

Editorial

I am pleased to present the first issue of 2018. This issue brings together authors from Bhutan, Brazil, and Turkey, as they address issues concerning science education with not only elementary, middle school, and secondary students but also prospective teachers. This issue's six papers explore the subject areas of physics, astronomy, chemistry, and biology. Mehmet Altan Kurnaz and Nezihe Gökçen Bayri from Turkey conducted an analysis of secondary school students' transition situations in multiple representations. Isadora Moutinho Carvalho A. Menezes, Daniel Fernando Bovolenta Ovigli, and Pedro Donizete Colombo Junior from Brazil present an analytical review of the relationship between formal education (FE) - non-FE (NFE) related to teaching Astronomy in the Brazilian context. Pabi Maya Das, Chatree Faikhamta, and Vittaya Punsuvon report on their work to enhance Bhutanese students' views of the nature of science (NOS) in matter and its composition and study of gas laws through an explicit and reflective approach. Hilal Aktamış and Emrah Hiğde from Turkey determined influence of nature and history of science (NHOS) courses on value perceptions of elementary science teacher candidates in conceptual dimension in Turkey. Furthermore, from Turkey, Ezgi Güven Yıldırım and Ayşe Nesibe Köklükaya sought to investigate The Effect of Project Exhibition Event on Physics Success and Prospective Teachers' Opinions about Projects. The final article by Murat Özarıslan and Gülcan Çetin explored Turkish gifted and talented students' views about biology activities in a science and art center.

In the first article by Kurnaz and Bayri, the relationships between students' personal relationship to the concept of pressure and teaching conditions of this concept were investigated in terms of the Anthropological Theory of Didactics. To determine these complex relationships, first an institutional analysis was conducted, and in this same manner, the student's textbook was analyzed to uncover the institutional relationship to the concept of pressure. Then, an achievement test was employed to gather data to uncover the students' personal relationship to the concept of pressure. 348 eighth-grade students who successfully completed the pressure topic in their science classes participated in this study. The gathered data were analyzed in a descriptive and qualitative way. The results of this study emphasize the relationship between the teaching conditions and the students' understanding of pressure. Kurnaz and Bayri's study supports the need for multiple representations to teach effectively concepts such as pressure.

The second article by Carvalho, Menezes, Ovigli, and Colombo Junior analyzed astronomy education in Brazil. They focused on the interface between FE and NFE at scientific events and a journal that support astronomy education. These events

were the National Symposium on Astronomy Education, the National Meeting on Research in Science Education (ENPEC), the National Symposium on Physics Teaching (SNEF), and the journal Latin American Journal of Astronomy Education (RELEA). The objective was to understand how the approach between FE and NFE in the teaching of astronomy was constructed. The analyses covered the period 2001–2014, which coincided with the constitution of Area 46 by the Coordination of Improvement of Higher Education Personnel (CAPES), which regulates postgraduate programs in Brazil. In a theoretical-methodological aspect, the ideas of content analysis proposed by Bardin (2011) were adopted. Among the results, they observed that few studies dealt with the relationship between FE and NFE, however, almost half of them occurred in institutions commonly classified as FE (i.e. schools), and the actions were mediated by teachers. Among the main activities, they highlighted the observations the sky, guided tours, and play activities, with more than 60% of the activities going through three moments proposed by Allard et al. (1994): Before, during, and after the accomplishment of the activity in a non-formal space. Their results are important as more and more NFE spaces are present in teaching-learning processes, but little has been done to associate FE and NFE in teaching practice.

Das, Faikhamta, and Punsuvon in the third article investigated the development of Bhutanese students' views of the NOS as they engaged in an explicit and reflective approach. Seven aspects of NOS were integrated into the chemistry content in two learning units titled "matter and its composition" and "study of gas laws" over a time span of 6 weeks in a 9th grade class. This study employed mixed method approaches which included the use of a questionnaire, semi-structured interviews, classroom observations, and a review of students' journals and assignments. Data were analyzed for established patterns and themes. Students' views of the NOS in preinstruction and postinstruction were categorized as naïve, transitional, or informed. They concluded that at the end of the intervention, students' views of the NOS had improved. Importantly, NOS-specific pedagogical knowledge and subject knowledge played an important role in the teacher's ability to enhance students' views of the NOS.

The fourth article from Aktamış and Hiğde aimed to determine changes in understanding about the NOS and conceptual values of 28 Turkish elementary science teacher candidates who engaged in the instruction of the NHOS. A Values Scale was used to determine the values of science teacher candidates in six areas of the conceptual dimension: Theoretical, economic, esthetic, politic, social, and religious. An open-ended questionnaire in conjunction with individual interviews

was used to assess participants' pre- and post-instruction NOS views. Semi-structured interviews were conducted with six science teacher candidates who were selected from the different value levels: Low, medium, and high according to the results of the value scale. In the light of results of this study, the science teacher candidates who were engaged in the NHOS instruction received the highest score on the theoretical value dimension and the lowest score for the religious value dimension. They argue that NHOS teaching influenced the value perceptions of elementary science teacher candidates. For this reason, science teacher candidates' value perception should be considered during the NHOS instruction planning and the teaching of science. Recommendations based on this study include explicitly addressing the NOS aspects in science education courses and history and NOS teaching courses to enhance science teacher candidates' views about specific NOS aspects.

Yıldırım and Köklükaya in the fifth article investigated the effects of the project-based learning method (PBL) and project exhibition event on the success of Turkish physics teacher candidates. As part of this study, they sought to reveal the experiment group students' views toward this learning method and their participation in the project exhibition. The research employed an explanatory mixed method, in which both quantitative and qualitative research methods were used. The findings obtained from the research showed that there was a significant difference in favor of the experiment group among the point averages of the achievement post-test of the groups. When the findings regarding the questions posed to prospective teachers were examined, it was seen that while they stated that there were a few disadvantages of PBL and project exhibition

event there were many advantages. The results obtained from the quantitative and qualitative data of the research showed that PBL contributed positively to the teaching process and learning characteristics in many aspects.

The final article for this issue is by Murat Özarslan and Gülcan Çetin. The aim of their study was to determine Turkish gifted and talented students' views about biology activities in a science and art center. The study was conducted with 26 gifted and talented students. These students studied animal and plant genus and species in biology activities. Data were collected through a questionnaire. Data were analyzed using descriptive and content analyses methods. Their results highlighted that the students had great interest in the animals and plants that they could not see nor examine closely in their own daily life. Since they found those activities enjoyable, interesting, and exciting, they liked their biology courses more. Özarslan and Çetin discussed their results in terms of the education of gifted and talented students. As a result of science and art center biology activities, these students gained positive opinions about those living things that they had not been previously able to encounter.

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