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Editorial: A paradigm shift in designing education technology for online learning: opportunities and challenges

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Editorial on the Research Topic

A paradigm shift in designing education technology for online learning: opportunities and challenges

The next-generation learners can be identified as those who do not just follow a typical linear learning path, but those who follow a lattice path, driven by desire and ambitions to develop their skills and knowledge. These are often adult learners who are playing multiple roles in their daily encounters while aiming to advance in their careers or expand their expertise pleasure. Unlike physical learning environments which provide essential personal attention, and opportunities to socialize and build social capital, these learners rely on education technologies that support their learning needs in the online context (Fernández-Batanero et al., 2022). The education technologies catering to these communities need to think of their efficacy in providing educational content, pedagogy, interactions, and assessments to enhance the learners' expectations. Especially, the technologies must enable or re-design human-centered design approaches (Adel, 2022).

However, such enhancements to education technologies need a multidisciplinary viewpoint backed by empirical evidence. In this editorial collection, we present solicited articles that address the challenges faced by existing educational technologies and present evidence-based solutions that can improve the effectiveness of educational technologies in the online learning context.

We begin by examining the challenges faced in traditional pedagogical approaches, where teachers provide lectures and subsequently provide a learning task in order to practice their learning. This context is challenged in the work presented by Alghazo et al. in their research titled "Back to basics: a role of reading, writing, and arithmetic teaching." Their research illustrated an effective strategy for teaching arithmetic by incorporating ICT and a specific "Write to Learn" approach, which articulates how teachers can instruct students on reading and writing (WTL) and encourage the use of online websites while providing formative feedback. It also provides opportunities for writing collaboratively, feedback, formative assessment, as well as publishing. In their experimental study, this method has outperformed the traditional way of teaching difficult subjects such as arithmetic, especially to adult learners. Importantly, the implications of this strategy contextualize the environment where the participants were adult learners from Saudi Arabia; thus it provides glims of how this could be implemented in the global context. Complementing the importance of the contextualization aspect, specifically in a large-scale open learning context as MOOCs, Joshua Littenberg-Tobias and Slama's work describe in

“Large-scale learning for local change: the challenge of massive open online courses as educator professional learning” provides empirical evidence of integrating a “Content-Collaboration-Context” (“C-C-C”) Model to MOOC design, which examines participants’ outcomes in global learning for local change. Their model specifically examined content, which captures the interaction between learners and the online content, collaboration, by examining the interactions that participants have with others around the content (either in-person or online), and context, which oversees the workplace setting where participants apply their learning with its specific culture around teaching and learning. This research provides design-based evidence where educators could integrate their learning from online courses across a variety of educational settings. The researchers specifically highlight the need for the design of online courses to be mindful of the various levels in which participants processed and applied their learning.

As we describe the pedagogical designs for online learning, the empirical evidence suggests the importance of interactions in content, collaborative opportunities, and formative feedback while continuing local detailed design for students. However, adult learners in multiple working environments have been facing changes in continuing and completing online courses with their full attention. Combating this challenge, our collection includes empirical evidence of the effectiveness of a modularized course design introduced by Serth et al. Their work presents a modularizing strategy explaining how a 6-week course can be modularized into three 2-week modules followed by a separate exam. The research provides not only optimal success factors of modularizing MOOCs but also provides empirical evidence of improved interactions and learning behaviors with a potential to lower dropout rates. However, future research is encouraged to tackle the lower engagements and to improve course completion rates. In the similar vein Hagedorn et al. also addressed the challenges of designing online courses where it is imperative to keep learners motivated during their course in order to continue course participation and completion with enhanced course satisfaction. The authors introduced a very interesting and curiosity-driven gamified MOOC design “*The mysterious adventures of Detective Duke: how storified programming MOOCs support learners in achieving their learning goals*” in order to address learner motivation and satisfaction in online courses. The research explains the practical implications of designing such MOOCs in few iterations and their research contribution provides advanced gameful learning designs that foster learner engagement and satisfaction in MOOCs.

Finally, we reinforce the idea that even though there are effective course design interventions, strategies or gamification elements, it is challenging to carry this out without the necessary stakeholder support. In the paper “*Changes in online course designs: before, during, and after the pandemic*,” Misiejuk et al. provide detailed data-driven insights which explain key challenges in

transforming onsite courses to online. Their research highlights the importance of the university leadership in supporting digital transformation which could resonate the effective learner engagement in education technology such as in a LMS.

This collection provides ample evidence and insights on improving learner engagement, course satisfaction, course completion, and effective online teaching strategies, which can be incorporated to design online courses to cater to the next generation learners. However, it also brought to our attention that effective strategies for building social capital within courses or the aspects of informal learning emerging across open online web environments such as StackOverflow, GitHub, Kaggle, or social networks have not been given enough attention in this collection. Moreover, new emerging technologies like geolocation, VR/AR, 5G, IoT, or AI in the new generation of online learning environments and courses have not been represented in this collection, thus, in the future, we expect researchers to make their efforts in addressing these aspects to build the next generation of educational technologies.

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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