

Didactic innovation in the subjects of Statistics in Environmental Sciences and Biology

S. González Aguilera^{*,1} and R. Fernández Pascual^{*,1}

¹ Department of Statistics and Operation Research, University of Jaén, Campus Las Lagunillas, Edificio B3, 23071 Jaen, Spain

The need for substantial and innovating changes in the education-learning process has motivated the development of a virtual teaching platform that provides a site to disseminate didactic materials. Academic information, curricular materials and tools that facilitate the e-learning and evaluation can be included. The goal is to promote the use of the Information and Communication Technologies (ICTs) in the set of students of these subjects to provide feedback concerning their use of this virtual platform.

Keywords Educational innovation; ICTs; Statistics.

1. Introduction

For analyzing the information and developing an investigation with major seriousness and rigor it is necessary to possess a statistical sense at the moment of planning. The statistical method offers a few possibilities that can help the current students of the subjects in their future scientific work. Understanding the statistics as an indispensable tool in the Biological or Environmental Sciences investigation areas turns out to be indispensable to do practical applications in their area of knowledge. With this intention, it was decided to develop a virtual platform of statistics. The goal is to give the students didactic resources additional to the traditional ones using the new computer technologies available.

Thus, this project approaches the creation of a virtual teaching platform to include curricular materials and "multimedia" resources for the subject of Statistics. This platform can be used as a support and complement of traditional teaching, it encourages active e-learning and also allow teachers to know the reality of the education-learning in context EEES in a more exhaustive and reliable way.

In particular, the web page we have designed has facilitated the attainment of the following aims:

- To improve the quality of the educational process using the new Information and Communication Technologies.
- To facilitate access to new curricular materials.
- To simplify the follow-up of the student's work (academic work, tutorships, project accomplishment...)
- To have interactive tools that can help the accomplishment of exercises and facilitate the understanding of fundamental concepts by means of multimedia resources such as graphs, images, simulations and animations.
- To use interactive systems of evaluation and auto-evaluation that facilitate the e-learning
- To favor the access for persons with disability and / or persons with difficulty of access due to working, residence, ..., and to promote the follow-up of the classes in non-presencial way.

* Corresponding author: e-mail: sgonza@ujaen.es, Phone: +34 953211910

* Corresponding author: e-mail: rpascual@ujaen.es, Phone: +34 953212816

To use interactive tools for student-student communication and lecturer-student communication which allow the interchange of ideas, consultation of doubts, resolution of the most frequent problems.

2. Justification and methodology

Considering on the one hand, the advantages of the application of the Information and Communication Technologies in the education and learning process in the university context, and on the other, the generalized demand of the curricular material of the course, specially notes and list of proposed and / or resolved exercises, it turns out to be attractive to develop a didactic innovative experience that increases the interest of the students by means of the development of a virtual platform where they can find the information required. For the development of such a platform, we chose to use the program Moodle.

Moodle is a software package for producing internet-based courses and web sites. It is an ongoing development project designed to support a social constructionist framework of education. One of the most important advantages of Moodle is its open-source nature. That means you are allowed to copy, use and modify Moodle to fit your own needs. These modifications can be sent to the Moodle Development Committee in order to be included in the baseline of the product in future releases. This kind of user contribution allows Moodle to evolve continuously and to provide additional functionality.

3. Contents

After determining the curricular necessities to cover, we proceeded to the design of the structure of the educational platform in which different modules have been included depending on the contents of the subjects. We decided to have restricted access, therefore the students of the academic current course would need a personal identification and entry key, see Fig 1.

Fig. 1 Page of access.

We decided to include the educational materials using a staggered design, so that the student should accede to the page that contains the main thematic blocks of the subject and inside each of them to the following modules:

- Notes of the topics, where the matter of the subject is developed.
- Lists of practical exercises where the final solutions are included
- Tutorial videos that solve problems "typical" of every lesson.
- Short questions on the topics treated in class that help the daily study of the subject.
- Questionnaires to be completed at the end of every lesson to simplify the process of self-learning.

Besides, the virtual platform has a module of Chat, across which the students can interchange both material and knowledge of the subject; and a module of News where modifications and innovations introduced are reported punctually. The aspect of the web page appears in Fig 2.

Fig. 2 Principal page. Scheme of modules.

3. Usefulness for the teacher

The use of Moodle offers big advantages in the development of the teaching across Internet. On the one hand, it allows the incorporation of resources and activities in a simple form, and on the other, allows a personalized follow-up of the users of the platform.

There are a number of robust interactive learning activity modules and different resource types that could be added to a course, see Fig 3.

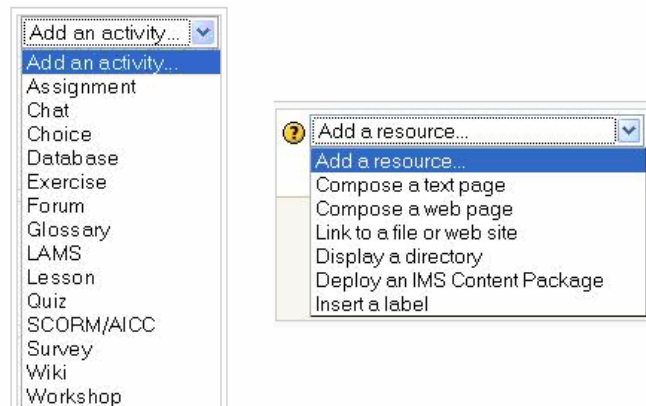


Fig. 3 Interactive learning activity modules.

The incorporation of resources allows the teacher to facilitate the curricular materials such as notes, list of practices or list of problems. On the other hand, the activities facilitate the self-learning process and the teacher's control in a continuous way. Besides, the use of a virtual platform as the one presented here favors the communication between the teacher and his students, and this communication finally improves the academic results of the students.



Fig. 4 Screen appearance for the teacher.

On the other hand, the platform offers a different aspect for the teacher, since he has access to options blocked for the students (users' edition, records, statistics, configuration of the course, levels ...).

The degree of satisfaction with the virtual platform and the usefulness of the educational experience developed were evaluated from the results derived from a opinion poll among the students - users of the web site, in which we think of these aspects, we ask their opinion of the usefulness and they explain any faults observed in evidence for possible improvements in the future. The teachers are gratefully satisfied by the level of use registered in the virtual platform and also by the academic results obtained.

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