

Agroforestry: Participative Education in Statistics

E. Ayuga Téllez ¹, C. González García ¹, J. Moral Medina ¹ and A. Martín Fernández ¹

¹ Grupo de Innovación Educativa en Técnicas Cuantitativas para la Ingeniería Medioambiental. Universidad Politécnica de Madrid. Ciudad Universitaria s/n. 28040. Madrid. Spain.

ABSTRACT

Applied Statistics may be regarded as a basic as well as technical subject in engineering, and therefore play a central role in the agro-forestry engineer professional curriculum. With the purpose of implement-ing a new learning method for statistics, within the framework of European Higher Education, an experi-mental evaluation was organised along a quarter in the academic year 2004/05 for students following the third grade at the Faculty of Forestry Engineering in the Madrid Polytechnic University. The teaching methodology goal was to improve students' oral information searching, use of technologies and analysis and synthesis capacities, while, at the same time providing them with a basic knowledge about the subject. The strongest point by the students were able to apply the conceptual statistical analysis techniques they learned in the classroom to a real world data with the aid of Excel and STATGRAPHICS.

INTRODUCTION

Applied Statistics may be regarded as a basic as well as technical subject in engineering, and therefore plays a central role in the agro-forestry engineer professional curriculum. A relevant issue in professional capacitation is human education in the sense of acquiring capacity for team work, appropriate and attractive presentation of results, and convincing others of correct and necessary conclusions.

METHOD

The number of students registered in this subject for the academic year 2004/2005 was 130.

The school period was from 1st of February to 19th of May of 2005.

There were two groups of students: one them who preferred to follow the traditional method and the other students who decided to collaborate in the experience to evaluate the student work in the European Credit Transfer System (ECTS).

The students of the experience participated in the learning of the unit by the presentation and exposition of a work, which made in groups of 3 – 6 students, and a discussion with the rest of students in classroom.

In the practice work students were able to apply the conceptual statistical analysis techniques they learned in the classroom to a real world data set. Students had a participative attitude applying with the aid of statistical software (Excel and Statgraphics)

RESULTS:

The period corresponding to the third partial exam was from 1st of February to 17th of March and the following three thematic units were explained: 1. Point and Interval estimate, error estimate and sampling coverage; 2. Estimate and testing of parametric, non-parametric, and hypotheses; 3. Variance analysis, lineal and advance regression. Design of experiments.

Percentage of passes: ECTS Group 100% Reference Group 33.3%

Average time necessary to finish the works . 76 hours (CV 40%)

The period corresponding the fourth partial exam was from 29th of March to 19th of May and the units exposed: 1. Basics on survey sampling; 2. Traditional sampling models; 3. Other types of sampling.

Percentage of passes: ECTS group 100% Reference group 87.5

Average time necessary to finish the works . 23 hours (CV 40%)

CONCLUSIONS

The number of failures decreases enormously.

There is a slight increase in the average mark of the students who passed (16% in Technical Drawing and 20% in Applied Statistics).

The students valued the method highly. They felt more motivated and their implication in the subject was also higher. Nevertheless, they considered that the method was more time-demanding.

The teacher achieves a deeper knowledge of the learning level acquired, in the both features quantitatively and qualitatively, and the attention devoted to the students is more specific. Moreover, the learning skills increase considerably.

The estimate realized was based on the information the students provided: Applied Statistics (2nd Semester): 7.5 traditional credits become 4 European credits.

Overall, the experience was so positive that, for its revision and improvement we have applied it again in the current academic year.