

ASSESSING STUDENT ACTIVITY THROUGH LOG ANALYSIS FROM COMPUTER SUPPORTED LEARNING ASSIGNMENTS

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SUMMARY:

The authors of this communication developed tracking-enabled interactive programs to be used in computer-supported learning assignments adapted to the EHEA context in Statistics and Physics courses. Trace files (logs) generated from the student activity can be processed by simple scripts in order to allow teachers to acquire information about the learning process of each single student. This information would comprise work dynamics, activity path followed, learning problems (either conceptual or methodological), resolution attempts with inappropriate procedures or alternative successful resolutions. Hopefully, the methodology will allow us to identify common patterns in student learning paths, typical errors and alternative procedures of resolution in open assignments where several valid solutions are possible. Full text available at: <http://cochise.bib.ub.es>

INTRODUCTION:

The implementation of the European Higher Education Area (EHEA) requires more autonomous work from students, but at the same time, it looks for more guidance and assessment. This research plans to meet this seemingly opposite goals in the case of highly interactive on-line applications.

XML-BASED LOG FILES:

Both applications can trace student activity optionally. Logs include:

- User, application and session
- Actions performed, objects modified, system variables at interaction time, ...
- Results obtained after the interaction, including answers to quizzes with their respective right answers, if appropriate.

PROCESSING LOG FILES: CONVERSION TO NATURAL LANGUAGE:

In a later stage, the description fields (the text between the <description> and </description> tags shown in the Figure on the right) are extracted from the XML file generated and they can be used as a report in natural language potentially for both the student and the professor

The report contains basic information on top (before the description of all actions in natural language), such as the number and type of interactions performed in each session, a summary of the data used, the number of objects that the student has interacted with, the time invested, among others.

This report can be extended progressively as needed fairly easy, through adding more queries based on regular expressions to the R script that generates it. R is a free software environment for statistical computing and graphics

DATA COLLECTED:

The tracking system in the Statistics courses has been used twice in a real classroom context: 160 enrolled students, from which 120 regularly assisted to face-to-face classes. Those students were offered the chance to voluntarily participate, provided that results would be kept anonymous, and that they could improve their grade if they successfully participated in the experience. The system generated around 1,7 MB of data in plain text log files regarding 52 students, which has been used later to fine tune the common log file markup in XML among all faculty involved.

The tracking system from optics-related courses also comprised a brief collection of problems that were used in October 2009 with last year students of Physics. Although the participation has been smaller (20 students), this data set will be enough to start a systematic log analysis, and new data sets from graduate students (masters in Nanoscience and Photonics) are expected.

CONCLUDING REMARKS:

Two tracking systems were adapted to record student activity in logs using a common XML markup. The initial analysis of some preliminary logs provides a simple report to the faculty in a human readable format.

Moreover, logs from student activity in real classroom contexts have been collected from several courses at university level. They are going to be processed in the near future, in order to shed light about the learning paths followed by the students, common problems, alternative procedures of resolution and ways to improve the computer-supported learning assignments

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COMPUTER-SUPPORTED LEARNING ASSIGNMENTS:

Two different tracking-enabled computer applications have been designed: (1) Statmedia II, for statistics courses for undergraduate students in Biology, and (2) an Optical tweezers simulation application, for senior or graduate students in Physics or Photonics.

Student interacts in computer-based assignment

(1) Statmedia II (Statistics) (2) Optical Tweezers (Physics)

Traces from student activity are written in files with common xml syntax

Automatic report is generated for students and faculty from R scripts through Web Page

r-project.org tiki.org

Students get prompt feedback on performance, critical milestones missed (if any), ...

Faculty discover common errors from students, paths followed, improve teaching & assessments of student performance in EHEA scenarios, ...