Enhancement of Geomatics Education by Using Internet Based Techniques

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Outline

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The Geomatics course towards e-learning

Development and implementation of Exomatic
  Motivations
  System Concept
  Structure
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Assessment
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GeoGebra in different ways

Perspectives and conclusions
**Context**

Ecole Polytechnique Fédérale de Lausanne includes 6 Faculties and offers many bachelor, master and PhD programs, altogether over 6'000 students.

EPFL’s guidelines include an e-learning strategy since early 2000.

The funding program FIFO supports the development of resources for training and testing of learning scenarii.

Focus on a specific topic: Fundamentals of Geomatics.

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**The Geomatics Course...**

Positioning of the basic course in the engineering geomatics domain.

Evolution of the number of students taking part in the basic course.
Towards e-teaching

Structure of the course

Motivations for the development

Develop innovative resources for teaching the fundamentals in engineering geomatics.

Improve e-learning tools with a focus on calculus exercises, saving on office hours (teaching staff).

Increase the students' autonomy in learning and in doing exercises by themselves.

Facilitate the creation of datasets for the exercises.
Development and Implementation
Current system concept and software design

LMS: Moodle
Database: MySQL
Script languages: php, Javascript
Graphical interface: Geogebra

Structure of Exomatic
Information flow and process


**Demonstration**

**First students’ opinion …**

Preliminary evaluation of the level of acceptance and the perception of utility of the different resources: LMS, Quizzes and Exomatic.

- Moodle
- Quiz
- Exomatic

More than 100 students answered 26 questions at the end of the spring semester 2009.
… to adjust the program and implement specific tools.

Implementation of Exomatic for the entire course curriculum with a larger collection of exercises

More animated and visual resources

Complement of information and adequate feedback for the quizzes and on-line exercises

Smart helps and new tools such as interactive graphical interface via GeoGebra and calculus toolboxes

GeoGebra – in different ways …

Generation of datasets (admin)
- in different ways ...

Stepwise construction

Visualisation of formulas

- on les formules:
  \[\begin{align*}
  \tan(\varphi_{SA}) &= \frac{y_{SA}}{x_{SA}} \\
  \varphi_{SA} &= \arctan\left(\frac{y_{SA}}{x_{SA}}\right) \\
  w &= \varphi_{SA} - \varphi_{SA} \\
  w &= \text{66.56 gon} - \text{10.91 gon} \\
  \varphi_{DP} &= \varphi_{S} + \varphi_{DP} \\
  \varphi_{DP} &= 59.93 gon + \text{55.65 gon} \\
  \text{Ces relations sont valables pour tous les cas.}
\end{align*}\]
**Conclusions**

All resources (lectures, lecture notes, quizzes) are perceived as useful by the students

... and Exomatic adds value to the course

Evaluations show a strong participation and a very good level of acceptance.

At this stage, we have not assessed an increase in the level reached by the students

... however the students’ autonomy is increasing

The co-operation of students allows the teaching staff to design further improvements!
Future work

Deeper assessment of Exomatic by the users

Development of learning scenarios based on Exomatic and other resources
  Towards a better integration of course contents and on-line resources

Improved use of graphical tools for teaching

Dissemination within the geomatics community

Thanks for your attention

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