Editorial

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Biographical notes: Peter Kraker received his Master in Business Administration from University of Graz in 2007 and his BSc in Computer Science from Graz University of Technology in 2008. Currently, he is a research assistant at Know-Center, Graz University of Technology. His main research interests are scholarly communication on the web, open science, and online privacy. In his PhD thesis, he investigates how readership statistics can be used to structure the field of Technology Enhanced Learning. He is chairman of the Knowledge Management Forum Graz and serves as an organiser of several events in the field of TEL and Web Science.

Israel Gutiérrez Rojas combines the profile of a researcher and a teacher at the University Carlos III of Madrid. His PhD thesis is about how live learning analytics raise awareness on teachers and students in face-to-face sessions, and the impact of this awareness in the teaching and learning processes. He received his BSc in Telecommunications in 2007 and his MSc in Telematics in 2010. He has worked in several companies, with responsibilities ranging from R&D developer of mobile applications, to consultant of web applications for telecom services.

Martina Rau received her Diploma in Psychology (equivalent to BA and MA) from the University of Freiburg, Germany in 2008. Currently, she is a PhD candidate in the Human-Computer Interaction Institute at Carnegie Mellon University in Pittsburgh, USA. Her thesis work focuses on learning with multiple graphical representations in intelligent tutoring systems. She has conducted a number of large-scale classroom experiments and employs educational data mining methods to analyse outcome and process measures of learning. She is a Siebel scholar, co-organiser of the inter-Science of Learning Center conference, and serves as student representative to the Pittsburgh Science of Learning Center.

Derick Leony received his BSc (2006) in Computer Science and his MSc (2007) in Telecommunications from Galileo University, Guatemala, and he obtained his MSc (2010) in Telematic Engineering from University Carlos III

of Madrid. Currently, he is a PhD student and a teaching assistant in the Department of Telematic Engineering at University Carlos III of Madrid. His research interests lie in the analysis of activity patterns in learning environments and their relationship with students' affective states.

Dirk Börner is a PhD candidate at the Centre for Learning Sciences and Technologies (CELSTEC) at the Open Universiteit in the Netherlands. In 2007 he graduated from the University of Applied Sciences in Dresden with a degree in Computer Science. Beside his work in European Projects, such as MACE, OpenScout, and STELLAR he is currently conducting research on ubiquitous learning support. In particular he focuses on the utilisation of ambient information presentation in combination with mobile technology to support learners in authentic situations.

Antigoni Parmaxi holds a BA in Classical Studies from the University of Cyprus and an MA in Pedagogical Sciences from the same University. Currently, she is a PhD Candidate at the Department of Multimedia and Graphic Arts of the Cyprus University of Technology. She is also a Greek language instructor at the Language Centre of the University. Her main research interests are Computer Assisted Language Learning, social technologies, constructionism, participatory design methodology in language learning and intercultural education. In her PhD thesis she explores the development of a theoretical and methodological framework for enhancing language learning within social technologies.

Wolfgang Reinhardt is a research associate at the University of Paderborn (Germany). He studied computer science at the University of Paderborn and works in the Computer Science Education Group since then. He conducted his PhD in the field of awareness support in technology enhanced research networks at the CELSTEC group of the Open University of the Netherlands. His research focusses on supporting researchers with technology to become and stay aware of the connections in their different social networks.

Moshe Leiba received his MA in Science Education from Tel Aviv University in 2005 and BSc in Electrical Engineering from Holon Institute of Technology in 2003. Currently, he is PhD candidate at the School of Education, Tel Aviv University and a Lecturer at Levinsky College of Education. He serves as an ICT regional supervisor at the Israeli Ministry of Education and leads the Israeli ICT national programme in over 600 schools. His research interests include ICT in science education, mathematical problem solving, web-mining of online learning and ICT in teachers' training.

The young researchers special issue seeks to give a voice to the generation of researchers who will shape technology-enhanced learning during the upcoming decades: young researchers at the (relative) beginning of their academic careers. The focus of this special issue is to establish the state-of-the-art and discuss upcoming challenges in current research areas. This issue includes a selection of high-quality articles that provide multi-disciplinary perspectives on TEL and that bring together a variety of strategies to further develop the field of TEL research. The overarching goal of this special issue is to promote international exchange between the multiple disciplines that shape the field of TEL.

Just like the first edition in 2011, this special issue is *from* and *with* young researchers. PhD candidates from three continents served as guest editors for this issue. Under the guidance of experienced reviewers, young researchers provided informed recommendations on how to improve the papers in this special issue. All main authors on the papers in this special issue are in the early stages of their careers (i.e. PhD students and early postdoctorates). In providing a platform to discuss issues, challenges, and directions of TEL research, we seek to stimulate the ongoing exchange among young researchers from multiple perspectives and disciplines and to establish a long-lived international research community. We are confident that senior researchers interested in TEL will value the well-crafted reviews and fresh thoughts in this issue and cherish their potential to define and enhance the field of TEL.

This issue includes two papers which present complementary perspectives on learning analytics. *Ferguson* gives a detailed account on the recent history of the field of learning analytics and its relation to the fields of educational data mining and academic analytics. In doing so, she discusses the factors that are driving the ongoing emergence of learning analytics as an interdisciplinary area of research. *Chatti, Dyckhoff, Schroeder and Thüs* integrate recent publications on learning analytics into a reference model. Based on this reference model, they not only describe current trends in the newly emerging field of learning analytics, but also highlight open issues and challenges that future research should address. Both papers provide an insightful synthesis of current developments and future trends and will likely stimulate new research in this rapidly emerging new area of research while vividly illustrating the importance of learning analytics for technology-enhanced learning.

Enabling learning anytime and anywhere by incorporating mobile technologies, usually referred to as mobile learning is one of the up and coming topics in TEL. One important concept in this area of research is context; both as determinant and as facilitator of learning. *Thüs, Chatti, Yalcin, Pallasch, Kyryliuk, Mageramov, and Schroeder* explore the notion of context and review current literature and research in the field focusing on the different types and the capturing of context. They identify research challenges and opportunities and propose a conceptual framework for context-aware mobile learning to address the challenges and understand the different components of respective learning environments.

Mobile learning games and their potential to bring about affective as well as cognitive learning are also explored in this special issue. *Schmitz, Klemke and Specht* present a review of research on the effects of mobile gaming on learning outcomes in order to better understand the game mechanisms with regard to learning outcomes. They introduce a framework which helps to evaluate and classify mobile learning games. The authors also report on the mechanisms that support design decisions of future mobile learning games.

One of the promising areas of Technology Enhanced Learning is to provide better support for children with special needs. *Avramides, Bernadini, Foster, Frauenberger, Kossyvaki, and Mademtzi* have put together an overview of the state-of-the-art in social communication skill development for children with autism. The authors investigate pedagogical foundations, technological advancements, and the role of the autistic learner in the design process. Even though children with autism tend to be technology-affine, this does not mean that existing solutions are actually usable for them. Based on that insight, the authors report a number of challenges for future research which were informed by the ECHOES project.

Neuroscience is a related but yet not well connected field to TEL, though it is one of the most interesting perspectives to take within the multi-disciplinary field. Based on the discovery of mirror neurons and the research on perception, attention, numbers and language within the field of cultural neuroscience, *Magni* presents a review on neuroscience studies which appear particularly relevant for TEL. Furthermore he draws implications for the research and practice in TEL and identifies research areas which require further investigation, namely short and long term effects on brain functioning as well as the cultural role of TEL and other forms of computer mediated communications.

Finally, Virtual Learning Communities (VLCs) have been a matter of interest in TEL for more than a decade. *Wegener and Leimeister* present a structured review of literature whose main outcome is a set of key factors needed to establish a successful VLC. Thus, the authors provide a list of best practices to apply in a VLC in order for the learners to enhance learning outcomes. They point out the main challenges of VLCs and provide advice for instructors involved in the organisation of a VLC. Furthermore, they also propose advice for VLC researchers on further research objectives in the field.