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Guest Editorial: Technology Supported Assessment in Formal and Informal Learning

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Assessment can be considered as a systematic process of making judgments, and consequently reporting results, either about the effectiveness (with respect to achievement of intended learning outcomes) of learning and educational processes (ranging from formally established educational programs to informal learning experiences), or about individual students' progress toward attainment of established educational objectives. Technology holds the potential to facilitate assessment implementation and maximize the benefits for all involved stakeholders. Cases of technology-enabled assessment are traced back to the use of the abacus and writing techniques for evaluating knowledge acquisition more than 2000 years ago. However, the use of technology alone, without being followed by the necessary paradigm shifts, cannot result to a significant effect in learning and teaching. The sometimes divergent evidence reported indicate the need for re-conceptualizing the ways in which technology should support both learning and assessment. Today, typically, learners and teachers use technology for accessing learning resources or submitting assigned homework, whereas technology has the potential to facilitate engagement in meaningful and authentic learning experiences and methods of keeping track of their levels of achievement. Technology is a vehicle that has the potential to help toward effectively meeting learning and assessment needs. However, this potential cannot be realized without taking account of the fact that learning and consequently assessment takes place within the context (both social and technological) in which the learner acts. Appropriately designed methods and tools may facilitate monitoring of learning processes and, with the necessary technology-led and/or instructor-led feedback and scaffolds, learners are able to reflect and adjust their actions towards optimizing the outcomes of their efforts by performing even beyond their Zone of Proximal Development.

A widely adopted field of application of technology for assessment purposes is that of computer-based testing, with appropriately designed software tools being used for generating and administrating tests, as well as reporting results. Ease of test items development, reduced costs of administration to large numbers of examinees, increased levels of tests validity and reliability, and the capacity to communicate results in a variety of formats to a range of stakeholders constitute a number of reported advantages. Based on Item Response Theory, there is potential to generate tests of different difficulty levels, as well as adapt the difficulty level of assigned test items at the run time level depending on performance. Technology allows flexibility in time scheduling with learners being able to take tests anywhere and in any time. Thus, the act of assessment may not be constrained either by the physical boundaries of the traditional classroom or by the stiff school/university timetable. Additionally, there is potential for accommodating people with physical disabilities by providing appropriate input and output means.

However, testing constitutes only one of the available category of assessment methods, and its use for grading and learners' ranking only one of the many purposes of assessment. Despite the bespoken advantages of computer-based testing, technology can reveal its real potential when used for the execution of assessment activities that are seamlessly interwoven in either formal or informal learning processes; that is, when used for formative assessment rather than summative assessment purposes. By this way both learners and instructors may have access to performance data in-context that will help eliciting decisions about future learning directions. Simulations, digital games, virtual worlds, virtual labs, as well as the use of e-portfolios, constitute characteristic examples of technological facilitators of formative, in-situ, assessment. From this perspective, current trends in computer-based testing, technology-supported assessment in MOOCs, competence-based assessment methods and tools, and innovative approaches regarding generation and administration of new types of test items and constructs, as well as validation processes, need to be considered within the context of technology-supported assessment (Ifenthaler, 2014; Fisteus, Pardo, & García, 2013; Miller, Baker & Rossi, 2014; Webb, Gibson & Forkosh-Baruch 2013).

To this end, this special issue targets at efforts that offer insights into current and future trends and research directions in technology-based assessment and testing. It attracted 32 submissions which where double blindly

reviews by 42 international experts. Finally, 8 papers have been selected for publication covering a wide range of topics in this filed.

Gabrielle A. Cayton-Hodges, Gary Feng and Xingyu Pan, in their contribution entitled "Tablet-based Math Assessment: What Can We Learn From Math Apps?" present a survey of mathematics education apps in the Apple App Store, conducted as part of a research project to develop a tablet-based assessment prototype for elementary mathematics.

Youngsoon So, Diego Zapata-Rivera, Yeonsuk Cho, Christine Luce and Laura Battistini, in their contribution entitled "Using Trialogues to Measure English Language Skills" explore the use of technology-assisted, trialogue-based tasks to measure the English language proficiency of students learning English as a second or foreign language.

Patricia Santos, John Cook and Davinia Hernández-Leo, in their contribution entitled "m-AssIST: Interaction and Scaffolding matters in authentic assessment" presents the m-AssIST model which captures the essential emerging properties to design and analyse m-assessment activities. Their model is used to analyse the benefits and limitations of existing m-test based systems, and the authors discuss the importance of meaningful interactions, and the provision of scaffolding mechanisms to support formative and authentic assessment supported by mobile technologies.

Walid Ibrahim, Yacine Atif, Khaled Shuaib and Demetrios Sampson, in their contribution entitled "A Web-Based Course Assessment Tool with Direct Mapping to Student Outcomes" a novel course assessment process supported by a Web based interface that articulates and streamlines the assessment data collection, performance evaluation and tracking of remedial recommendations in the context of higher education.

Jun-Ming Su and Huan-Yu Lin, in their contribution entitled "A Reconfigurable Simulation-Based Test System for Automatically Assessing Software Operating Skills" present a reconfigurable simulation-based test system designed on a Software Operation-Finite State Machine targeting to reduce cost and time effort through sharing and reusing the designed simulation-based tests items.

Jin-Young Kim, in his contribution entitled "A Study of Perceptional Typologies on Computer Based Assessment (CBA): Instructor and Student Perspectives" reports on different viewpoints on Computer Based Assessment (CBA) by using Q methodology to identify perspectives of students and instructors and classify these into perceptional typologies.

Antonio Robles-Gómez, Salvador Ros, Roberto Hernández, Llanos Tobarra and Agustín C. Caminero, in their contribution entitled "User Acceptance of a Proposed Self-Evaluation and Continuous Assessment System" present a service-oriented system that follows students' progress and automatically assess their practical abilities, through self-evaluation and continuous assessment.

Wanli Xing, Robert Wadholm, Eva Petakovic and Sean Goggins, in their contribution entitled "Group Learning Assessment: Developing a Theory-Informed Analytics," present a study that explores natural language processing of the chat log data and incorporates it into an activity theory measure construction system and visualizations in order to further inform learning assessment in Computer Supported Collaborative Learning (CSCL).

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