

Advances in Intelligent Systems and Computing

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Series editor

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Editors

The Challenges of the Digital Transformation in Education

Proceedings of the 21st International
Conference on Interactive Collaborative
Learning (ICL2018) - Volume 2

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Preface

ICL2018 was the 21st edition of the International Conference on Interactive Collaborative Learning and the 47th edition of the IGIP International Conference on Engineering Pedagogy.

This interdisciplinary conference aims to focus on the exchange of relevant trends and research results as well as the presentation of practical experiences in Interactive Collaborative Learning and Engineering Pedagogy.

ICL2018 has been organized by Aristotle University of Thessaloniki, Greece, from 25 September to 28 September 2018 in Kos Island.

This year's theme of the conference was "Teaching and Learning in a Digital World".

Again outstanding scientists from around the world accepted the invitation for keynote speeches:

- Stephanie Farrell, Professor and Founding Chair of Experiential Engineering Education at Rowan University (USA)—2018–19 President of the American Society for Engineering Education. Speech title: Strategies for Building Inclusive Classrooms in Engineering.
- Demetrios Sampson. Ph.D. (ElectEng) (Essex), PgDip (Essex), B.Eng./M.Eng. (Elec) (DUTH), CEng—Golden Core Member, IEEE Computer Society—Professor, Digital Systems for Learning and Education, University of Piraeus, Greece. Speech title: Educational Data Analytics for Personalized Learning in Online Education.
- Rovani Sigamoney, UNESCO Engineering Programme. Speech title: UNESCO—Engineering the Sustainable Development Goals.

In addition, three invited speeches have been given by

- Hans J. Hoyer, IFEEES, United States of America. Speech title: The work of IFEEES and GEDC towards a new Quality in Engineering Education.
- David Guralnick, Kaleidoscope Learning, United States of America. Speech title: Creative Approaches to Online Learning Design.

Furthermore, five very interesting workshops and one tutorial have been organized:

- Tutorial titled “Improving Practical Communication Skills Through Participation in Collaborative English Workshops” by Edward Pearse Sarich (Shizuoka University of Art and Culture, Japan); Mark Daniel Sheehan (Hannan University, Japan), and Jack Ryan (Shizuoka University of Art and Culture, Japan).
- Workshop titled “Evaluation of Experimental Activities by Diana Urbano and Maria Teresa Restivo” (University of Porto, Portugal).
- Workshop titled “Machine Learning and Interactive Collaborative Learning” by Panayotis Tzinis and Irene Tsakiridou (Google Developer Experts).
- Workshop titled “Teaching and Learning Electrical Engineering and Computer Science in High School with a STEM Approach” by Arturo Javier Miguel-de-Priego (Academia de Ingeniería y Ciencia Escolar, Perú).
- Workshop titled “Introduction to BLE System Design Using PSoC[®] 6 MCUs” by Patrick Kane (Cypress).

Since its beginning, this conference is devoted to new approaches in learning with a focus to collaborative learning and engineering education. We are currently witnessing a significant transformation in the development of education. There are two essential and challenging elements of this transformation process that have to be tackled in education:

- the impact of globalization on all areas of human life and
- the exponential acceleration of the developments in technology as well as of the global markets and the necessity of flexibility and agility in education.

Therefore, the following main themes have been discussed in detail:

- Collaborative learning
- Lifelong learning
- Adaptive and intuitive environments
- Ubiquitous learning environments
- Semantic metadata for e-learning
- Mobile learning environments applications
- Computer-aided language learning (CALL)
- Platforms and authoring tools
- Educational Mashups
- Knowledge management and learning
- Educational Virtual Environments
- Standards and style guides
- Remote and virtual laboratories
- Evaluation and outcomes assessment
- New learning models and applications
- Research in Engineering Pedagogy
- Engineering Pedagogy Education
- Learning culture and diversity

- Ethics and Engineering Education
- Technical Teacher Training
- Academic–industry partnerships
- Impact of globalization
- K-12 and pre-college programmes
- Role of public policy in engineering education
- Women in engineering careers
- Flipped classrooms
- Project-based learning
- New trends in graduate education
- Cost-effectiveness
- Real-world experiences
- Pilot projects/Products/Applications.

The following special sessions have been organized:

- Entrepreneurship in Engineering Education (EiEE 2018)
- Digital Technology in Sports (DiTeS)
- Talking about Teaching 2018 (TaT'18)
- Multicultural Diversity in Education and Science
- Tangible and Intangible Cultural Heritage digitization and preservation in modern era (TICHE-DiPre)
- Advancements in Engineering Education and Technology Research (AEETR).

Also, the “1st ICL International Student Competition on Learning Technologies” has been organized in the context of ICL2018.

The following submission types have been accepted:

- Full paper, short paper
- Work in progress, poster
- Special sessions
- Round-table discussions, workshops, tutorials, doctoral consortium, students' competition.

All contributions were subject to a double-blind review. The review process was very competitive. We had to review near 526 submissions. A team of about 375 reviewers did this terrific job. Our special thanks go to all of them.

Due to the time and conference schedule restrictions, we could finally accept only the best 186 submissions for presentation.

Our conference had again more than 225 participants from 46 countries from all continents.

ICL2019 will be held in Bangkok, Thailand.

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