A virtual laboratory for blended-learning: Numerical Methods using WIRIS

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Lecture Proposal for the TI-Nspire & Derive Strand

ABSTRACT

Numerical Methods is a hard subject for the students of the Computer Science Engineering in the Málaga University. Since 2003-2004 academic course, we have been moving to a blended-learning framework and introducing the new technologies as a method to improve the understanding of the subject. In a first state, we designed a virtual course in the previous platform of the university and we observed a crucial change in the relation with students (motivation, number of students attended to exams, results, etc.). The next step was to adapt the lecture material for the new Moodle site of the virtual course in our university.

Nowadays, Numerical Methods is a blended-learning subject supported with a wide material developed in Moodle: forums, questionnaires, lessons, tasks, wikis, glossaries, books, chats, etc. Therefore, the Moodle platform is the meeting point for working on our subject.

This subject needs special materials and activities: firstly, the material must include mathematical formulas and secondly, the activities included in the virtual course must be able to do math computation. We emphasize, for these proposals and for the development of new and more interesting learning units, the help of WIRIS (www.wiris.com) as an alternative to Matlab and Derive used in other academic courses. WIRIS is a powerful tool with the ability of edition, calculation, easy design of graphics, etc. WIRIS has two versions: WIRIS CAS (web version) and WIRIS Desktop (local version) especially adequate for educational environments. It has libraries for calculi, algebra, geometry, etc, but it has not a library for the learning of numerical methods.

In this work, we present the design of a library for WIRIS for the teaching-learning process of the numerical method subject. Moreover, as a complement of this library, we have developed a web portal that connects with WIRIS. In this virtual laboratory, we provide the students with different materials for each unit:

- theoretical aspects
- exercises to be solved with WIRIS
- auto-evaluation activities in order to evaluate the knowledge and understanding acquired in each unit.

Keywords

Blended-Learning, LMS, CAS, WIRIS, Virtual Laboratories.