mCLT: an application for collaborative learning on a mobile telephone

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Introduction
  – Collaborative workspace expression
  – The JELD system

• mCLT architecture
  – Overview
  – Security Management module
  – Navigation Course module
  – Course Note module
  – Editing module
  – Peer-to-peer Communication module
  – Manage Local Repository module

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Introduction

Topics

• Collaborative workspace expression
• The JELD system
Most studies on collaborative learning have been proposed in the last decade and they have proposed different meanings of "Learning".

Studies regard the standardization of collaborative learning (Okamoto, Kayama & Cristea, 2001); six essential structural elements:

- collaborative learning environment expression;
- collaborative workspace expression;
- collaborative learning resources expression;
- collaborative workplace expression;
- learner group model in collaborative learning;
- collaborative memory structure expression.
The mCLT application focuses attention on the collaborative workspace expression because...

... one of the major advantages of using mobile devices for online learning is the benefit they offer to cooperation.
Collaborative workspace expression

- **Cooperation is working together to accomplish shared goals.** *Within cooperative activities individuals seek outcomes that are beneficial to themselves and beneficial to all other group members. Cooperative learning is the instructional use of small groups so that participants work together to maximize their own and each others' learning*  
  
  (Johnson, Johnson & Smith, 1991)
The JELD system

- Java Environment for Learning Design (JELD) system

- Developed in the Institute for Educational Technology in Palermo of the Italian National Research Council

- The JELD system allows the teacher to design the learning process using a direct graph model
• The mCLT can be seen as an extension of the JELD system

• The students, using a mobile device, can play an active role in the knowledge building process, anywhere, anytime

• The mCLT would be an application for ubiquitous collaborative learning
mCLT architecture
mCLT architecture Topics

- Overview
- Security Management module
- Navigation Course module
- Course Note module
- Editing module
- Peer-to-peer Communication module
- Manage Local Repository module
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Architecture overview

Overview
- Security Management
- Navigation Course
- Course Note
- Editing Module
- Peer-to-peer Communication
- Manage Local Repository
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Overview
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Architecture overview
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Use case view

- Overview
- Security Management
- Navigation Course
- Course Note
- Editing Module
- Peer-to-peer Communication
- Manage Local Repository

Local Repository
- Store Note
  - Select Stored Note

Message Web Service
- Send SMS
  - Send e-mail

Peer-to-peer Communication
- Send Message
  - Type of Message

Extension points
- Auto Logon
- Manual Logon

Security Management
- Logon

Navigation Course
- View Course List
- View Course Detail
- View Course Users
- View User Detail
- View Context

JELD Web Service
- Select Stored Note
- Store Note
- Insert Note
- Select Knowledge Type
- Write Text
- Make a photo
- Edit Note

User
- View Note
- Send Message
- Type of Message
- Auto Logon
- Manual Logon

Send SMS
- Send e-mail
Security Management module

- Guarantees that communication with the server through the web-services is made in a crypted way

- It uses a lightweight implementation of the AES algorithm

- Automatic logon is performed using the latest access information stored in the local repository of mobile devices
Navigation course module

- It manages a number of course activities.
- This module allows students:
  - to browse the list of courses
  - to look for detailed information about each course
  - to look for the participants
  - to show the list of contexts
Course Note module

- Select the notes
- Visualize the notes
- Publish the notes
- Reply to notes
- Add new notes with images already stored in the Local Repository
Editing Module

- Create notes
- Modify notes
- In this version it is only possible to insert static images into notes
Peer-to-peer Communication module

- The users can communicate among them by email and/or SMS
- This module uses a message system web-service to send email and SMS
Manage Local Repository module

- To work in off-line modality
- Arrange and store notes and images
- All of the objects stored in the local repository can be used to create new messages or notes in the online sessions
The images can be acquired from a photo camera embedded in the mobile device.
Scenario
An example of a possible scenario for the building knowledge process:

- Mathematics Course
  - Create Course Context
    - Function
      - How do you graph a function?
      - It is possible to construct it by points. Look the coordinates which verify the equation y=f(x) and transfer them to the cartesian plane.
      - How many points do you need?
      - Try to draw it with a few points and if you aren't satisfied increase the number
    - Limit
      - Can you calculate the limit of a function at a point in which a function is not defined?
      - First of all you must establish the function domain that is for which points of x it is defined
      - And how can I establish the domain?
    - Derivative
      - What happens to log(x) when the value of x become bigger and bigger?
      - If a body moves at a constant velocity the derivative, with respect to time, of which quantity doesn't vary?
      - I attach a photo of a function graph calculated with a few points
• An example of a possible scenario for the building knowledge process:
Conclusion and ongoing works
Testing

- Pre-deploy testing using an application prototype

- Involved five users from the C.N.R Institute for Education Technology of Palermo.
  - three Java compliant mobile telephones (MIDP 1.0 with MMAPI)
  - two PDAs with the Java Personal Edition

- The results collected in this phase have been used to improve the functionality of the system and to correct some application bugs

- We plan to start the online experimentation in a real university course
The application described should be considered as a contribution to ubiquitous collaborative learning. The mCLT allows students to participate in a knowledge building process. The students interact among themselves according to the model defined by the teacher.
Conclusion

Thank you for your attention!

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