Preface

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Biographical notes: Eric Ras leads the group Embedded Assessment at the Luxembourg Institute of Science and Technology, Luxembourg. He received his PhD in Computer Science from the University of Kaiserslautern in 2009. With regard to technology-based assessment, his particular interest is to assess 21st century skills with tangible user interfaces. Further, he researches how to automatise the assessment lifecycle by using knowledge models to generate test items for formative assessment. He is author of over 100 scientific publications. He is co-chair of the Special Interest Group TEA (Technology Enhanced Assessment) and chairs the International Computer Assisted Assessment Conference 2015.

Mohammad AL-Smadi is an Assistant Professor at Jordan University of Science and Technology, Jordan, February 2014. He holds a Doctoral degree in Computer Science form Graz University of Technology with distinction, 2012. His research interests include human-computer interaction, technology enhanced learning, social and semantic computing, and information search and retrieval. He has participated in EC-funded projects, national and internal research projects (ALICE, Learning Layers, SOFIA). He has published over 35 scientific publications in peer-reviewed journals, and conferences. He is a PC member of international conferences (e.g. EC-TEL, ICALT, ICWL) and co-chair of e-Assessment special track CAF since 2008.

Ivana Marenzi, PhD (F), is senior researcher at the L3S Research Center in Hannover. Her main area of research in Technology Enhanced Learning includes the support of collaborative and lifelong learning. During the past five years she has worked as educational technologist and collaborated in the

management of international European projects such as TENCompetence, STELLAR, LivingKnowledge, TERENCE, and LinkedUP. She is referee for international conferences and journals, and has collaborated in organising conferences and workshops (e.g. EbTEL, TEFA).

Today, learning often occurs collaboratively in learner networks, formal learning is combined with informal learning, and learners' use, for example, personalised and personal learning environments adapted to their needs and preferences. Moreover, the 'data culture' has become an omnipresent phenomenon in classrooms and a lot of additional data is gathered when students engage in a modern learning environment. New technologies in the future will enable a continuous stream of data which is supposed to be continuously used to shape learning and teaching activities with the purpose to improve learning. One mean for that is learning analytics that provides new information to instructors and learners to reflect about respectively their teaching activities and their learning progress.

A new culture of assessment emerged in which assessment is designed as *embedded* rather than dedicated (AL-Smadi et al., 2012) and as *continuous* instead of being *sporadic* (Segers et al., 2003). Students have more responsibility in the learning process in general and in the assessment activities in particular. They have become more engaged in developing assessment criteria, participating in self-, peer-assessments, reflecting on their own learning, monitoring their performance, and utilising feedback to adapt their knowledge, skills, and behaviour. Formative assessment is heading more and more towards learner-centred assessment.

Boyle and Hutchinson (2009) suggest that, "e-assessment will become an important and widely-used feature of education systems in the near future. Further, the types of questions and tasks used in near-future e-assessment may well be quite different from questions and tasks used in on-paper assessment, and in early implementations of computerized assessment." Chudowsky and Pellegrino (2003) emphasised that by using multimedia, interactivity and more control over the stimulus, it will allow us to assess other constructs which couldn't be assessed before.

Therefore, Ras et al. (2015) claim that technology can play a double role in the development of formative assessment approaches: "Technology can be an enabler to gather and deliver data as a basis to facilitate self-, peer- or teacher-driven assessment and feedback" or "technology can lead to completely new assessment practices which allow for example to assess a much wider array of competences".

This special issue focuses on formative assessment as a support for learning in today's innovative technology-enhanced learning (TEL) environments and shows different examples of technology-based formative assessment scenarios in various educational settings.

The issue brings together contributions in TEL that deal with approaches and innovative assessment technologies that support the transition from current assessment scenarios towards the development of novel forms of e-assessment through which different types of knowledge and skills are evaluated, continuous feedback is provided, and students are more engaged in the learning process. Nevertheless, this issue reflects on the outcomes of the TEFA 2013 workshop (Technology-Enhanced Formative Assessment[1]). The goal of TEFA 2013 was to develop the notion of technology-enhanced formative assessment further combining expertise from pedagogy, educational measurement,

cognitive science, and information technology. The fruitful discussions over TEFA topics between the organisers, contributors, and the audience have led to the following suggestion of future R&D in TEFA:

- Move from knowledge-based to competence-based assessment with appropriate formats.

- Support learners in self-monitoring and self-assessment (including teaching them to do it).

- Involve learners in the design of assessment and feedback.

- Training on assessment for tutors essential for uptake of TEFA in TEL.

- Balance R&D with regard to the different core competences (currently unequal).

- Develop ICT environment and tools allowing teachers to quickly, easily and flexibly create customised electronic learning and assessment environments.

- Realise authentic real-world assessment scenarios.

- Develop guidelines, specification and standards for formative assessment (e.g. peer- and self-assessment).

The issue contributions

In the first paper "LMS assessment: using IRT analysis to detect defective multiple-choice test items" Fotaris and Mastoras introduce a methodological framework that embeds an Item Response Theory (IRT) analysis tool in a Learning Management System (LMS) in order to extend its functionalities with assessment optimisation support. Through this approach, assessment refinement is achieved by applying a set of validity rules to the statistical indices produced by the IRT analysis so that flawed items are detected and incrementally eliminated in the enhanced LMS.

Belcadhi and Garlatti suggest a heavyweight ontology-based approach to deliver formative peer assessment activities in inquiry-based learning scenarios. A semantic web framework is proposed to integrate the semantic models, specified to enable the delivery of peer assessment activities as part of the learning process, by means of the SMOOPLE framework based on a set of social media tools, ontologies and linked data.

In the third paper titled 'Peer assessment of language learning resources in virtual learning environments with e-rubrics', Martín-Monje, Vázquez-Cano and Fernández analyse the usefulness of electronic rubrics in the peer assessment of resources and materials for foreign language teaching, as well as for the assessment of language skills. The results of a twofold action-research methodological approach based on a SFFI-ER questionnaire (Scale of Factors that Foster Innovation with E-Rubrics) and on a social network analysis perspective of the students' interactions indicate that the use of e-rubrics optimises the adequacy of self-assessment criteria for digital learning materials, and help develop students self-regulated learning as well as linguistic and interpersonal competences.

Bjørkli presents a study where a mobile-enhanced learning tool called Peer Learning Assessment System (PeLe) is used for combining formative and summative assessment in an introductory mathematics course for engineering students. By adopting a mixed method approach including one online survey and two focus-group interviews, the

quantitative impact on learning outcomes was augmented by a qualitative study of the students' attitudes towards the combination of formative and summative assessment. The findings show that the mobile-enhanced combined approach improved learning outcomes in the test group with 'medium' effect sizes of around 0.5 for the final exam.

Finally, the contribution 'Supporting formative assessment in content and language integrated learning: the MWS-Web platform', by Taibi, Kantz and Fulantelli, presents preliminary results of a pilot experimentation carried out using the *MWS-Web* platform specifically designed to support both learners' activities and their assessment in a CLIL learning scenario. The application of a backwards stepwise regression model provided significant clues that led to consider the students' interactions on the *MWS-Web Storyboard* as an important factor to support formative assessment practices.

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References

Al-Smadi, M., Wesiak, G. and Guetl, C. (2012) 'Assessment in serious games: an enhanced approach for integrated assessment forms and feedback to support guided learning', *15th International Conference on Interactive Collaborative Learning (ICL 2012)*, 26–28 September, Villach, Austria, pp.1–6.

Boyle, A. and Hutchison, D. (2009) 'Sophisticated tasks in e-assessment: What are they and what are their benefits?' *Assessment & Evaluation in Higher Education*, Vol. 34, No. 3, pp.305–319.

Chudowsky, N. and Pellegrino, J.W. (2003) 'Large-scale assessments that support learning: What will it take?' *Theory into Practice*, Vol. 42, No. 1, pp.75–83.

Ras, E., Whitelock, D. and Kalz, M. (2015) 'The promise and potential of e-assessment for learning', in Reimann, P., Bull, S., Kickmeier-Rust, M., Vatrapu, R. and Wasson, B. (Eds): *Measuring and Visualizing Learning in the Information-Rich Classroom*, Routledge, London.

Segers, M., Dochy, F. and Cascallar, E. (2003) 'The era of assessment engineering: changing perspectives on teaching and learning and the role of new modes of assessment', in Segers, M., Dochy, F. and Cascallar, E. (Eds): *Optimising New Modes of Assessment: In Search of Qualities and Standards*, Kluwer Academic Publishers, The Netherlands, pp.1–12.

Note

1   http://ceur-ws.org/Vol-1147/