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## Guest Editorial: Current Advances in Digital Learning Technologies

During the past years, the increased interest for applying digital technologies aiming to improve learning and teaching has led to the evolution of the research discipline of Technology-enhanced Learning (TeL). Typically, Technology-enhanced Learning refers to a transformative movement in learning and teaching that exploits technological advances for offering learning experiences, which are not possible to be organized in existing formal educational settings. Several initiatives world wide are aiming at investigating which digital technologies and how can be used for meeting the 21st century lifelong learning societal needs taking into consideration global as well as local challenges. On the other hand, Learning Technologies are now part of the ACM Computing Classification System and they are included as distinctive subject courses in undergraduate and postgraduate programs of Computer and Information Sciences. To this end, this Special Issue aims to capture the current advances in digital technologies for learning and education by a number of selected invited papers in key research areas.

Professor J. Michael Spector, Professor and Chair in Learning Technologies at the University of North Texas, USA in his contribution entitled “*Emerging Educational Technologies: Tensions and Synergy*”, discusses three emerging educational technologies, namely, (a) massive open online courses (MOOCs), (b) personalized learning, and (c) game-based learning. Based on a critical discussion of policy documents published by the US National Science Foundation, the US Department of Education, the New Media Consortium, and two European Networks of Excellence, he concludes that *digital games* can promote interest and motivation; *personalized learning* still lacks the required supporting technologies (e.g., learning analytics) to be effectively deployed at a large scale; whereas, *MOOCs* can be used effectively to support existing teaching models, but at their current implementation, they lack learning guidance, formative feedback, and overall assessment. His final recommendation is that educational technology research

needs to focus to evidence-based research that can demonstrate the highly acclaimed advantages of learning technologies when applied at large scale implementations.

Lanqin Zheng, Junfeng Yang, Wei Cheng and Ronghuai Huang, from the School of Educational Technology, Beijing Normal University, Beijing, China, in their contribution entitled “*Emerging Approaches for Supporting Easy, Engaged and Effective Collaborative Learning*”, discusses issues in both face-to-face and online collaborative learning, as well as, the differences of collaborative learning between West and East emphasising on the potential cultural differences. The authors, based on their analysis, they propose three new approaches for future Computer-Supported Collaborative Learning (CSCL) studies, namely, (a) orchestrating diverse activities with resources, (b) embedding assessment into learner experience, and (c) infusing smart environment with group activities.

Jorge Torres, Ignacio Aedo and Juan Manuel Doderó, in their contribution entitled “*A Model-Driven Development approach for Learning Design using the LPCEL editor*” present the Learning Process Composition and Execution Language (LPCEL) Editor, a software tool that provides a broad level of expressiveness and facilitates the authoring process of Complex learning scenarios, which are represented using Educational Modelling Languages (EMLs). The authors offer a user evaluation to analyse their perspective regarding the level of functionality of LPCEL and its services. User experience with the LPCEL tool, suggests that the features included are necessary to perform an instructional design simpler and more closely to the requirements of end users with limited technical skills, such as school teachers.

Mohsen Laabidi, Mohamed Jemni, Leila Jemni Ben Ayed, Hejer Ben Brahim and Amal Ben Jemma, from the Research Laboratory of Technologies of Information and Communication & Electrical Engineering LaTICE at the National Higher School of Engineering of Tunis, University of Tunis, in their contribution entitled “*Learning Technologies for People with Disabilities*”, discuss the basic concepts of e-accessibility, universal design and assistive technologies and proposed a new approach for the development of accessible e-Learning environments. Their proposal consists of three phases: design, implementation and validation. This approach has been

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implemented, which led to the development of the MoodleAcc+ as the accessible version of the widely used Moodle platform.

Sergio Gómez Ardila, Panagiotis Zervas, Demetrios Sampson and Ramon Fabregat, in their contribution entitled “Context-Aware Adaptive and Personalized Mobile Learning Delivery Supported by UoLmP”, present a context-aware adaptive and personalized mobile learning system, namely the Units of Learning mobile Player (UoLmP), which aims to support semi-automatic adaptation of learning activities, that is: (a) adaptations to the interconnection of the learning activities (namely, the learning flow) and (b) adaptation to the educational resources, tools and services that support the learning activities. Initial evaluation results from the use of UoLmP provide evidence that UoLmP can successfully adapt the learning flow of an educational scenario and the delivery of educational resources, tools and services that support the learning activities. Finally, these adaptations can facilitate students to complete successfully the learning activities of an educational scenario in technology supported language learning.

Fan-Ray Kuo, Chi-Chih Hsu, Wei-Chieh Fang and Nian-Shing Chen, from the Information Management Department, National Sun Yat-sen University, Taiwan in their contribution entitled “The Effects of Embodiment-based TPR approach on student English vocabulary learning achievement, retention and acceptance” propose an integration of motion-sensing technology and theory of embodied cognition into the Total Physical Response (TPR) approach, called Embodiment-based TPR approach, to enhance English vocabulary learning. The authors test the effectiveness of the proposed approach with a study that involves 50 fifth-grade elementary students in Taiwan. Results showed that both the post-test and the delay test concerning English vocabulary learning performance between the two groups had no significant difference. However, the result of learning retention showed a significant regression for the control group while the experimental group’s learning retention retained, which implies the Embodiment-based TPR approach could bring better learning retention than the conventional TPR approach. In addition, experimental group showed highly positive level of acceptance towards the proposed learning approach.

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**Prof. Demetrios Sampson** has received a Diploma in Electrical Engineering from the Democritus University of Thrace, Greece in 1989 and a Ph.D. in Electronic Systems Engineering from the University of Essex, UK in 1995. He is a Full Professor of Digital Systems for Learning and Education at the Department of Digital Systems, University of Piraeus, Greece and a Research Fellow at the Information Technologies Institute (ITI), Centre of Research and Technology Hellas (CERTH). He is the Founder and Director of the Advanced Digital Systems and Services for Education and Learning (ASK) since 1999. His main scientific interests are in the area of Learning Technologies. He is the co-author of more than 310 publications in scientific books, journals and conferences with at least 1380 known citations (h-index: 20). He has received 6 times Best Paper Award in International Conferences on Advanced Learning Technologies. He is a Senior and Golden Core Member of IEEE and he was the elected Chair of the IEEE Computer Society Technical Committee on Learning Technologies (2008–2011). He is Co-Editor-in-Chief of the Educational Technology and Society Journal (impact factor 1.171, 2012). He is also a Member of the Steering Committee of the IEEE Transactions on Learning Technologies, Member of the Advisory Board of the Journal of King Saud University - Computer and Information Sciences, Member of the Editorial Board of 20 International/National Journals and a Guest Co-Editor in 26 Special Issues of International Journals. His participation in the organization of scientific conferences involves: General and/or Program Committee Chair in 35 International Conferences, Program Committees Member in 330 International/National Scientific Conferences. He has been a Keynote/Invited Speaker in 48 International/National Conferences. He has been project director, principle investigator and/or consultant in 65 R&D projects with external funding at the range of 14 Million € (1991–2016). He is the recipient of the IEEE Computer Society *Distinguished Service Award* (July 2012).

**Prof. Kinshuk** is Associate Dean of Faculty of Science and Technology, and Full Professor in the School of Computing and Information Systems at Athabasca University, Canada. He also holds the NSERC/iCORE/Xerox/Markin Industrial Research Chair for Adaptivity and Personalization in Informatics. He has a PhD from De Montfort University, United Kingdom. His work has been dedicated to advancing research on the innovative paradigms, architectures and implementations of online and distance learning systems for individualized and adaptive learning in increasingly global environments. Areas of his research interests include learning technologies, mobile, ubiquitous and location aware learning systems, cognitive profiling and interactive technologies. With more than 350 research publications in refereed journals, international refereed conferences and book chapters, he is frequently invited as keynote or principal speaker in international conferences (27 in past five years) and visiting professor around the world (16 in the past five years in China, Hong Kong, Finland, Italy, Japan, and Taiwan). He was awarded the prestigious fellowship of Japan Society for the Promotion of Science in 2008. In his on-going sustained professional activities, he has initiated professional movements at international and national levels. At the international level, he is Founding Chair of IEEE Technical Committee on Learning Technologies, and Founding Editor of the Educational Technology & Society Journal (SSCI indexed with Impact Factor of 1.011 according to Thomson Scientific 2010 Journal Citations Report).

At the national level, he is Founding Chair of the New Zealand Chapter of ACM SIG on Computer-Human Interaction, and Past President of the Distance Education Association of New Zealand.

**Prof. Mohamed JEMNI** is a Full Professor at the University of Tunis and the General Chair of the Computing Center El Khawarizmi, the Internet services provider for higher education in Tunisia. He is the Head and the founder of the Research Laboratory of Technologies of Information and Communication & Electrical Engineering (LaTICE) of the University of Tunis ([www.lattice.rnu.tn](http://www.lattice.rnu.tn)). He is also an Adjunct Professor at the Faculty of Science and Technology, Athabasca University, Canada. He is a Senior Member IEEE and the Founder of the Tunisian IEEE Education chapter. He is member of the executive board and New Initiative chair of IEEE Technical Committee on Learning Technology. His research projects involvements during the last 22 years are in Enhanced Learning Technologies, High Performance & Grid computing and Accessibility of Information and Communication Technologies to People with Disabilities. He is currently conducting two main projects in his laboratory: Development of an e-learning environment for students with disabilities & Improving accessibility and education of Deaf community by the use of ICT. He has published over 200 papers in international referred journals, conferences and book chapters and he has produced many studies for international organizations such as UNESCO, ITU and ALECSO. Prof. Jemni and his laboratory have received several awards, including the Silver medal of the International Fair of Inventions in Kuwait 2007, the UNESCO Prize 2008 for the e-learning curriculum they developed for visually impaired, President's Award for the integration of persons with disabilities 2009 and the "World Summit Award (WSA) – Mobile 2010" in the field of social inclusion, and recently in April 2012, his laboratory LaTICE received the Google Student AWARD and he has received the Best Communication Paper of the Web For All 2012. He is also member of the steering committee of G3ICT – United Nations, Global initiative for Inclusive Information and Communication Technologies and he is also the president of a Tunisian NGO created in June 2011: the Tunisian Association of e-accessibility ([www.e-access.tn](http://www.e-access.tn)). He has launched many initiatives to promote ICT accessibility in the Arab region including the project of WCAG2.0 translation to Arabic (<http://www.utic.rnu.tn/wcag2.0>) to

promote accessibility of Arabic Web Content and the 2009 initiative for using ICT to develop Arab Sign language and Education of Deaf People ([www.icta.rnu.tn/asl/](http://www.icta.rnu.tn/asl/)).

**Prof. Nian-Shing Chen** is Chair Professor at the Department of Information Management in the National Sun Yat-sen University, Taiwan. He has published over 350 papers in the international referred journals, conferences and book chapters. One of his papers published in Innovations in Education and Teaching International was awarded as the top cited article in 2010. He is the author of three books with one textbook entitled "e-Learning Theory & Practice". Prof. Chen received the national outstanding research awards from the National Science Council, Taiwan in 2008 and 2011–2013. His current research interests include assessing e-Learning course performance; online synchronous teaching & learning; mobile & ubiquitous learning; natural user interface & game-based learning. Prof. Chen is serving as editorial board members for many international journals and guest editors for more than 10 special issues of international journals. He has also organized and chaired numerous international conferences and workshops in the area of advanced learning technologies. Professor Chen is a senior member of IEEE, ACM and the Chair of the IEEE Technical Committee on Learning Technology (<http://lttf.ieee.org/>). He is Co-Editor-In-Chief of the SSCI-indexed Journal of Educational Technology & Society.

**Demetrios Sampson**

*University of Piraeus and CERTH, Greece*

**Kinshuk**

*Athabasca University, Canada*

**Mohamed Jemni**

*University of Tunis, Tunisia*

**Nian-Shing Chen**

*National Sun Yat-sen University, Taiwan*