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Volume 411

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Michael E. Auer · Thrasyvoulos Tsiatsos
Editors

New Realities, Mobile Systems and Applications

Proceedings of the 14th IMCL Conference

Editors

Michael E. Auer
CTI Global
Frankfurt, Germany

Thrasyvoulos Tsiatsos
Department of Informatics
Aristotle University of Thessaloniki
Thessaloniki, Greece

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Preface

IMCL2021 was the 14th edition of the International Conference on Interactive Mobile Communication, Technologies and Learning.

This interdisciplinary conference is part of an international initiative to promote technology-enhanced learning and online engineering worldwide. The IMCL2021 covered all aspects of mobile learning as well as the emergence of mobile communication technologies, infrastructures and services and their implications for education, business, governments and society.

The IMCL conference series actually aims to promote the development of mobile learning, to provide a forum for education and knowledge transfer, to expose students to latest ICT technologies and encourage the study and implementation of mobile applications in teaching and learning. The conference was also platform for critical debates on theories, approaches, principles and applications of mobile learning among educators, developers, researchers, practitioners and policy makers.

IMCL2021 has been organized by Aristotle University of Thessaloniki, Greece, November 4–5, 2021.

This year's theme of the conference was “New Realities, Mobile Systems and Applications.”

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

- Helen Crompton, Old Dominion University, Norfolk, VA, USA: **Mobile Learning: Integration Theories and a Social Ecological System Approach.**
- Marcus Specht, TU Delft, LDE-CEL, The Netherlands: **Mobile Learning 2.0, Toward Added Value and Cross-Media Collaboration.**

Furthermore, one very interesting workshop has been organized: “Navigating the Various Wired and Mobile VR Systems and VR Applications for a More Productive and Immersive Learning Experience” by Dimitrios Boglou, Cyprus University of Technology, Cyprus.

Since its beginning, this conference is devoted to new approaches in learning with a focus to mobile learning, mobile communication, mobile technologies and engineering education.

We are currently witnessing a significant transformation in the development of working and learning environments with a focus to mobile online communication.

Therefore, the following main topics have been discussed during the conference in detail:

- Mobile Learning Issues:
 - Dynamic learning experiences
 - Large-scale adoption of mobile learning
 - Ethical and legal issues
 - Research methods and evaluation in mobile learning
 - Mobile learning models, theory and pedagogy
 - Life-long and informal learning using mobile devices
 - Open and distance mobile learning
 - Social implications of mobile learning
 - Cost-effective management of mobile Learning processes
 - Quality in mobile learning
 - Case studies in mobile learning
- Interactive Communication Technologies and Infrastructures:
 - Wearables and Internet of things (IoT)
 - Tangible, embedded and embodied interaction
 - Location-based integration
 - Cloud computing
 - Emerging mobile technologies and standards
 - Interactive and collaborative mobile learning environments
 - Crowd sensing
 - 5G network infrastructure
 - Platforms to support students mobility
- Mobile Applications:
 - Augmented-, virtual-, mixed- and cross-reality apps
 - Smart cities
 - Remote and online laboratories
 - Serious games and gamification
 - Mobile health care, healthy lifestyle and training
 - Mobile apps for sports
 - Mobile credentials, badges and blockchain
 - Learning analytics
 - Mobile learning in cultural institutions and open spaces
 - Mobile systems and services for opening up education
 - Social networking applications
 - Mobile learning management systems (mLMS)

The following **Special Sessions** have been organized:

- **University – Industry – Developer “Creative Collaborations” In IoT, Mobile and Reconfigurable Technologies (IoT-MRT)**, Chair: Doru Ursutiu, Transilvania University of Brasov – AOSR, Romania.
- **Let them Innovate: Developing Digital Competencies for Mobile STEAM Learning and Teaching by Utilizing Immersive and Adaptive Digital Technology (DigiCompImmersive)**, Chairs: Petros Lameris, Coventry University, UK, and Nektarios Moumoutzis, Technical University of Crete, Greece.
- **User Experience with Remote Interaction and Fitting (uXRiF’2021)**, Chair: Dionysios Politis, Aristotle University of Thessaloniki, Greece.
- **Skill-Labs for Skilled Learners (SL4SL)**, Chairs: Jenny Pange, University of Ioannina, Greece and Eugenia Toki, University of Ioannina, Greece.
- **Digital Technology in Sports (DiTeS)**, Chairs: Chair: Styliani Douka, Aristotle University of Thessaloniki, Greece, Lambros Lazuras, Sheffield Hallam University, UK.

Also, the “**4th IMCL International Student Competition for Mobile Apps**” has been organized in the context of IMCL2021. The winning teams were:

- **Winner:** “Smart Ladder” by Hippokratis Apostolidis, Chrsistodoulos Tryphonidis, Nikolaos Politopoulos, George Psathas, Angeliki Mavropoulou, Aristotle University of Thessaloniki, Greece.
- **Runner-up:** “Robotics with Augmented Reality for Training and Rehabilitation” by José Carlos Rodrigues, LAETA-INEGI, Faculty of Engineering, University of Porto, Portugal, Paulo Menezes, Department of Electrical and Computer Engineering, Institute of Systems and Robotics, University of Coimbra, Portugal and Maria Teresa Restivo, LAETA-INEGI, University of Porto, A3ES, Portugal.

As submission types have been accepted:

- Full paper, short paper
- Work in progress, poster
- Special sessions
- Round table discussions, workshops, tutorials and students’ competition

All contributions were subject to a double-blind review. The review process was very competitive. We had to review about **264** submissions. A team of about **180** 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 **104** submissions for presentation.

The **best papers** were the following:

- **Category “Full Paper”:** “A Board Game For Sustainable Development Education: Kindergarten Students As Game Designers” by Maria Tsapara, Tharrenos Bratitsis, University of Western Macedonia, Greece.

- **Category “Short Paper”:** “An Assessment of the Advantages using Smartphone – Based Tele-Audiology and its Effects on Hearing Care Professionals’ Willingness for Integration into the Fitting Process” by Florian Ross, MATE Hungarian University of Agriculture and Life Sciences, Hungary.
- **Category “Work in Progress”:** “Hybrid Education: From Telecommuting with e-Learning to Broadcasting Ourselves” by Anastasios Nikiforos (1), Vasileios K. Vasileiou (2), Georgios H. Patronas (2), Stavros N. Dimitriadis (1). Organizations: (1) Dept. of Informatics, Aristotle University of Thessaloniki, Greece; (2) Dept. of Music Science and Art, University of Macedonia, Greece.

Our conference had more than 192 participants from 33 countries.

IMCL2023 will be held again at Aristotle University of Thessaloniki, Greece.

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Petros Lameris	The Serious Games Institute, UK

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