – News (31)
  – Directory (28)
  – Calendar/Events (24)
  – Maps (21)
  – Courses (13)
  – Libraries (13)
ARL Libraries + Mobile: Current State

• number ARL library websites with redirect to mobile site: **23 (40%)**
• number ARL libraries with iPhone apps: **15 (12%)**
• number ARL libraries with Droid, BlackBerry apps: TBD
Why redirect matters
iPhone apps

Cornell
Illinois
Houston
Notre Dame*
Brown*
Vanderbilt*
Northwestern**
Toronto*
Saskatchewan**
UC-Irvine**
Alberta**
Kentucky**
Rice**
Emory**
Princeton**

*developed by Boopsie, Inc.
**campus app., with library search
Vendor mobile services

• Databases
  – IEEE, Gale, EBSCO, Press Display, Google Books, PubMed,

• Library Discovery Systems
  – WorldCat, Primo, Summon, VuFind

• Citation Management
  – RefWorks
Examples from the ARL community
Ahead of the curve – NC State
WolfWalk - NCSU

WolfWalk
A Historical Guide to Campus Landmarks
North Carolina State University
Raleigh, NC

Campus Map
All Locations
About WolfWalk

Featuring images from the University Archives Photograph Collection and Ed. T. Funkhouser
WolfWalk - NCSU

http://m.lib.ncsu.edu/wolfwalk
Collaborative Approach - Houston

'SUHLibrary' has been developed as part of course project for the course 'COSC 6355 - Ubiquitous Computing' in the Department of Computer Science at the University of Houston.

Team Members:
Satya Pavan Surapaneni
Srikanth Kambhampati
Ganesh Vinay Kumar Lagadapati
Rohith Kumar Kodakandla

Course Instructors:
Dr. Pradeep Buddharaju
Dr. Ioannis Pavlidis

Course Website
Back

source: iPhone app. UHLibrary
Undergrad Library Video Tours - Illinois

ugl4eva

please use while seated
be aware of your surroundings

source: iPhone app. ugl4eva
Creative campus app – Laundry - Iowa

source: http://m.uiowa.edu
Arizona State – computer availability

source: http://m.lib.asu.edu
BYU – floor maps

source: http://lib.byu.edu/m
BYU – floor maps

source: http://lib.byu.edu/m
BYU – Search

source: http://lib.byu.edu/m
Native apps, multiple platforms - Brown

MoBUL (Mobile Brown University Library)
Brown University Library on the go - catalog (Josiah), hours, locations, news, computer availability, and easy contact information.

Get the App!
iPhone users via the Apple App Store. Android users via the Android Market. Blackberry users via the App World Store.

Search for "MoBUL" or "Brown Library" on these devices.

Other smartphones can download the application by going to mobul.boopsie.com on the phone's Internet browser. Search for "Brown University Library".

MoBUL Tips
MoBUL has a great new way to search our books. No need to search by field, no need to enter full words, no need to wait for results. Just type the first couple of letters of words and see the search in action while you type.

So for books on "Cuban Missile Crisis" simply type "cu mi cri". Or to search for books by or about "James Agee" simply type "ja age".

Take a look! - Screenshots (android platform)
• Catalog Search

source: moBUL iphone app
Native apps, multiple platforms - Brown

source: moBUL iphone app
Library Locations - Alberta

Augustana Library

The Augustana Library is located on the Augustana Campus in Camrose, Alberta.

4901 46 Avenue
Camrose, Alberta
Canada T4V 2R3
780.679.1156
augustana.library@ualberta.ca

The Augustana Library has a collection of over 100,000 books and bound periodicals and provides access to a wide array of databases. Through its collection and services, the Library

source: http://m.library.ualberta.ca
Library Locations - Alberta

source: http://m.library.ualberta.ca
Coffee queue - NCSU

source: http://m.lib.ncsu.edu
Boolean Operators (Connectors): AND

SAMPLE KEYWORD SEARCH: Reading AND Achievement

AND narrows a search: you get fewer records, because both search terms must be present in the search results.

Here we demonstrate the search results for Reading AND Achievement. When you do a search for Reading AND Achievement, you will only see the search results where the the words Reading AND Achievement appear in the title, abstract or other searched fields.

Use AND to combine different concepts in one search.

source: http://m.lib.wayne.edu
Discussion Questions

• Do you agree that delivering library services to mobile users is important? Why?
• What progress has your library made in this area?
• What are the obstacles to more rapid movement?
• What can ARL do to facilitate?
• Would a registry of library mobile sites/services be helpful?
• How do you bring public and tech. services together on decision-making for mobile services?