How Do We Measure Effectiveness In Mobile Learning Environments?

Veronica Diaz, PhD
Associate Director
EDUCAUSE Learning Initiative
EDUCAUSE
A. I’m attending solo today
B. I’m attending with at least one other colleague
Agenda

• Mobile learning initiative frameworks (the what?)
• Strategies and methodologies to help measure the impact of mobile tools on teaching and learning (the how?)
• Mobile learning measurement tours (the for instance)
Resources

http://tinyurl.com/mecar
Got mobility?
A. Yes
B. No
C. Sort of, we’re working on getting to this point
A. Yes
B. No
C. Sort of, we’re working on getting to this point
A. Yes
B. No
C. Sort of, we’re working on getting to this point
Pushing mobile content (registrar, library, tram)

Generic mobile instructional functions (clickers, twitter, LMS)

Discipline-specific customized mLearning
BEHAVIOURIST
activities that
promote
learning as a
change in
observable
actions

Source: http://www2.futurelab.org.uk/resources/documents/lit_reviews/Mobile_Review.pdf.
CONSTRUCTIVIST learning as an active process in which learners construct new ideas or concepts based on both their current and past knowledge.

Source: http://www2.futurelab.org.uk/resources/documents/lit_reviews/Mobile_Review.pdf.
SITUATED activities that promote learning within an authentic context and culture.

Source: http://www2.futurelab.org.uk/resources/documents/lit_reviews/Mobile_Review.pdf.
COLLABORATIVE activities that promote learning through social interaction

Source: http://www2.futurelab.org.uk/resources/documents/lit_reviews/Mobile_Review.pdf.
LEARNING AND TEACHING SUPPORT activities that assist in the coordination of learners and resources for learning activities

Source: http://www2.futurelab.org.uk/resources/documents/lit_reviews/Mobile_Review.pdf.
Which of these best describes your current efforts in mobility

A. Behaviorist
B. Constructivist
C. Situated
D. Collaborative
E. Learning support
ACTIVITY, PART 1::
YOUR MINI MOBILE INITIATIVE

The mobile tools (tablet, smart phone, etc.)
The mobile applications (apps, cloud, etc.)
The goals (engagement, content delivery, etc.)
Mobile technology is best suited for...
Tapping into the PLE
Content delivery is the low-hanging fruit
Innovation doesn’t always start in the classroom
Rapid growth in mobile applications and their interoperability with other tools
The new tool in the toolkit
Challenge of ownership patterns
What will you do in your initiative?

............

ACTIVITY, PART 2::
YOUR MINI MOBILE INITIATIVE
Review your plan and ask...

• What would be the **ramifications and opportunities** for learning if this technology were adopted?

• What kinds of teaching and learning **engagements** might this technology: **make better or enable**?

• If we decide to do a pilot, what kind of **evaluation methodology** can we overlay on the project to assess outcomes?

• What kind of additional research needs to be done concerning this technology (student)?
The Thing(s) To Measure

vs

How To Measure
Measuring the Impact: 5 Studies
MOBILE RESEARCH: CHALLENGES AND GOALS

Source:
https://lra.le.ac.uk/bitstream/2381/8162/3/%5B14%5DVavoulaSharples-mlearn2008%5B1%5D.pdf
Capturing learning context and learning across contexts

Challenge 1
Has anyone learned anything yet?

Challenge 2
An ethical question

Challenge 3
The technology itself

Challenge 4
The big picture

Challenge 5
Formal vs informal

Challenge 6
5 recommendations

• Capture and analyze learning in context with consideration of learner privacy

• Assess the usability of the technology and how it affects the learning experience (PLE)

• Look beyond measurable cognitive gains into changes in the learning process and practice

• Consider organizational issues in the adoption of mobile learning practice and its integration with existing practices

• Span the lifecycle of the mobile learning innovation that is evaluated, from conception to full deployment and beyond
CASE STUDY:
MOBILE LEARNING
IN A BLENDED COURSE

Source:
Focus Areas

- if student enjoyed the learning experience
- how students feel about interacting with fellow learners
- how students felt about their relationship to their instructors in the mobile blended learning environment
- mobile blended classroom’s effects on students’ study habits
<table>
<thead>
<tr>
<th>Cluster 1 – Overall Satisfaction</th>
<th>Overall satisfaction with this class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster 2 – Course Organization</td>
<td>The mLearning class was well organized</td>
</tr>
<tr>
<td>Cluster 3 – Course Activities</td>
<td>The course’s activities were engaging</td>
</tr>
<tr>
<td>Cluster 4 – Student Interaction</td>
<td>The activities strengthened my connections with my classmates.</td>
</tr>
<tr>
<td></td>
<td>I had more opportunities to help my classmates.</td>
</tr>
<tr>
<td>Cluster 5 – Instructor Interaction</td>
<td>The activities strengthened my connections with the instructor.</td>
</tr>
<tr>
<td></td>
<td>I had more opportunities to ask questions.</td>
</tr>
<tr>
<td>Cluster 6 – Relationship to Content</td>
<td>I had more opportunities to practice what I learned.</td>
</tr>
<tr>
<td></td>
<td>Mobile learning helped me a great deal in studying the content of this class.</td>
</tr>
<tr>
<td></td>
<td>Mobile learning helped me grasp the course’s main points.</td>
</tr>
<tr>
<td></td>
<td>Mobile learning changed my habit of studying alone</td>
</tr>
<tr>
<td>Cluster 7 – Sustainability</td>
<td>The modality of mLearn (words, audio, video) fits my learning style</td>
</tr>
<tr>
<td></td>
<td>I felt that my social skills have improved through the use of mobile learning.</td>
</tr>
<tr>
<td></td>
<td>I would like to recommend mobile learning to other students.</td>
</tr>
<tr>
<td></td>
<td>I would like to participate in future mLearn activities.</td>
</tr>
</tbody>
</table>
Overall Satisfaction

Course Organization
Course Activities

Student Interaction
Instructor Interaction

Relationship to Content
Sustainability
BUILDING A SUCCESSFUL MLEARNING FRAMEWORK

Proportionate
Appropriate to the specific learning technologies, to the learners, and to the ethos of the learning

– ideally built in, not bolted on
Alignment between learning goals and technology
Unintended results
ACTIVITY, PART 3::
YOUR MINI MOBILE INITIATIVE

How and what will you measure?
What would success look like?
How can you capture it?

............
CASE STUDY: MOBILE LEARNING IN MEDICAL SCHOOL

Source: http://www.biomedcentral.com/1472-6920/10/57
Context

• 57 students in cohort
• 4-year
  – Bachelor of Medicine
  – Bachelor of Surgery
• 2 online tools
  – Blackboard
  – Interlearn
• Access to
  – Internet
  – Customized software
  – Info repositories
• Sharing info within and between cohorts
• 2 RQs
  – In what ways does mobility support learning?
  – What areas need further development?
### Session notes

<table>
<thead>
<tr>
<th>Overviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture notes</td>
</tr>
<tr>
<td>Tutorial notes</td>
</tr>
<tr>
<td>Practical notes</td>
</tr>
<tr>
<td>PBL materials</td>
</tr>
<tr>
<td>Applications</td>
</tr>
<tr>
<td>Weblinks</td>
</tr>
</tbody>
</table>

### Student information

<table>
<thead>
<tr>
<th>Announcements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated timetables</td>
</tr>
<tr>
<td>CBPP information</td>
</tr>
</tbody>
</table>

### Learning activities

<table>
<thead>
<tr>
<th>Formative assessments (Quizzes; Assignments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summative assessments (Exams)</td>
</tr>
</tbody>
</table>

### External weblinks
Student Improvement Suggestions

• Better and more electronic learning resources
  – more materials, especially audiovisual resources
  – more flexibility in accessing materials

• Guidelines/support on managing the VLE

• Improvements to VLE
  – Streamlining organization of information
  – Reduced the number of clicks to access resources
  – Orientation for students
EVALUATING MOBILE APPLICATIONS
<table>
<thead>
<tr>
<th>Domain</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum</td>
<td>Skill(s) reinforced in the app are not clearly connected to the targeted skill or concept</td>
<td>Skill(s) reinforced are prerequisite or foundation skills for the targeted skill or concept</td>
<td>Skill(s) reinforced are related to the targeted skill or concept</td>
<td>Skill(s) reinforced are strongly connected to the targeted skill or concept</td>
</tr>
<tr>
<td>Curriculum</td>
<td>Skills are practiced in a rote fashion (e.g., flashcards)</td>
<td>Skills are practiced in a more authentic way (e.g., game-based environments)</td>
<td>Some aspects of the app are not authentic</td>
<td>Targeted skills are practiced in an authentic way (e.g., project-based environments)</td>
</tr>
<tr>
<td>Connection</td>
<td>Feedback is limited to correctness of student responses</td>
<td>Feedback is specific to student performance</td>
<td>Feedback is available electronically for improved student performance</td>
<td>Data is available electronically to student and teacher</td>
</tr>
<tr>
<td>User</td>
<td>App offers no flexibility in order to use the app</td>
<td>App offers limited flexibility (e.g., few levels)</td>
<td>App offers more than one degree of flexibility to meet student needs</td>
<td>App offers complete flexibility to alter settings to meet student needs</td>
</tr>
<tr>
<td>Friendliness</td>
<td>Students avoid the use of the app when the app is assigned by the teacher</td>
<td>Students view the app as “more schoolwork” and may be off-task when directed by the teacher to use the app</td>
<td>Students will use the app as directed by the teacher</td>
<td>Students are highly motivated to use the app and select it as their first choice from a selection of related choices of apps</td>
</tr>
<tr>
<td>Differentiation</td>
<td>Students need to have the teacher review how to use the app</td>
<td>Students need to have the teacher review how to use the app</td>
<td>Students need to have the teacher review how to use the app</td>
<td>Students can launch and navigate within the app independently</td>
</tr>
<tr>
<td>Feedback</td>
<td>Student Motivation</td>
<td>Authenticity</td>
<td>Curriculum Connection</td>
<td>Feedback</td>
</tr>
<tr>
<td>Domain</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------</td>
</tr>
<tr>
<td>Curriculum Connection</td>
<td>Skill(s) reinforced in the app are not clearly connected to the targeted skill or concept</td>
<td>Skill(s) reinforced are prerequisite or foundation skills for the targeted skill or concept</td>
<td>Skill(s) reinforced are related to the targeted skill or concept</td>
<td>Skill(s) reinforced are strongly connected to the targeted skill or concept</td>
</tr>
<tr>
<td>Authenticity</td>
<td>Skills are practiced in a rote or isolated fashion (e.g., flashcards)</td>
<td>Skills are practiced in a contrived game/simulation format</td>
<td>Some aspects of the app are presented in an authentic learning environment</td>
<td>Targeted skills are practiced in an authentic format/problem-based learning environment</td>
</tr>
<tr>
<td>Feedback</td>
<td>Feedback is limited to correctness of student responses</td>
<td>Feedback is limited to correctness of student responses and may allow for student to try again</td>
<td>Feedback is specific and results in improved student performance (may include tutorial aids)</td>
<td>Feedback is specific and results in improved student performance; Data is available electronically to student and teacher</td>
</tr>
<tr>
<td>Differentiation</td>
<td>App offers no flexibility (settings cannot be altered)</td>
<td>App offers limited flexibility (e.g., few levels such as easy, medium, hard)</td>
<td>App offers more than one degree of flexibility to adjust settings to meet student needs</td>
<td>App offers complete flexibility to alter settings to meet student needs</td>
</tr>
<tr>
<td>User Friendliness</td>
<td>Students need constant teacher supervision in order to use the app</td>
<td>Students need to have the teacher review how to use the app on more than one occasion</td>
<td>Students need to have the teacher review how to use the app</td>
<td>Students can launch and navigate within the app independently</td>
</tr>
<tr>
<td>Student Motivation</td>
<td>Students avoid the use of the app or complain when the app is assigned by the teacher</td>
<td>Students view the app as “more schoolwork” and may be off-task when directed by the teacher to use the app</td>
<td>Students will use the app as directed by the teacher</td>
<td>Students are highly motivated to use the app and select it as their first choice from a selection of related choices of apps</td>
</tr>
</tbody>
</table>
The Thing(s) To Measure

vs

How To Measure
How do I ask?

• Questionnaires
  – Paper
  – Online
• Interviews
  – Individual
  – Focus Group
• Observations
  – Classroom
  – Online

• Focus groups
• Surveys
• Tracking tools
• Journaling
• Pre post tests
• Debriefs
Types of Questionnaires

- Paper distributed in class
- Mail
- E-mail
- Online, e.g., SurveyMonkey
- Twitter poll
- Facebook
Types of Interviews

- Face-to-face
- Telephone or Skype
- Teleconference
- Synchronous Chat
- Asynchronous forum
- Focus group
- Twitter poll
- Facebook
Observation Options

Onlooker ↔ Participant

Overt ↔ Covert

Fully-explained ↔ Unexplained

Once or limited ↔ On-going

Narrow focus ↔ Broad focus

Source: http://www.amazon.com/Conducting-Educational-Design-Research-Mckenney/dp/0415618045/ref=sr_1_1?s=books&ie=UTF8&qid=1329938445&sr=1-1
Triangulate to Tell the Full Story

Source: http://www.amazon.com/Conducting-Educational-Design-Research-McKenney/dp/0415618045/ref=sr_1_1?ie=UTF8&qid=1329938445&sr=1-1
What strategies will you use to measure?

· · · · ·

DISCUSSION/QUESTIONS
Veronica Diaz, PhD
Associate Director
EDUCAUSE Learning Initiative
EDUCAUSE

vdiaz@educause.edu
http://www.educause.edu/eli

Resources
http://tinyurl.com/mecar

Copyright Diaz, 2014. This work is the intellectual property of the author. Permission is granted for this material to be shared for non-commercial, educational purposes, provided that this copyright statement appears on the reproduced materials and notice is given that the copying is by permission of the author. To disseminate otherwise or to republish requires written permission from the author.