Getting Serious About a Platform Independent Application for the Usage of Mobile Moodle Quizzes: A Case Study

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Introduction
Smart Devices Getting in (Almost) Every Student’s Bag

Source: Gartner Smartphone Forecast
No unified Architecture or OS

Image Sources:
Webpages of the different companies
Development and Research Goals

• Development Goals
  • System that supports access to quizzes of Moodle eLearning system
  • Minimal modification effort for porting to another OS
  • Running on different device types (e.g. screen size and resolution)
  • Intuitive user interface

• Research Goals
  • Suitable software architecture
    • flexibility and performance
  • User acceptance
  • Preferred field of application
The System
Technical Implementation

Mobile Devices App Based on HTML5 and JavaScript using GWT
The Mobile Application

• App developed to optimize UI (compared to generic Webbrowser usage)
• Using HTML5 and Javascript leads to easy portability to other modern OS for mobile devices
• Limited functionality to Moodle quizzes
  • allows quick access to desired function
• Designed UI to work on different screen sizes and resolutions
Screenshots from an Android Device

Moodle Quiz on Mobile Devices

Please select a quiz from one of your courses:

- SWT 2011
- VIT 2011
- HMI 2011

Reliable communication

Which of the following statements are wrong (you can select more than one answer)? To ensure reliable communication...

- ... a checksum is used
- ... every message needs to be confirmed by the receiver.
- ... every message needs to be sent twice.
- ... a twisted-pair cable is used.
Screenshots from an Apple iPhone

Moodle Quiz on Mobile Devices

Please select a quiz from one of your courses:

- SWT 2011
- VIT 2011
- CAN-bus characteristics
- Reliable communication
- Focus of the usability engineering process
- HMI 2011

Reliable communication

Which of the following statements are wrong (you can select more than one answer)?

- ... a checksum is used
- ... every message needs to be confirmed by the receiver.
- ... every message needs to be sent twice.
- ... a twisted-pair cable is used.
The Case Study
Technology Acceptance Test

• Based on technology acceptance model

• Adapted to fit to eLearning environment

• To categories of questions
  • Perceived Usefulness
  • Perceived Ease of Use

• 7-level Likert scale for rating
## Questionnaire

<table>
<thead>
<tr>
<th>PU – Perceived Usefulness</th>
<th>PEU – Perceived Ease of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>The MobileMoodleQuiz app ...</td>
<td></td>
</tr>
<tr>
<td>Q1.1: ... helps me to repeat content and to deepen it</td>
<td>Q2.1: ... is easy to learn</td>
</tr>
<tr>
<td>Q1.2: ... with time and location independent access allows me to use the Moodle system more often and helps to better understand the learning content</td>
<td>Q2.2: Reverse: ... is unflexible in its usage</td>
</tr>
<tr>
<td>Q1.3: ... used in lessons and excercises helps me in to follow the lecture and to understand the learning content more efficiently</td>
<td>Q2.3: ... is easy to handle and reacts as assumed</td>
</tr>
<tr>
<td>Q1.4: Reverse: ... usage limits my productivity in formal learning settings</td>
<td>Q2.4: ... handling is easy to understand</td>
</tr>
<tr>
<td>Q1.5: ... eases the enduring learning</td>
<td>Q2.5: Reverse: ... makes it difficult to remember how to achieve certain exercises</td>
</tr>
<tr>
<td>Q1.6: Reverse: ... hindered the enduring learning</td>
<td>Q2.6: Reverse: working with the app is exertive</td>
</tr>
<tr>
<td>Q1.7: ... helps me to increase my course achievements</td>
<td>Q2.7: ... is overall user-friendly</td>
</tr>
<tr>
<td>Q1.8: ... is overall meaningful for usage university</td>
<td></td>
</tr>
</tbody>
</table>
Conducting the Test

• Participants
  • N=17 students applied of computer science
  • 7 used iOS, 10 Android
  • 12 experienced, 5 inexperienced

• Execution
  • Getting familiar: free trial
  • 1st task: find out available quizzes
  • 2nd task: quiz with short question text and few answers
  • 3rd task: quiz with long question text and many answers
Results: Perceived Usefulness

Reverse questions rated with 8-value

**Overall average: 5.62**, std. dev.: 0.46; high value for usefulness

**Cronbach's alpha: 0.55**, low consistency, further evaluation with improved questionnaire, more specific test material and improved test environment necessary
Results: Perceived Ease of Use

The MobileMoodleQuiz app ...

Q2.1: ... is easy to learn
Q2.2: Reverse: ... is inflexible in its usage
Q2.3: ... is easy to handle and reacts as assumed
Q2.4: ... handling is easy to understand
Q2.5: Reverse: ... makes it difficult to remember how to achieve certain exercises
Q2.6: Reverse: working with the app is exertive
Q2.7: ... is overall user-friendly

Reverse questions rated with 8-value

Overall average: 5.3, std. dev.: 1.03; high value for ease of use, detail improvements were suggested and will be implemented

Cronbach‘s alpha: 0.89, high consistency
Summary and Outlook
Summary and Outlook

• The evaluated system offers quick access to quizzes if the Moodle eLearning system
• Usefulness confirmed, more detailed study on preferred field of application required
• Ease of use for platform independent user interface confirmed, details can be improved
• Future work
  • provide more types of questions
  • larger study with application over a complete semester
  • comparison with other existing mLearning approaches
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