Editorial: Beyond Standalone Educational Technology Coursework: K-16 Teacher Preparation Strategies

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In a recent interview, former director of the U.S. Office of Educational Technology Joseph South, noted that "Schools of Education must bring technology meaningfully into the practice of preparing teachers to become full-time educators" by providing "exemplars of best practice that are not limited to a three-credit technology course" (Bull, Spector, Persichitte, & Meiers, 2017). The set of papers in this issue of CITE is directly responding to this call by providing new approaches to integrating technology in teacher education that move beyond standalone courses to explicitly address content and pedagogy in methods courses and field experiences. These papers address teacher education and professional development practices that not only familiarize teachers with new technologies but help them acquire firsthand experiences of what it means to learn with technology.

Collectively, these papers touch upon different classes of emerging technologies, including technologies that support understanding, collaboration, and anytime, anyplace learning (Mouza & Lavigne, 2012). They also present evidence and analyses highlighting successes and shortcomings using rigorous research methodologies, including design-based, qualitative, and quantitative methods. Finally, they focus on participants across the continuum, including preservice and in-service teachers as well as teacher educators.

The current issue of *CITE Journal* includes four articles, as well as two commentaries in response to "An Interview With Joseph South" published by Bull et al. (2017) submitted by the Teacher Education and Technology and Media Divisions of the Council for Exceptional Children and the University Council for Educational Administration Center for the Advanced Study of Technology Leadership in Education.

The Science Education article, "Examining Preservice Elementary Teachers' Technology Self-Efficacy: Impact of Mobile Technology-Based Physics Curriculum" by Deepika Menon, Meera Chandrasekhar, Dorina Kosztin, and Douglas Steinhoff investigates changes in preservice elementary teachers' technology self-efficacy during their participation in a science content course that utilized a mobile technology-based physics curriculum, Exploring Physics. The objective of the course was to enhance preservice teachers' science content knowledge on physical science topics while simultaneously modeling instructional strategies, including technology use, that teachers are expected to apply in their future classrooms. Using surveys, focus-groups, and individual interviews the authors examined participants' self-efficacy before and after participation in the course and identified factors that supported participants' technology self-efficacy.

The Mathematics Education article, "Flipping Preservice Elementary Teachers' Mathematics Anxieties" by Anthony Dove and Emily Dove, examined how different instructional practices, including in-class lecture, flipped learning with teacher-created videos, and flipped learning with existing online videos, compared in improving students' mathematics anxiety and anxiety about teaching mathematics. Survey and interview data demonstrated that flipped learning with teacher created videos appeared most promising in reducing preservice teachers' anxieties and promoting confidence in mathematics.

The General section article, "A Design-Based Research Approach to Improving Professional Development and Teacher Knowledge: The Case of the Smithsonian Learning Lab" by Doron Zinger, Ashley Naranjo, Isabel Amador, Nicole Gilbertson, and Mark Warschauer, shifts attention from preservice to in-service teachers. In this study, the authors investigated a professional development program designed to prepare a group of middle school social studies teachers to teach with an online resource, the Smithsonian Learning Lab. In their work, the authors utilized an iterative, design-based approach to develop learning opportunities for practicing teachers. Utilizing teacher feedback over the course of four separate workshops, the authors articulate how the design of the professional development series evolved and the associated changes in teacher knowledge of technology, content, and pedagogy.

Finally, the Current Practice article, "Access is Not Enough: A Collaborative Autoethnographic Study of Affordances and Challenges of Teacher Educators' iPad Integration in Elementary Education Methods Courses" by Sheri Vasinda, Di Ann Ryter, Stephanie Hathcock, and Qiuying Want, closes the loop by examining how teacher educators learn and reflect on their own efforts to teach with technology. Specifically, in this work four faculty members representing different content areas documented their own technology integration journey through collaborative autoethnography identifying the affordances and limitations of mobile technology integration in science, social studies, and literacy methods courses. Through authoethnographical writings the authors found that high quality use of mobile technologies required not just access but also time for exploration, experimentation, practice and professional support.

I see two broad themes in this group of papers, which are further highlighted by the two commentaries that round up this issue of *CITE Journal*. First, teacher educators have already begun looking beyond standalone educational technology courses as the primary vehicle to teacher preparation on the use of technology. The articles in this issue address the integration of technology in both content-related courses (e.g., Science Education article) and methods courses (e.g., Current Practice article). They also focus on modeling technology-enhanced practices that current and future teachers are expected to implement in their classrooms (e.g., Mathematics Education article).

As Menon et al. write in the Science Education section, "One unique aspect of the course was integration of iPads in ways for preservice teachers to learn science content, which also provided firsthand experiences in which they witnessed effective models of teaching science using technology." Recently, Mouza and colleagues also noted the important role of integrating technology across teacher education programs, including content, methods courses, and field experience in order for preservice teachers to acquire a deep and sustained understanding of technology use (see Mouza, 2016; Mouza & Karchmer-Klein, 2013; Mouza, Nandakumar, Yilmaz Ozden, & Karchmer-Klein, in press).

Second, all articles are deeply grounded in theoretical frameworks related to effective uses of technology in instruction, including the framework of Technological Pedagogical Content Knowledge (Koehler & Mishra, 2009) and Bandura's (1977) self-efficacy construct. The two commentaries in this issue of CITE also highlight the importance of using theory-driven interventions for teacher education and school leadership as well as broader theoretical frameworks related to Universal Design of Learning and How People Learn (Bransford, Brown, & Cocking, 2000). Further, both commentaries encourage more research and specific guidelines on translating vision into reality for both special education teachers and school leaders. Such research would be essential to helping teachers and administrators "improve their organization and instructional technology-related decision-making" (McLeod & Richardson, this issue).

While this issue of *CITE Journal* makes important contributions to the preparation of teachers on the use of technology as it occurs in university-based education programs, it is important to note that one in five new teachers receives preparation through nontraditional programs (U.S. Department of Education, 2013) and that we know little about the technology preparation provided in those programs. Thus, *CITE Journal* readers are encouraged to continue the discussion on effective strategies for teacher preparation on the use of technology across a variety of settings. This discussion is essential for helping all students thrive in the new digital world.

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