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Commentary: Response of the Association of Science Teacher Educators to "An Interview with Joseph South"

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The Association for Science Teacher Education (ASTE) has a long history dating back to the 1920s of convening meetings of people involved in the education of science teachers. The broad membership of formal and informal science educators, scientists, and policymakers work together to promote leadership and support for professionals involved in the education and development of teachers of science at all levels. ASTE strives to advance practice and policy through scholarship, collaboration, and innovation in science teacher education.

The overarching goal of the *Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas* (National Research Council, 2012, Summary, para. 2) is to "ensure that by the end of 12th grade all students have some appreciation of the beauty and wonder of science; possess sufficient knowledge of science and engineering to engage in public discussions on related issues; are careful consumers of scientific and technological information related to their everyday lives; are able to continue to learn about science outside school; and have the skills to enter careers of their choice, including (but not limited to) careers in science, engineering, and technology (p. 1)."

The achievement of this goal requires that all of our students are served by highly qualified teachers who "have acquired the specialized knowledge of teaching and assessment that enable them to promote science learning (ASTE, n.d., para 2)." In parallel to Joseph South (Bull, Spector, Persichitte, & Meier, 2017), we believe that this specialized knowledge includes explicit attention to both technological pedagogical knowledge and technological content knowledge, and teacher education programs must provide opportunities for candidates to engage in reflective practice related to their technology integration efforts. Attaining this goal will require that science teacher educators develop their own technology competencies and enact those strategies throughout all science teacher preparation courses.

It is the position of the ASTE that qualified science teachers should possess a strong knowledge base in understanding how implementing technology in science curricular contexts may be used to promote the teaching and learning of science. We agree with South that our candidates must think critically about the specific pedagogical uses of technology in the classroom. The goal of "developing teachers who are savvy consumers of technology" is a charge that is increasingly embraced by our teacher education programs and, more importantly, the schools that our candidates will ultimately teach in. What separates a "savvy" technology consumer from a "savvy" teacher as technology consumer is the teacher's ability to think critically about classroom learning goals and the ways a given technology may (or may not) support students in reaching those goals. Careful consideration of the affordances and limitations of common educational technologies is an important first step in becoming a teacher who can effectively leverage technologies for educational purposes.

We also agree that technology has great potential to support science content learning. Science enjoys a complex and intertwined relationship with technology. Technological advancements often unlock new frontiers of scientific discovery, and many scientific discoveries result in technological advances. Our science teacher preparation programs must not only expose our candidates to this symbiotic relationship, but also prepare them to thoughtfully use technologies that support the science content learning of their future students. For example, technology has the potential to support students' scientific investigations through the use of real-time data collection tools. Science teachers can also use digital simulations or visualizations to allow their students opportunities to explore complex scientific phenomena that would otherwise be inaccessible. These are just two approaches to supporting students' scientific understanding through the thoughtful use of technology to support science learning.

As teacher educators explore how best to support science teacher candidates' application of technology integration to their teaching practice, candidates must be afforded the opportunity to reflect on their technology integration and its efficacy in supporting science learning goals. These reflective opportunities may be as complex as an action research project or as simple as a guided writing prompt in a methods course. The key is to provide candidates the opportunity to think critically on evidence that their decisions about technology integration are advancing student learning. This engagement in evidence-based reasoning is a hallmark of science content learning, as well as a critical assessment of pedagogical practices.

Similarly, we encourage science teacher educators to conduct action research related to technology integration and other innovative practices in their teacher preparation programs and to share their findings at our regional and international ASTE conferences. Our affiliated journals, *Innovations in Science Teacher Education* and the *Journal of Science Teacher Education*, provide further opportunities for the sharing of innovative practices and research findings.

Critical to supporting candidates' technology integration are the technology competencies of science teacher educators. If their instructors do not model effective technology use, candidates may assume that it must not truly be important. Further, if candidates do not experience these teaching strategies as learners themselves, they will struggle to create such experiences for their future students. These learning experiences with technology must not be isolated within a technology course but, instead, integrated into science methods courses. Science teacher educators can then "model technology-based science curricular activities with appropriate pedagogy and design activities involving technology-integrated materials to promote student-centered, inquiry-based learning" (ASTE, 2004, para. 2).

Author Note

Gillian Roehrig is the ASTE President.

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References

Association for Science Teacher Education. (n.d.) *ASTE position statement on science teacher preparation and career-long development*. Retrieved from http://theaste.org/about/aste-position-statement-science-teacher-preparation-and-career-long-development/

Association for Science Teacher Education. (2004). *ASTE position statement on technology in science teacher education*. Retrieved from: http://theaste.org/about/aste-position-statement-on-technology-in-science-teacher-education/

Bull, G., Spector, J. M., Persichitte, K., Meier, E. (2017). Reflections on preparing educators to evaluate the efficacy of educational technology: An interview with Joseph South. *Contemporary Issues in Technology and Teacher Education*, *17*(1). Retrieved from http://www.citejournal.org/volume-17/issue-1-17/editorial/reflections-on-preparing-educators-to-evaluate-the-efficacy-of-educational-technology-an-interview-with-joseph-south

National Research Council. (2012). *Framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. Washington, DC: The National Academies Press.