NorDiNa Editorial 2/2022

Welcome to the second issue of NorDiNa in 2022.

In this issue we have two parts which all have gone through the normal peer review process, but with different backgrounds. Four articles are from a conference by “Föreningen för Naturvetenskapernas Didaktik” (FND), and four regular articles. For this reason we have two separate introductions in this issue.

Pauline Book presents an article with the title “Creative meaning-making of a model through transformations and narratives in lower secondary school” with investigations of 11–12-year-old Norwegian students’ written narratives over time. The students were imaging living in a “Bottle Garden”, a sealed micro-ecosystem often used in school settings. The analysis focused on meaning making inspired by theories on creative visual imagination. The findings indicate that writing-tasks giving students the opportunity to express themselves in imagined worlds in a scientific context activates their bodily experiences and emotions. The approach also represents a potential for formative assessment if the writings are used for text conversations.

The article “In The Scope and Status of Sustainability Education in Out-of-School Settings across Denmark” is written by Henry James Evans and focuses on middle school students and of out-of-school education institutions (OSSEIs), for example visits to natural history museums, science and technology museums, science centres, zoos and aquaria. Thematic analysis of observation field notes and interviews with educators and teachers yielded four themes that collectively defined the sustainability programmes: institution, formal education, content and pedagogy. The authors suggest that it is essential that OSSEIs move away from a more reactive approach to sustainability policy (i.e. curriculum changes and specialised organization initiatives), to allow for a more proactive thinking mind-set within sustainability practice, using their unique areas of expertise.

Louise Rietz, Anders Jönsson and Mats Lundström article “Students’ experiences of an SSI and the perceived significance for their roles as democratic citizens” explores the experiences of Swedish upper secondary school chemistry students working with a socio-scientific issue about per- and polyfluoroalkyl substances (PFAS). The results show that the students are able to view the issue from different perspectives and to understand the inherent complexity. The results also suggest that the students developed their critical thinking skills and awareness as consumers. Furthermore, students report to have developed an interest in environmental issues and a feeling that they have opportunities to make a difference. These aspects constitute important conditions for active citizenship and informed decision-making.
Lars Ulriksen and Andrea Fransiska Møller Gregersen article “Expectations and Challenges of First-Year Biotechnology Students – The Importance of Social Relations” explores the expectations and experiences of first-year biotechnology students. The analysis builds on video-diaries, interviews and open-ended survey responses. The findings indicate that the students were mainly challenged by the organisational dimension (lack of clarity in goals and course organisation). The social relations to peers were pivotal for the students as learning support when managing the challenges and decoding expectations, but also for keeping up the motivation. The authors argue that in order to support the students’ sense of belonging and their academic achievements, the study programmes should facilitate the formation of social networks and consider the course organisation and management.

We hope you enjoy your reading,

Clas Olander & Are Turmo
Editors of NorDiNa

Contributions from the FND-conference 2020

The subsection of this issue of NorDiNa includes four papers that were all part of the digital conference FND (Svensk förening för forskning i naturvetenskapernas didaktik, http://www.fndidaktik.se/) in November 2020. The FND conference was organized by the Department of Pedagogical, Curricular and Professional Studies at the University of Gothenburg. FND is a non-profit association, which was established in 2001, composed of science education researchers in Sweden. The association arranges conferences biannually and works as a platform for research, teacher education, and school and preschool education. The next FND conference will be held at Mittuniversitetet, Campus Sundsvall, November 8-10, 2022.

The 2020 FND conference attracted nearly 60 participants, most of whom were also authors or co-authors of the 25 oral presentations held during the two-day-long conference. The theme of the conference was “Multilingualism and multimodality in science and technology education”, and the conference provided a picture of ongoing educational research in Sweden. The participants represented 15 universities and colleges in Sweden, and both senior researchers and doctoral students were among the participants. At the conference, a call for a thematic issue of NorDiNa was made. In the call, we invited the researchers who presented their research during the conference to develop drafts of papers for publication based on their presentations. The researchers were asked to submit summaries of planned articles in the autumn of 2020. Of the total of ten summaries submitted, eight were judged to be relevant to the conference theme. The authors of the selected summaries were then asked to develop their summaries into full papers and to submit them in the spring of 2021. Finally, six full drafts were submitted, after which the drafts were sent out for blind peer review, in line with NorDiNa’s ordinary routines. The review rounds eventually resulted in the acceptance of four papers, each of which are presented below.

In the article “Reflecting on Boundary Crossings between Knowledge and Values: A Place for Multimodal Objects in Biology Didactics?”, Dawn Sanders reflects on the affordances of multimodal objects, through three practice-based narratives, or vignettes. The vignettes are drawn from specific personal teaching experiences in a higher-education context in Sweden and different categories of student groups. The paper highlights the potential of multimodal tools as boundary objects between knowledge and values in biology education and between art and science approaches to knowledge and inquiry. The three vignettes concern teaching moments called “Learning to Look at Plants”, “Being
Bird: Meetings with Mortality” and “Young Children and the Environment: A Window on a Changing World”. Sanders concludes that her reflective narratives suggest that multimodal objects can support higher-education students’ engagement with affective discussions in biology and related classes.

Anna Maria Hipkiss and Eva Nyberg’s article "Rainforest Conversations – How Students Talk about Plants” aims to explore the multimodal affordances of the rainforest in a greenhouse botanical garden in Sweden. The study takes its point of departure from the concept “plant blindness”, the inability to acknowledge plants in our environment. The researchers shadowed the student groups as they walked through the greenhouse, and noted on an observation protocol where the student teachers stopped and what they did. Moreover, the student teachers’ conversation during the walk was audio recorded. The results show that the walk through the botanical greenhouse provides the students with multimodal and multisensory experiences. Additionally, the students get opportunities to explore the rainforest and its plants throughout the walk. The texts on the signs adjacent to the plants also play an important role for students’ meaning-making, together with the conversations between the student teachers during the walk.

Ingela Bursjöö describes a classroom study performed by a teacher who is also the researcher. The article is titled “Multimodality in the Teaching of Biology: Student Voices about Sequencing of Some Semiotic Resources.” The focus of the study is how lower secondary students make use of and describe the semiotic resources offered in a teaching sequence consisting of three lessons. The content is hearing and ear anatomy in biology education. The data consists of observations, student surveys and interviews from two different classes. The findings indicate that students can benefit from using different semiotic resources, if carefully chosen, and that the order of the semiotic resources used may also matter. Embodied cognition such as touching and exploring a physical model of the ear seems to be important for the students to be able to make full use of the digital simulation. Bursjöö concludes that as new learning resources are added, the teacher constantly needs to evaluate the teaching in order to plan and prepare the subsequent teaching in the best way.

Eva Nyberg, Miranda Rocksén, Nada Baker and Cecilia Silverhagen Camacho,’s paper “Emotions and Aesthetics in Preschool Science” presents a research project that is a collaboration between teachers and researchers in a preschool context. The aim of the paper is to contribute knowledge on how aesthetics and explorative teaching is used in science education in preschool with children aged 3-5 years. The data analysed in this study is interactive logbooks that were used as communicative tools throughout a five-month-long project about soil and earthworms. The thematic analysis reveals that different aesthetic and multimodal experiences are expressed during the project: for example motion, drawing, communicative and verbal expressions and close observations. The logbooks show the children’s engagement, curiosity and sense of fascination. Furthermore, the preschool teachers make use of the children’s expressions of engagement and base the following activities on the children’s interests.

Eva Nyberg & Karin Stolpe
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