What will be covered

• Defining mobile learning
• Learning theories and how they could be used for mobile learning design
• Mobile learning design exercises
Workshop aims

- Explore some learning theories and their application to mobile learning design
- Brainstorm possible mobile learning design scenarios
- Suggest further resources
Background

**Jenny Pesina**

E-learning Specialist/Multimedia Developer

**Over 15 years experience in:**

User experience, web and multimedia development, graphical user interfaces for complex online applications and educational media production

E-learning and blended learning: academic staff development, seminars, research into mobile learning, designing and coordinating online courses through the institutional LMS, integration of educational technologies into teaching and learning in higher education

Twitter: @BE_eLearning
Now your turn:

In groups of 3, introduce yourself to each other and discuss the following questions:

- What is your favourite ‘mobile’ device (laptop, tablet, smartphone etc.)?
- What app(s) do you use the most/the least?
- What app(s) do you think function especially well in your context?
Defining mobile learning
Defining ‘mobile learning’

737,000 results in July, 2013!

The term M-Learning, or "mobile learning", has different meanings for different communities. Although related to e-learning...

en.wikipedia.org/wiki/Mobile-learning

M-learning - Wikipedia, the free encyclopedia

en.wikipedia.org/wiki/M-learning

One definition of mobile learning is, "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when..."
Defining ‘mobile learning’

Wikipedia:

• “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.”

• “Different meanings for different communities”

Quinn (2000) and Pinkwart, et al. (2003) defined m-learning as “e-learning that uses mobile devices”.

Possibly just a differentiation between formal and informal learning? Is this really a new concept?

My view: it depends on your context, subject, learning and teaching methods
Defining ‘mobile learning’

Definition I like:

Mobile learning “as the use of handheld computing devices to provide access to learning content and information resources” (Haag, 2011, p.3). ²

The Department of Defense (DoD) Advanced Distributed Learning (ADL) Mobile Learning Team
“You can’t control how the phone will be used, or the environment the phone will be used in”
Shared versus personal: from e-learning to m-learning

**E-learning**
- Shared environment
- Continuous Interaction
- Formal guidance
- Structured content
- Complexity of information
- Given ahead of time
- Media-rich
- Distance learning

**M-learning**
- Personalisation
- Exploration
- Self-discovery
- Digestible chunks of information
- Progressive understanding
- Media-cautious
- Situated learning

E-learning  M-learning
From e-learning to m-learning

Feedback and assessment

**E-learning**
- Standard tests
- Usually delayed feedback
- Theoretical / text-based
- Individualised, component-based group work

**M-learning**
- Individualised test
- Instant feedback
- Practical / on-site
- Simultaneous collaborative group work

“The best mobile learning is usually just in time, just the right amount, and just for the user.”


By Chad Udell
Key opportunities: m-learning

1. Encourage “anywhere, anytime” learning
2. Reach students from a variety of backgrounds
3. Foster collaboration and communication
4. Fit with existing learning environments
5. Enabled adaptive and personalised learning experience
Planning for mobile learning: overall goals and objectives

• Your context
• Your goals and objectives
• Why mobile learning?
Learning theories and how they could be used for mobile learning design
Combining relevant learning theories and adapting them to mobile learning:

1. Guided Experiential Learning (GEL)
2. Authentic Learning
3. The Framework for the Rational Analysis of Mobile Education (FRAME) model
Guided Experiential Learning (GEL)
Guided Experiential Learning (GEL)

Outline:

• Work of Dr. Richard Clark, University of Southern California
• Designed to promote the development of adaptable experts
• Conceptual and procedural knowledge should be provided during training
• Outcome: knowledge applied when conditions shift and change

Guided Experiential Learning (GEL)

GEL design system attempts to promote the development of adaptable expertise through applying all of the empirically identified training methods that promote flexibility:

• **Environment** (situated where skills need to be applied)
• **Motivation** (personalised for each task)
• **Increasing novelty** (collection of five increasingly novel and challenging scenarios)
• **Variable practice** (during lessons and a whole task)
• **Targeted Feedback**

Let’s look at how these methods can be applied to mobile learning

Guided Experiential Learning (GEL)

GEL Adaptation to Mobile Learning

Instructors
• Field-based training (medicine, science, business, law, education..)
• Practice and feedback based on expert-led demonstrations

Users
• Learning how to handle routine situations
• Learning how to apply the skills to complex scenarios

Case-study
Guided Experiential Learning (GEL) - example

nQuire Toolkit: [http://www.nquire.org.uk/node/2](http://www.nquire.org.uk/node/2)

- The Personal-Inquiry Project: collaboration between the Open University and the University of Nottingham
- Helps students aged 11-14 to understand themselves and the world around them through a process of active enquiry
- The online toolkit guides the students through the task.

Typical investigation steps (with teacher support throughout all stages):

1. Start in the classroom.
2. Research the topic online.
3. Develop shared enquiry questions and proposed methods of investigation.
5. Analyse.
nQuiry Toolkit – inquiry process representation

Reflect
on my progress

Find
my topic

Share
And discuss my inquiry

Decide
my inquiry question or hypothesis

Respond
To my question or hypothesis

Plan
my methods, equipment, actions

Collect
my evidence

Analyse
and represent my evidence

Adopted from: Stamatina Anastopoulou et al., 2012
Microclimates
My progress: 1 → 2 → 3

Microclimates
A Year 9 investigation finding out about the microclimates around our school, with Mrs. Brown

Preparation
Your inquiry is organised into things that you need to do at certain times. A period of time is called a 'stage'. This stage is called 'Preparation'. Have a look and see what you need to do by clicking on the activities below. Some you can do right now, others you will be able to do later on.

Homepage: Year 9 microclimates investigation around their school grounds

http://www.nquire.org.uk/demo/
**Microclimates**

A Year 9 investigation finding out about the microclimates around our school, with Mrs. Brown

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**Find my topic**

This is where you and your teacher can keep useful things like files and photos to help you decide what you will investigate, you can write notes here too!

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>Submitted by Sarah Teacher on Thu, 06/03/2010 - 19:16</td>
</tr>
<tr>
<td>欢迎 to your Microclimates investigation. This is your Year 9 geography fieldwork investigation. We will find out more about local climates, called microclimates, and gather data from around the school. We'll then analyse our data and draw some conclusions. Microclimates are areas where the normal temperature and conditions are slightly different from the surrounding areas. Most common microclimates are around large buildings such as shops, schools and office blocks.</td>
<td></td>
</tr>
<tr>
<td><strong>My notes</strong></td>
<td>I shall be investigating Microclimates around the school grounds with my group in Mrs. Teacher's class. We'll use this notes section to write up notes about the way we'll work. We'll also put in any useful documents we find on the internet. Wikipedia has a useful article on Microclimates: <a href="http://en.wikipedia.org/wiki/Microclimate">http://en.wikipedia.org/wiki/Microclimate</a> We've included a good picture that shows a jungle microclimate. Submitted by James Student on Thu, 06/10/2010 - 02:13</td>
</tr>
</tbody>
</table>

http://www.nquire.org.uk/demo/
Microclimates

A Year 9 investigation finding out about the microclimates around our school, with Mrs. Brown

My hypothesis

Here you can think about what it is you will investigate and type in your decisions.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My hypothesis</strong></td>
<td>A hypothesis is a prediction that you can test.</td>
</tr>
<tr>
<td></td>
<td>The garden site nearest the school entrance will be the best place to have a bench because it is sheltered from the wind but south facing, so it is warm and not windy there. The “MUGA” (games area) will be the worst place...</td>
</tr>
<tr>
<td></td>
<td>Submitted by James Student on Thu, 06/10/2010 - 09:13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>My key questions</th>
<th>These are my key questions. Click the activity to sort them or add a new one.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where is the windiest part of the school grounds?</td>
<td></td>
</tr>
<tr>
<td>Where is the sunniest part of the school? this is likely to be the warmest.</td>
<td></td>
</tr>
<tr>
<td>Where will we find the warmest part of the school grounds?</td>
<td></td>
</tr>
</tbody>
</table>
### Plan my method

Here you can plan the type of data to collect (your measures).

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose measures</td>
<td><strong>Key measures</strong>&lt;br&gt;Key measures are how you organise the data you collect.</td>
</tr>
<tr>
<td></td>
<td><strong>Location</strong>&lt;br&gt;Choose from: Games area, Reception, Canteen, Humanities block, Car park, Assembly hall using GPS receiver</td>
</tr>
<tr>
<td></td>
<td><strong>Selected measures</strong>&lt;br&gt;Selected measures are collected with key measures.</td>
</tr>
<tr>
<td></td>
<td><strong>Humidity</strong>&lt;br&gt;A number measured in Percentage (%) using Humidity sensor</td>
</tr>
<tr>
<td></td>
<td><strong>Image of location</strong>&lt;br&gt;Upload an image using Camera</td>
</tr>
<tr>
<td></td>
<td><strong>Not used</strong>&lt;br&gt;These measurements will not be collected.</td>
</tr>
<tr>
<td></td>
<td><strong>Windspeed</strong>&lt;br&gt;A number measured in Radians per second (rs-1) using Anemometer</td>
</tr>
<tr>
<td></td>
<td><strong>Temperature</strong>&lt;br&gt;A number measured in Celsius (C) using Thermometer</td>
</tr>
<tr>
<td></td>
<td><strong>Notes</strong>&lt;br&gt;Text using nQuire tool</td>
</tr>
</tbody>
</table>

Submitted by James Student on Thu, 06/10/2010 - 09:34

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**Microclimates**

A Year 9 investigation finding out about the microclimates around our school, with Mrs. Brown

**Navigation**

- Find my topic
- Decide my question or hypothesis
- Plan my method
- Collect my data
- Analyse my data
- Decide my conclusions
- Share my findings
- Reflect on my progress

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[nQuire Toolkit – Plan my method](http://www.nquire.org.uk/demo/)
Microclimates
My progress: 1 → 2 → 3

Collect my data
Here you can add new data for your measures.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>My data</td>
<td>You have collected these data for your key measure Location. Click the activity to sort them or add new data.</td>
</tr>
</tbody>
</table>
nQuire Toolkit – Analyse my data

Organise and analyse the data that you've collected. You can choose from your measures to create a presentation and answer your key questions.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My results presentations</strong></td>
<td>View and organise the presentations of your results.</td>
</tr>
<tr>
<td><strong>Temperature result</strong></td>
<td>I predict the sunny places will be the warmest.</td>
</tr>
</tbody>
</table>

Temperature result

![Temperature result graph]

http://www.nquire.org.uk/demo/
Three different types of infrastructure was used during trials:

- Inquiry was accessed from a range of devices from a central server (used mostly during the analysis and writing up phases of the larger inquiries).

- Local installation of nQuire on notebooks, synchronisation with the central server at a later date (used mostly to collect the data).

- Field activities: mobile server with WiFi connectivity was used to allow the students to share data using mobile devices as web clients.

Note: nQuire has a custom mobile interface with optimised navigation and layout to collect and observe data on a smartphone.
Effective design of mobile learning environment

- Learner-centered
- Devices are utilised and play a supporting role
- Information-context layer is present
- Learners use their existing knowledge
- Learners encode, store and transfer knowledge
- Enhanced social interaction: collaborative learning environment
Use of media and game play increase motivation and learning.

True or false?
Use of media and game play increase motivation and learning.

True, or false?

Richard Clark:

• Training methods influence learning.
• Motivation is caused by beliefs.

HOWERVER:

• “Effective instructional methods can improve learning outcomes across different media, whereas using hand-held instructional media may increase students’ willingness to continue to engage in learning.”

Authentic Learning
Authentic Learning

Outline:

• Learner **starts with a need and motivation**
• Learning occurs ‘any time, any place’
• Learner has **access to information** that will help them to **perform an immediate action**
• Situated
• Self-directed

Authentic Learning - implementation

Learning design steps:

• Present students with an authentic problem
• Ask the students to analyse
• Give students realistic tasks aligned with the problem and assessment
• Ask students to reflect on their tasks throughout problem solving
• Provide feedback at various stages of task completion
Two students are tasked to edit and present the following day’s morning news programme on school radio. Teachers pick new students every time.

Their responsibility: to make sure their school is kept up to date on current affairs.

Activities: research, editing, filtering and presentation.

Skills acquired: authentic critical, organisational and reflective (transferable!).

The Framework for the Rational Analysis of Mobile Education (FRAME) model
Koole’s Framework for the Rational Analysis of Mobile Education (FRAME)

Three key aspects:

Device

Learning

Social Environment

Outline:

• Technology, learners and social interactions are placed within an information context

• Learners must **interact** with the information in order to extract **meaning** from it
  
  – Instructors need to find ways to encourage learners to do this

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2. [http://mobile-technology.wikispaces.com/theoretical+frameworks](http://mobile-technology.wikispaces.com/theoretical+frameworks)
“This model is useful for guiding the development of future mobile devices, the development of learning materials, and the design of teaching and learning strategies for mobile education”.

The FRAME does this by connecting three aspects: Device, Learner and Social.
Aspects:

• D (Device)
  – Physical Characteristics (size, weight)
  – Input Capabilities (touch screen, stylus)
  – Output Capabilities (speakers, monitors)
  – File Storage and Retrieval (internal, or external)
  – Processor Speed (response rates)
  – Error Rates (malfunctions – flaws in hardware, software, interface design)
Aspects:

• **L (Learner)**
  - Prior knowledge
  - Memory
  - Context and Transfer
    (inert versus active knowledge)
  - **Discovery Learning** (solutions for novel problems)
  - **Emotions and Motivations** (feelings of the learner towards a task and reasons to accomplish a task)
Aspects:

• S (Social)
  – Conversation and Cooperation
    (quality of communication)
  – Social Interaction
    (conversation as a cooperative activity)
FRAME model

Device Usability Intersection (DL)

- **Portability**
- **Information Availability**
  (anytime, anywhere)
- **Psychological Comfort**
  (affects cognitive load and the speed with which users can perform tasks)
- **Satisfaction** (aesthetics of the interface, physical appearance of the device, functionality...)

Interaction Learning Intersection (LS):

- Interaction
  (learner-learner, learner-instructor, learner-content)
- Situated Cognition
  (authenticity of content and audience)
- Learning Communities
  (communities of practice)
Social Technology Intersection (DS):

- **Device Networking**
  (various connectivity standards allow users to connect to other users, systems and information)

- **System Connectivity**
  (internet access and document transfer protocols)

- **Collaboration Tools**
  (shared tools such as calendars, authoring tools and project management tools)
Mobile Learning Process (DLS)

- **Mediation**
  (nature of interaction changes as learners interact with each other, their environment...)
- **Information Access and Selection**
  (relevancy, accuracy)
- **Knowledge Navigation**
  (learners acquire skills to appropriately select, manipulate and apply the information to their own unique situations)
“By assessing the **degree** to which all the areas of the FRAME model **are utilized** within a mobile learning situation, practitioners may use the model to design **more effective** mobile learning experiences.”

(Koole, 2009, p.27)⁶.
Activity

Planning for mobile learning using the FRAME model checklist

Write down your thoughts using the checklist (provided)
When was the first commercial cell phone released?

What brand model was it?
Answer:
The DynaTAC 8000X, 1984


http://en.wikipedia.org/wiki/Motorola_DynaTAC
Mobile Learning Planning – Lessons
Mobile Lesson Template – Part 1

• **Background**
  – Content Area
  – Title
  – Grade Level or Target Group

• **Pre Planning**
  – Big Idea(s)
  – Essential Questions
  – Objectives
Mobile Lesson Template – Part 2

• **Lesson Opening**
  – Lesson Opening (The Hook): Include a least one content-area app to gain students’ interest.

• **Lesson Body**
  – Explanation: Include at least one content-area app that provides an explanation of the concepts
  – Check for Understanding: Include at least one content-area app “tests” student knowledge of the concepts.
  – Extended Practice: Include at least one content-area app that assists students in getting more practice in applying content-related concepts.

• **Closing**
  – Lesson Closing: Include at least one content-area app that assists students creating a project – producing a project that integrates and demonstrates the lesson’s concepts.

http://usergeneratededucation.wordpress.com/2012/11/24/mobile-learning-lesson-plans/
Mobile Lesson Plan - Example

Solving Multiple Step Equations:
http://jpiatt.weebly.com/mobile-learning.html

Technology Integration for Teachers

Solving Multiple Step Equations: Mobile Device Lesson

This lesson uses several different applications that use either an iPhone or iPad. All applications work on an iPad, most will also work on an iPhone.

Background

- Content Area: Mathematics
- Title: Solving Multi-Step Equations for the variable
- Grade Level or Target Group: Middle school level, and/or Algebra I

http://jpiatt.weebly.com/mobile-learning.html
More resources: http://usergeneratededucation.wordpress.com/2012/11/24/mobile-learning-lesson-plans/
Educational Apps - taxonomies

Teaching and Learning with iPads

Work down to create a Learning Workflow

- Reading: Teachers read digital stories from iBooks to students
- Modeling: Teachers model how to complete a worksheet by importing into GoodReader and annotating
- Orientating: Students construct WALT, WILF, and TIBs for the lesson using Mindomo to establish their learning goals
- Personalising: Students identify their own personal goals as part of a digital learning plan using Office2 HD presentation tools

- Researching: Teachers model how to safely and effectively search for information using Safari
- Brainstorming: Teachers use Mindomo to create a concept map of student responses to show categories and relationships
- Listening: Students using the Music app to listen to audiobook podcasts from iTunes as a listening post for literacy rotations
- Contextualising: Students create their own personalised spelling lists using SpellBoard

- Annotating: Teachers capture real-world photos using Camera to collaboratively annotate with students using Sketch for Science, Health, PE, and SOSE
- Scaffolding: Teachers create an instructional video using ShowMe for students to access independently for support
- Creating: Students create a short movie in Reel Director to demonstrate their understanding of a concept
- Designing: Students use Book Creator to design their own eBook to demonstrate their knowledge and understanding

- Sequencing: Teachers use Camera to capture photos from a special day for students to later sequence and caption in Comic Life
- Demonstrating: Teachers use Camera to capture a video of students correctly performing sporting techniques to demonstrate best practices
- Assessing: Students demonstrate their knowledge of a maths concept by creating a tutorial in Explain Everything
- Composing: Students create a podcast with an original backing track in GarageBand to demonstrate their knowledge of a concept

- Collating: Teachers collate students' work daily as part of a class digital portfolio with reflections using Office2 HD Presentation tool.
- Sharing: Teachers use GoodReader to copy students' work to a shared drive for others to access
- Blogging: Students use the Camera app to capture their learning reflection as a video blog
- Socialising: Students share their work by uploading to the Student Portal WordPress site

- Reflecting: Teachers use Twitter to post a class reflection at the end of the day
- Recording: Teachers record students' audio reflections at the end of a lesson with WavePad, email to themselves and upload to the Bounty Broadcast
- Emailing: Students mail their work to a peer for feedback or to collaborate on a task
- Conferencing: Students present their learning artefacts in the Office2 HD Presentation tool as part of a digital portfolio assessment

iPad Learning: Rich, Personalised, Higher-Order, Collaborative and Creative

http://bountyboulevardss.eq.edu.au/?page_id=2395
Educational Apps - taxonomies

iPAD Apps to Support Bloom's Revised Taxonomy
assembled by Kathy Schrock

Android Apps to Support Bloom's Revised Taxonomy
assembled by Kathy Schrock

http://www.schrockguide.net/bloomin-apps.html
Using mobile lesson planning template (provided), take a few minutes to think it through and write down a lesson plan for your subject. Discuss with a person beside you.
Where to next?
A lot of mobile learning projects happen in isolation / disconnected from professional development.

Most mobile learning are project funded and professional development is seen as a by-product.

Many projects are informal and have not been properly researched and documented.

Very little evidence that mobile learning works better than its alternatives.
Recommendations

Strong need for a more coordinated approach in the education sector:

1. Professional development for educators: **ongoing and job embedded**.
   It doesn’t have to follow classic staff training models (trainer – trainee).

2. **More and better training**, not less and faster training:
   It should be more than an one-hour demonstration on how to use a mobile phone for teaching!
Recommendations

Strong need for a more coordinated approach in the education sector:

3. Mobile learning is **not done in isolation**: integrate it in the learning and teaching cycle. Use relevant learning theories.

4. Research opportunities for educators – competitive grants and information dissemination.

5. Strong need for **a clear evidence** that mobile learning is working.
“School Kills Creativity” by Ken Robinson

http://www.youtube.com/watch?v=eYzX-ghW0mU&feature=player_detailpage#t=448
References

- Mulholland, P; Anastopoulou, S; Collins, T; Feisst, M; Gaved, M; Kerawalla, L; Paxton, M; Scanlon, E; Sharples, M; Wright, M. IEEE TRANSACTIONS ON LEARNING TECHNOLOGIES; APR-JUN, 2012; 5; 2; p157-p169
References


