One Device Will Rule Them All: Make Way for Mobile Technologies

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WHAT IS MOBILE COMPUTING?
Ubiquitous Computing

- Mark Weiser
- Computers of different sizes and shapes
- Serving many separate functions
- Focus on applications rather than devices
- Connecting electronic information to objects in the physical world.

The road to ubiquitous computing
Ubiquitous computing-Redux
158,812 iPod apps (1 March 2010)

+ Apps =
How do people use the mobile web?

How do people use the mobile web?

Iowa Course Online (ICON) Website survey

- Looking up course reserves
- Course schedules
- News

How do people use the m-library?

University of Cambridge M-Libraries study

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library Hours</td>
<td>85%</td>
</tr>
<tr>
<td>Library Catalog</td>
<td>60%</td>
</tr>
<tr>
<td>Map of the library</td>
<td>50%</td>
</tr>
<tr>
<td>Contact Information</td>
<td>50%</td>
</tr>
<tr>
<td>Patron’s borrowing record</td>
<td>50%</td>
</tr>
</tbody>
</table>

How do people use the m-library?

Kent State University Library focus groups

• Library Databases
• Course reserve materials
• Patron’s account
• Map of the library
• Ask a librarian

Away from the “bleeding edge,” or,

LESSONS FROM MOBILE COMPUTING INITIATIVES
Our context

• Small Upper-Midwestern state university
  – 6023 undergraduate students
  – 3268 graduate students
• Flagship, liberal-arts campus in 6-school system
• Carnegie DRU classification
• Faculty-to-student ratio = 1:14
• Undergraduate classes with less than fifty students = 94%
• Classes have less than thirty students = 75%
Our context

USD’s vision statement (2005):

“At USD, students are inspired to become **lifelong learners** who will make significant contributions through leadership and service as citizens of the state, the nation, and the world.”
Our context

USD’s educational outcomes (2005):

“The University of South Dakota is a learning-centered institution...Every student, undergraduate or graduate, regardless of major or program of study shall: achieve competence in communication, analysis, quantitative reasoning, and information literacy; acquire deep knowledge of at least one discipline or program area; gain problem solving skills that transcend discipline boundaries; develop a tolerance for ambiguity and complexity; commit to ethical conduct; become open to diverse people, ideas, and experiences; be dedicated to the ideals of democracy and freedom; and recognize his/her responsibilities as a global citizen.”
Our context

BOR System General Education Goals (2005):

1. Writing
2. Speech
3. Social Sciences
4. Arts and Humanities
5. Math
6. Science
7. Information Literacy
Palm Initiative, phase 1 (2001-3)

• incoming freshmen and law and medical students received Palm m500 at greatly reduced cost
• mandated inclusion of Palm in teaching of general-education courses (English Composition, Speech Communication)
• expectation of library support via both IL instruction and (especially) software support
Palm Initiative, phase 1 (2001-3)

- Library support of Palm initiative
  - teaching of workshops on academic functions and uses of the Palm to faculty and students
  - creation of downloadable “survival guides” for English and Speech in .pdb and .pdf format
  - creation of a manual, *Beyond the Four Functions: Academic Uses of the Palm m500* (published in ERIC)
Palm Initiative, phase 1 (2001-3)

- why the Palm Initiative failed:
  - top down implementation
  - Palm Steering Committee lacked ENGL and SPCM faculty as members
  - lack of preparation of relevant faculty (most of whom were graduate teaching assistants)
  - technology, not pedagogy, drove the instruction
  - no meaningful integration into learning activities or courses
  - Steering Committee ignored suggestions of Palm User Group
Palm Initiative, phase 1 (2001-3)

- why the Palm Initiative failed:
  - no student buy-in
  - devices not already being used by students
  - required student-owned computer for synching (c. 40% of students owned computers)
  - presence of non-freshman in freshman courses ("haves" vs. "have-nots" limited use of devices)
  - design flaws/limitations to usefulness of devices
Palm Initiative, phase 2 (2003-4)

• Improvement
  – cool, user-friendly device (Zire71)
  – limited student test group (Honors students)
  – faculty volunteers recruited to integrate Palms in courses
  – more integration into courses, e.g., quiz review, use in speech peer evaluation (beaming = “gee whiz” factor)
Palm Initiative, phase 2 (2003-4)

• Continuing problems
  – top down implementation
  – devices not already being used by students
  – lack of faculty familiarity with appropriate pedagogies
  – little meaningful integration into learning activities
SDBOR Mobile Computing Initiative (2009)

“The Board of Regents recognizes the potential disconnect in the near future between the state’s high schools and the Regental institutions and that the institutions need to move in concert with K-12 schools. From a practical standpoint, the system’s teacher education programs are already moving to prepare candidates who have experience in and can work in the laptop/tablet high schools. Clearly, the system needs to establish a leadership role in this process and this role needs to play out in all of the manners through which the universities commonly provide educational services. “
Mobile Computing Initiative, 2009-

- **Improvements**
  - faculty provided with laptops and training in appropriate pedagogies
  - campus-wide wireless environment
  - students not restricted to specific laptops (e.g., tablet PC)
  - benefit from research/case studies

- **Continuing challenges**
  - restricted to laptops
  - no support for handheld devices or smart phones
  - BOR mandate seems to be more about meeting student expectations (marketing) than effective teaching and learning
Research: Key resources on mobile computing


http://ro.uow.edu.au/newtech/

Potential uses of mobile devices in higher education

• Administration, e.g., the use of calendars, exam reminders, grading software
• Reference, e.g., dictionaries, e-books and office applications;
• Interaction, e.g., quizzes, response software
• Microworld, e.g., simulations, games
• Data collection, e.g., data logging, note taking, audio recording, eportfolios
• Location awareness, e.g., augmented environments, gps navigation and tagging
• Collaboration, e.g., pod/vodcasting, blogging, instant messaging

Potential uses of iPods in higher education

Belanger (2005) identified five categories of iPod use in academic settings:

- Course content dissemination
- Classroom recording
- Field recording
- Study support
- File storage and transfer

Importance of faculty development in technology initiatives

Despite the significant potential of mobile technologies to be employed as powerful learning tools in higher education, their current use appears to be predominantly within a didactic, teacher-centred paradigm, rather than a more constructivist environment. It can be argued that the current use of mobile devices in higher education (essentially content delivery) is pedagogically conservative and regressive. Their adoption is following a typical pattern where educators revert to old pedagogies as they come to terms with the capabilities of new technologies, referred to by Mioduser, Nachmias, Oren and Lahav (1999) as ‘one step forward for the technology, two steps back for the pedagogy’ (p. 758).

Jan Herrington et al., “Using mobile technologies to develop new ways of teaching and learning,” p. 2
Importance of faculty development in technology initiatives

When introducing new technology into courses, faculty tend to regress in their teaching:
- uncertain about integrating technology into courses
- need to push technology use
- often focus on teaching about the technologies themselves rather than with the technologies
- neglect how students can use devices as ‘partners in cognition’ to learn with rather than from technology

Result: more authoritarian, teacher-centered instruction that emphasizes technology over pedagogy.

Recommendations based on research and experience

- Learn from the “big boys”; avoid the “bleeding edge”
- Pedagogy trumps technology
- Professional development in pedagogy is key
- Avoid top-down imposition of technology mandates
- Promote and reward bottom-up initiatives from faculty and staff
- Promote and reward active, authentic, situated teaching (with/without technology)
- Allow time for experimentation and reflection
- Don’t put all your “eggs” in the one-device “basket”
Design principles for mobile learning

1. **Real world relevance**: Use mobile learning in authentic contexts
2. **Mobile contexts**: Use mobile learning in contexts where learners are mobile
3. **Explore**: Provide time for exploration of mobile technologies
4. **Blended**: Blend mobile and non mobile technologies
5. **Whenever**: Use mobile learning spontaneously
6. **Wherever**: Use mobile learning in non traditional learning spaces
7. **Whomsoever**: Use mobile learning both individually and collaboratively
8. **Affordances**: Exploit the affordances of mobile technologies
9. **Personalize**: Employ the learners’ own mobile devices
10. **Mediation**: Use mobile learning to mediate knowledge construction.
11. **Produse**: Use mobile learning to produce and consume knowledge.

BUILDING A MOBILE LIBRARY
“don't convert, create!”

- determine what mobile services are needed and will be used

- don't just copy your existing website to a mobile version
Stuff to think about

- Needs assessment
- Integrating with existing library services
- Project planning
- Building the site
- Testing, marketing, launching
- Keeping up
Can we mobilize?

- MIT Mobile Web Open Source Project (display and device detection)
No developers?

- **Free tools that require only HTML knowledge**
  - Dashcode
  - [http://iwebkit.net/](http://iwebkit.net/)

- Good for static content
- May lack good multi-tiered device support
iUI (Google – iPhones)
Simple do-it-yourself (Dreamweaver)

```html
<html>
<head>
<title>University Libraries (Mobile site)</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
<meta name="HandheldFriendly" content="true">
</head>
<body>
<p><center>
University Libraries<br>
The University of South Dakota</center></p>

<!-- Library Catalog (Keyword Search): -->
<form method="get" name="form1" action="http://apollo.adln.net:80/F/">
<fieldset>
<input type="hidden" name="func" value="find-b" />
<input type="hidden" name="local_base" value="usd" />
<input type="hidden" name="filter_code_1" value="WLN" />
<input type="hidden" name="filter_code_2" value="WIR" />
<input type="hidden" name="filter_code_3" value="WIR" />
<input type="hidden" name="filter_code_4" value="WFV" />
<input type="hidden" name="filter_code_5" value="WDL" />
<input type="hidden" name="filter_code_6" value="WFV" />
<input type="hidden" name="find_code" value="WRD" />
<input type="hidden" name="filter_request_1" value="" />
<label for="keyword"><input size="15" maxlength="200" name="request" value="" /></label>
<input type="submit" value="Search" />
</fieldset>
</form>
</center></body>
</html>
```
Testing

1) Test your mobile application on your desktop to ensure functionality. Mozilla’s Firefox has add-ons that you can use to manipulate the UserAgent.

2) Test on browser simulators and device emulators.

3) Test on actual devices. Keep a list of people that have different devices; or go to the nearest T-Mobile store.
How can I test if I don’t have a mobile device?

http://www.testiPhone.com

http://www.opera.com/mini/demo/

http://emulator.mtld.mobi/emulator.php
Where are we going—what are we doing?

- Provide access to several mobile applications & databases. Inform stakeholders of resources (LibGuide mobile info).
- Look at other mobile library sites (M-Libraries).
- Ask for code / ask how others created their sites.
- Needs assessment stage. Who are our key stakeholders / who uses mobile?
- Work closely with rest of campus on mobile initiative; make sure Libraries have seat at “table”.

Q’s

• Why should I put effort into a mobile library site, just to serve a small handful of people?

• With better mobile browsers that are platform-independent, can’t users access full web versions of resources on their mobiles? (Why build a separate site just for mobile?)

• Licensing and installation models of mobile library resources are all over the place.
  – Some require setting up a personal account
  – Authentication can be a hassle
  – Some need a serial number for installation
MEDICINE – HEALTH – MOBILE TECHNOLOGY
How do you want medicine to be “practiced” on you?
Past

- Textbooks
- Monographs
- Research Articles
- Anecdotes
- Personal experience
Recent Past
(late 90’s)

- Textbooks
- Monographs
- Research Articles
- Databases (Medline)
- Micromedex
- Diagnostic Imaging
- Palm
Evidence Based Medicine 2000 -

- Same research
- Same sources
- Meta-analysis
- Clinical trial data
- Synthesis
- Peer review
- Best Practices
Present

- Same research
- Same sources
- Evidence Based Practice
- Mobile devices
- Smart Phones
  - MD Consult
  - Epocrates
  - Dynamed
  - Medlineplus

3/15/2010
Future

• Better devices with improved diagnostic imaging results
• Immediate data retrieval
• Improved decision algorithms
• Better Care
Future redux . . .

- Point of Care improves with:
  - Rapid access
  - Immediate diagnostics
  - Better synthesis
- Mobile devices send
- Mobile devices deliver
Evolution
And one device shall rule them all!

Consolidation

Speed

Accuracy