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Editorial: Technology-assisted learning: Honing students' affective outcomes

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Editorial on the Research Topic
Technology-assisted learning: Honing students' affective outcomes

When this Research Topic was first conceived, we were focusing on a couple of cross-institutional projects which had made substantial use of information technology (IT) to facilitate students' learning and achievement of affective outcomes. The projects started well before the world was ravaged by COVID-19, with the activities conducted in the calm of pre-pandemic times. As we progressed to receive submissions, the world was learning to live with COVID-19, catapulting educational institutions at various levels around the globe into the fast-track on eLearning or virtual teaching and learning (VTL) adoption. Interestingly, at this stage of finalizing our Topic, we noted that the lessons learned—before being rushed by the pandemic and pushed to respond to the "new normal"—have remained apt and appropriate in current times. This realization has armed us with confidence to continue to rely on technologies to assist and continue student learning, and to prepare ourselves and our students to be "disruption-ready" in the emerging era.

Another important realization on our Topic is that despite our initial aim to address the gap in the literature concerning the use of IT to help students achieve attitudinal outcomes, the predominant focus has still been on using VTL to enhance students' attainment of knowledge and skills outcomes. Yet again, useful insights have been gained to help advance our VTL deployment for affective outcomes.

From the selection of papers published under our Research Topic, we noted that using IT to exemplify gamification to engage students in active learning has been gaining popularity with both teachers and students. We have had a good number of papers on games, which have been used to supplement classroom teaching, or entice students to learn outside the curriculum, including in relation to the United Nations' Sustainable Development Goals (UNSDGs). Access records kept by Frontiers in Education confirm that readers of our papers are

also keen on topics about IT with games to drive VTL. Of the 10 published papers, eight were from Hong Kong, one from the Philippines, and the other from the USA, covering a good spectrum of using technologies to help students learn/achieve outcomes, for emotional support, and for gauging the reception of proctored online examinations.

Within our Research Topic, Cheung and Ng's paper attracted the largest number of readers as it showed their success in arousing students' intrinsic and extrinsic motivation with a combination of gamification and traditional methods to enhance their subject knowledge learning, in this case, in Physical Education. Lu et al. used gamified augmented reality (AR) to help their students learn Chemistry, a fundamental science subject. Their AR app proved to be useful in terms of enhancing students' awareness, learning, understanding, and engagement in Chemistry. Lam and Tse explored gamification in Hong Kong's primary and secondary classrooms. They confirmed that gamification was already popular at these levels, with teachers believing that "the game is a powerful way to engage students".

In terms of coupling IT and games for attitudinal outcomes, Marcial et al. brought scenarios to life by using AR and mobile devices to create a learning trail on the responsible use of social media at a university in the Philippines. This advanced form of situated learning stimulated students' interest and awareness as the scenarios were relevant and engaging. Lau used a similar technology-assisted learning trail to engage his research students in academic integrity and ethics scenarios. Of the six fundamental values of academic integrity defined by the International Center for Academic Integrity (ICAI), Lau noted that *honesty* and *respect* might be the most familiar values to his students. Interestingly, his study also highlighted his students' emphasis on *empathy* and *mindfulness*, two attributes not defined by ICAI. Both Leung et al. and Lau et al. reported on the same project that used an online competitive game to help students develop cross-cultural skills by working in virtual teams to learn about the UNSDGs. Leung et al. used pre-post questionnaires to gauge whether the online game had helped students develop global perspectives. The findings supported those of prior research on how gamified eLearning platforms could contribute to the development of students' global perspectives. Lau et al. analyzed the chat histories of students from the top-5 and bottom-5 teams of two consecutive eTournaments (online competitions). The results provided evidence that high performing teams took a different gaming approach from the low performing ones in such areas as team building and game strategy deployment. The authors shared valuable insights on building cross-cultural virtual teams, a critical and essential endeavor in our interconnected world today.

The other three papers reviewed IT in education from various perspectives. Chan et al. explored the relationship between performance and enjoyment in game-based learning. With various statistical analyses performed, they aimed to

continue their study to shed light on improvement of intended learning outcomes in the Asian tertiary education context. Alessio and Messinger studied faculty members and students' perceptions of academic integrity with technology-assisted proctoring in online testing in a US university. They found that both groups had similar perceptions of the importance of academic integrity and ease of cheating in online tests, but differed regarding proctoring software's effectiveness in deterring cheating, and concerns about privacy, anxiety, stress and how to uphold academic integrity. Lee deployed eLearning to provide emotional support for her students in difficult times, and shared some useful practices to facilitate the teaching of healthy lifestyles to students.

As stated at the beginning, the studies and research selected for our Research Topic were not targeted at coping with the urgent and poignant challenges posed to education due to COVID-19. Yet from the outcomes achieved by the students involved and the conclusions drawn by the various authors, we are encouraged to seek further ways to employ VTL to effect better learning experiences for our students during both regular and more challenging times.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

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