With the support of the Erasmus+ Programme of the European Union

Example presentation Data-based-learning

Course description

The students here are freshmen in Economics/Law. This course is optional and taught online in the 2nd semester, between March 7th and April.
Prerequisites : Students must know the Descriptive Statistics course content and have completed the previous exercises.

Material needed to follow the course: a personal computer

Learning outcomes

The objective of the approach is to let students discover how descriptive statistics can be applied to big data so as to show up features and tendencies in order to figure out dependencies between variables and to forecast trends.
The objective is also to make them understand the overall process of managing data collection, data cleaning, data manipulation, before moving on to the analysis itself, all that in a real environment.
A last goal is to let them experiment a most-renowned open-source software that all statisticians and data scientists are used to handling.

Student's activities

Students will be provided the content of this course on an ongoing process, week by week, and according to the official course program (i.e. in line with each topic appearing along time).
They should discover all the complementary aspects of the approach with regards to a classical one and possibly integrate new knowledge and understand how applicable are statistics to real-world economic studies.
There will not be any collaborative work, students will work on their own, but the teacher will answer any questions they may have.
Support is maintained by the teacher through emails and chats, ongoingly and on-demand.
The teacher will only be able to ensure that the students understand the part of the activity statement that was given at this time and the objective of the activity

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through email messages from the students and the tutorial sessions, i.e. up to 3 times a week.
During the process, the teacher will act as a guide by asking questions with open answers and letting them find a solution and learn from their own mistakes. The purpose is also to assess their understanding of the scripts and to facilitate knowledge transfer in a real-world situation. Once the students find a possible solution, the teacher will validate it. Optionally, the students could present their solution to the rest of the class.

Evaluation

Evaluation is about assessing how learning outcomes were achieved by each student.
At the end of each stage i.e. each week, proposals are made about alternative variable wrangling in order to check if students can easily rework the available code to respond to teacher's questions.

Examples:

- Select the ground surface field, replace any existing NA's by the mean of the non-NA values and redo the analysis: how does this impact the result?
- Re-run a bivariate analysis on avg. squared-meter price by selecting the ground surface field instead of the habitable surface as the reference, and by comparing it to each city in a given department of your choice. Which cities give a more reliable result? Is there any relationship with their size in terms of demography?
- Perform the exact same analysis with the most recent bunch of data as provided; do the mean values match the projections made earlier before? Give explanations about it.

Each group (students being regrouped in teams of 5) will have to render the teacher the above work by email, week by week.
In addition, at the end of the overall teaching program, a final evaluation will be done by asking live-questions to each group, every question being randomly asked to any member.
All the questions will be prepared so as to get assurance that the students handle the basic knowledge in descriptive statistics as mentioned in the official program, independently from the software: the software is just there to help them link theory with ground information. The first two learning outcomes will be assessed.
The final note will result from averaging the number of satisfying answers vs. overall questions across the course period.

Course designing

The SFLM machine is not applicable as a support for designing this course because the source file is over 2GB, which is heavier than what the machine can bear.

This course uses the following active learning component:

- investigation: after copying and pasting each code bit into the software, they will execute each line and see what it brings to the previous line. Also, they will have to reuse the algorithms later during the exercise and modify the code for another dataset.
- Practice
- discussion: students will respond to the questions from the teacher or from their peers.

Checklist

- Does the problem revolve around the same topic? Yes, all is about basic descriptive statistics
- Is the topic appealing to the students? Yes as other subjects, e.g. macroeconomics, require to let them be connected with ground information
- Is the approach of the problem close to a real-life situation? Yes, it's directly pulled from it
- Do the students have to do any previous work before the lesson? Yes, download software + source
- Do the students have the previous knowledge required to solve the problem? Yes, except the coding which is the reason why a step-by-step procedure is described
- Does the problem statement or report given to the student contain all the necessary information to solve the exercise? Yes, they'll just have to adjust the dataset to respond to the questions
- Is the dataset given to the students with the problem statement? Yes, as described in the relative document
- Does the course script contain all the information required to follow the lesson? Yes
- Does the course script consider the previous knowledge that the students may have? Yes
- Is the course script easy to follow without misinterpretation? Yes
- Are all the tools and equipment required for the lesson described in the course script? Yes