IT's and Engineering Pedagogy (ITEP'12)
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This issue collects few contributions submitted to the ITEP'12 Special Track of the International Society for Engineering Education (IGIP) within EDUCON 2012.

Its main goal was to offer an open reflection and discussion on the use of Information Technologies in Engineering Education and their Pedagogy.

It also intended to foster the involvement in continuing education, bridging the gap between higher education and the industry by focusing the IT's use in lifelong learning and training. At K-12 level this session intended to evaluate the impact of IT's in fostering young people in the field of science and technology. Moreover, at any level it is important to evaluate regularly IT's potential as facilitating tools of collaborative work everywhere, in the enhancement of knowledge, in promoting intercultural experiences, in the efforts for sharing resources, in fostering the student-centered learning...

Last but not the least it is relevant to consider the IT's potential for improving engineering education conditions in developing countries and for those people with special needs.

ITEP'12 special track got diversified contributions from pure and solid technology use for remote, virtual and hybrid labs to reflections on how challenges of knowledge at the engineering education level are really shared by the community.

The present generation – the true digital natives – based in "multi-tasking" expertise, is a constant access consumer and needs to be entertained. More than ever before educators need to be alert of what they are doing and why and which results they are getting. Using information age tools for teaching information age skills, teachers need to be constantly aware of all these problems and must share reflections and results. According to Bill Gates advice "Use digital tools to help customers solve problems for themselves", they need to get constant feedback to take care of the important task of keeping knowledge growing.

In the next paragraphs short summaries of each work in this special issue are presented.

TVSP: A Tool for Validation Software Projects in Programming Labs, describes an simple application for testing software, to be used with first year students, in opposition to many existing complex ones for this purpose and it has been developed in the University of Sevilla. The course of Fundamentals of Programming II Laboratory in Telecommunication Technologies Engineering Degree has used this tool achieving good results. This tool, used for autonomous student evaluation of the software applications developed during their projects in order to fill the requirements imposed, permits the self evaluation of their performance as software developers and has increased the rate of success in their final assessment. For all interested in this type of assistance the work describes the implemented tool and its functionality, goals and usability.

The work entitled **3D AutoSysLab Prototype, A Social, Immersive and Mixed Reality Approach for Collaborative Learning Environments**, presents a tool, named 3DAutoSyslab, which was conceived by the authors for engineering education of control and automation. The tool combines concepts such as remote and virtual labs, virtual world meta-universe, social collaborative interface, and tutoring support, all integrated within a virtual learning environment. The tool has been implemented using free/open software and has been successfully applied for teaching both 3rd and 4th year engineering students in control systems design, as well as for Computer Engineering freshmen students. Results obtained so far are very encouraging, since student motivation has remarkably increased and their performance also improved.

Technology is an important component of the inquiry-learning approach that permeates through the mathematics program in several countries. However, new technologies are coming at an increasing rate, making it difficult for teachers to be up to date about devices and software. In the case of mobile devices, students may be more knowledgeable than their teacher in the use of this technology. Teachers and educators can learn from the expertise of some students. New roles of students and teacher need to be conceptualized, as well as the interactions with technology. Based on neuroscience advances, such interactions are conceptualized in the work **Incorporating the iPad in the mathematics classroom**. Extending the mind into the collective, which has been awarded during the EDUCON 2012 Conference.

Comparative Study of Electronic Visualisation Techniques for E-Learning, describes a platform developed for delivering virtual experiments in electric and electronics subjects. It makes available three different approaches: the Falstad simulator, a webservice based on the SPICE simulator and the Videomodels. The evaluation of the three multimedia systems according with the authors' five defined criteria was based in four resources: amplifier with common-emitter configuration with biasing, Kirchhoff's voltage law, full wave rectifier, NPN transistor in active mode operation. Students appreciated to get access to all resources, although with clear preference for the Falstad, which got the higher marks in all criteria. The evaluation has shown that the interactivity and the simplicity were the most important aspects. The reader may get a more clear perception of the work at http://iwt2.ehb.be/ElektroSims/

In addition to our special focus on the role of ICT in engineering pedagogy, **Tracking Engineering Education Research and Development – contributions from bibliometric analysis** also includes research which takes a somewhat broader focus to look at the development of the field of engineering education research itself: Williams and Neto use a taxonomical and citation analysis approach to present data on the publication patterns in two leading engineering education research journals and they draw our attention to important issues relating to cross-fertilization and the diffusion of innovative practices in engineering education as well as to the developing maturity of engineering education as a field of research.

The paper named **Short Experimental Ceramic Projects to Incentivise Mechanical Engineering Students**, comes up after authors' long experience in teaching a course about ceramics, polymers and composite materials in the Integrated Master degree in Mechanical Engineering at the University of Porto, where project based learning methodologies have been often used. The authors being aware of the Digital Native characteristics of the present higher education students, completely familiar with information technology and gathering lots of information through virtual channels, try to compensate their learning style. Young people are no longer used to exercise in making things hands-on, in solving practical problems and in finding real solutions for real engineering situations. In this course the adopted methodology is focused on an intensive experimental project based learning approach improving student results.

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