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A New Era in EdTech: Emerging Challenges and Opportunities

Deoksoon Kim (김덕순)
Boston College

Katrina Borowiec
Boston College

Stanton Wortham
Boston College

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The COVID-19 pandemic dramatically expanded the increasingly important role of educational technology ("EdTech") in K–16 education. EdTech is "the introduction of information and technology tools in teaching and learning" (Ganimian et al., 2020, p. 5). Examples of EdTech include audio-visual aids, computer-assisted learning, mobile devices, smart technologies, and virtual reality (Huang et al., 2019). One sign of the growing importance of technology in schools is the rapid increase in EdTech investments, which tripled between 2019 (pre-COVID) and 2021 (during COVID; HolonIQ, 2022). Nonetheless, inequality in access to technology remains a barrier for students in underserved schools (Chapman et al., 2010; Dorn et al., 2020).

Educators swiftly incorporated new technologies and identified innovative strategies to continue delivering instruction during the early stages of the COVID-19 pandemic, when most schools had stopped providing in-person instruction (e.g., Kim et al., 2021). While schools have moved most instruction back to in-person, it is clear that existing and new technologies will continue to be

Corresponding author:
Katrina Borowiec, Lynch School of Education and Human Development, Chestnut Hill, Massachusetts 02467-3800, USA.
Email: Katrina.borowiec@bc.edu

central to online, hybrid, blended, and face-to-face learning environments. While the "emergency remote teaching" phase of the pandemic has passed, its lessons are here to stay (Hodges et al., 2020).

In this special issue, "A New Era for Educational Technology: Opportunities and Conversations," we invited eight teams to share insights from their research on innovative uses of educational technologies. As we hope you will see throughout this issue, these papers address crucial and interconnected issues and develop shared insight into EdTech.

In the first paper, "Technology Assisted Reading Instruction for English Learners: A Methodological Review," Zuo and Ives (2023) share a review of 32 peer-reviewed articles published over the past two decades on technology-assisted reading instruction (TARI) for English language learners (ELLs). Their review demonstrates the benefits of TARI for ELL students, as this approach provides scaffolding for students' reading performance, increases their reading motivation, and offers opportunities for collaborative learning. While Zuo and Ives's review considers studies that use the field's diverse methodologies, they note that most research in this area uses standardized reading tests. They recommend that future research also use other evaluative tools such as portfolios. Zuo and Ives also note that more professional development is needed to "[leverage] the enormous potential of TARI" (2023, p. 19). Teachers can be trained to "equip students with the skills necessary to make technology a facilitator of their literacy development" (Zuo & Ives, 2023, p. 19).

Zeng and Fisher (2023) examine one specific educational platform, Duolingo, in their paper, "Opening the Black Box: How Out-of-Class Use of Duolingo Impacts Chinese Junior High School Students' Intrinsic Motivation for English." The authors use self-determination theory to explore mechanisms that may explain how mobile-assisted language learning apps such as Duolingo contribute to Year-8 Chinese junior school students' language learning motivation. Based on their findings, the authors suggest that Duolingo provides students with opportunities to meet their psychological needs for autonomy and competence as conceptualized by self-determination theory, allowing them to choose when and how they learn. The authors suggest that "motivation transfer" explains how intrinsic motivation facilitated by Duolingo can transfer to English language learning in general. The authors conclude that technology can increase learner motivation.

In their paper, "U.S. Preservice Teachers Learning with Multilingual Learners in South Korea through Educational Technology: Bringing Heteroglossic Approaches to TESOL Teacher Education," Shin et al. (2023) use qualitative case study methods to examine how educational technology influenced whether U.S.-based preservice teachers incorporated heteroglossic approaches (e.g., translanguaging) into their linguistic pedagogy when working with elementary school-aged multilingual learners in South Korea. Focusing on a digital storytelling project,

Shin et al. conclude that the influence of educational technology was mixed. On the one hand, the apps sparked engagement in both English and Korean because they were built using multilingual components. However, technical challenges also made the collaboration between teachers and students challenging in some cases, negatively influencing students' reactions to the digital storytelling project. Despite the affordances of technology, Shin et al. found that English was still privileged within the classroom. This illustrates that educational technology is not a panacea for all of the challenges faced in schools. Rather, Shin and colleagues argue that considerable groundwork must be laid for the technology's potential to be realized: "Merely connecting the two cultural agents vis-à-vis the technological tools did not result in critical outcomes. The larger lesson is that educational technology is only a medium and platform in service to the project design" (Shin et al., 2023, p. 21). In other words, technology is only successful when educators provide an appropriate pedagogical foundation.

Wang's (2023) multiple case study of postsecondary English teachers, "Exploring In-Service Teachers' Perceptions of Technology Integration in the EFL Classroom in China: A Multiple-Case Study," applies Teo's (2010) Technology Acceptance Model and teacher value beliefs theory in the context of Chinese higher education. Wang found that technology integration was influenced by whether teachers perceived technology as tailored to their needs (e.g., preparing course materials) and their students' needs (e.g., instant feedback on quizzes). Although prior research on pre-service teachers has shown different results, in this study, ease of use was not a driving factor for technology integration among in-service teachers. Challenges with technology integration arose from financial constraints, the need for training opportunities focused specifically on technology integration in English-as-a-foreign-language classrooms, and the need for more support from university administration.

In their study, "Enriching Middle School Students' Learning Through Digital Storytelling: A New Analytical Framework," Kim, Park, et al. (2023) use a new multimodal analytical framework to explore the digital storytelling experiences of middle school students. The middle school students they studied built dynamic identities as both learners and teachers through a digital storytelling project. One of the goals of the project was to provide an avenue for students to reflect on their teaching experiences. Teaching elementary school students allowed middle school participants to learn about effective course design while developing responsibility, professionalism, and technical proficiency.

In his paper, "Comparing Point of View in Animations of Children's and Adult Literature: Multimodal Literacy in a New Era of Educational Technology," Unsworth (2023) critically analyzes how book and animated movie versions of the same story can have different interpretive effects on readers or viewers. Unsworth argues that it is important to incorporate digital multimodal narrative art into literacy education and provide students with tools to analyze such texts. Simply growing up in a multimedia world does not automatically provide young people with the analytical tools that

can be employed to make sense of these media. Unsworth notes, "This is indicative of a new era for the recognition of educational technology as creating distinctive and innovative literature rather than simply existing as an alternative channel for the dissemination of established literature" (2023, p. 20).

In "On the Trail of Self-Directed Learners," Bonk and Zhu (2023) synthesize over a dozen research studies on self-directed online learning (SDOL). SDOL appeals to learners who seek a sense of autonomy in their learning. The authors note that most research in this area has been conducted on massive open online courses (MOOCs), which have gained popularity through entities such as Coursera and edX. The authors describe MOOCs as "truly a global phenomenon with the potential to help upskill and reskill the disenfranchised, the distraught, the recently unemployed, and those seeking new directions or career changes" (Bonk & Zhu, 2023, p. 6). Citing research by Venkataraman and colleagues (Venkataraman & Kanwar, 2015; Venkataraman & Prabhaker, 2020), Bonk and Zhu illustrate how farmers in India and Africa have used mobile devices and low-bandwidth toolkits to access MOOCs on agriculture-related topics. Another of Bonk and Zhu's salient findings is that intrinsic motivation is a key driver of participation in MOOCs for both students and instructors.

In the issue's final paper, "Voices From the Industry: How EdTech Leaders Responded to the COVID-19 Pandemic," Kim, Borowiec, et al. (2023) note that EdTech industry leaders' voices are often absent from conversations about technology in schools, despite that their work intersects with many aspects of education. Kim et al. addressed this gap by interviewing 11 EdTech leaders from a diverse range of organizations to better understand their perspectives and backgrounds as well as to gain their insights regarding their role in shaping both the response to the COVID-19 pandemic and the future of EdTech. Many EdTech leaders have responded to the pandemic by focusing on equity in access to EdTech, making their tools available for free or at a reduced cost, and collaborating in an empathic manner with educators. These leaders demonstrate that potential EdTech must empower teachers, increase technology access by centering equity, support online community development, and make learning more engaging.

Several overarching themes have recurred in these studies. First, several authors claim that EdTech's ability to change education depends on its users. For example, several studies have described the importance of providing teachers with adequate professional development to leverage EdTech tools (Bonk & Zhu, 2023; Shin et al., 2023; Wang, 2023; Zuo & Ives, 2023). Students must also engage in new multimodal literacies (Kim, Park, et al., 2023; Unsworth, 2023). EdTech leaders who focus on equity and compassion can collaborate with educators to maximize EdTech's potential (Kim, Borowiec, et al., 2023).

Second, additional EdTech-related research across diverse populations and contexts is needed. For example, Kim, Borowiec, et al.'s (2023) study on EdTech leaders addresses the gap in research on industry partners, but more work is needed. Zuo and Ives (2023) found that most research on TARIs has been conducted on elementary school students, whereas limited research has been

conducted on kindergarten, middle, and high school students. In Wang's (2023) study, ease of use was not a factor in technology integration among in-service English teachers, which contrasts with prior research on pre-service teachers. Wang's findings underscore the importance of recognizing the diversity of teachers' experiences in our research on technology integration. Researchers must engage with diverse voices to understand the EdTech landscape.

Third, EdTech affords learners considerable opportunities for autonomy. For example, MOOCs (Bonk & Zhu, 2023) and self-directed language learning tools such as Duolingo (Zeng & Fisher, 2023) provide avenues for self-directed learning. These tools also enhance learning opportunities outside traditional classroom environments.

We hope that this special issue sparks further conversation among researchers, educators, policymakers, and EdTech developers regarding the growing and diversifying roles of educational technology at all levels.

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ORCID iDs

Katrina Borowiec https://orcid.org/0000-0002-7460-2480
Stanton Wortham https://orcid.org/0000-0003-0482-1191

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