Editorial

Kam Cheong Li*, Billy Tak-Ming Wong, Fu Lee Wang and Reggie Kwan

Hong Kong Metropolitan University,
Homantin, Kowloon, Hong Kong
Email: kcli@hkmu.edu.hk
Email: tamiwong@hkmu.edu.hk
Email: pwang@hkmu.edu.hk
Email: rkwan@hkmu.edu.hk
*Corresponding author

Yeping Li

Texas A&M University,
540 Ross St., Harrington Tower,
College Station, TX 77843, USA
Email: yepingli@tamu.edu

Biographical notes: Kam Cheong Li currently serves as the Dean of the School of Open Learning, Director of Research and Knowledge Transfer, as well as Director of Institute for Research in Open and Innovative Education at Hong Kong Metropolitan University. He has published over 180 refereed journal articles/book chapters/conference papers and eight monographs/textbooks, and co-edited 12 books. Besides serving as an editor for the *Asian Association of Open Universities Journal* and *SN Computing Science*, he is an editorial board member for the academic journal *Interactive Technology and Smart Education*. His research interests lie in open learning and technology in education.

Billy Tak-Ming Wong is a Senior Research Coordinator and Deputy Director of the Institute for Research in Open and Innovative Education at Hong Kong Metropolitan University. He has been involved in various research projects related to technology-enhanced education. His research areas include mobile learning, computer-enhanced learning and academic analytics.

Fu Lee Wang is a Professor and Dean of the School of Science and Technology at Hong Kong Metropolitan University. He was the Vice President at the Caritas Institute of Higher Education and faculty member at City University of Hong Kong. He has over 150 publications in international journals and conferences and led more than 20 competitive grants. He is a Fellow of the BCS, past Chair of ACM Hong Kong Chapter and IEEE Hong Kong Section Computer Society.

Reggie Kwan is a Professor of Computer Science and currently the Provost of Hong Kong Metropolitan University. He served as the Chair of Computer Science at the Montana Technological University, Head of Computing and Mathematics at Open University of Hong Kong, and President of Caritas Institute of Higher Education. Though trained as a Computer Scientist, he has been fascinated by e-learning and open and distance learning.

Yeping Li is a Professor at the Department of Teaching, Learning, and Culture at Texas A&M University, USA. He was also named by the Shanghai Municipal Education Commission as 'Eastern Scholar' Chair Professor at Shanghai Normal University, China. His research interests include STEM education, mathematics education and teacher education. He is the founding Editor-in-Chief of the *International Journal of STEM Education* and *Journal for STEM Education Research*, and is also an editor of monograph series including *Advances in STEM Education*. In addition to publishing over 15 books and special journal issues, he has published more than 100 articles in topic areas that he is interested in.

Latest advances in mobile and ubiquitous technologies have been playing a key role in enhancing flexibility in learning. Learning has become more flexible in terms of time, space, curriculum content, organisation, pedagogical methods, infrastructure and requirements. The widespread adoption of relevant technologies, such as mobile meeting tools, virtual and augmented reality and learning analytics, illustrates the global trend of changing the modes of learning and teaching for greater mobility, ubiquity and flexibility. Such changes have been made in educational delivery at different levels from primary to secondary and tertiary and in various subject disciplines. The influence on educational delivery due to the global pandemic also highlights the pressing need to change the conventional approaches to learning. In this special issue, researchers and educational experts share their ideas, practices and research findings to show how learning could become more flexible with the support of mobile and ubiquitous technologies. The articles cover topics ranging from English language learning to game-based learning, creativity learning, mobile instruction, at-risk student prediction, as well as learner and system readiness for digital learning.

The article by Nitisakunwut and Hwang reports a meta-analysis and systematic review on digital game-based learning for language education and relevant learning outcomes. The review covered a wide variety of digital games such as serious games, board games, argument reality games and music games. The findings show the positive impacts brought about by digital games on language learning through an effective design of game mechanics and combination with language learning theories. This review study reveals the usefulness of mobile game-based learning approaches in providing a meaningful and purposeful communicative virtual environment to motivate students to learn the English language.

In their article, Lui and Ng evaluated the feasibility of predicting students in a Zoom-based course who are at-risk of failing or dropping out the course. The evaluation covered various prediction scenarios, prediction models and machine learning algorithms. Their findings show an acceptable level of prediction accuracy at an early stage of the course, and indicate the effective use of formative and summative assessments for prediction at various stages of the course. These findings illustrate a better implementation of rolling prediction with the use of a logistic regression model at an early stage of the course and a random forest model if summative assessment scores are available.

The article by Jia et al. investigates the effects of integrating mobile devices and an intelligent tutoring system into a university English language course on vocabulary learning. Their study features the limitation of students' access to the drilling content on the tutoring system only during the class time. Given such constraint, the study found the

differences between the treatment and control groups in online learning behaviours, the improvement of vocabulary mastery quality and automaticity of the treatment group learners as well as their performance in vocabulary tests, and the increase of their engagement in learning. The study suggests the effectiveness of long-term integrative usage of mobile devices and a tutoring system into classroom teaching and learning of the English language.

Xiao et al.'s article examines the potential impacts of iPad-assisted instructional approaches in K-12 STEM classrooms in comparison with traditional instructional approaches. Based on a meta-analysis of 17 relevant studies, the authors observed the greater pedagogical impacts of iPad-assisted instruction than that of traditional instruction. They also identified the moderating roles of subjects and assessment tools in the effects of iPad use on students' STEM achievement.

The article by Berhan et al. analyses the readiness of the health system and health workers in Ethiopia for digital learning. The authors observed the preference of health workers for blended learning as the mode of educational delivery. They also found cost-effectiveness of digital learning, frequent access to mobile devices, and government and partners' commitment along with learners' preference as persuasive conditions to implement and transform digital learning for health workers. These findings, as claimed by the authors, serve as a baseline for improving the pre-service health education curricula and the in-service health training manuals and guidelines.

The final article by Yeh and Peng examines the connection between personality traits and self-efficacy of creativity based on a smartphone-based mindfulness intervention. The authors found that a combination of the affordances of smartphones, mindfulness, self-determination, and online knowledge sharing tends to contribute to positive learning outcomes. They also observed that harmonious passion for smartphone use and a growth mindset of creativity have a positive impact on the development of creativity self-efficacy. The findings shed light on how different types of mindsets and passion toward smartphones may influence self-efficacy of creativity.

Overall, these articles reveal the affordances of mobile and ubiquitous technologies in enhancing flexibility in learning. The findings reported in the articles contribute to pedagogical development and policy-making in education and suggest future research directions with respect to mobile and ubiquitous learning. We look forward to more relevant research and practices in this area in the future.