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Welcome to the first issue of NorDiNa this year. In this issue of NorDiNa, we present five research articles, one contribution to the curriculum development section, as well as three recent PhD dissertations from the Nordic science education community.

The first article in this issue provides research on articles published in NorDiNa, more specifically research papers in physics and chemistry education published 2005–2013 in the journal. In the article, Päivi Kinnunen, Jarkko Lampiselkä, Veijo Meisalo, Lauri Malmi develop a typology, which is used to categorise 89 research papers, from all levels of education (primary, secondary and tertiary). The results suggest that students' characteristics, their understanding of the content and learning outcomes are studied frequently. In contrast, science teachers are studied much less. The authors show that most papers reported studies that had been done at the teaching organisation level.

In Sweden, a new subject syllabus for Science Studies (Naturkunskap) in upper secondary school was introduced in 2011. In this syllabus knowledge about norms concerning sexualities and relations was brought to the fore as a core content. The aim of Ylwa Li Hast and Anna T. Danielsson's contribution is to explore how norms concerning sexuality guide the teaching, through a case study where three upper secondary school teachers were observed and their teaching was analysed from the perspective of companion meanings. All three observed teachers did teach about homosexuality, bisexuality, and transgender identities, often using genetics or evolution as their explanatory model. The teaching most often assumed that all students in the class were heterosexual, positioning LGBT-people as the Other, and did at no times take power perspectives into account.

Students' problems with learning science in school are well documented. Earlier studies report on differences in students' interest in and attitudes towards science due to gender and age. However, fewer studies have focused on relations with experience and recruitment on a detailed content level. The article "Student experience and interest in science: Connections and relations with further education" by Anders Jidesjö and Åsa Danielsson presents a statistical analysis of student interest in specific content areas and combines this with student experience of science and science-related activities outside school. The results show that patterns of interest and experience can be identified. These patterns showed differences in gender and also relate to student preferences of upper secondary education. The results are presented on both a detailed content and an experience level. The results are discussed in relation to the purpose of compulsory science education.

Jesper Bruun and Frederik V. Christiansen's article "Kinaesthetic activities in physics instruction: Image schematic justification and design based on didactical situations" deals with one of the major difficulties in learning physics; for students to develop a conceptual understanding of the core concepts of physics. Many authors argue that students' conceptions of basic physical phenomena are rooted in image schemas, originating in fundamental kinaesthetic experiences of being. They argue

that this idea should be utilised in physics instruction, that kinaesthetic activities will provide useful entry point for students' construction of physics conceptions. They discuss the nature of image schemas and focus particularly on one: *effort-resistance-flow*. This schema is fundamental not only in our everyday experience, but also in most of school physics. The authors argue that performing kinaesthetic activities can support student understanding and intuitions with respect to central physics concepts. The authors use the Theory of Didactical Situations to design a lesson, which targets *effort-resistance-flow*. In this lesson, a kinaesthetic activity takes centre stage in both adidactical (fully autonomous) and didactical (less autonomous) situations.

The past couple of decades, concerns about the participation in science, technology, engineering and mathematics (STEM) have been endemic in the Western World and have sparked a substantial amount of research and development activities. This has led to an increased focus on the role that potential identities related to STEM disciplines play in students' choice of study and therefore also on how young people conceive what a science student is like. Students' choice processes and their conceptions of science students build on their prior experiences with the field of science, as well as what they expect a possible future study and career in STEM to be like. In their article "Role model and prototype matching: Upper-secondary school students' meetings with tertiary STEM students", Eva Lykkegaard and Lars Ulriksen investigates how students match themselves to real life STEM role models and how this matching process is affected by the setup of the role-model meeting and by the students' individual preferences concerning role models and experiences with the disciplines.

Since language is an essential tool for both talking and thinking, metaphors may influence our perception of reality. Hence they may influence the way we view science fields like molecular biology. For instance, we speak of the immune system in terms of an army, and we speak of DNA in terms of a book. Furthermore, a metaphor determines how reality might be interpreted, since the metaphor offers one way to look at it, while eliminating many other possible ways. Generally, the metaphor is believed to be a seductive linguistic element, rather than a way of thought or action. The aim of Alexandra Fredriksson and Susanne Pelger's article "Metaphorical concepts in molecular biology students' texts – a way to improve subject-matter understanding" is to investigate the occurrence and character of metaphors, and in particular metaphorical concepts, in student-written popular science articles on molecular biology. They ask: What is the frequency and nature of metaphorical concepts used in molecular biology students' popular science texts?

Jorun Nylén's contribution to the curriculum development section entitled "Two bridges between biology and learning" gives two examples where neurobiology and evolution influences learning, and these examples are discussed in relation to education: mirror neurons and adaptive memory. Mirror neurons serves imitation and understanding of other peoples' intentions. Adaptive memory implies that our memory is an adaptation influenced by our evolutionary past, enabling us to solve problems in the present and in the future. Additionally, the aim is to contribute to bridges between natural and social sciences in an attempt to achieve an improved understanding of learning. The relevance of perspectives on learning founded in biology are discussed, and the article argues for including biological perspectives in discussions of education and learning processes.

We hope you enjoy your reading!

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