Monitoring Students in Course Management Systems: from tracking data to insightful visualizations

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Outline

- Research questions
- CourseVis
- GISMO
- Graphical monitor for the courses’ usage
Motivation

- Course Management Systems (CMS) are rapidly becoming very popular in distance learning
  - WebCT, Blackboard
  - Moodle
- However, problems occur due to instructors’ difficulty to gain sufficient understanding about what is happening in their classes, e.g.
  - Overview of the class performance
  - Participation in discussions
  - Group tendencies and individuals that may need help
  - Usage of the course materials
- CMS Tracking logs and monitoring tool are inappropriate to the instructor’s needs.
CourseVis

☐ An application that exploits graphical representations of student tracking data from Course Management Systems

☐ Aim to help distance learning instructors to understand what is happening in their classes

☐ Uses tracking data collected by the Course Management System to visualize data on social, cognitive, and behavioral aspects of the students

☐ Developed in the context of my Ph.D.
Graphical representations
Access Plot
Summary of student's behaviours
from 2002-01-15 to 2002-04-11
Student: "francesco"
Evaluation

☐ Visualisations are evaluated with distance learning instructors

☐ Focused and on evaluating **usefulness**, **effectiveness**, and **efficiency** of proposed representations

☐ Tree stages:
  - a focus group (usefulness)
  - a controlled experiment (effectiveness and efficiency)
  - a semi-structured interview (usefulness)
Follow up of CourseVis, taking into account the results of CourseVis’ evaluation

Implemented in Java, available as a “add-on” on Moodle CMS

Gismo is part of the EU Socrates founded project “Edukalibre - Libre Software Methods for e-Education (http://www.edukalibre.org)
GISMO representations

- Login
- Assignment submission
- Student’s access to resources
- Discussions
- Students - resources overview
- Resource access overview
CMS Administrators

- How the administrators of such platforms can have an overview of the usage of different modules in courses?
  - E.g.
    - To what extend the discussion forum module has been used in all courses managed by the platform?
    - Which courses used the assignment module during last month?
    - Which are the most and last accessed courses?
Each course is represented by a subwindow.

Block of pixels $t_i$, representing a unit of time (1 minute, 1 hour, 1 day, ..).
Module’s usage during $[t_i, t_{i+1})$ is mapped onto color saturation of pixels (max usage = max saturation).

Spiral arrangement, first timeframe on the center.

{ $t_0$, ..., $t_n$ }
Future research

☐ Explore empirical evaluations of InfoVis
  ■ Perceptual-cognitive tasks
  ■ Quality measures
  ■ New evaluation methodologies

☐ User-adaptive InfoVis
  ■ Adapt visualizations to user’s specific needs and capabilities