

# Editorial: A Message from the Editorial Team and an Introduction to the April-June 2017 issue

Peter Brusilovsky and Mike Sharples



WELCOME to the second 2017 issue of the *IEEE Transactions on Learning Technologies*. The issue starts with the introduction of the new cohort of Associate Editors. We are excited to bring in nine new editorial board members who will help us to assess the increasing flow of high-quality submissions while also bringing expertise in several popular and emerging areas such as augmented reality, MOOCs, gamification, and learning analytics. The expertise profiles of the new Associate Editors are presented in the next section. Please, join us in welcoming them to the journal team!

This first regular issue of 2017 uses the expanded page budget to present 10 papers on popular topics in the area of Learning Technologies.

In “Adaptive Social Learning Based on Crowdsourcing”, Evgeny Karataev and Vladimir Zadorozhny show how to combine learner-contributed content, social networked learning, and personalization. They describe the SALT system that enables students to contribute and consume mini-lessons (or ‘lesslets’) comprising name, explanation of concept, brief example and test of understanding. Lesslets can stand alone, or can be built into learning pathways. SALT automatically sequences these for each learner based on estimated difficulty derived from user’s test scores. In a trial with 260 undergraduate and graduate students, the students contributed about 300 lesslets, as well as commenting and voting on each other’s contributions. The system was able to identify clusters of students with similar learning patterns and use these to perform personalization.

Providing individualized learning in open-ended environments, where students can explore alternative solution paths, is a challenge for learning technology. In their paper “Integrating Model-Driven and Data-Driven Techniques for Analyzing Learning Behaviors in Open-Ended Learning Environments”, John S. Kinnebrew, James R. Segedy and Gautam Biswas bring together two previous approaches: model-based analysis of students’ activity sequences and data-driven pattern discovery. The strategy model determines how to analyze learner behavior and data-driven analysis of frequent learner activity extends the strategy model. This combined approach was applied in the *Betty’s Brain* system for students to learn science by constructing causal models. The paper reports data from a study with 68 sixth-grade students. It showed no significant effect of treatment, however the pattern-mining approach identified new variations of strategies and gaps in the model.

Model construction is also the topic of the paper by Kurt VanLehn, Jon Wetzel, Sachin Grover, and Brett van de Sande on “Learning How to Construct Models of Dynamic Systems: An Initial Evaluation of the Dragoon Intelligent Tutoring System”. Dragoon is designed to teach high school and college students to construct models of dynamic systems (such as changes in animal population) through four modes: *edit* a model, *test* the output of a model, *gain immediate feedback* on a new entry in the model, and be *coached* through process advice on what steps to do next. An evaluation compared 16 students receiving computer-based coaching (Tutor) from Dragoon with 18 students who used it for editing only (Editor). The mean exam scores for the two groups were not significantly different, but a comparison of those students who made high use of the system (in either condition) showed better performance for the Tutor group.

In “Cognitive Diffusion Model: Facilitating EFL Learning in an Authentic Environment”, Rustam Shadiev, Wu-Yuin Hwang, Yueh-Min Huang, and Tzu-Yu Liu describe a mobile learning system that enables students to learn a foreign language by taking pictures of objects, describing them in writing, and then sharing their work with peers. The students are introduced to a topic in class, then go outside to apply their knowledge. An evaluation with 57 junior high school students compared an experimental group that used the system on tablet computers with a control group that were set a traditional learning approach using textbooks, making notes and taking pictures of objects. The two groups showed similar performance in tasks to remember words, but the experimental group performed better in test items to understand and apply knowledge.

The affordances of mobile devices are also explored in a paper by David Cabiellas-Hernández, Juan-Ramón Pérez-Pérez, MPuerto Paule-Ruiz, and Samuel Fernández-Fernández with the title “Specialized Intervention Using Tablet Devices for Communication Deficits in Children with Autism Spectrum Disorders”. This describes the *Chain of Words* system to help young children with autism communicate by learning how to build sentences, pronounce them and extend their skills in grammar, syntax and phonetics. The system was tested with eleven children aged three to eight, with data recorded from

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log files supplemented by insight from interviews with autism experts. The findings show that the children using the system progressed in their vocabulary use and sentence production.

The paper “Automatic Chinese Factual Question Generation” by Ming Liu, Vasile Rus, and Li Liu is focused on content aspects of foreign language learning. Its approach to automatic question generation in Chinese opens a way to considerably reduce content authoring efforts in language learning and related courses. The evaluation results presented in the paper demonstrate an adequate level of performance for the suggested approach.

The paper “An Architecture Combining IMS-LD and Web Services for Flexible Data-Transfer in CSCL” by Ioannis Magnisalis and Stavros Demetriadis is focused on architectural solutions for Computer-Supported Collaborative Learning (CSCL). The authors present a novel back-end architecture MAPIS3 that supports a complex multi-tool orchestration scenario for CSCL and report the results of its evaluation through a sequence of case studies.

An interesting attempt to bring gamification to computer science education is reported in “CMX: The Effects of an Educational MMORPG on Learning and Teaching Computer Programming” by Christos Malliarakis, Maya Satratzemi, and Stelios Xinogalos. Armed with knowledge about earlier attempts to use games in learning computer programming, the authors scale up past research by introducing CMX, a Massive Multiplayer Online Role Playing Game (MMORPG). The paper presents the design framework that supports CMX, reviews key features of the new game, and reports an extensive evaluation of CMX as technology to teach computer programming. The study evaluated the learning effectiveness as well as the entertaining and motivating elements of CMX and provides useful insights for future work on using games and MMORPG for learning programming.

Another extensive study of using games in education is presented in the paper “Investigating the Impact of Gaming Habits, Gender, and Age on the Effectiveness of an Educational Video Game: An Exploratory Study” by Borja Manero, Javier Torrente, Clara Fernández-Vara, and Baltasar Fernández-Manjón. Going well beyond many studies that merely register the effectiveness of game-based learning, the authors use a large volume of data to connect the outcomes of using an educational game to characteristics of individual students, such as gender, age, and gaming preferences.

Finally, “A Fuzzy Group Decision Making Model for Ordinal Peer Assessment” by Nicola Capuano, Vincenzo Loia, and Francesco Orciuoli focuses on peer assessment technology that has emerged as a popular approach for assessment and feedback in Massive Open Online Courses (MOOCs). Addressing a known problem of low reliability of peer ratings, the authors propose a new peer assessment model based on Fuzzy Sets Theory and on the application of Group Decision Making (GDM) techniques. The proposed model attempts to reduce noise in peer assessment by asking student to provide relative ranking rather than absolute grades for peer work. These preferences are used to produce a global ranking and final grades. The paper presents the proposed model and reports the results of four experiments performed to evaluate it. The results demonstrate that the model outperforms existing ordinal and cardinal peer assessment models.

Enjoy your reading!  
 Peter Brusilovsky, *Editor-in-Chief*  
 Mike Sharples, *Associate Editor-in-Chief*



**Ig Ibert Bittencourt** received the PhD degree in computer science from Federal University of Campina Grande (Brazil), in 2009 and the post-doctoral degree in computer science from the University of Campinas (UNICAMP, Brazil), in 2013. He is an associate professor with the Federal University of Alagoas (Brazil) and co-director of the Center of Excellence for Social Technologies. During his PhD, he proposed a theoretical and computational model to build Semantic Web-based Educational Systems. His research career has been devoted to Artificial Intelligence in Education (AIED), working on the design, development, and experimentation of educational technologies. He was also a visiting researcher with the University of São Paulo (Brazil), Advanced Institute of Science and Technology – JAIST (Japan) and Mannheim University (Germany). He also was the W3C Advisory Committee Representative, Brazilian Computer Society Representative of IFIP TC on Education (TC 3). Nowadays, he is the president of the Special Committee of Computers and Education from the Brazilian Computer Society (leading around 2,500 researchers). He co-founded an awarded company called MeuTutor (more than 50 thousand students already used) and he stands out from his peers because he created one of the most innovative companies in the field of educational technology in Brazil.

As a result, MeuTutor has won three important awards, including the Innovation Hall Award at the RioInfo – the biggest event in Software Industry in Brazil. He believes in innovative social entrepreneurship as a model for promoting a sustainable economic and social development to mankind.



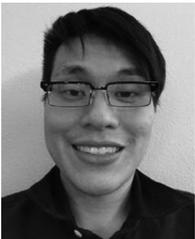
**Francisco José García-Peñalvo** received the bachelor’s degree in computing from the University of Salamanca (Spain), and the University of Valladolid (Spain), and the PhD degree from the University of Salamanca, where he is currently the director of the Research Group in Interaction and e-Learning (GRIAL). His main research interests focus on e-Learning, computers and education, adaptive systems, web engineering, semantic web, and software reuse. He has led and participated in more than 50 research and innovation projects. He was the vice chancellor of technological innovation at the University of Salamanca between March 2007 and December 2009. He has published more than 200 articles in international journals and conferences. He has been a guest editor of several special issues of international journals (*Online Information Review*, *Computers in Human Behavior*, and *Interactive Learning Environments*). He is the editor in chief of the *Education in the Knowledge Society* magazine and the *Journal of Information Technology Research*. He coordinates the doctoral program for the Education in the Knowledge Society.



**Marco Kalz** is a full professor and UNESCO chair of Open Education at the Faculty for Management, Science and Technology and the Welten Institute of the Open University of the Netherlands. He is a fellow of the Interuniversity Center for Educational Sciences (ICO) and the Dutch research school information and knowledge systems (SIKS). He is the chair of the Special Interest Group on Technology-Enhanced Assessment (SIG TEA) of the European Association of Technology-Enhanced Learning (EATEL). Over the last 5 years, he secured approximately 2 million Euros of research funding for his institution. Besides European projects, he was and is regularly involved in educational innovation projects at the Open University of the Netherlands and in cooperation with other partners. His research interest lies on the use of open educational resources, pervasive technologies, and formative assessment to support self-directed lifelong learning.



**Effie Lai-Chong Law** received the PhD degree in psychology from the University of Munich, Germany. She is a professor in Human-Computer Interaction (HCI) in the Department of Informatics at the University of Leicester, U.K. For almost 15 years, she has engaged in researching usability and user experience (UX) methodologies, applying them to a range of domains, especially Technology-enhanced Learning (TEL), serious games, cultural heritage, health, law, and e-commerce. She has chaired two HCI-based COST Actions, MAUSE and TwinTide, and is actively involved in a number of EU and national projects on TEL, leading work packages on participatory design, UX evaluation, and quality assurance. Her recent research focus is measuring emotional experiences of multimodal interactions with new technologies.



**Mark J. W. Lee** is an adjunct senior lecturer with the School of Education at Charles Sturt University, Australia. He has broad research interests in learning technologies, in computer science and engineering education, and in tertiary teaching innovation, having authored more than 70 peer-reviewed publications in these areas. His current work focuses on university teacher cognition and on pedagogies of production and play that transcend multiple spaces, temporalities, and/or modalities. He was the founding chair of the IEEE Education Society's New South Wales Chapter and has served as an associate editor of the *IEEE Transactions on Education* (ToE) since 2011. He has also regularly reviewed manuscripts for the *IEEE Transactions on Learning Technologies* (TLT) since the journal's inception. He recently guest edited a special issue of *TLT* on "Learning through Wearable Technologies and the Internet of Things." In addition to being a senior member of the IEEE and ACM, he is an associate fellow of the Australian Institute of Management (AIM) as well as a fellow of the Australian Computer Society (ACS), the Commercial Education Society of Australia (CESA), the Australian Institute of Training and Development (AITD), and the U.K. Royal Society for the Encouragement of Arts, Manufactures, and Commerce (RSA).