EDITORIAL

Call for Papers: Science teaching, learning, and assessment with 21st century, cutting-edge digital ecologies

The science education community has embraced the deployment of contemporaneous technological tools and platforms in the service of improving science teaching, learning, and assessment. Technology use in science education has ranged—among many other things—from computer-assisted instruction in the 1970s, to using microcomputer-based laboratories and first-generation simulations and micro-worlds in the 1980s and throughout the 1990s. The 1990s also witnessed the deployment of interactive videodiscs, multimedia, hypermedia, and other digital resources as cognitive tools in science classrooms (Songer, 2007), which was followed by efforts to harness the power of the Internet to, for instance, share data in support of multisite student-driven inquiry projects, among many other applications (Abd-El-Khalick, 2001). The last two decades featured the expanded and integrated use of learning-specific software applications, interactive visualizations, modeling tools, and immersive e-learning environments in science teaching and learning (Krajcik & Mun, 2014).

The last decade or so has witnessed rapid and groundbreaking advancements in technologies and digital platforms, as well as their application to teaching and learning. These include advances that made high-powered computing and powerful applications in serious gaming, and virtual and augmented reality more accessible to mainstream users. Similar advances have been evident in big data curation, data mining and data analytics, natural language processing, as well as next-generation machine learning and the application of artificial intelligence (AI) to the real-time and adaptive assessment of learning. The coordination through powerful computing and AI of tangible, immersive, intelligent, and multiuser technologies and digital media systems (coordinating, for instance, learner interactions with interactive wall displays, intelligent interfaces, multitouch tables, motion sensors, etc.) now allow the creation of digital ecologies that provide learners with highly engaging and authentic interactive science learning experiences. Simultaneously, these technologies and interfaces enable the collection of massive data about the choices, behaviors, and cognition of an individual learner or groups of learners (keyboard strokes, mouse clicks, eye tracking, body movement, etc.) that allow for real-time feedback both to learners and their teachers, as well as the delivery of adaptive and personalized learning experiences (ILSDI, 2014). These digital technologies and ecologies have the potential to transform science teaching and learning, as well as deliver on the promise of more personalized science education experiences in service of promoting scientific literacy for all (NGSS Lead States, 2013) including, but not limited to, historically underrepresented populations in science, culturally, ethnically, and linguistically diverse students, as well as learners in underprivileged and underserved communities in the United States and around the globe.

The aims of this Special Issue of JRST is to provide a platform for reporting on empirical research that examines the use and impact of 21st century cutting-edge technologies, technological platforms, technological activity, and digital ecologies on science teaching, learning, and assessment. We also
are interested in manuscripts that present conceptual or critical analyses related to and/or examine theories and frameworks needed to advance the ways in which digital ecologies and technological activity can transform science teaching, learning, and assessment, as well as the potential of these technologies and platforms to realize equity in access and outcomes in science education for all learners.

The review process for the special issue will take place in two stages. In Stage 1, authors will submit an extended abstract describing key dimensions of the proposed manuscript, including a summary of the research questions, methodology, findings, and implications. This extended abstract should not exceed 1,000 words. The special issue guest editors will review extended abstracts in order to invite full manuscript submissions. The review of extended abstracts will be guided by the potential of the proposed manuscripts to be relevant, advance understanding of science teaching and learning, and have substantial impacts on the field, which are standard criteria for all JRST reviews. In addition to these basic criteria, the guest editors will consider the extent to which submissions reflect research that deploys cutting-edge, 21st century digital ecologies and technologies, as well as the rigor and impact of the associated empirical research. In Stage 2, invited manuscripts will undergo a double-blind review employing the same process and criteria used for the review of all JRST manuscripts. Not all invited submissions will be published in the special issue. Manuscripts that are not reviewed favorably through the double-blind process will not be accepted. If there are more manuscripts that receive favorable reviews and recommendations to publish than there is available space in the special issue, some manuscripts will be recommended for publication in a later JRST issue.

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2 | TIMELINE

- Extended Abstract Submission Deadline: April 15, 2019
- Invitations for Manuscript Submission Extended: May 15, 2019
- Invited Manuscript Submission Deadline: July 20, 2019
- Expected publication: Spring 2020

3 | SUBMISSION GUIDELINES

Submissions of both extended abstracts and invited manuscripts should follow the publication guidelines for the Journal of Research in Science Teaching and be submitted electronically to ScholarOne Manuscripts (http://mc.manuscriptcentral.com/jrst). Within the Submission interface, at Step 5: Details and Comments, select “Cutting-Edge Digital Ecologies” in the Special Issue pull-down menu.

For the Stage 1 submission of an Extended Abstract, (1) Leave BLANK the abstract text box found in submission Step 1: Type, Title and Abstract; and (2) Upload the Extended Abstract as a file in submission Step 5: File Upload, labeling it as a “Main Document” in the File Designation pull-down menu.
Manuscripts selected after competitive, peer-reviewed process will be published, following which reactions from experts in the field will be invited and published, along with author responses. Inquiries concerning the suitability of possible contributions to this special issue should be sent directly by email to one of the Co-Editors or Guest Editors.

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REFERENCES


