R as integrated engine in blended learning environment

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Teaching environment

Students:
in chemistry
Not familiar with statistics
With no real will to learn R, a software running with « commands »
Working with a laptop (required for each one)

Course:
In a traditional classroom
One semester course, twice a week
Using R for probabilities/quantiles calculations

Test for hybrid learning environment during spring ’06

The idea is to keep the profit of working with R, without the burden for students to learn it, at least at the beginning, in this introductory course in statistics.

The test is developed on a small part of the course: hypothesis testing; and is used in the class-room in a blended learning situation

Technical objectives:
- integration of an R server to run simulations for examples and exercises
- implement the different course elements, in agreement with the SCORM standard.

Pedagogical objectives:
- re-think the content for the teacher
- evaluate the ease-of-use by our students
- evaluate the added-value of such an approach
The approach to perform an hypothesis test, explained step-by-step

Choice between two examples to illustrate the approach all along.

Simulation of null hypothesis population, owing to embedded simulations, calculated with R.

An R calculations and graphics window available online at any time.
Work done up to now

R commands displayable for each interactive demonstration.

Example 2: Chile

Visualization des risques a et b:
Seuil de signification a = 0.05

- Hypothese alternative:H0: Xb = 35 (valeur entre 44 et 47)
- Test pour le seuil a = 0.05:
  - Stat. = 3.2
  - p-value = 0.002
  - Conclusion: H0 refusée

R implementation

We use the Rpad Library from Tom Short.

- Rpad extension
- R server
- Apache web server
  - (php, perl, Moodle, ...)
- Web Browser
  - Rpad extension
- Perl (mod_perl or CGI)

The plus and minus

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First version available
After some distrust, the students had a rather positive reaction. They appreciate to be able to go through again on their own at home.
As a teacher, it was quite interesting to think of and produce all the contents.

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Running only with firefox
Some improvements and extensions are needed
Very time-consuming to implement and to use with students

We can discuss further during the forum