

Guest Editorial

Learning through play has proven to be a great success, especially in areas such as primary education, foreign language courses and artistic education, mainly for drama and music. In fact, several degrees on pedagogy include subjects for training future teachers in tasks linked to play preparation and its benefits for students.

Regarding engineering education, play based methodologies have normally been connected to problem or project based learning activities, especially in architecture degrees with the typical implementation of scale models as a visual support for marketing or discussion tasks.

However, until recent decades, examples of gaming and play based experiences in higher education, in particular in engineering education, have been sporadic as the teaching-learning methodology at universities has been for centuries focused on master classes and on the teachers' wisdom, more than on the students' actual learning and needs.

In recent years educational gaming has been progressively perceived as a very effective tool for improving teaching-learning activities in higher education. The use of such play-based methodologies for engineering education promotes several practical and communication skills of great value for students' future professional development, as discussed in some experiences presented in this special number. At the same time it helps to motivate students and to make them more aware of their own capabilities and the whole learning process is enhanced.

As a result there is an increasing interest among scholars in investigating this area, so as to quantify its actual effect on global learning and in order to apply its principles in a more efficient way. Bringing together experiences from different technical universities on the application of these play-based activities can be of great help in optimizing their benefits for students. With such a central objective in mind, the special issue was proposed.

Topics of interest include detailed description (focusing on pedagogical aims and results) of experiences in innovative student competitions, teamwork activities, linking science and technology with society, atypical science or engineering experiments, toy design experiences, role plays linked to real-life case studies, game theory and decision making, simulators and virtual worlds in education, among others.

For ease of understanding the manuscripts have been grouped in different categories including:

- Play based teaching methodologies.
- Laboratory experiences.
- Role playing, games and case studies.
- Student competitions.
- Simulators and virtual worlds.
- From schools to technical universities.
- Assessment of innovative teaching experiences.

A total of 33 full papers have been accepted after the peer-review process, from more than 80 received abstracts. The papers come from 31 universities and teaching centres and help to understand current trends in higher education, within the global context and perspective of more than 15 different countries from Africa, America, Asia and Europe.

Reported experiences are linked to several areas and subjects of engineering, such as acoustics, aeronautics, agricultural engineering, bioengineering, economics, electrical engineering, electronics and telecommunications, fluidics, industrial engineering, informatics, manufacturing processes, mechanical engineering, nuclear technology and pedagogy linked to the technical sciences.

The variety, excellence and impact of the different teaching-learning experiences presented help to support the actual relevance of the proposed topic and its global influence, including detailed descriptions of collaborative actions between subjects and teaching centres, together with some references to the present implications of coordinate pedagogical renewal actuations designed for universities, such as the European Area of Higher Education and the Latin American Area of Knowledge.

Due to the number of experiences covered, the special issue has been divided into two parts with the manuscripts grouped in different categories. First part includes manuscripts related to *play based teaching methodologies, laboratory experiences and role playing, games and case studies*. The second part concentrates on *student competitions, simulators and virtual worlds, from school to technical universities and assessment of innovative teaching experiences*.

This special issue would not have been successful without the strong involvement and input from the Peer-Review Committee, formed by Pilar Lafont, Juan Manuel Munoz-Guijosa, José Luis Muñoz, Javier Echávarri, Enrique Chacón, Eduardo de la Guerra and Juan de Juanes Márquez. We sincerely thank them all for their efforts and precise comments that have helped to promote final quality of papers.

We would also like to acknowledge IJEE Editor Dr. Ahmad Ibrahim for agreeing with us that this was a worthwhile topic for a special issue. His help and advice have been also a continuous source of motivation.

Finally we hope that the special issue on *Learning through play in engineering education* will be attractive for all teachers and researchers trying to introduce novel student-based approaches within their teaching activities. At the same time we wish it will fulfil the high quality standards of the International Journal of Engineering Education and prove to be a fun-reading, as well as appealing experience for the readers.

Prof. Dr. Andrés Díaz Lantada
Universidad Politécnica de Madrid, Spain (adiaz@etsii.upm.es)
Guest Editor