Requirements for mobile learning games shown on a mobile game prototype

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Outline

1. Objectives of this Talk
2. Introducing the Mobile Game
3. System Architecture
4. Requirements
5. First Evaluation Results
6. Outlook
Objectives of this talk

- Introduce the motivational potential of mobile learning
- Requirements and lessons learnt of Mobile Game

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Mogi

Second Generation location based Gaming:


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mobileGame - overview

- The goal: To familiarize new students with the university within an orientation rally
- This orientation rally was supported by mobile devices
- Some basic features:
  - Localization of the players on the campus maps (indoor & outdoor)
  - Basic questions that lead the students over the whole campus and introduce them to the "campus life"
  - Chat to communicate between the players
  - Catch other groups to increase the fun-factor
  - Annotation of real-life objects with virtual "post-its" to discuss something or just tell others what you think about it
  - Inclusion of spectators through a web client
mobileGame – outdoor orientation

mobileGame – indoor orientation
mobileGame – answer questions

mobileGame – catch other groups
mobileGame – chat

mobileGame - annotation
Commercial Application for Annotation: Tag&Scan

- «TagAndScan» (Cimarrones Inc.)
  - Java-based Cellphone-Software
  - allows to leave electronic annotations
  - private and public graffiti
  - free software
  - Sending and receiving messages cost 30 cents
  - since January 2004 available in large British cities.

http://www.tagandscan.com Download April 20th 2004

mobileGame – web client: spectators
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System Architecture

- mobileGame - Server:
  - Ekahau Positioning Engine
  - Apache OJB
  - My SQL
  - Jetty Servlet Engine

- mobileGame - Mobile Client:
  - Java - RMI

- mobileGame - Web Client (Java Applet):
  - Annotation (Browser)
  - HTTP

- GPS:
  - Java - Comm API

- Ekahau Client

- Browser (JVM 1.4)
  - HTTP
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Use on the Move

- Although the map size was 50 % of the PDA screen and the floor was only a straight corridor, the players mentioned that it was not possible to move and navigate with the PDA at the same time. If they wanted to look for their current position they had to stop and look at the PDA. Even though they don’t have to interact with the PDA they have to look down and compare the map on the screen with their surrounding. It’s really hard for people to work on the move.
- Refinement of Mobility: Portability vs. Use on the Move
- Sound interfaces?
Accuracy of the Positioning System

- Sufficient for general orientation, insufficient for close search (find a PDA in a Room)
- Integrate GPS, WLAN + RFID

Offline areas and short reaction time

- Updating position every 3 second is much too slow
  - fast position update
  - low data transfer → replicated architecture
- PDA can become disconnected
  - Intelligent Caching algorithm
- (Several position Information may be available from different systems
  - Intelligent choice)
Easy to Use Interface

- Drop-down menus vs. push-buttons
  - all functions 1-2 clicks away
- Interest (= Open questions) vs. ease of use (Multiple choice questions)

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The sample

Two runs of user tests:
- Number: 22 students
- Study background: 12 CV, 3 IM, 5 other
- Gender: 17 male, 5 female
- Familiarity with computers (1-6): average 5.68
- Number of semesters: 3x 1st semester, 6x 2nd semester, 9x 3rd or 4th semester, 4x more than 5 semesters

What is fun to play the game

<table>
<thead>
<tr>
<th>Was it fun to play the game?</th>
<th>Yes, I'd play it again at any time</th>
<th>Yes, but playing it once was enough</th>
<th>No, but it could be fun if some details would be changed</th>
<th>No, I wasted my time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, I'd play it again at any time</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, but playing it once was enough</td>
<td>5</td>
<td></td>
<td></td>
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<tr>
<td>No, but it could be fun if some details would be changed</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No, I wasted my time</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What did you like most?

Which elements of the game did you like the most? (max. 2 answers)

- Orienteering on map: 11
- Playing as group: 8
- Solving the tasks: 7
- The technical aspect: 8
- Learning something about the university: 6
- Collection of game points: 5
- Orientation on maps by icon: 1
- Orientation on maps by compass: 1
- Hunting and hiding: 1
- Playing as group: 0

Benefit of Support

Became the game more exciting by the technical support given?

- Yes, there is a significant added value compared to ordinary orientation games: 10
- Yes, but the technical solution is not sufficiently developed: 11
- No, the game could have been done without a PDA: 1
- No, the game would have been more useful without any PDA: 0
What the students liked and disliked?

Summary of positive and negative issues resulting from further questions:
+ Students liked especially
  o seeing own and others' positions on map
  o hunting
  o messaging
- Students disliked
  o the insufficient accuracy of the Ekahau engine
  o the delay time of positioning from about 3 seconds
- Students were did not learn much about university
  (because there have not been many beginners)

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Technique can also be applied to ....

.... learn about Animals in a Zoological Museum (Zurich)

Future Work

- Significant events and persons
- Integrated location infrastructure
- Evaluation with larger user community in Zurich (Fall 2004)
- Transfer to other areas