

Emerging technologies for diverse and inclusive education from a sociocultural perspective

In recent decades, emerging technologies have affected various fields, bringing opportunities and the need for increasing integration of new technologies and modalities in our society. In education, emerging technologies have also been used to transform teaching and learning. The implementation of emerging technologies in the education sector is now providing innovative alternatives to improve students' learning processes and teachers' practices (Oliveira et al., 2019). Emerging technologies offer unprecedented opportunities, benefits and challenges. In particular, educational opportunities are foundational to building strong societies; however, access to learning opportunities remains unequally distributed. Therefore, the aim of this special section of *British Journal of Educational Technology* is to provide insights on how emerging technologies can be used to support diverse and inclusive education and address learners' unique needs. This is especially true for students belonging to groups that are excluded and marginalized due to their sociocultural background (Hamburg & Bucksch, 2017; Salas-Pilco, 2020).

This special section brings important contributions to the existing body of educational technology research from the perspective of emerging technology applications. The empirical and theoretical studies included in this special section critically examine and reflect on the role of emerging technologies in transforming learning experiences, teaching practices and the education system. The selected studies draw on diverse methodological approaches, datasets and theoretical frameworks, providing an understanding of how the new technologies blend into educational practices across all levels. Moreover, these studies provide practical solutions for learners, educators, administrators and researchers.

PAPERS IN THIS SPECIAL SECTION

The six selected studies (five empirical studies and one theoretical study) are focused on diversity and inclusiveness in education research. They use emerging technologies and identify positive, meaningful and implementable educational models to support under-represented groups with diverse sociocultural backgrounds.

The first paper by Yang et al. (2022a) critically presents a case for using programmable robots to empower children in an under-resourced early childhood education centre in Hong Kong. The authors analyse the affordances and challenges of these emerging technologies in early childhood education. Although robot programming is often found to promote young children's computational thinking, the unsatisfactory engagement of children in these activities reflects a lack of child-directed self-regulated learning opportunities in this under-resourced early childhood education setting. The study, therefore, uncovers the ecological difficulties of

integrating emerging technologies to promote inclusiveness, equity and sustainable development in early childhood education.

The second paper by Yang et al. (2022b) introduces a reflective assessment-augmented knowledge building inquiry to support low-achieving students' productive disciplinary engagement, including cognitive, emotional, and epistemic aspects. The study reveals the effectiveness of portfolio-supported reflective assessment in Knowledge Forum in knowledge building inquiry in supporting low-achieving students' productive disciplinary engagement. Reflective assessment was shown to facilitate low-achieving students' enactment of collective reflection, monitoring, and regulation, and these metacognitive processes further helped them to achieve higher levels of productive disciplinary engagement. The study addresses an important problem of providing equity and access to help low-achieving students develop higher-order skills and engagement, and it has implications for scaffolding the engagement, agency, and learning of learners from diverse backgrounds in inquiry-based learning.

The third paper by Zhu et al. (2022) attempts to expand the scope of inclusive education by introducing physical learning environments that encourage students to express their identities by sharing online posts using mobile social networks in an environmental psychology course. The study supports students to share, discuss, and build knowledge from different perspectives and diverse contexts, and to build their sense of belonging. The study explores the inclusiveness of an Instagram-based learning community using network analysis and shows the formation of a sense of belonging to an inclusive and active community through social media.

The fourth paper by Kumar and Tissenbaum (2022) presents a designed interface named Connected Spaces that fosters inter-student collaboration in the form of cross-groups that provide help in computing education. The technology bridges agentic gaps and provides new agencies regarding help-seeking actions. It employs a design-based research methodology based on actor network theory. The study highlights the designs that respond to learners' sociocultural background and enables them to act in new ways and become new actors.

The fifth paper by Itenge et al. (2022) introduces a digital multiplayer reading-action game developed to explore how a social group game may increase children's engagement in reading. The approach of collective reading games involves providing peer support to those students who are weak readers. It offers dialogic reading experiences and provides embodied actions that contribute to the involvement of indigenous children, empowering them through a "fairness-by-design" approach.

The theoretical study by Savelyeva and Park (2022) discusses the applications of blockchain in education regarding sustainability. They conceptualize a "sustainable education blockchain" for knowledge transformation in marginalized communities. Their framework helps to build educational commons through network cooperation, diverse interactive agents, shared resources, and educational logistics. They highlight that an emerging technology, such as blockchain, may be pivotal for communication and sharing, thereby enhancing the learning of students with diverse backgrounds and helping to provide inclusive education.

CONCLUDING REMARKS

The effect of emerging technologies in teaching and learning processes necessitates continuous research, as the field of education has recently been affected by abrupt changes that have required incorporating technologies into the classroom. Emerging technologies offer opportunities to employ technological advances and implement new approaches to enhance learning. In this special section, a number of studies are presented that focus on diverse and inclusive education and employ different methodologies that are suitable from a sociocultural perspective. Emerging technologies, such as artificial intelligence, augmented reality and blockchain, are revolutionizing many sectors, and the field of education is no exception (Sousa

et al. 2022). Therefore, the integration of emerging technologies in education may offer alternative approaches to support diverse and inclusive education in an increasingly digital world.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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REFERENCES

- Hamburg, I., & Bucksch, S. (2017). Inclusive education and digital social innovation. *Advances in Social Sciences Research Journal*, 4(5), 162–169.
- Itenge, H., Muashekele, C., Chamunorwa, M. B., Winschiers-Theophilus, H., Brereton, M., & Soro, A. (2022). Design and evaluation of a social and embodied multiplayer reading game to engage primary school learners in Namibia. *British Journal of Educational Technology*, 53(6), 1571–1590.
- Kumar, V., & Tissenbaum, M. (2022). Supporting collaborative classroom networks through technology: An actor network theory approach to understanding social behaviors and design. *British Journal of Educational Technology*, 53(6), 1549–1570.
- Oliveira, A., Feyzi Behnagh, R., Ni, L., Mohsinah, A. A., Burgess, K. J., & Guo, L. (2019). Emerging technologies as pedagogical tools for teaching and learning science: A literature review. *Human Behavior and Emerging Technologies*, 1(2), 149–160.
- Salas-Pilco, S. Z. (2020). The impact of AI and robotics on physical, social-emotional and intellectual learning outcomes: An integrated analytical framework. *British Journal of Educational Technology*, 51(5), 1808–1825. <https://doi.org/10.1111/bjet.12984>
- Savelyeva, T., & Park, J. (2022). Blockchain technology for sustainable education. *British Journal of Educational Technology*, 53(6), 1591–1604.
- Sousa, M. J., Dal Mas, F., Gonçalves, S. P., & Calandra, D. (2022). AI and blockchain as new triggers in the education arena. *European Journal of Investigation in Health, Psychology and Education*, 12(4), 445–447.
- Yang, Y., Yuan, K., Feng, X., Li, X., & van Aalst, J. (2022b). Fostering low-achieving students' productive disciplinary engagement through knowledge-building inquiry and reflective assessment. *British Journal of Educational Technology*, 53(6), 1511–1529.
- Yang, W., Luo, H., & Su, J. (2022a). Towards inclusiveness and sustainability of robot programming in early childhood: Child engagement, learning outcomes and teacher perception. *British Journal of Educational Technology*, 53(6), 1486–1510.
- Zhu, W., Hua, Y., Zhu, G., & Wang, L. (2022). Share and embrace demographic and location diversity: Creating an Instagram-based inclusive online learning community. *British Journal of Educational Technology*, 53(6), 1530–1548.