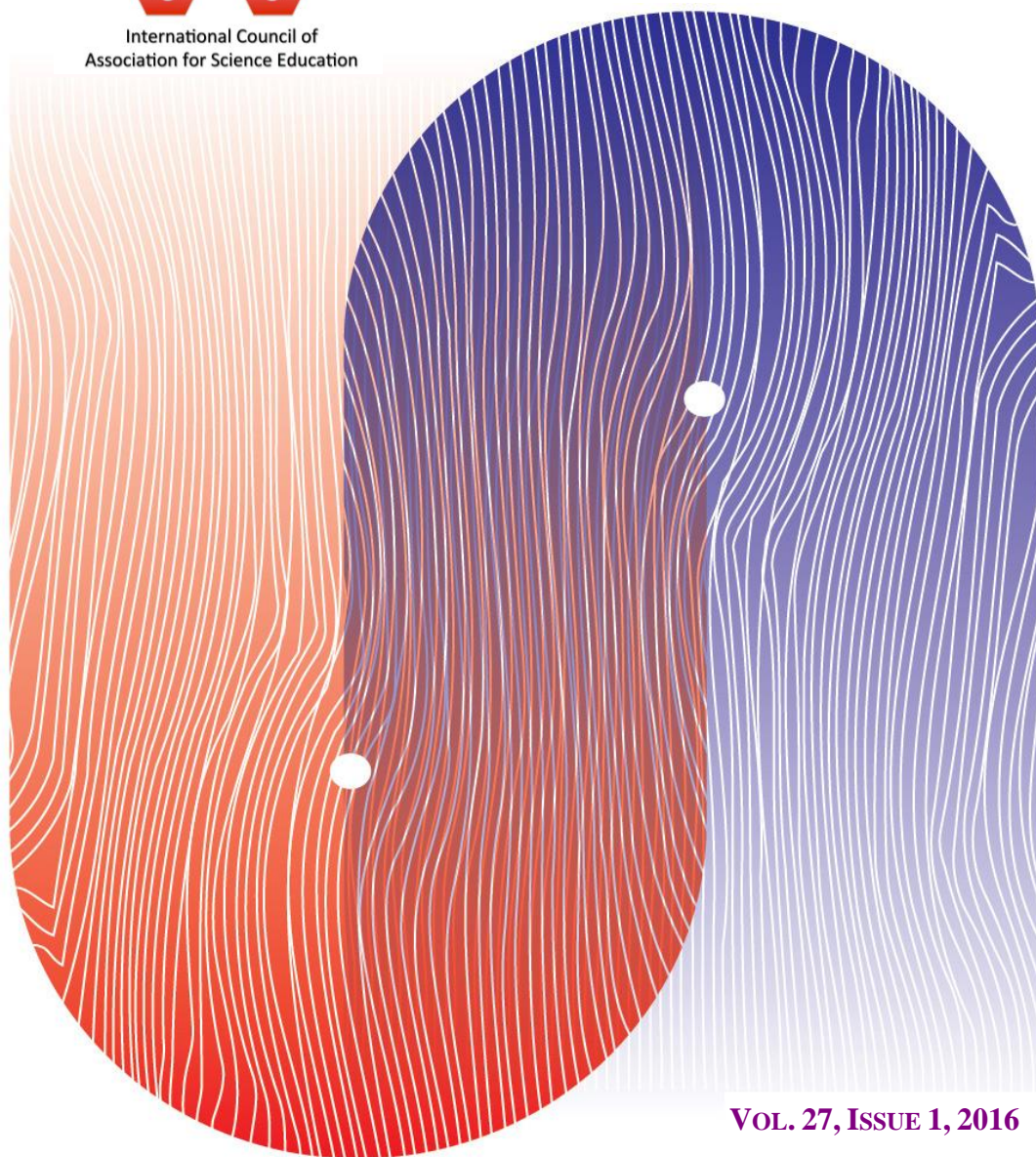


SCIENCE EDUCATION INTERNATIONAL



International Council of
Association for Science Education



VOL. 27, ISSUE 1, 2016

SCIENCE EDUCATION INTERNATIONAL

Year 2016
Volume 27, Issue 1

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Editor

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ISSN: 2077-2327

Science Education International (SEI) is published by International Council of
Associations for Science Education (ICASE).



International Council of
Association for Science Education

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Editorial

J. HOLBROOK, B. H. ZHANG

Welcome to first issue of the SEI journal for 2016. This issue comprises 8 articles from Australia, Estonia, Turkey and USA. The foci are critical thinking, inquiry based learning, the promotion of creativity, behavioural actions in the face of natural disasters, pre-service science education, ecological system reasoning, student perceptions and interdisciplinary in studying environmental issues. More specifically the articles are summarised below:

The first article recognises the importance of critical thinking on the development of scientific literacy. The paper goes further beyond considering what is intended by critical thinking and examines a person's disposition towards critical thinking. It seems this is related to students' attributes such as character, impacted by the effect of gender, grade level, school, authority at home and independent decision making and received academic guidance.

The uniqueness of the second article is that it compared guided-inquiry based teachers' professional development to a teacher-directed approach in supporting students to understand science topics (density in this case). Students in six classes were randomly assigned by a school to one of two conditions (guided or teacher-directed condition) while they studied the same unit on density in their science curriculum. The three teachers in the guided condition attended an intervention on using guided-inquiry activities to teaching a unit on density. The three teachers in the teacher-directed condition used their regular approach to teaching the same unit. By comparing pre- and post-tests of the students' understanding and explanation of density, results showed that the students in the guided-inquiry condition demonstrated significant improvements in both conceptual understanding and their levels of explaining the concept of density. The study pointed out a better way to support student inquiry-based science learning by providing support to their teachers in Saudi Arabia. The idea has the potential to benefit inquiry-based teaching in other countries/regions.

The next and the third article in this journal issue considers the role of science teaching in promoting creativity. It addresses the issue of a lack of interest in science at the post-primary level and its impact on attitudes towards STEM careers. It further explores the gender factor, whereby girls are less likely to choose a pure research path, even where they choose a scientific-related career. Findings suggest science does not seem to promote creativity, especially for girls in high schools and for both genders at the college level. Where science is linked to creativity, the attitude towards science careers seems to be more positive. Again the issue of gender bias portrayed by teachers is raised related to the choice of science careers.

While the teaching of natural disasters is recognised as a component of geography/earth science teaching, less attention is paid to dispositions towards

such disasters and behavioural action to be taken in tackling disaster risk reduction during and in the aftermath of natural disasters. Article 4 from Estonia promotes the need for the teaching, related to natural disasters, to go beyond conceptual aspects and incorporate developments of education learning towards more attention to values education. The paper attempts to devise an instrument for determining students' awareness of natural disasters, the manner in which their learning of the nature of science and technology is of importance and the actions that students propose to take in the face of impending disasters so as to mitigate against its impact on human lives.

The fifth article by Turkish researchers examines knowledge and mental models associated with astronomy by pre-service teachers teaching at the kindergarten, primary and secondary levels. It concludes that no student tested conceptualised the ideal model related to scientific understanding and most common model was labelled as inappropriate. The paper blames poor links between university teacher training and that required for teaching in schools. The paper makes recommendations for alleviating the situation.

Article 6 from USA explored teaching systems and system models for elementary students. The author adopted four dimensions of scientific reasoning about complex systems and used them as progress variables for ecological systemic reasoning: Systemic Synthesis, Systemic analysis, Circular connectivity, and Dynamic recycling. The author applied a fine-grained learning progression for ecological systemic reasoning with five levels of reasoning patterns for students from first through fourth grade. The main data source was semi structured interviews. The author used the rank correlation and qualitative examples to investigate the extent to which students used the same level of reasoning across the various progress variables. The results show a wide range of students' reasoning patterns and kinds. Based on the results, the author recommends using specific strategies to teach each progress variable, and providing students with opportunities to reason within and across the progress variables.

The literature has extensively covered the perceptions of students' vision about scientists captured by means of drawings. These have tended to relate to findings expected to be culture free. The article from Turkey, article 7, however, tries to separate perceptions of scientists in general, from those formed by portraying scientists in a similar culture, in this case that prevailing in Turkey. At first glance, it would seem differences were not likely, but on further examination differences were found to arise, related to factors such as scientists associated with scarcity of equipment, types of symbols of knowledge and differences in scientific symbols.

Article 8 from USA If explaining environmental issues is of value, then this paper evokes the question, "when is science, science and art, art? But perhaps this is not of consequence if the education goal is related to promoting both thinking skills and students' dispositions towards issues, such as those pertaining to the beauty of nature and the environment. In this paper on primary school environmental studies, the focus is on the arts- science divide apparent in environmental issues. In this paper, these aspects are brought together, drawing attention to whether there is, from an educational point of view, the need for an art/science divide.

Formatting and liaison by Yasemin Ozdem Yilmaz