Guest editorial

Technological mediation in innovative education

The advances in information and communication technology have initiated an evolutionary wave that is changing human interaction in many aspects of society – with education being no exception. Technological advances have mediated innovative practices in learning and teaching and brought a paradigm shift in contemporary education in areas such as pedagogical methods, curriculum development and educational management. Technological mediation addresses how the use of technology influences human behaviour. In the context of education, technology not only transforms the interactions between teachers and learners, as well as learners and learners, but also presents how learners interact with learning materials.

This special issue focuses on the impacts of technological mediation on innovating educational practices. It looks into how the use of technology has created opportunities for education and how educational practices have deployed technology for mediational purposes. This issue includes the extended versions of five of the best papers from the 2019 International Conference on Open and Innovative Education held at the Open University of Hong Kong. The papers contribute to addressing the pressing need for scholars and practitioners in education-related fields to keep abreast of technological advances in various aspects.

The first paper "A Framework of Smart Pedagogy Based on the Facilitating of High Order Thinking Skills" by Meng and Jia proposes a smart pedagogy framework for cultivating high-order thinking skills. Their framework integrates situated learning, mastery learning, adaptive learning, reflective learning and thinking tools. Based on this framework, they illustrate a curriculum design method covering instruction principles such as task centredness, demonstration, application and integration, as well as teaching strategies such as collaborative learning, personal inquiry learning, and blended learning. In a quasi-experiment, the effectiveness of the proposed smart pedagogy framework is verified in terms of students' improved learning outcomes and learning satisfaction after using an intelligent tutoring system design based on their framework. This research demonstrates the construction of a technology-mediated learning environment to implement smart pedagogy.

The paper entitled "Individual Difference on Reading Ability Tested by Eye-Tracking: From Perspective of Gender" by Zhan *et al.* investigates learners' reading ability by using the eye-tracking method. They focus on the differences between male and female learners, as well as learners with good and poor reading ability, and examine the most sensitive eye movement indicators for revealing the differences. Their work also demonstrates the feasibility and advantages of using popular mobile devices (e.g. smartphones with cameras) to identify learners' reading ability through their eye movements, which might be more objective and efficient than conventional reading tests and questionnaires. The findings provide valuable information for personalising the experience of digital reading to cater for learners' differences.

Sembiring and Rahayu's paper "What Makes Quality Satisfied OER? Insights from Universitas Terbuka for Indonesia 4.0" identifies what faculty members see as the key factors for satisfaction with the quality of open educational resources (OER). With a focus on the context of the Universitas Terbuka, they found the factors which contribute most to satisfaction with OER included putting users at the centre of interaction, and well-presented

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and appealing resources. The use of quality-satisfied OER was found to influence the development of hard skills (e.g. practical and technical ability and industrial know-how) and soft skills (e.g. communication, collaboration, adaptability and decision-making). The results highlight the key factors for developing high-quality OER and suggest the implications for the resources for advancing learners' hard and soft skills.

In the paper "Developing a Pedagogical Photoreal Virtual Environment to Teach Civil Engineering", Walker *et al.* illustrate the design of a virtual reality (VR) environment for civil engineering students to conduct virtual field trips in a construction site. Their work solves a conventional problem in civil engineering education – that students cannot see the construction process of a structure after it has been built. This VR environment also incorporates pedagogical features (e.g. active collaborative learning, discovery learning and situated cognition) and addresses a number of human–computer interaction and user experience design issues (e.g. learner autonomy and experience evaluation).

The final paper "Trends of Learning Analytics in STE(A)M Education: A Review of Case Studies" by Li and Wong reviews the use of learning analytics in STE(A)M education which comprises the disciplinary integration of science, technology engineering, arts and mathematics. It addresses the increasing use of learning analytics in STE(A)M education by summarising the case studies in this area, examining the patterns and identifying the trends in terms of the types of STE(A)M learning practices, as well as the purposes, data types, outcomes and limitations of learning analytics practices. The results reveal how learning analytics was implemented in relation to the contexts and needs of STE(A)M education, and suggest future work for further development.

Overall, the papers in this special issue illustrate a broad range of possibilities for the deployment of technologies as a mediation for innovating educational practices. They cover technology-related issues such as smart learning, learning analytics, OER and VR, as well as diverse educational contexts such as STE(A)M education and civil engineering. The findings and ideas will contribute to stimulating new insights and further discussion in the relevant areas.

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