

Mobile learning, emerging learning design and learning 2.0

Mobile and wearable devices, social networking and cloud computing platforms, and other recently emerging technologies are beginning to be adopted as educational tools by innovative educators and institutions around the world. To scale up these initiatives, there is a pressing need to harness research studies with solid theoretical underpinnings and empirically validated practical recommendations to inform learning designs. This special issue of *Interactive Technology and Smart Education* provides an update on contemporary theories of, and practices with, mobile and emerging technologies in education, with a particular focus on evolving design frameworks, considered alongside exemplary cases of the adoption of new technologies for teaching and learning.

This special issue consists of a selection of papers from the 3rd International Mobile Learning Festival (IMLF), held in Bangkok from 27th-28th May, 2016, on the theme of Mobile Learning, Emerging Learning Design and Learning 2.0. The IMLF serves as an annual platform for educational policy-makers, lecturers and teachers, academics and researchers, and industry representatives to share in discussions and explorations of new uses of mobile and related technologies in education. With organisational support from the Consultants International for Human Capital Development (CIHCD), academic support from the Faculty of Education at The University of Hong Kong and the Sukhothai Thammathirat Open University, Thailand, and financial support from Echo360, the 3rd IMLF attracted participants from institutions and organisations across the globe, who joined in a rich exchange of ideas over two intensive days.

This issue is going to press at a time when mobile learning is making inroads into education at all levels, linked to the innovative options being opened up by new hardware ranging from smartwatches to smart glasses (Bower and Sturman, 2015; Pegrum, 2016a; Sapargaliyev, 2015); new virtual reality and, especially, augmented reality interfaces (Bacca *et al.*, 2014; Delello *et al.*, 2015; Dunleavy and Dede, 2014; Radu, 2014; Wu *et al.*, 2013); and new paradigms such as big data and its educational inflection, learning analytics (de Freitas *et al.*, 2015; Kinshuk, 2015; Mayer-Schönberger and Cukier, 2014; Mor *et al.*, 2015; Tabuenca *et al.*, 2015).

A growing number of books and special journal issues are helping to build up a comprehensive picture of mobile learning as they approach it from a variety of angles (Berge and Muilenburg, 2013; Churchill *et al.*, 2016a, 2016b; Lim and Churchill, 2016; McConatha *et al.*, 2014; Palalas and Ally, 2016; Parsons, 2013; Traxler and Kukulska-Hulme, 2016). It is apparent that mobile devices offer a spectrum of educational opportunities for teacher–technology, student–technology and teacher–student partnerships. Some key areas of exploration have included multimodal materials delivery, interactions, representations and creations (Churchill, 2014, *in press*; Clarke, 2013; Eisenlauer, 2014; Kukulska-Hulme and Pegrum, *in press*; Oakley *et al.*, 2013); digital collaboration and networking (Alhinty, 2015; Ilic, 2015; Pachler *et al.*, 2012; Pegrum *et al.*, 2014); seamless learning outside the classroom (Nordmark and Milrad, 2015; Uosaki *et al.*, 2012; Wong *et al.*, 2012; Wong and Looi, 2011); and the development of new literacies essential for twenty-first century learning, working, socialising and playing (Bosman and Strydom, 2016; Dudeney *et al.*, 2013; Frawley and Dyson, 2014; Kukulska-Hulme and Pegrum, *in press*; Pegrum, 2016b).



In short, the conjunction of today's hardware and software opens up transformative pedagogical possibilities – not always fully realised as yet – across a variety of educational contexts (Cochrane, 2013; Kearney *et al.*, 2015; Kukulska-Hulme *et al.*, 2015; Lindsay, 2016; McConatha *et al.*, 2014). These pedagogical possibilities are in turn underpinned by the three levels, or paradigms, of mobile learning (Churchill *et al.*, 2014; Pegrum, 2014; Pegrum, 2016c). While in practice these paradigms are rarely entirely isolated from each other, it is possible to say that learning with mobile technologies was typically the focus of early mobile learning studies (Anderson and Blackwood, 2004; Churchill and Churchill, 2008; Song and Fox, 2008); learning by mobile learners became an increasing focus of the next wave of studies (Gu *et al.*, 2011; Kukulska-Hulme, 2013; Woodill, 2011); and mobile learning experiences have become a focus in more recent studies, which in varying degrees emphasise contextual learning (Reinders and Pegrum, 2016; Sharples, 2016) and seamless learning across contexts (Song, 2014; Wong and Looi, 2011).

Faced with expanding possibilities for pedagogical transformation, educators must increasingly act as designers of learning materials, learning environments and learning experiences for their students, whether independently or in collaboration with programmers and instructional designers. Over recent years, this point has been widely noted in the general literature about educational technologies (Colpaert, 2016; Garcia, 2014; Gee, 2015; Laurillard, 2012). It is also increasingly being noted in the literature about mobile learning, where the learning possibilities both inside and outside the classroom are dramatically increased (Hockly, 2016; Milrad *et al.*, 2013; Ng *et al.*, 2010; Reinders and Pegrum, 2016; Sharples, 2016). We are now seeing the rise of research on specific aspects of mobile learning design covering, for example, apps (Churchill *et al.*, 2016a, 2016b; Dennen and Hao, 2014; Kucirkova, 2016; Leinonen *et al.*, 2016), mobile massive open online courses (MOOCs) (de Waard, 2013), augmented reality (AR) games (Antonaci *et al.*, 2015; Dunleavy, 2014; Wetzels, 2013), and even independently or semi-independently mobile learning technologies such as robots (Hung *et al.*, 2013). More broadly, we are witnessing the development of mobile design-based research (Ford *et al.*, 2014; Hoven and Palalas, 2011; Leinonen *et al.*, 2016; Palalas *et al.*, 2015). It is becoming clear that for effective integration of mobile technologies in education, appropriate learning designs are paramount. Such designs can, moreover, support interventions to transform teacher thinking in productive directions (Churchill *et al.*, 2013).

This special issue features five papers, which showcase research and evidence-based developments in mobile learning. The first three papers offer theoretical frameworks, or lenses, for mobile learning. First, Crompton discusses mobile learning from the perspective of challenges for teachers in the integration of mobile technologies into the curriculum. Her paper proposes an *mLearning Integration Framework* for the use of mobile devices in teaching and learning, comprising four main parts: Beliefs, Resources, Methods, and Purpose. Second, Burden and Kearney outline a *Mobile Pedagogical Framework* covering three key dimensions of mobile learning, namely, Personalisation, Authenticity and Collaboration. They describe the results of an international survey in which teacher educators self-rated their educational practices, reporting high ratings on Authenticity and some aspects of Collaboration, with lower ratings on Personalisation and certain aspects of Collaboration. Third, Stevenson and Hedberg trace the history of app usage in education, suggesting that recent advances in mobile technologies have opened up more pedagogically

effective options, with the approach of *app smashing* – where a variety of apps may be used in conjunction to achieve desired learning outcomes – showing promise for fostering constructivist learning linked to the development of higher order thinking skills.

The remaining two papers reflect on mobile approaches used in widely varying contexts. Rosario-Raymundo explores the use of QR codes to support professional workplace learning, reporting on a study which reveals the usefulness, acceptability and feasibility of this approach for labour room nurses in the Philippines. Isaías, Reis, Coutinho and Lencastre describe a three-dimensional immersive environment which incorporates empathic technologies, pointing the way forward to empathic virtual reality, AR and mixed reality learning environments. This final paper serves as a call for further research to investigate the relationships between learners equipped with personal multimedia devices, their teachers, and their institutions.

As an ensemble, these papers highlight the importance of underpinning the integration of mobile and other emerging technologies into education with appropriate learning design frameworks. To maximize the advantages offered by contemporary technologies, it is vital to refer to evidence-based design frameworks to guide research, practice and policy. It is hoped that future studies will continue to explore some of the research directions suggested in this collection.

To conclude, the authors would like to offer special thanks to the members of the IMLF Programme Committee for their guidance on the development of this special issue, and to the reviewers for strengthening the papers included here. In addition to this collection, we are working towards the establishment of an International Special Interest Group on Mobile Learning; we are planning to inaugurate a journal focusing on Mobile and Emerging Learning Design, which will provide an international forum for the exploration of the latest developments in mobile learning design and technology integration in education; and we are currently preparing for the 4th IMLF, to be held in Hong Kong in June, 2017. We look forward to seeing you there!

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