THERE’S AN APP FOR THAT:
USING SMARTPHONES IN EDUCATION

Najib Manea
Agenda

- Introduction
- Key Trends
- What is Phone Apps & Web Apps
- Devices
  - Smartphones & Feature Phones
- Statistics
- Pedagogy
- Summary of some ideas
Introduction

- Video -
  http://www.youtube.com/watch?v=EhkxDlr0y2U
Key Trends

- Mobile Learning
- Online Learning
- Digital Content
- Distributed (Cloud) Computing
- Extended Smart Mobile Technology
- Collaborative Environments
- 3D Visualization and Interaction
The Future...

- 1989: ‘The future is multi-media’
- 1999: ‘The future is the Web’
- 2009: ‘The future is smart mobile’
- Now: What is the future?
The Future...?

- Multimedia brought the world into the classroom...

- Smart technologies will take the classroom into the world.
Mobile Devices

Why are mobile devices so popular?

- Combine the functionality of a computer with portability
- Lower cost
- Connect to Internet wirelessly
- Apps
What are Apps?

- The term ‘app’ stands for a computer application on the mobile device.
- Apps can be e-books, interactive reference materials, training modules, educational software devices, data collection tools, interactive handouts, etc.
Mobile Application development

- Is the process by which application software is developed for low-power handheld devices such as personal digital assistants, enterprise digital assistants or mobile phones.
- These applications are either pre-installed on phones during manufacture, can be downloaded by customers from various mobile software distribution platforms,
Web Applications

- Delivered over HTTP which use server-side or client-side processing (e.g. JavaScript) to provide an "application-like" experience within a Web browser.
Mobile Devices - Feature Phones

- Feature Phones
  - Not a smartphone or PDA
  - May have Internet connectivity
  - Some able to send/receive SMS messages
  - Not able to run advanced applications
  - Still has a share of the market

Smartphones

According to Apple:

- 63% of all students enrolled in colleges and universities own smartphones
- College students are the fastest growing sector of the market
- Expected growth for 2011 is almost 50%

Mobile Web

- Websites mobile ready?
  - Content Management system Drupal
  - Dreamweaver – style sheets for mobile
  - Optimization options (Wordpress)
  - Use emulators to test your site
    - [http://iphonetester.com/](http://iphonetester.com/)
Smartphone Market Share

Smartphone Platform Market Share

<table>
<thead>
<tr>
<th>Platform</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google</td>
<td>48.6%</td>
</tr>
<tr>
<td>Apple</td>
<td>29.5%</td>
</tr>
<tr>
<td>RIM</td>
<td>15.2%</td>
</tr>
<tr>
<td>Microsoft</td>
<td>4.4%</td>
</tr>
<tr>
<td>Symbian</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

Top Smartphone Platforms for 3 month average ending Jan 2012

http://www.digitaltrends.com/mobile/us-smartphone-users-now-over-100-million-android-increases-market-share/
Top Mobile OEMs for 3 month average ending Jan 2012:

- Samsung: 25.4%
- LG: 19.7%
- Motorola: 13.2%
- Apple: 12.8%
- RIM: 6.6%
Mobile OS Trends

Mobile Devices – Market Share

Smartphone Market Share
Q1 2010, Mobile Insights, National (n=11,724)

- RIM BlackBerry OS 35%, -2% QoQ
- Apple iPhone OS 28%, +2% QoQ
- Microsoft Windows Mobile 19%, -2% QoQ
- Android OS 9%
- Palm OS 4%
- Symbian OS 2%
- Linux 3%

Source: The Nielsen Company

The complex picture of the mobile phone market

Source: VisionMobile
Smartphone sales vary greatly by region Q2 2011 are the majority of handset sales in North America (63%) and Europe (51%)
Android became dominant smartphone OS
Samsung and HTC benefited the most from Android success (Q4 2011)

Smartphone market share by OEM and platform (H2 2011)
HTML5 is pitched as the future of mobile apps
...but what is HTML5, really?

- A set of browser specs by 2 standard groups: W3C and WHAT
  - WHAT - Web Hypertext Application Technologies
  - The WHAT working group specs merge into W3C specs

- Brings capabilities of web apps closer to those of native apps
  - UI tools, off-line storage, 2D graphics, plugin-free video/audio
  - geo location, speed and communication
Many benefactors, but no clear leader
all pushing and hyping HTML5 for their own unrelated reasons

- Apple looking to move the web away from Flash
- Google searching for more ways to commoditize complements
- Facebook aiming to break-down Apple/Google silos and distance Adobe
- Microsoft to onboard web developers onto Windows 8
- Mobile operators hoping to regain control lost to native platforms
- Qualcomm aiming to create a competitive advantage for its chips
- Brands looking use web as a low-cost way to go cross-device and cross-screen
- Adobe aiming to sell tools that facilitate web-to-native hybrid apps
So many platforms, so little time
Developers face a real challenge making apps for multiple platforms
Cross-platform tools to democratize development

Extend the reach of masses of web developers beyond the browser

“Native” developers
create apps using programming languages and tools specific to platforms

Web developers
create apps using HTML/CSS/JavaScript
– less dependent on specific programming skills

about 300K

Cross-platform tools

about 3 million
There is an app for every need and taste

Application categories as percentage of the number of iOS apps

Source: 148Apps.biz, iTunes App Store (iOS), updated 2012-03-26
Apps ... wait, what's my device?

### 'Very Interested' In Developing For Each Platform

<table>
<thead>
<tr>
<th>Platform</th>
<th>Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPhone (iOS)</td>
<td>92%</td>
</tr>
<tr>
<td>Android Phone</td>
<td>87%</td>
</tr>
<tr>
<td>iPad (iOS)</td>
<td>87%</td>
</tr>
<tr>
<td>Android tablet</td>
<td>74%</td>
</tr>
<tr>
<td>BlackBerry Phone</td>
<td>38%</td>
</tr>
<tr>
<td>Windows Phone 7</td>
<td>36%</td>
</tr>
<tr>
<td>BlackBerry PlayBook</td>
<td>28%</td>
</tr>
<tr>
<td>webOS tablet</td>
<td>16%</td>
</tr>
<tr>
<td>webOS Phone (pre)</td>
<td>13%</td>
</tr>
<tr>
<td>Symbian</td>
<td>12%</td>
</tr>
<tr>
<td>Kindle</td>
<td>9%</td>
</tr>
<tr>
<td>MeeGo</td>
<td>6%</td>
</tr>
</tbody>
</table>

N = 1,971 responses

Source: Appcelerator / IDC - 01/2011
Mobile Learning

- Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies.

Skills needed for Mobile Apps

Pre-requisite Skills
- Game Design & Development
- Programming: C++, Java, VB etc.
- Drawing skills: 2D Graphics, Story boards – Photoshop or Fireworks
- Creativity, Problem Solving
- Math skills: coordinate systems, geometry, trig
- Physics skills: Speed of falling objects, bouncing
- Writing skills: Story lines, game documentation

iPhone Development Skills
- Mac Operating System
- iPhone SDK
- Objective C Programming Language
  Mix of C and Smalltalk
- Cocoa Touch – iPhone class library
- Xcode, Interface Builder, Simulator etc.
How would you use a mobile device to help you with schoolwork?

- A. Increase effectiveness of school:
  - Take notes for class 77%
  - Access online textbooks 70%
  - Write papers and do homework 68%
  - Use the calendar 60%
  - Learn about school activities 55%
  - Check grades 52%
What types of devices do students have access to?

Source: Speak Up 2009: Creating Our Future: Students Speak Up about their vision for 21st Learning
If allowed, how would students use a mobile device to help with schoolwork?

Source: Speak Up 2009: Creating Our Future: Students Speak Up about their vision for 21st Learning
If allowed, how would students use a mobile device to help with schoolwork?

Source: Speak Up 2009: Creating Our Future: Students Speak Up about their vision for 21st Learning
Parents’ Views

Table 1: Parents share their ideas about the value of mobile devices for instructional purposes

<table>
<thead>
<tr>
<th>Potential Benefits</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increases student engagement</td>
<td>43%</td>
</tr>
<tr>
<td>Prepares students for world of work</td>
<td>41%</td>
</tr>
<tr>
<td>Extends school day learning</td>
<td>38%</td>
</tr>
<tr>
<td>Provides access to online textbooks</td>
<td>37%</td>
</tr>
<tr>
<td>Improves teacher-parent-student communications</td>
<td>35%</td>
</tr>
<tr>
<td>Students can review class materials</td>
<td>32%</td>
</tr>
<tr>
<td>Personalizes instruction</td>
<td>31%</td>
</tr>
<tr>
<td>Provides way to help struggling students</td>
<td>27%</td>
</tr>
</tbody>
</table>

Source: Speak Up 2009: Creating Our Future: Students Speak Up about their vision for 21st Learning
### Teachers’ Views

**Table 2: Teachers’ biggest concerns about using mobile devices at school**

<table>
<thead>
<tr>
<th>Reason</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will be distracted</td>
<td>76%</td>
</tr>
<tr>
<td>Not all students have the mobile devices</td>
<td>62%</td>
</tr>
<tr>
<td>Concerned that students will cheat using the devices</td>
<td>33%</td>
</tr>
<tr>
<td>Do not know how to effectively use the devices within instruction</td>
<td>24%</td>
</tr>
<tr>
<td>Need curriculum to support the use of mobile devices</td>
<td>23%</td>
</tr>
</tbody>
</table>

*Source: Speak Up 2009: Creating Our Future: Students Speak Up about their vision for 21st Learning*
If your child’s school allowed the use of mobile devices for educational purposes, how likely would you be to provide one for your child?

Source: Speak Up 2009: Creating Our Future: Students Speak Up about their vision for 21st Learning
Companies Transforming Content Development and Delivery

Sourcing & Creation Process
- Curriculum Mapping
- Instructional Design
- Content Development & Integration
- Quality Check & Assurance
- Collaboration & Crowd Sourcing

Education Content Stack
- Curriculum
- Expository Animations
- eBooks
- Interactivities
- Assessments
- Simulations & Games
- Collaboration Content

Packaging for Delivery
- New Media Devices – iPad, IWB, Mobile Apps
- LMS/ Assessment Standards – SCORM, IMS/QTI, Custom
- eBook Standards – .epub, .mobi, Custom
- Offline – Compatible to Operating Systems
- Online – Internet browser based

Subjects
- Math
- English
- Science
- Languages
- Social Studies

Delivery
- iPad
- iPod
- Android
- Mac
- Linux
- Windows
- Other Handheld device platform
Formal and Informal learning

Formal Learning

Informal Learning
Self organised learning

In SOL students take responsibility for their own learning and put this into successful action.

Source: http://www.equal-works.com
Is there a Pedagogy Specifically for Mobile Learning?

- A Lack of Mobile Learning Theory

Most theories of pedagogy fail to capture the distinctiveness of mobile learning.

Any theory of mobile learning must embrace the considerable learning that occurs outside the classroom and is personally initiated and structured. Thus, theories of learning must be tested against the following criteria:

- Do they account for both formal and informal learning?
- Do they analyze the dynamic context of learning?
- Do they theorize learning as a constructive and social activity?
Education must begin with the solution of the teacher-student contradiction, by reconciling the poles of the contradiction so that both are simultaneously teachers and students.”

~ Paulo Freire
Uniqueness of Mobile Learning

- Personal
- Informal and formal learning
- Dynamic context of content
- Social and constructive
- User-driven/Self Directed
- Ubiquity
- Mobility

Pedagogical Perspectives of Mobile Learning

Behaviourist – Stimulus and Response

Multiple Choice Questions with Feedback
General Practice Quizzes and Tests
Language learning

SOURCE: NESTA Futurelab Series Report 11: Literature review in mobile technologies and learning
Constructivist – Construct new ideas based on previous experience

Games and Simulations Mobile tools have facilitated the collection of data that can be analyzed and shared

SOURCE: NESTA Futurelab Series Report 11: Literature review in mobile technologies and learning
Pedagogical Perspectives of Mobile Learning

Situated Learning – Immersion in a situation, where experts and apprentices work together

Use devices to take photos, write notes, upload, and share data with others

SOURCE: NESTA Futurelab Series Report 11: Literature review in mobile technologies and learning
**Problem-Based Learning** – Provide an ill-defined problem and allow students to explore.

Case Studies in medical education, business training, nursing, Army training, etc

*SOURCE: NESTA Futurelab Series Report 11: Literature review in mobile technologies and learning*
Pedagogical Perspectives of Mobile Learning

Others....

• Context Awareness Learning – multimedia in museums and galleries

• Social-Cultural Theory of Learning – learning takes place in social context

• Collaborative Learning – sharing of information in group settings

• Conversational Learning – conversations with others and interactions with systems

• Activity Learning – Activity, subject, and tools used

SOURCE: NESTA Futurelab Series Report 11: Literature review in mobile technologies and learning, Taylor, J. Pedagogy in the mobile learning environment. The Open University
Pedagogy of Mobile apps: Text

Interactivity:
- Reference material with little pedagogical structure or sequencing

Environment:
- Low granularity and exclusively text-based
- Searchable databases of static information

Role:
- Learner is passive recipient of information
Pedagogy of Mobile apps: Graphic

Interactivity

- Some interaction with the content and/or manipulate the content

Environment

- Reference materials, question banks, calculators, charts with minimal or no pedagogical structure
- Low granularity but with some multimodal media richness e.g., short videoclips to demonstrate a skill

Role

- Some pre-requisite specialist knowledge
Pedagogy of Mobile apps: Multimedia

Interactivity
- Apps contain some activities/assessments

Environment
- multimodal media richness/choice of media to suit learning styles eg podcasts

Role
- Addresses a learning issue not always explicitly stated but implicit in the content eg takes the learner through guidelines
Pedagogy of Mobile apps: Interactive

Interactivity
- interactivities and self-assessments appropriate to the learning tasks
- may stimulate social learning by linking to networks of learners or tutor via blogs or texts

Environment
- media rich with high quality and appropriate media for knowledge transfer on a mobile device
- excellent scaffolding, sequencing of tasks and feedback for the skill level of the learner eg small performance support nuggets or feedback on inputted data

Role
- problematized learning goals with tasks that the learner has to actively solve
Finding Apps

- Apple’s App Store for iPod, iPhone and iPad
- Google’s Android Market for Android mobile devices
- Blackberry’s App World for RIM mobile devices
- Nokia’s Avi Store for Nokia mobile devices
- Windows 7 Phone Marketplace
- Third-party app stores
App Selection Criteria

- Free
- Easy to use
- Useful for teaching and learning
- Web App/Mobile App
Categories of Apps

- Productivity
- Communications
- Publishing
- Virtual community
- Media
- Blogs
- Wiki
- Teaching & Learning
Some possible smart tech uses

- Informal, self organised learning
- Problem based learning
- Group based activities
- Outdoor learning
- Independent study
- Distance learning
- Blended learning
Some issues with Smart Devices

- Personalized learning?
- Connectivity
- Choosing a device
- Learning how to use it
- Learning what it can be used for
- Bandwidth availability
Game Design Curriculum

Game Design and Simulation program will start spring 2013 that will feature courses that will address:

- Design Concepts for Mobile Applications (iPhone, ObjectiveC)
- Intro to CS (Python, Lego Robotics)
- Intro to Game Design & Development (GameMaker)
- C++ .NET Programming (Dark GDK)
- Java I and II Programming
- Creating Web Graphics (Photoshop)
- Interactive Web Design (Flash)
- 3D Modeling (3D Studio Max)
- 3D Game Level Design (Unity)
Summary: Ideas for Educators & Students

- Set homework alarms and study alarms
- Text reminders for quizzes, things to return
- Writing notes
- Use to record fieldwork (camera, audio, video)
- Work on speaking and writing skills
- Review questions with a classmate, teacher, friend
- Make a podcast (using GarageBand or Audacity)
- Review/watch a lecture or experiment video
- Create a portfolio album
- Create a survey and send
- Use GoogleMaps and MapQuest for direction
Summary: Ideas for Educators & Students

- Raise spatial awareness and positioning
- Play an educational game
- Use the calculator or graphing tool
- Look up directions
- Compare sources of information
- Perform basic and advanced research
- Compare temperature and weather conditions
- Convert metric to English system
- Learn a new language
- Check your calendar and time
- Talk to someone