



Enhancement of Geomatics Education by Using Internet Based Techniques

ExOMatic

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Outline

Context

ExOMatic

The Geomatics course towards e-learning

Development and implementation of Exomatic

Motivations
System Concept
Structure
Demonstration

Assessment

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Adjustments

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.

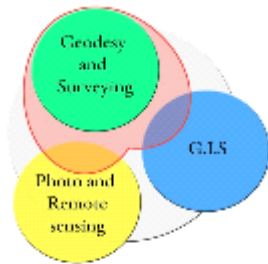
EPFL's guidelines include an e-learning strategy since early 2000.

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

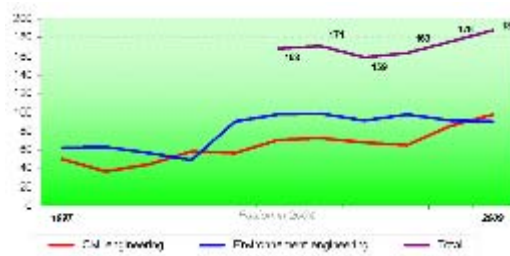
Focus on a specific topic:
Fundamentals of Geomatics.



The Geomatics Course...



Geomatic engineering (green circle)
Basic course for Civil and Environmental Engineering (red circle)

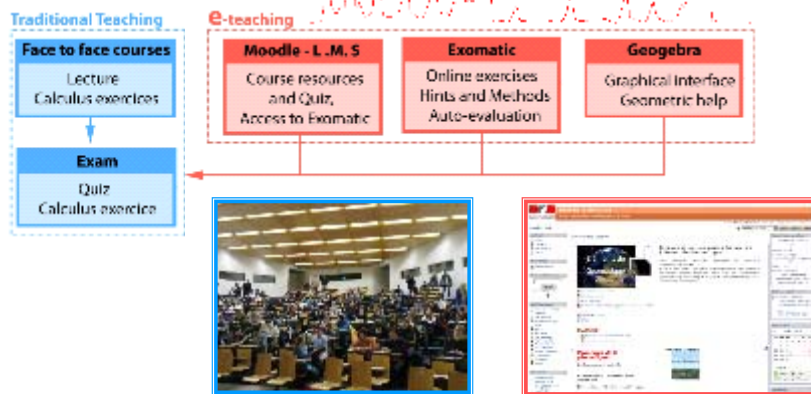


Positioning of the basic course in the engineering geomatics domain.

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

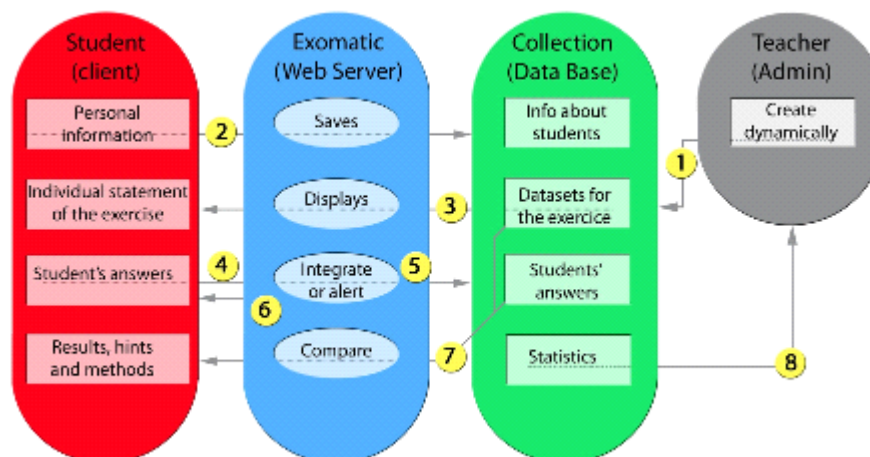
Database: MySQL

Script languages: php, Javascript

Graphical interface: Geogebra

Structure of Exomatic

Information flow and process

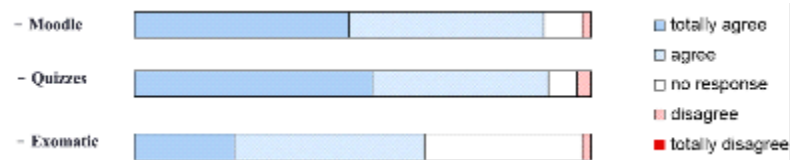


Demonstration



First students' opinion ...

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



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

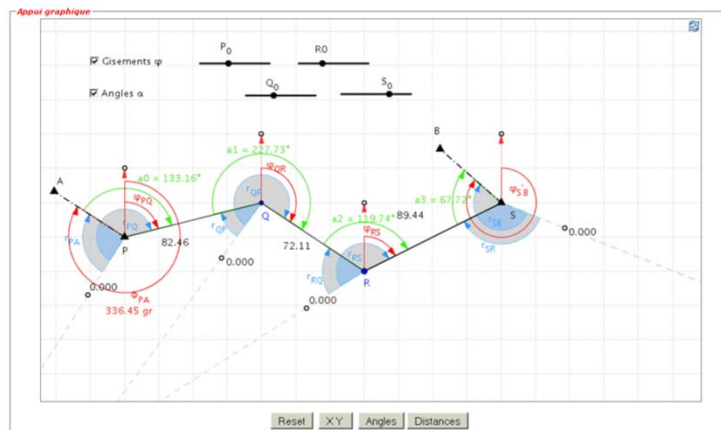
Smart helps and new tools such as interactive graphical interface via GeoGebra and calculus toolboxes

GeoGebra - in different ways ...

Dynamic Mathematics for Everyone

Generation of datasets (admin)

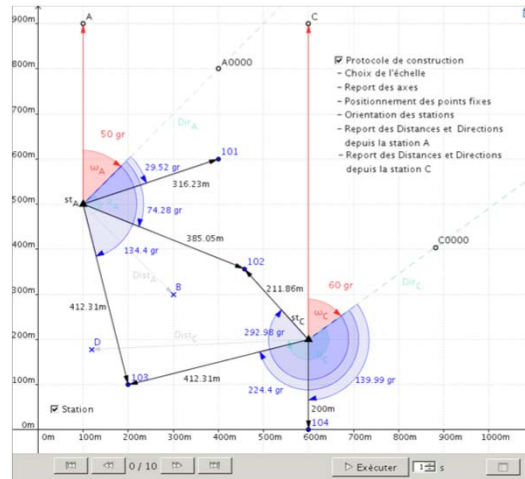
ExOMatic



GeoGebra – in different ways ...

Dynamic Mathematics for Everyone

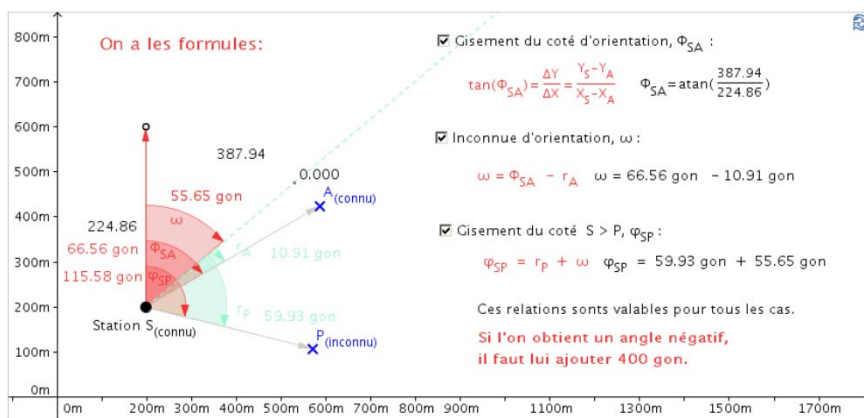
Stepwise construction



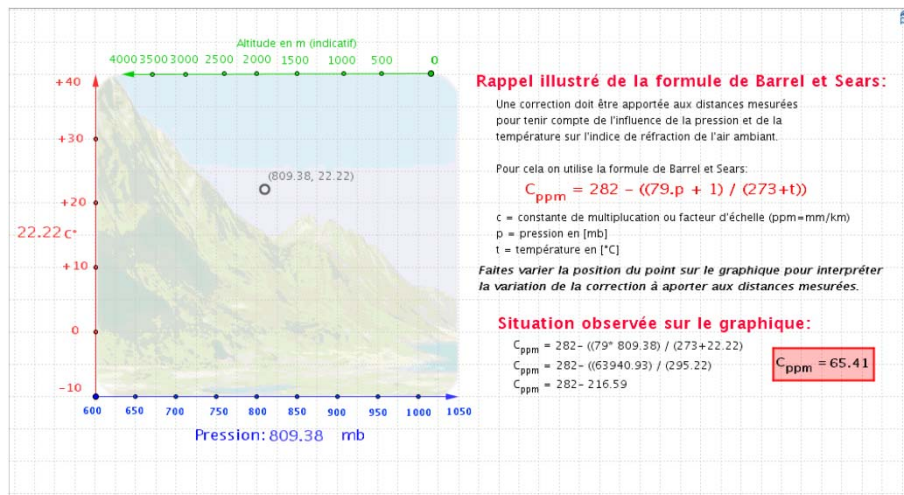
GeoGebra – in different ways ...

Dynamic Mathematics for Everyone

Visualisation of formulas



Calculus toolboxes – e.g. "Barrel and Sears"



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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 scenarii 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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