Mobile Learning: A Framework and Evaluation

Presented By: ADOR GROUP
Paper Summary

- Explores the extension of e-learning into wireless/handheld devices with the help of mobile-learning (m-learning) framework.
- Explores the integration of m-technology in distance learning (SMS, WAP, WML etc.) or traditional classroom environments.
- M-learning is an add-value element of existing learning model.
Paper Summary

- **Social constructive theory** *(Brown & Campione, 1996)*
  Learners has to act and reflect in an learning environment.

- **Conversation theory** *(Pask, 1975)*
  Learning to be successful requires continuous 2-way conversions and interactions.
Research Questions

- What is the problem for the study?
- What procedures did the experimenter use for the study?
- What were the major conclusions for the study?
- How would you classify the study, according to the six types of research studies we looked at in this lesson?
What is the problem for the study?

Related Work

- The reason of m-learning that may NOT have been widely used in education nowadays.
- Use of SMS technology as collaboration tools for m-learning.
What is the problem for the study?

A Mobile Learning Framework

- **Mobile Connectivity**
  - anytime-anyplace which PC is immobile.
- **E-learning**
  - individualized, learner-centered, situated, collaborative and continuing (support both theories previous stated)
- **Framework**
  - “Push” and “Pull” mechanisms.

<table>
<thead>
<tr>
<th></th>
<th>Personalized Content</th>
<th>Collaborative Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUSH</strong> Mechanism</td>
<td>Pedagogical Agents &amp; Mentors</td>
<td>Communication Aids</td>
</tr>
<tr>
<td><strong>PULL</strong> Mechanism</td>
<td>System Tools &amp; Resources</td>
<td>Simulated Classrooms</td>
</tr>
</tbody>
</table>
What is the problem for the study?

**Mobile Learning Applications**

- **Information and content delivery**
  - presenting the materials in different media, parallel access paths, and assessments via computer logs and software packages.

- **Communication and interaction process**
  - usage of synchronous and asynchronous communication tools for idea sharing.

- **ICT alters the roles of students and instructors.**
Experiment Background – Prototype m-Learning environment

- 3 courses during two semester.
- Purchase a few popular mobile devices & applications.
- M-Learning environment “wapsite”
  - “wapsite” with
    - RSS news alerts.
    - Discussion board.
    - Chat room.
Experiment Background – Implementation background

- Customizing commercial mobile software.
- M-Learning applications developed via WAP (wireless access protocol)
- WAP supported mobile device from a “wapsite”/website.
- Students are required to authenticate before accessing the course materials.
- Students & instructors can interact with course materials either from PC or W/H (wireless handheld devices).
- Instructors have an administrative right for configuration & monitoring the course contents and students’ access log.
Experiment Background – “wapsite” and m-Learning application architecture

Course Contents

Discussion Forums

Provide Data Access Services for WAP Phone

Cold Fusion Server

vBulletin Board System

WiForums WAP Server

IIS Web Server

Welcome to UMass Lowell
MISCOM WAP Site

Course Announcements
Course Discussion Forum
Submit Your Feedback

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UMass Lowell

From:
alerts@miscom.uml.edu

Msg:
Assignment 1 is due on Feb 26th; Midterm Exam 1 is on Feb 26th.

My SQL Server

Discussion Board, Alerts, News data

Mobile learning application architecture.
Experiment Procedure

Two phases implementation during two semesters and using 5-point Likert scale (5=Strongly agree, 3=Neutral, 1=Strongly disagree) and literature review for evaluation.

**Phase I:**
1. 19 undergraduate students.
2. Implement in elective course.
   2.1 If NO WAP phone/internet data services, students need to download simulator software to access materials on PC.
3. Students need to login course website & “wapsite” to access materials and interact with peers and instructor.
   3.1 System logged students usage and check whether they accessed website or “wapsite” or not.
4. Participation grade will grant and students need to access “wapsite” at least 10 times.

**Phase II:**
1. 44 undergraduate students.
2. 3 weeks to access and discuss the class materials.
3. Same requirement in phase I.
4. Students need to give their perceptions on the potential role of m-Learning system (MLS) in learning.
5. Students need to feedback and foresee wireless devices for e-learning under 5-point Likert scale.
<table>
<thead>
<tr>
<th></th>
<th>Phase I</th>
<th>Phase II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students think mobile phone keypad &amp; screens very difficult while navigating, reading and typing their messages.</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Students think MLS is easy to use.</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Students are much more experienced with SMS messaging and cell phones.</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Students satisfied with MLS application.</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Students foresee MLS is potentially useful tool for learning.</td>
<td>✗</td>
<td>✔️</td>
</tr>
<tr>
<td>Students find the flexibility of W/H devices useful for learning.</td>
<td>✗</td>
<td>✔️</td>
</tr>
<tr>
<td>Students think MLS used for pull media more than interactive.</td>
<td>✗</td>
<td>✔️</td>
</tr>
<tr>
<td>Students like the convenience, ease of use, and allow them to utilize any dead-time for productive learning activity.</td>
<td>✗</td>
<td>✔️</td>
</tr>
<tr>
<td>Students dislike slow connection speeds, response times, lack of pictures and visual stimulation for mobile learning application.</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
# Experiment Result – Phase I

## Quantitative Data

Results from survey of 19 students

<table>
<thead>
<tr>
<th>MLS survey 1 ((N = 9))</th>
<th>Average</th>
<th>Std. dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLS was useful for the existing course</td>
<td>3.79</td>
<td>0.63</td>
</tr>
<tr>
<td>MLS was a good discussion tool</td>
<td>3.53</td>
<td>0.96</td>
</tr>
<tr>
<td>MLS was easy to use</td>
<td>2.68</td>
<td>0.94</td>
</tr>
<tr>
<td>MLS was easy to understand</td>
<td>3.00</td>
<td>1.05</td>
</tr>
<tr>
<td>MLS had a good forum for interaction</td>
<td>3.58</td>
<td>0.50</td>
</tr>
<tr>
<td>MLS was easy to discuss course material w/other students</td>
<td>3.42</td>
<td>0.90</td>
</tr>
<tr>
<td>MLS was easy to discuss course material w/the instructor</td>
<td>3.32</td>
<td>0.67</td>
</tr>
<tr>
<td>MLS was a convenient platform to access course discussions</td>
<td>3.79</td>
<td>0.85</td>
</tr>
<tr>
<td>Overall satisfaction with MLS</td>
<td>3.16</td>
<td>0.89</td>
</tr>
<tr>
<td>MLS has potential to become good learning tool</td>
<td>3.74</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Survey questions.  

<table>
<thead>
<tr>
<th>Background questions</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have a W/H device?</td>
<td>84.21%</td>
</tr>
<tr>
<td>Can your W/H device access Internet?</td>
<td>43.75%</td>
</tr>
<tr>
<td>Can you send SMS?</td>
<td>87.50%</td>
</tr>
<tr>
<td>Willing to use wireless for e-learning?</td>
<td>57.89%</td>
</tr>
</tbody>
</table>
# Experiment Result – Phase II

## Quantitative Data

Results from 2nd survey of 44 students

<table>
<thead>
<tr>
<th>MLS survey 2 (n = 44)</th>
<th>Average</th>
<th>Std. dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLS adds value to e-learning</td>
<td>3.75</td>
<td>0.92</td>
</tr>
<tr>
<td>MLS allows instant access regardless of your location</td>
<td>4.27</td>
<td>0.66</td>
</tr>
<tr>
<td>MLS is useful to supplement to an existing course</td>
<td>3.64</td>
<td>1.04</td>
</tr>
<tr>
<td>MLS is an effective learning aid or assistant for students</td>
<td>4.20</td>
<td>0.70</td>
</tr>
<tr>
<td>MLS is an effective method of providing personalized information</td>
<td>3.70</td>
<td>0.85</td>
</tr>
<tr>
<td>MLS allows to convert any wait (dead) time into productive</td>
<td>3.89</td>
<td>0.95</td>
</tr>
<tr>
<td>MLS allows convenient access to discussions – anywhere and anytime</td>
<td>4.05</td>
<td>0.75</td>
</tr>
<tr>
<td>MLS that sends the information via messages may be better</td>
<td>3.50</td>
<td>1.00</td>
</tr>
<tr>
<td>MLS that also allows access to information from the website</td>
<td>3.80</td>
<td>0.98</td>
</tr>
<tr>
<td>MLS can be used as a supplemental tool for any existing course</td>
<td>3.33</td>
<td>1.19</td>
</tr>
</tbody>
</table>

*5 = strongly agree, 3 = neutral, 1 = strongly disagree*

## Background questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have a W/H device?</td>
<td>86.36%</td>
</tr>
<tr>
<td>Is your wireless device a Cell or Mobile Phone</td>
<td>79.55%</td>
</tr>
<tr>
<td>Can your wireless device access data services?</td>
<td>63.64%</td>
</tr>
<tr>
<td>Do you plan to have data services access from your wireless device?</td>
<td>59.09%</td>
</tr>
<tr>
<td>Willing to use wireless for learning?</td>
<td>64.63%</td>
</tr>
</tbody>
</table>
Experimenter Research Limitations

Phase I
1. Small sample size.
2. Limited MLS functions.
3. Limited visual interface.
4. Problem of navigational capabilities.
5. Students biased perception.

Phase II
1. Small sample size.
2. Limitation for wireless network service used for m-Learning.
3. Limitation of technology.
4. Information and interaction overload.
5. Same situations in phase I.
What were the major conclusions & future study?

1. Research results can help to next mobile learning research phase.
2. This results can evaluate the students learning outcomes with use of mobile learning and know the role of mobile learning in higher education.
3. The major problem of m-Learning is information and interaction overload. But, adult learner to minimize their unproductive time and enhance their work-life-education balance.
4. Most constructive learning and conversation theories can be applied for m-Learning.
5. M-Learning technology has value-added features (i.e. alerts, personalized agents/discussion utilities) for learning pedagogy. But, technology is one of the major barriers such as screen size and keypad.
How would you classify the study, according to the six types of research studies we looked at in this lesson?

This study is **Descriptive Research**.

- Hypothesis is introduced at the start, and use the data to develop the hypothesis.
- The data is from:
  - 2 semesters with a total of 63 students from undergraduate and graduate courses at University of Massachusetts.
  - Survey was done to collect the data.
  - The points is supported by the references.
  - The Hypothesis is developed after the conclusion.