

An Introduction to the October-December issue

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WELCOME to the last issue of 2017, the second extended issue of this year which brings together 12 papers. We start the issue with two survey papers that offer deep analyses of popular research areas.

Robert Bodily and Katrien Verbert present a “Review of Research on Student-Facing Learning Analytics Dashboards and Educational Recommender Systems”. Research into systems that track learning analytics data and report it directly to students is becoming increasingly popular in areas such as learning analytics, intelligent tutoring, and educational recommender systems. The authors examined nearly 1,000 articles on the topic, retrieved from databases and journals, and selected 93 articles to include in the analysis. The analysis reveals subtopics that have not received sufficient attention and offers recommendations for further research.

A survey of Augmented Reality Learning Experiences (ARLEs) is provided by Neven Drljević, Lung Hsiang Wong, and Ivica Botiči in “Where Does My Augmented Reality Learning Experience (ARLE) Belong? A Student and Teacher Perspective to Positioning ARLEs”. The survey adopts the dual criteria of enabling meaningful learning and reducing teaching effort. It finds that some ARLEs support one or more of active, constructive, authentic, intentional, and cooperative learning. But only two papers from the survey describe ARLEs that offer effective support for a teacher to guide the activities.

The next group of papers in this issue focus on problems of student modelling.

The paper “Design and Evaluation of a Case-Based System for Modelling Exploratory Learning Behavior of Math Generalization” by Mihaela Cocea and George D. Magoulas investigate the problems of learner modelling in exploratory learning environments. The authors propose an interesting strategy-focused mechanism that is able to assess a learner’s progress by monitoring learner interaction with the system. The approach was evaluated in a learning environment for mathematical generalization.

“Dynamic Bayesian Networks for Student Modeling” by Tanja Käser, Severin Klingler, Alexander G. Schwing, and Markus Gross attempts to advance the state of the art in probabilistic student modelling. The paper suggests a student modelling approach based on dynamic Bayesian networks, a more powerful technology than Hidden Markov Models used in traditional Bayesian knowledge tracing. To demonstrate the power of this new approach, the paper shows the benefits of new models on five data sets from various learning domains.

In “Predicting Student Actions in a Procedural Training Environment”, Diego Riofrío-Luzcando, Jaime Ramírez, and Marta Berrocal-Lobo suggest an approach to build a collective student model by processing past student logs. This model is then used to predict the actions of new students, to improve tutoring feedback provided by an intelligent tutoring system. The proposed model has been validated using student logs collected in a virtual laboratory for teaching biotechnology.

The remaining part of the issue introduces papers on a broad range of learning technology topics.

The paper “How Learners’ Interactions Sustain Engagement: A MOOC Case Study” by Ayse Saliha Sunar, Su White, Nor Aniza Abdullah, and Hugh C. Davis examines social behavior of learners on FutureLearn MOOC courses. It finds that learners who ‘follow’ other participants are more likely to complete a course. The paper proposes social following alongside posting to forums as predictors of course completion.

The results of trials of software tools to prompt reflection in the workplace are presented in “In-App Reflection Guidance: Lessons Learned Across Four Field Trials at the Workplace” by Angela Fessl, Gudrun Wesiak, Verónica Rivera-Pelayo, Sandra Feyertag, and Viktoria Pammer. The trials showed that the tools to track mood and activity were adopted into the workplace, though the depth of reflection they prompted was generally low.

“Automated Essay Feedback Generation and Its Impact on Revision” by Ming Liu, Yi Li, Weiwei Xu, and Li Liu describes an analysis of teacher comments on student essays that provides data to train a machine learning system for classifying types of response to students. The system generates feedback on weaknesses in the language and organization of essays. A study in two English writing classes shows it can be effective in helping students improve aspects of essay content and structure.

Design of effective educational games is the topic of “Let Them Play: The Impact of Mechanics and Dynamics of a Serious Game on Student Perceptions of Learning Engagement” by Yichuan Wang, Pramod Rajan, Chetan S. Sankar, and P.K. Raju. In an educational game, designed for the research study, clear goals and perceived usefulness were found to be

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Digital Object Identifier no. 10.1109/TLT.2017.2776818

associated with concentration and user enjoyment. Perceived ease of use was positively associated with enjoyment, but negatively associated with concentration. If a game is too easy to use, it may not provoke focused effort.

The paper “Web Environment for Programming and Control of a Mobile Robot in a Remote Laboratory” by Maísa Soares dos Santos Lopes, Iago Pacheco Gomes, Roque M.P. Trindade, Alzira F. da Silva, and Antonio C. de C. Lima describes a system for students to carry out remote experiments with a robot vehicle. The robot can be controlled using C/C++ programs from a web browser.

In “Point Cloud-Based Automatic Assessment of 3D Computer Animation Courseworks”, Gianluca Paravati, Fabrizio Lamberti, Valentina Gatteschi, Claudio Demartini, and Paolo Montuschi expand the borders of automatic assessment to yet another important educational domain. Automatic assessment of student work can considerably decrease both instructors’ load and student experience, yet it is currently available in very few domains. The novel approach suggested in this paper enables automatic assessment of student work and knowledge in a virtual animation course.

Finally, in their short paper “Enhancing e-Learning Content by Using Semantic Web Technologies”, Herminio García-González, José Emilio Labra Gayo, and MPuerto Paule-Ruiz present a prototype system, LODLearning, that was designed to enhance lesson content in a traditional learning management system with relevant information cards recommended through the entity-extraction process. The evaluation of this approach demonstrated that content enhancement can be used to improve didactic effectiveness.

Happy reading, and happy holidays!

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