Interactive Multimedia based Teaching in a Notebook University Environment

J. Brehm, University of Hannover
Contents

- Overview
- UbiCampus Hannover Scenarios
- Interactive Lecture
- Technology
- Pilot Lecture
- Evaluation

- Objectives
- Lecturer’s view
- Students’ view
UbiCampus Hannover - Overview

- Project supported by BMBF (German Ministry for Education and Research)
  - Budget for “Notebook Universities in Germany” approx. 25 Mio. Euro
  - Budget for “UbiCampus” = Notebook University Hannover: approx. 1 Million Euro
  - Cooperation: UH and MHH
  - Management: SRA University of Hannover
  - Funding period: July 2002 – December 2003
UbiCampus Hannover - Overview

• Notebook University
  – New form of academic organization
  – Extensive usage of mobile devices and wireless networks

• Objectives:
  – New didactical concepts for on-campus teaching
  – Multimedia and mobile tools.
  – > Replace “Paper and Pencil” by Notebook
• The Group-Selective Lecture
  – One course (physics) for students with different academic backgrounds

• Notebook Seminar
  – An action-based self-learning approach in small groups

• The Mobile-Project Group
  – Pair programming of complex applications
The Interactive Lecture - Objectives

- Enhancement of the classroom teaching with new tools
  - Students with wirelessly-connected notebooks
  - Multimedia courseware for lecture and exercises
  - Interactivity through
    - Online quizzes
    - Anonymous electronic messages
    - Lecture rating by students
  - Hands-on online practice
The Interactive Lecture - Evaluation

- Evaluation of the tools
  - Frequent opinion polls to the students
  - Analysis of exam results
  - Comparison between users with / without notebooks
The Interactive Lecture

Lecturer

Text Messages

Was ist ein Betriebssystem?

DOS
Office
KDE

Multiple Choice Questions

64%

64%
KDE

Bewertung der Vorlesung

gut
schlecht

I

F

E

S

Students

Interactive Multimedia Based Teaching in a Notebook University Environment

© J. Brehm 2003
Technologies - Interactivity through IVES

• Interaktives VorlesungsEvaluierungsSystem (Interactive Lecture Evaluation System)

• IVES handles
  • Distribution of course material (ftp)
  • Creation, distribution, answering and evaluation of quizzes (based on multiple-choice questions)
  • Feedback from the students

• IVES is based on
  • Servlets and HTML (Apache Tomcat)
  • Applets
  • Database (MySQL)
Technologies – Lecturer’s MM Desk

- Display 1 (interactive)
  - Navigation
  - Annotations

- Display 2 (private)
  - Feedback
  - Quizzes control publish & evaluate
  - Messages

- Display 3 (practice)
  - Shell
  - Simulations
Technologies – Classroom

- **Beamer 1**
- **Beamer 2**
- **Video 3x2 Crossbar Switch**
- **Display 2**: private
- **Interactive Display 1**: presentation and annotation
- **Display 3**: practice
- **PC**
- **MM-Desk**
- **Notebook**
- **WLAN**
The Interactive Lecture - Lecturer

- **Presentation**
  - Lecture with beamed courseware

- **Lecture slides**
  - Distributed before and after the lecture

- **Lecturer annotations**
  - Made by the lecturer on the Smart display and
  - Distributed to the students

- **Test quizzes**
  - Consisting (mainly) of multiple-choice questions
  - Automatically and statistically evaluated

- **Feedback from students**
  - Ratings of the lecture from students
  - Quiet messages from students, to avoid loud embarrassing questions

- **Online and permanent UNIX shell-access**
Technologies - Annotations Example

M3 Maskierung (Quoting) (1)

- Zeichen mit Sonderbedeutung für die Shell:
  > < ; & ( ) | \ <CR> $
  müssen maskiert werden, wenn sie in einem String vorkommen. Ihre
  Sonderbedeutung muß also unterbunden werden.

- 3 Methoden
  \ maskiert das folgende Einzelzeichen
  ` ` ` ` ` maskiert alle eingeschlossenen Zeichen (außer ` `)
  " " " " " maskiert alle eingeschlossenen Zeichen (außer $ ` `)

- Beispiel 1
  $ a=cd` /usr/mike/ftn
  $ b=`cd /usr/mike/ftn`
  $ c="cd /usr/mike/ftn"
The Interactive Lecture - Student

- Lecture slides
  - Downloaded before and after the lecture
- Student annotations
  - Made in parallel during the lecture
  - Merged after lecture with those from lecturer
- Online and permanent UNIX shell-access
- Test quizzes
  - Answering to (mainly) multiple-choice questions
- Feedback to the professor
  - Lecture rating
  - Quiet messages
Technologies – Lecturer’s MM Desk

Beamer 1

Switch

Beamer 2

Display 2: private

Display 1: presentation

Display 3: practice

PC

Notebook

MM-Desk

Beamer

Switch

Display

MM-Desk

Technologies – Lecturer’s MM Desk

Beamer 1

Switch

Beamer 2

Display 2: private

Display 1: presentation

Display 3: practice

PC

Notebook

MM-Desk
Technologies – SMART (Interactive Display)

Smart Sympodium

- Eraser
- Right Mouse Click
- Left Mouse Click
- Electronic Ink Color
- On-Screen Keyboard
- Pen Tool Buttons
- On-Screen Display Buttons
- Interactive Screen
- Attached Stylus
Technologies – Infrastructure and Software

• **Infrastructure (Hardware):**
  – WLAN (or other wireless communication)
  – MM-desk
  – 2 beamers
  – Electrical power supply (for many Notebooks)
  – Notebooks

• **Software:**
  – IVES
  – XP-Office
  – Webbrowser
  – VPN
Pilot Lecture EBS

• UNIX lecture as a block-event (3 days x 8 hours)
  • February 2003 (started on 2/10/2003)
  • Approx. 100 first year students (65 with notebooks)

• Structure of the lecture
  – Operating Systems Theory: 4 hours
  – Unix: 8 hours
  – Online exercises: 12 hours

• Slides in Powerpoint
Evaluation

- **Drawbacks**
  - Price of notebooks
  - Teacher training
  - Preparation effort of interactive material
  - Difficulty to train non-technical students

- **Benefits**
  - Fun of use
  - More attention and concentration
  - Great interest and cooperation,
  - Interactivity and feedback,
  - Exercises during the lecture,
  - Better exam results!

![Graph showing grade distribution with and without notebook](image)
Thank you for your attention!

There is more: www.ubicampus.uni-hannover.de