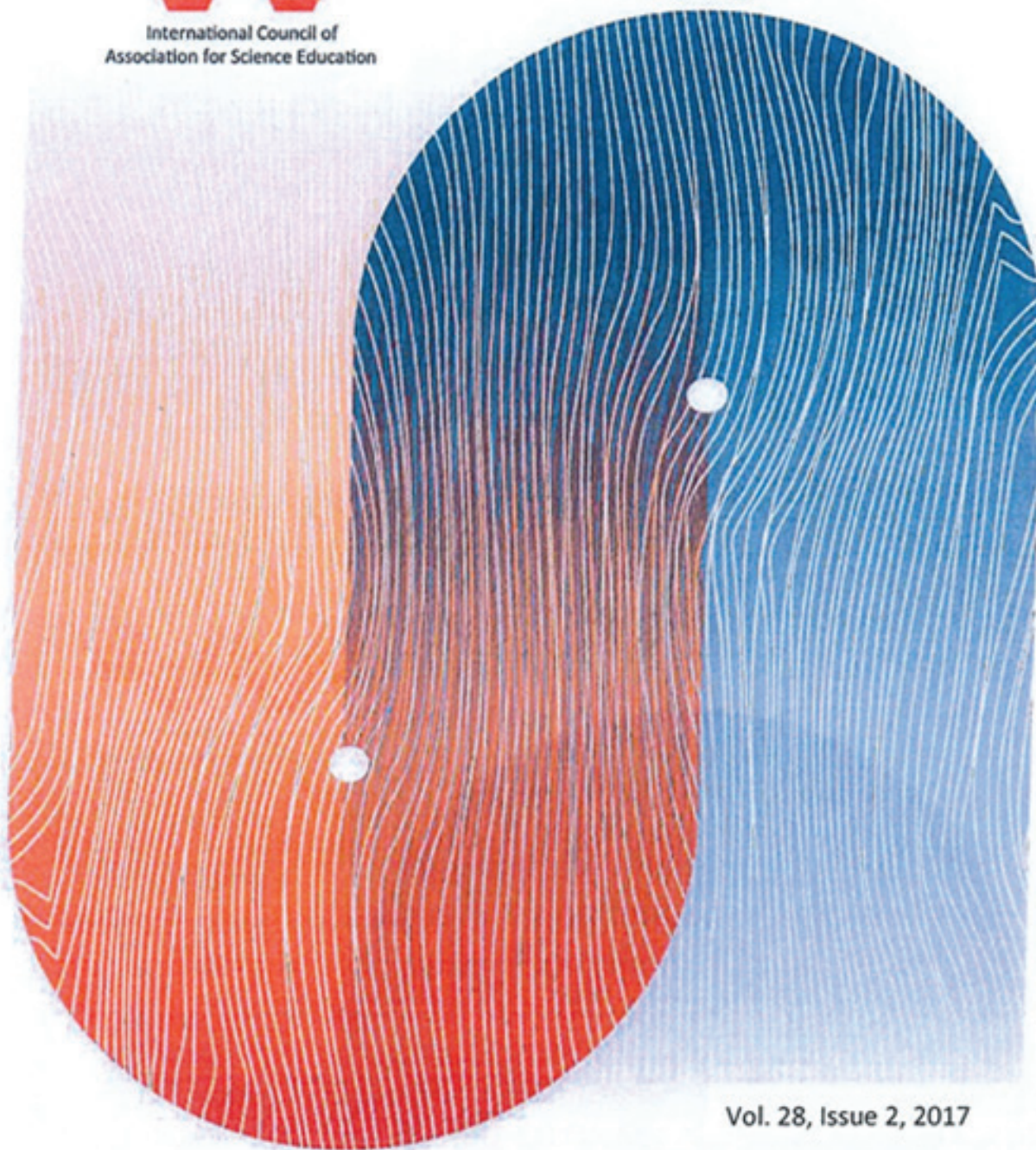


# SCIENCE EDUCATION INTERNATIONAL



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*Steven S. Sexton*

Editor

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## Editorial

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

This is a special edition consisting of 12 papers selected from those presented at the WORLD STE2016 5<sup>th</sup> World Conference on Science and Technology Education in Antalya, Turkey November 1<sup>st</sup> through 5<sup>th</sup>, 2016. The theme of the conference was Interdisciplinary Practices in Science and Technology Education:

- Strand 1: Science and technology teachers and STA role in promoting 21<sup>st</sup> century skills
- Strand 2: Impacts of national and international projects on classroom practices and science teachers' experiences from project such as EU or NSF-funded projects
- Strand 3: Science teaching and learning: Teaching resources developed and tested by teachers
- Strand 4: Science learning in informal contexts such as science centers and museums
- Strand 5: Curriculum development, evaluation, and assessment
- Strand 6: Innovation and entrepreneurship in science and technology education
- Strand 7: Environmental education
- Strand 8: Information and communication technologies in science education.

These papers represent this wide range of presentations that sought to further the vision and mission of the International Council of Associations for Science Education (ICASE). ICASE seeks to deliver, coordinate, enact, and disseminate research and resources that enhance the impact and growth of science education and science teacher associations throughout every continent. WORLD STE2016 offered participants presentations from North America, Europe, Africa, Asia, and Australasia. The 11 papers selected for this special edition represent qualitative and quantitative research with early childhood, primary, secondary, and tertiary students, teachers, principals, and the wider community.

The first article by Gkouskou and Tunnicliffe investigate how young children in Britain are able to acquire realistic concepts of the living world through a natural history museum's dioramas. Dioramas offer viewers a moment in time. When this observation is combined with relevant activities, young children's spontaneous conversations demonstrated their scientifically authentic comments regarding science. The results of this study show that crossover learning in informal settings, such as museums, can link to educational contexts.

The second article also focuses on education outside the classroom. Kalathaki's paper reports on how School Projects of Environmental Education (SPEE) promote learning in

the wider Greek community. Secondary students and their teachers used a SPEE to build upon what students learned in class with meaningful involvement with scientific collaborators, local bodies, and institutes. Results highlighted how students constructed knowledge by themselves and the participating teachers became trained properly and advocates of sustainability.

The third and fourth articles are from Turkey. Bahar and Sahin investigated middle-school students' environmentally responsible behavior, their nature relatedness, and motive concerns; while Idin and Dönmez highlighted middle-school science teachers' concerns about gender equity within science education. Bahar and Sahin conducted a large-scale quantitative study of 12-15-year-old students. Their results show that these students moderately developed internalized identification with nature reflecting favorable feelings and thoughts about their personal connection to nature. Idin and Dönmez noted gender equity does not mean that both girls and boys are the same biologically. Therefore, their study sought to ask science teachers about whether science teaching in schools strengthened gender inequity or not. Almost half of their teachers did not think there was gender equity in Turkish Science education.

The fifth, sixth, and seventh articles come from Nigeria. Agbo and Isa examined the scientific skills and concept learning of rural women. Charity, Ozoji et al. investigated the effects of teaching gardening on science students' attitudes toward entrepreneurial skills acquisitions. Dung et al. focused on assessment of college students' knowledge and attitudes toward solid waste management. All three articles employed quantitative methodology to address their research questions. The Agbo and Isa study included 100 rural women who participated in an 8-week intervention to address five essential skills. Their results show that exposure of rural women to a science education program improved significantly the skills of these rural women. The greatest improvement was in nutrition, followed by health, water use, agriculture, and sanitation. The Charity et al.'s study included two senior secondary school classes in an experimental and control group design. Their results indicated that explicit teaching of gardening skills had a significant impact on the students' attitudes toward entrepreneurial skill acquisition. Dung et al.'s study was a large-scale study of college of education students. Results of their study revealed that these students generally had a low level of knowledge but had a positive attitude toward solid waste management.

Articles eight and nine are from Bangladesh. Bain and Siddique explored the organization and content of junior

secondary science curriculum while Chowdhury and Siddique identified the content of the secondary curriculum that was excluded in teaching and learning and how this impacted on students. Bain and Siddique used document analysis of curriculum and textbooks for how the content was organized and sequenced for student learning. Their results highlighted how the junior curriculum was neither well organized nor sequenced for student learning. Chowdhury and Siddique investigated teachers', students', curriculum developers', and textbook authors' understanding and/or reasons behind the null curriculum. Results highlighted the teachers noted they excluded certain content from their classroom teaching. The students, however, differed in that opinion and said there was nothing left out. The curriculum developers and textbook writers pointed out several impacts for teachers excluding topics such as genital health, reproduction, and changes during adolescence.

The 10<sup>th</sup> article is from Japan. Yamashita, Kashiwaguma, Hagashi, and Pietzner highlighted a problem of teaching the law of definite proportions in chemistry. Their paper is an argument for their procedure, which is an improved copper oxidation experiment to enable students to get reliable results

for investigating the law of definite proportions. In the conventional experimental method, the heating temperature and heating time differed depending on the faculty members and groups that performed the experiments, a ratio of copper to oxygen of about 7.5:1 was obtained; which is significantly different from the theoretical value of 4:1. Using their procedure, 99% of students who participated in the study were able to confirm that the law of definite proportions could be derived for the mass ratio of copper to oxygen.

The final paper comes from New Zealand. Sexton and Williamson-Leadley investigated how primary student teachers were able to use video capturing of own teaching practice to develop their own sense of self-as-teacher. Results indicate how video capturing provided the experiences necessary for these student teachers to reflect on teaching practice and learn how to think, know, feel, and act like a teacher.

**Steven S. Sexton\***

College of Education, University of Otago, New Zealand, Oceania

**\*Corresponding Author:**  
steven.sexton@otago.ac.nz