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International Council of Association for Science Education

EDITORIAL

Editorial

Welcome to the third issue of Science Education International for 2017.

This issue presents seven articles from the United Kingdom, Turkey, Nigeria, New Zealand, and the United States of America. These seven articles address issues ranging from laboratory safety, climate change, innovative and entrepreneurial skills acquisition, cogenerative dialoguing, indigenous science, and learners' perspectives of chemistry to the use of science fiction in science education with a focus on the middle school, secondary, or tertiary science education communities.

The first article is from James Smith, Melleisha Chungh, Sara Sadouq, and Asarthan Kandish and involves pharmacy students in the United Kingdom. These qualitative and quantitative studies investigate how the chemistry experience of Master of Pharmacy (MPharm) students could be enhanced through virtual learning environments (VLEs). The results highlight MPharm students had a wide variation in prior chemistry learning both theoretically and practically. Most students said studying chemistry was important, especially when the relevance could be easily identified and were able to provide appropriate reasons for needing to study the subject. Students welcomed more VLE content, which they access mainly through laptops and smartphones, especially in the form of video lectures and formative assessments.

The second article by Joanna Higgins and Azra Moeed from New Zealand sought to develop secondary students' scientific literacy through video clips. The data drawn on in this paper included cogenerative dialogue, field notes, and video records of lessons in which the researchers were participant observers. Higgins and Moeed argue that the structures of the classroom culture or learning context afford and constrain students' opportunities to learn science from video watching including strategies or structures for viewing a video. The study highlights how cogenerative dialogue can provide a means for teachers and students to consider and generate local knowledge of what such teacher expertise might look like for their setting.

The third article by Catherine Smallbone, Craig Rofe, and Azra Moeed from New Zealand concerns a review of the theory and practice of learning science from an indigenous perspective. The article reviews of Pūtaiao (indigenous Māori science) in both theory and practice in New Zealand Kura kaupapa (secondary schools in New Zealand in which the language of instruction is predominately in Te Reo Māori). Smallbone et al. highlight the field of Pūtaiao studies is small, but there is a gradually growing body of work becoming available. They then note how and why policymakers need to provide professional development and support to enable Māori medium teachers to teach their students Pūtaiao.

The fourth article by Maryrose Mbanefo and Obiajulu Eboka from Nigeria was originally going to be part of the Special Edition based on papers presented at the World STE 2016 Conference in Antalya, Turkey. Mbanefo and Eboka investigate what was needed to bridge the gap between school and the labor market. They highlighted that various types of skills such as managerial, accounting and financial competencies, marketing and sales skills, and general business skills needed to be included into the basic science education program. Their study surveyed principals and science teachers. The results revealed that the teachers and the principals agreed that innovative and entrepreneurial skills were needed in basic science education for job creation. Mbanefo and Eboka conclude with three recommendations.

The fifth article from the United States is by Wayne Breslyn, Andrea Drewes, J. Randy McGinnis, Emily Hestness, and Chrystalla Mouza. Breslyn et al. report their efforts to identify, describe, and organize the development of learners' understanding of climate change in an empirically supported learning progression (LP). Their study sought in address how middle-school aged learner's progress over time from an initial to a more sophisticated understanding of climate change. Using survey, interviews and classroom observations, they noted that middle school students recognize the relationship between fossil fuels and global warming although they may not understand the mechanism. Their study also reports on several previously unreported findings. Breslyn et al. conclude with how the conditional climate change LP developed offers an empirically supported conceptual framework to guide students toward understanding a scientifically informed view of climate change.

The sixth article by Bulent Cavas and Simge Akpullukcu reports on how they developed a laboratory safety questionnaire for middle school science teachers in Turkey. Beginning with a short history of laboratory accidents and reasons for them, Cavas and Akpullukcu noted why laboratory safety awareness is important. They then report on how the questionnaire was developed and piloted with science teachers. Their article concludes after a pilot study analysis of their questionnaire's ability to address middle school teachers' behaviors toward laboratory safety.

The final article for Volume 28, Issue 3 is by Randy K. Yerrick and Tiffany Simons. In this article, Yerrick and Simons report on the many reasons, educators have given for promoting the use of fiction for teaching science. Yerrick and Simons explore how researchers have argued that the use of fiction cannot only improve high school students' interests and attitudes toward science it can also assist in the development of conceptual understanding of science constructs. Their

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study was a collaborative action research project in which the Simons explored the use of fictional supplements to a traditional pedagogical approach to teaching chemistry. Their study helped to inform Simons' efforts and the effects of fiction upon her students' fundamental conceptions of chemistry.

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