Editorial NorDiNa 2/2017

Welcome to the second issue of NorDiNa in 2017. In this issue, we present six scientific articles, one contribution to the curriculum development section, and one abstract of a recent PhD dissertation.

Erik Mellander and Joakim Svärdh's article "Three lessons from an effect evaluation of the Swedish Science and Technology for Children Programme" discusses three methodological aspects on evaluations of effects of teacher support programmes on students' scholastic achievements. The three aspects are: i) participants and non-participants are, in general, not comparable, which needs to be accounted for, in order to avoid incorrect conclusions regarding the program's effects, ii) program effects can differ across subject fields, and iii) to enable precisely estimated effects it is essential to have access to standardized outcome measures. To illustrate the three aspects, the authors use the results in an earlier evaluation of the effects of the Swedish Science and Technology for Children programme (the NTA programme), on school achievements in grade 9. There, positive effects could be established only after adjusting for systematic differences between participants and non-participants. Moreover, the effects were limited to one subject, Physics, and visible only for results on nationwide tests, not for course grades set by the students' teachers.

Eija Yli-Panula, Eila Jeronen, Heidi Seiko-Ahlström and Elsa Ruotsalainen's article is entitled "Important Biological Issues for Elementary Pupils – A Study of Elementary Pre-service Teachers' Conceptions". Their survey investigated what kind of conceptions the elementary pre-service teachers (EPT) find important in teaching and management of biology in order to provide adequate learning for Finnish elementary pupils. The authors found that EPT emphasized biological facts, but they had incomplete views of the totality concerning elementary biology education. The one challenge for science educators is to find ways to change EPT's focus from detailed, fact stressed issues to the basic knowledge of biology. Another challenge is how to support EPT so that they understand biology as a continuously changing subject even at the elementary level.

"Teknikåttan" is a Swedish science, mathematics and technology tournament for 15-year-old students. The article "The Technology-Eight Competition: An analysis of Year 8 Students' Quiz Results" by Tanja Kramer Nymark and Lena Gumaelius investigates whether the initial quiz results can be used to evaluate young people's knowledge in relevant subjects and whether such an evaluation can broaden the collective understanding of young people's knowledge. The results showed great variation in how the students responded to the 15 different questions. The authors argue that Teknikåttan results can be used as an evaluation tool to complement other more formal tools, yielding information on other aspects of students' knowledge in science, mathematics and technology.

In the article “Boys and girls written responses to PISA science questions” Nina Eliasson, KG Karlsson, Lena Lenner and Maria Lundgren use student responses to science questions from the Swedish PISA 2006 Main Study and the PISA 2015 Field Trial in order to investigate differences in boys’ and girls’ written responses. The authors study students’ correct and incorrect answers to the science questions with respect to response length, the number of everyday words used, and the inclusion of nouns and long words in the responses. The results reveal that girls give longer and denser correct responses to most of the questions, compared to boys. The difference in response length cannot be explained by girls’ excessive use of the most common Swedish words, since boys and girls use the same proportion of these words. For incorrect answers the only difference between boys and girls is in the response length, since girls give longer answers than boys.

The article “Creative writing in science - a glimpse into students’ conceptual ideas?” by Anne Holt and Anne Bergliot Øyehaug use students’ creative texts in science as a means to gain insight into their conceptual ideas. Eight grade students’ creative writing tasks were analyzed with respect to the conceptual metaphors that were used to describe the abstract concept chemical bonding. The conceptual metaphors were identified and sorted into two main categories: location event-structure conceptual metaphors and object event-structure conceptual metaphors. Results show that most metaphors can be categorized as location event-structure conceptual metaphors. Embodied concepts and everyday language rooted in senso-motoric experiences from students’ daily life as well as from former science education seem to play a central role when they attempt to make meaning of the abstract concept ‘chemical bonding’ within a creative writing context.

In the article “Changes in preservice teachers’ knowledges? A case study from a new teacher education program at UiT - the Arctic University of Norway”, Magne Olufsen, Solveig Karlsen, and Marianne Ødegaard present a case study of the new master education at UiT - The Norwegian Arctic University. In the study, teacher supervisors evaluate students’ knowledge in their school practice. The results show that all teacher supervisors in the study, experienced that the master students had increased knowledge in both science matter knowledge and pedagogical content knowledge (PCK). These changes in preservice teacher knowledge can possibly be explained by changes in the education program. The results show that early emphasize on subject, increased focus on PCK and subject matter knowledge are important features in the development of the pre-service teachers’ professional knowledge.

Finally, in their contribution to the curriculum development section with the title “Extended classroom - a tool for designing outdoor science activities”, Kari Beate Remmen and Merethe Frøyland synthesize theory, findings and experiences from 20 years of research and development projects aiming to integrate outdoor teaching in school science, resulting in a pedagogical model called “Extended classroom”. Discussing “Extended classroom” in light of related frameworks in the literature, the authors propose that the “Extended classroom” offers more explicit tools for teachers in designing outdoor science activities that foster opportunities for students to develop deeper learning. In addition, “Extended classroom” seems to facilitate collaboration between classroom teachers and external professionals.

We hope you enjoy your reading!

Carl-Johan Rundgren & Are Turmo