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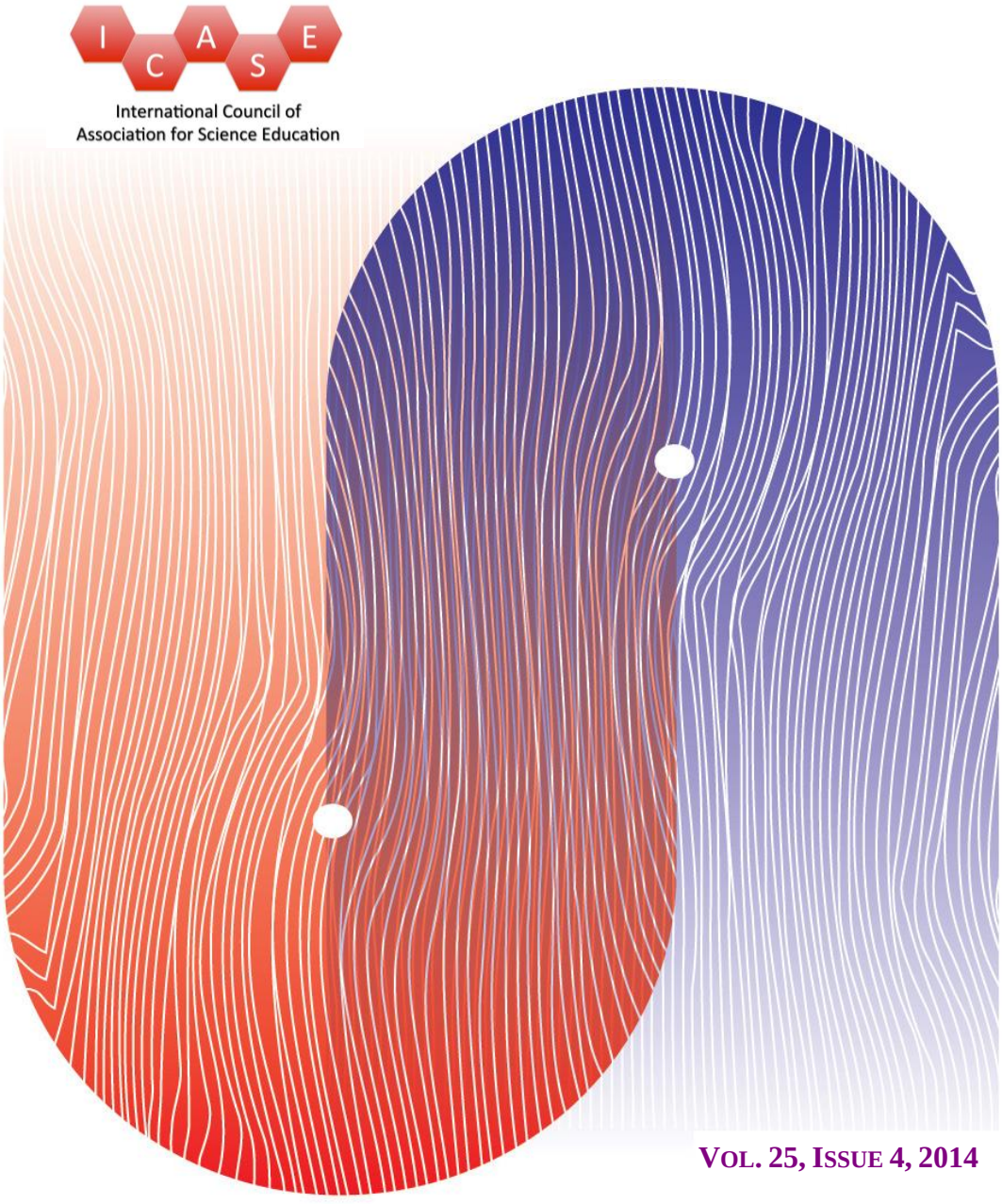

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Editorial

B. H. ZHANG, Y. OZDEM YILMAZ

Dear colleagues, it is our great pleasure to present you the December issue of the journal Science Education International. While realizing the backlog of papers we need to "clean up" (be reviewed), we are trying to deliver papers that report efforts in improving science education in regional contexts. There can be theoretical and/or empirical studies to achieve the goals. For the December issue, here are the papers:

In an increasingly cyber-driven world, the paper *The Impact of Online Homework on Class Productivity* (pp.354-371) by Joshua R. Dodson from the US studied whether online homework created a measurable difference in student performance when compared to traditional paper homework. Over the course of an academic quarter, two environmental science classes, both included junior and senior-level students, served as the control and comparison groups. Overall, the results for this study indicate that online homework, at the very least, maintains student performance within the classroom, this is an important finding because we certainly can save vast amount of trees without paper-based homework. While the results give us hope that OC can be as good as PC in homework assignment, we might still need to test the conclusions with larger samples. We should further explore the mechanism about how the findings happened and how these findings were related to the subject matters. On the other hand, our efforts should not stop at using the online environment only for delivering and completing homework because it is quite important to adjust the educational tools to the interests and skills of the new generation, which is known by their efficient use of digital environments.

The paper *Application of the First Law of Thermodynamics to the Adiabatic Process of An Ideal Gas: Physics Teacher Candidates' Opinions* (pp.372-395) by Selahattin GONEN from Turkey studied pre-service teacher candidates' learning difficulties in explaining the heat, work and internal energy relationships in the processes of adiabatic compression and expansion of an ideal gas. The learning difficulties of the 46 physics teacher candidates were under two categories: a) discriminating the concepts (heat, work, internal energy and temperature and b) application of the first law of thermodynamics to the adiabatic processes. Teacher candidates being investigated had the difficulties to

understand the fact that there was no difference between the functions of the concepts of heat and work in the microscopic scale. While we acknowledge that such basic studies are needed to improve science teaching and learning (Thermodynamic related concepts in this case), we hope to understand whether cultural background or any other factors that might also affect the teacher candidates' difficulties in their learning the subject. Furthermore, we expect further intervention studies to investigate how such findings can be applied to really improve related learning.

The paper *Professional Journals as a Source of Information about Teaching NOS: An Examination of Articles Published in Science & Children, 1996-2010* (pp.396-416) by Suleyman Cite and Deborah L. Hanuscin from the US addressed issues related to teaching the Nature of Science (NOS). The authors wanted to ascertain the extent to which activities aligned with research based suggestions for teaching NOS and the extent to which articles on a high impact journal had potential for informing teachers' Pedagogical Content Knowledge [PCK] for teaching NOS. The results showed that the majority of activities focused on broad ideas such as "science as a human endeavour." The study, however, in terms of the potential of articles to improve teachers' PCK for NOS, does not give much information relevant to teachers' knowledge of assessment of NOS and knowledge of learners. Although we agree with the authors that further studies into the degree to which 'activities that work' (Appleton, 2006) from teacher professional journals as a source of PCK may be conducted, we would suggest that pre-service and in-service teacher education programs might be an important alternative to compensate the lack of teachers' PCK for NOS.

The paper *A Conceptual Change Model for Teaching Heat Energy, Heat Transfer and Insulation* (pp. 417-437) by Carole K. Lee from the US reported an intervention study. The study examined the existing knowledge that pre-service elementary teachers (PSETs) had regarding heat energy, heat transfer and insulation. A pilot study was conducted in 2011 to investigate which container kept hot water warm for the longest period of time. A follow-up study in 2012 included the same practical task with the addition of pre- and post-assessment and used an assessment probe and interviews. Results showed that PSETs could not explain the concept of insulation and heat transfer. Moreover, they held the misconception that a container deemed best to keep water warm would not be the best container to keep ice cream cold. The researcher used the ED3U Conceptual Change Model (McComas, 1995) integrated with Posner, Strike, Hewson and Gertzog's (1982) conditions to help PSETs to understand the concepts better. The intervention yielded improvement in PSETs' understanding. We applaud the efforts in addressing pre-service teachers' difficulties in learning heat energy, heat transfer and insulation, which are important in learning physics. We certainly hope the same

intervention can be equally effective for pre-service elementary science teachers from other culture with different life experience and analogies to use.

The paper *Salient beliefs of pre-service primary school teachers underlying an attitude "liking or disliking physics"* (pp.438-459) reported by Serkan Kapucu in Turkey measured salient beliefs of pre-service primary school teachers (PPSTs) about why they like or dislike physics and explored whether these beliefs predict their teaching beliefs about physics. There were 267 PPSTs participated in the study. Qualitative data analyses were used and the data were collected through an open-ended questionnaire, the interview, and classroom discussion. Results revealed that the majority of the PPSTs did not like physics. Fundamental salient beliefs of the PPSTs about why they disliked physics were their unsuccessfulness in solving physics problems and their previous teachers' teaching based on more memorization of physics formulas and rules. Moreover, the majority of the PPSTs indicated that they would use the teaching strategies that make students more active in learning in their professional teaching. We hope further studies can reveal the mechanism about the relationship between PPSTs' attitudes, beliefs and student achievement; we need strategies that are related to the subject matters. Certainly, we expect more intervention studies to make use of the findings here.

We now welcome you to read, critic, and make use of the results in the papers. For any queries and suggestions, please contact us via our e-mails: B. H. Zhang baohui.zhang@snnu.edu.cn and Y. Ozdem Yilmaz yasemin.ozdem@hotmail.com.