

English summaries

Sofie Hellberg and Benjamin Knutsson: Devices and distinctions: Education for sustainable development and the global biopolitical GAP [Don efter population? Utbildning för hållbar utveckling och det globala biopolitiska GAPet]

Education for sustainable development (ESD) has become recognised as a key way of meeting contemporary sustainability challenges. In accordance with Agenda 2030 and the sustainable development goals (SDGs), the global action programme on education for sustainable development (GAP) is now under implementation globally.

A recurrent message is that ESD unites humanity in a common pursuit of a better, more just and 'greener' life for all. But do these efforts unite mankind and create a more equal world? The thesis in this article, which we base on previous research on sustainable development, is that ESD interventions, rather than achieving such a desired state, attribute different roles, responsibilities and lifestyles to different categories of people.

The article, which is a theoretical and methodological contribution to Nordic Environmental and Sustainability Education Research, argues for the need of global outlooks and studies of how GAP is implemented in relation to different populations in different contexts. It also makes a case for the usefulness of a biopolitical perspective. Such a perspective focuses on how the conditions of life, at the aggregated level of populations, are administered and regulated. Biopolitics in a neoliberal governance regime is premised upon, and consolidates, distinctions between different forms of life and uses the agency of the free subject in order to create responsible subjects. This perspective hence makes possible a problematization of ESD as a force that unites mankind in the mission towards a sustainable future. However, one important argument in this article is that we need detailed empirical studies on ESD interventions and their biopolitical effects, not only in terms of how sustainable lifestyles are constructed within these programmes but also on how individual subjects react to them in terms of compliance, negotiations,

resistance and identity formation. Such a framework hence acknowledges the uncertainty of governing and requires rich empirical data from different geographical contexts.

Based on biopolitical theory, the article therefore proposes a methodological framework for the study of the biopolitics of ESD. Methodology is in this context understood in a broad sense: in terms of an intellectual process that includes reflections on the relationships between theoretical assumptions, data collection and analysis as well as knowledge production. The framework focuses on governing rationales, governing techniques and governing effects. Questions that can be asked in relation to these themes are for example how GAP actors – be they schools, NGOs or other relevant actors at global, national and local levels – construct different populations as appropriate for particular forms of ESD? (rationales). And further, how pedagogical tools such as syllabus, learning objectives and teaching activities are put to work so as to conduct people's conduct (techniques) as well as how the participants construct notions of sustainable development and sustainable lifestyles in connection to these education interventions (effects).

By asking such questions in different geographical and socio-economic contexts where GAP is implemented we can learn something about how sustainable development and sustainable lifestyles are understood and constructed in relation to different populations. In turn, this creates an understanding of how GAP works as a global biopolitical regime and how ESD interventions risk reproducing the global gap that distinguishes between rich and poor populations.

Such an approach takes us beyond official discourses and makes visible more problematic aspects of (education for) sustainable development. The conclusion of the article is that there is a great need for such knowledge production if we are serious about wanting to promote a better, more equal and a greener life for all.

Helena Pedersen: Saving a Threatened World: A schizoanalytic critique of the function of animals in upper secondary Natural Resource Use programmes [Att rädda en hotad värld: Schizoanalytisk kritik av djurens funktion i naturbruksutbildningar]

This article analyses and critiques the functions of animals in Swedish upper secondary Natural Resource Use programmes, designed to prepare students for future professional work primarily in the animal trade sector, such as pet shops, zoos, and animal research laboratories. The article focuses on educational practices relating to nature conservation and sustainability.

Its purpose is twofold: First, to investigate how Natural Resource Use programmes connect students and animals through educational practices in environmental conservation and sustainability issues. This involves analysing how the machines of Natural Resource Use education work, and what they produce. The second purpose is to apply and evaluate schizoanalysis as a tool for Environmental and Sustainability Education Research, as well as for pedagogical and didactic research more generally.

Schizoanalysis (Deleuze & Guattari, [1972]2009) is a mode of critical inquiry that has its origins in psychoanalysis as well as in Marxism, analysing relations between power and desire as a core part of critical social theory. Schizoanalysis explores the hyperactivity, contradictions and anxieties ceaselessly created around socialisation and subjectivity formation processes, especially under conditions of capitalist expansion, making it particularly interesting for education research. Through schizoanalysis, education emerges not as a coherent institution, but as a set of machines, devices and technologies forging together humans, animals and materialities in contested spaces of teaching and learning. The article analyses how these machinic dimensions of education organise pedagogical activities while being constantly traversed by shifting and heterogeneous affects and forces of all sorts.

Data collection has been carried out through ethnographic field studies and semi-structured interviews with students and teachers in two upper secondary schools during a total of 83 days. As a “post-qualitative” (Lather & St. Pierre, 2013) approach, schizoanalysis has no general guidelines, but is developed in the intersection between a philosophical work and a specific set of data. The philosophical work engaged in this study is Deleuze and Guattari’s *Anti-Oedipus* ([1972]2009). An overarching analytic task is to begin to identify educational desiring-machines and what they produce. The results of the study are presented in two empirical sections: (1) Desiring-machines: Human-animal relations as pedagogical force; and (2) Promise-machines: Saving a threatened world.

Natural Resource Use programmes appropriate animals as affective investments and desiring-machines to promote the programmes and attract applicants. Once students are enrolled in the programme, desiring-machines are connected to technical and analytic machines that organise affect-flows and form a professional, self-disciplining “animal caretaker subject”, educated to work in the animal-based economy. With a schizoanalytic approach, Natural Resource Use programmes capture, mobilise, and organize desire-flows in multiple creative ways: sometimes to fulfil students’ dreams, sometimes to repress. These processes connect students and animals through both violence and care, and insert them both into the economy of the animal production system, where scientific knowledge production is a significant part. In this

analysis, environmental and sustainability education emerges as technologies of teaching, rather than a field of subject didactics; and affective feelings between students and animals become components of the animal production system, rather than a “natural” expression of empathy. Although schizoanalysis has no predefined agenda that offers a way out of present power arrangements and environmental crises, continued schizoanalytic work can identify how emancipatory processes may be catalysed within and beyond formal education.

Lili-Ann Marléne Wolff and Ann-Christin Furu: Sustainability in Finnish Kindergarten teacher education: From concept to commitment [Hållbarhetspedagogik för finländska barnträdgårdslärostudenter: Från begrepp till engagemang]

Education for sustainability is part of the national core curricula for early childhood education and care in Finland. Education for children aged 0–6 years is supposed to follow and promote the principles of a sustainable lifestyle. Kindergarten teachers are in a key position to implement this vision and realize sustainability in the daily practice of daycare and pre-primary education. However, research on early childhood sustainability education as well as on sustainability in pre-service Kindergarten teacher training is limited.

The aim of this study is to explore how sustainability education can be realized in a way that promotes learning among Kindergarten student teachers. To reach this aim, we asked two questions: 1. How do the students understand the concept of sustainable development at the beginning of their studies? 2. How do they relate to the concept during a course including sustainability education?

We conducted the study in two steps. The data in step one consisted of mind maps of 46 students from two Finnish universities (A and B). The data in step two consisted of course evaluations answered by 28 students from University A, and 12 students’ learning diaries in the same course. These 12 are included in both the 46 who drew the mind maps and the 28 who wrote the diaries. The mixture of approaches, data and analyses could be called mixed methods. We collected both quantitative and qualitative data and analyzed them in various ways.

We analyzed the mind maps through four lenses. The first lens was quantitative and focused on how much the respondents had written. The second lens was qualitative, focusing on the perspective and breadth of the respondents’ understanding of the subject. Through the third lens, we searched for potential actors for a sustainable future pointed out by the respondent. (The fourth lens, we will write about later).

We conducted step two of the study during a university course in the third semester of the Kindergarten teacher education at the University A. The course comprised 4 academic credits (ECTS) and dealt with environmental, nature and sustainability issues.

The analysis of the 12 diaries was based on hermeneutics, which meant that we interpreted the diaries as a whole and in parts and in comparison with each other. Our analysis consisted of repeated reading of the diaries. In particular, we interpreted in which ways the students talked about sustainable development and sustainability, how they understood the concepts, and how they looked at them in relation to their future profession. We tried to determine the mood of the stories, judge whether some components dominated others, count repeated statements, and reflect on interesting statements. We finally considered the students' learning process and their attitude to the topic of sustainability.

The course evaluation took place with the help of a questionnaire with nine closed and two open questions. However, the students also had the opportunity to comment on and complete the closed questions. In addition, they rated the many elements of the course on a scale from 1 to 10. The students also evaluated how well the course corresponded to the course objectives and how it supported their learning.

The result of step one of the study shows that the student kindergarten teachers' understanding of the concept of sustainable development was inadequate before attending the course. This was despite the fact that sustainable development has been emphasized in the curricula for basic education and secondary education in Finland since the 1980s. Both the quantitative and qualitative alterations in the material were large. Some respondents revealed no real understanding at all of the concept, while a few of them were able to describe all dimensions of sustainability in a very complex way. Qualitatively, the content varied from respondents primarily visualizing the issue as related to environmental and natural resource management to those understanding it as overall lifestyle issues. A few mind maps contained educational and professional aspects of the preschool's activities and management, governance and innovation issues. However, in some mind maps there were also direct misconceptions of the concept.

Since the participants' backgrounds were heterogeneous, their perception of the course content varied considerably. All of them appreciated the course diversity and many preferred the practical elements, while others emphasized the course as an entity. In the mind maps, the students enthusiastically described the importance of working with sustainability issues in preschool.

The evaluation and the diaries furnished similar answers. After the course, the concept of sustainable development had become familiar and also interesting, something the students wanted to promote in their future work.

Sustainability became meaningful for the students when they were engaged in practical collaborative exercises and meaningful discussions. They regarded the hands-on elements using nature as important in their learning.

When theory and practice alternate, and opportunities exist for students to discuss these with each other and the teacher, the students gradually adapt a reflective teaching style and learn to translate theories into practice and vice versa. Yet this course was not able to give a complete multidisciplinary perspective of this complex issue. A single course in an education program is not enough to equip future preschool teachers with tools to handle complicated sustainable issues in their entire work career. Sustainability thinking needs to be distributed into all courses in the Kindergarten teachers' pre-service training. Only then will all dimensions of the very complex concepts of sustainable development and sustainability, regardless of what division we follow, become a multidimensional reality. The students also realized that they will need continuous in-service training in sustainability education.

In conclusion, our study shows that student kindergarten teachers' learning about sustainability is promoted by practice-oriented and collaborative learning. The students' own involvement is an important factor, as well as their ability to interact with and share their thoughts and experiences with other students. Their own experiences, especially in non-university environments, are also a crucial component.

Mia Svedäng, Bodil Halvars, Ingela Elfström and Johanna Unga: From complex issues to concrete content - the preschool didactics of sustainable development [Från komplexa frågor till konkret innehåll – hållbar utveckling ur ett förskoledidaktiskt perspektiv]

This paper tries to illuminate preschool teacher's thoughts, ideas and strategies concerning what sustainable development can be in a preschool context. The study maps and analyses the discussions in four parallel groups in three Preschool Didactic Rooms – a network/platform for discussing, collaborating and sharing ideas about science and Early Childhood Education for Sustainability (ECEfS). The study is grounded in concepts like “Learning as a relational field of potentiality” (Deleuze & Guattari, 2015) and recent preschool didactic research (Dahlberg & Elfström, 2014; Unga, 2013; Olsson, 2013).

The aim with the network Preschool Didactic Rooms is to collectively develop preschool didactics focusing on science and sustainability, through sharing and discussing ideas and experiences about ongoing science and sustainability projects and processes in the preschools. Approximately 40

preschool teachers, researchers and students from Stockholm University participated in the studied network meetings.

Three main themes emerged in the preschool pedagogues' discussions: 1) What is sustainable development in a preschool context about and how do the preschool teachers meet the challenges imbedded in the subject? 2) What is the preschool teachers' view of the role of the children for a sustainable future? 3) What role can a network like Preschool Didactic Rooms play in the teachers' professional development and how is the network used?

Sustainable development issues were regularly discussed in the network, the preschool teachers showed a serious commitment in sustainability issues and pointed out that social and ecological sustainability were mutually interdependent. Subject content which emerged in the discussions was cycles in nature and ecological relationships. The preschool teachers highlighted the importance of connections between species, interdependence, caring and empathy. They also emphasized that sustainable development is a complex and abstract concept and that it is important to concretize it using "down to earth" methods. Many pedagogues use aesthetic and creative working methods like drama, art and play to approach complex sustainability questions, but they also stress the importance of reflection and discussion when addressing these questions.

Many preschool teachers pointed out that sustainability addresses complex questions and that it is important to be able to break them down so they suit also the youngest children. They emphasize the importance to practicing a holistic perspective, and the dilemma with being honest and illuminate the environmental problems without at the same time being alarmistic. It is obvious that the pedagogues give credence in the children, their creativity and ability to approach the challenges of the future. They point out the importance of discussing environmental problems and potential solutions with the children.

The discussions in the network revealed that the preschool teachers used and appreciated the platform/network as an important arena for sharing important ideas and experiences with colleagues. They pointed out that it was interesting to reflect on sustainability issues on "such a high level", and much of what was discussed was taken straight back to the preschool teachers' practices, distributed among colleagues and used in every day work.

Thus, the network Preschool Didactic Rooms can be viewed as a "Learning as a relational field of potentiality" (Deleuze & Guattari, 2015) where preschool didactic research (Dahlberg & Elfström, 2014; Unga, 2013; Olsson, 2013) focusing on sustainable development, is highlighted and discussed and inter-connections and complex relations are formed. This relational approach is fruitful for illuminating the rhizomatic connections and interplay among

preschool teachers participating in the network and the reorientation of thinking which is crucial in creating a sustainable future (Tillmanns, Holland, Lorenzi & McDonagh, 2014).

Marie Grice, Anna Mogren, Helene Grantz and Niklas Gericke: Teacher competences in education for sustainable development – the development of a questionnaire instrument [Kompetenser för lärare inom utbildning för hållbar utveckling– konstruktion av ett enkätinstrument]

Teacher competences in education for sustainable development - the development of a questionnaire instrument [Kompetenser för lärare inom utbildning för hållbar utveckling– konstruktion av ett enkätinstrument]

Since the introduction of the UN's development programme – Global Action Programme (GAP) – in 2014, activities in education have increased in relation to ESD. One of the purposes of GAP is to change a global educational agenda so that everyone will have the possibility of developing the competences required to contribute to sustainable development. The overall barriers of implementing ESD as identified by UNESCO make up three categories: limited economic resources, the lack of awareness and support and limited knowledgeable human resources in ESD including the ability of leading for change processes. Teachers are expected to develop their own as well as their students' sustainability competences. Therefore, the study of teacher competences is of great importance. Empirical studies focusing teachers' approaches to ESD are however limited, and so are quantitative studies of in-service teachers' competences in ESD. In response to this gap it is of great importance to develop new research instruments with the ability to investigate and analyze the development of teacher competences in ESD, especially in relation to continued professional development initiatives.

The aim of the study is to develop a research instrument using a broad conceptualization of competence as a theoretical framework, and then to correlate these results to the teachers background variables of: age, sex, teaching subject and years of work experience as a teacher. The conceptualization of competences can be described as holistic and integrated recognizing the multidimensionality of the concept. The assumed dimensions of competence in the study stem from the OECD-framework Definition and Selection of Competencies (DeSeCo) that is underpinned by the following competence aspects: knowledge, practical abilities, ethical values, attitudes and emotions. Two research questions are used to guide the empirical work that explores them:

How can ESD competence be operationalized in a questionnaire through teachers' approach to the ESD teaching perspective?

What correlations can be established between the dimensions of ESD competence and the background variables of sex, age, teaching subject and years of work experience as a teacher?

A 26-item questionnaire of Likert-type questions was distributed electronically to a convenience sample of teachers at a Swedish upper-secondary school in the process of implementing ESD. It is assumed that the choice of school is crucial for exploring ESD competences. The results are thus based on 183 participating teachers, 53 per cent female, 46.5 per cent male, 0.5 per cent not applicable. The average age span is 40-49 years old and the average span of years in the teaching profession is 11 to 19 years. Among the subject-matter categories, vocational teachers and teachers of esthetics dominate, followed by language teachers and teachers of natural science, technology and mathematics.

An exploratory factor analysis, principal component analysis, orthogonal rotation, was conducted using SPSS 23.0 in order to explore the dimensionality of the concept of ESD competence among teachers. Four dimensions were identified using all the variables, rendering a four-dimension model. The dimensions were named teaching (15 variables), motivation (5 variables), capacity (3 variables) and barriers (3 variables) based on concepts in the teacher competence literature. The assumed aspects of competence are spread across the identified dimensions, except for in the dimension of capacity, in which all the variables belong to the competence aspect of knowledge. It seems that knowledge is important for the competence aspect of capacity among the respondents. By contrast the dimension of motivation does not contain a variable of the knowledge aspect. The largest dimension was teaching, which fathoms the pedagogical work of teachers. The dimension named barriers is made up of variables relating to the assumed dimensions of feelings and practical abilities.

The variables that make up each dimension were transformed into sum variables and the demographic variables of sex, age, subject-matter category and years of work experience were transformed into dummy variables before they were entered into bivariate analyses. One quality at a time was correlated with each dimension. No significant correlations could be established between the demographic variables and the dimensions, which suggests that the participants responded in a homogenous manner. This could depend on the development of a specific school culture at the participating school, which actively work with ESD implementation.

The questionnaire instrument of teacher ESD competence developed in this study offers a novel and useful tool for the research field of ESD to monitor longitudinally the development of ESD implementation over time, as well as

comparing and disseminating the effects of different ESD initiatives, and/or comparing different groups that undergo the same initiative.

The results of the study are limited by the fact that the research instrument was used for the first time. The Cronbach Alphas were acceptable but not entirely satisfactory, which means that the instrument needs to be further developed and used in additional studies. In future studies it will be relevant to examine whether the four-dimensional model of teacher ESD-competence can be established also among teachers who work in schools that are not actively implementing ESD.

Helena Roos and Ulla Gadler: The importance of competence in the didactic encounter – a model for analysis of equal education opportunities for all students based on the mission of the school [Kompetensens betydelse i det didaktiska mötet - en modell för analys av möjligheter att erbjuda varje elev likvärdig utbildning enligt skolans uppdrag]

The Swedish school has a mission to provide equal education for every student. The point of departure in this equal education is every students' prerequisites. The mission, which can be termed as the double mission, covers development of knowledge, as well as development of socialisation. Several reports, from for instance the National agency of education and the Swedish Schools inspectorate (Skolverket, 2011, 2015; Skolinspektionen, 2014, 2016), reports on a discrepancy between the statements and the objectives behind the governing documents and what is actually happening in schools regarding every students' opportunity to learn and have access to equal education. This discrepancy can affect individual students' opportunities to achieve the stated goals and be included in the school activities.

The research presented in this article highlights conditions for Swedish schools to realise the double mission of school governed by the Swedish school law. This is made by focusing the quality of the didactic encounter in relation to every students' right to equal education, and motivation for lifelong learning. The aim is to develop a model for analysing the quality of the didactic encounter. The model contains three components; students varied prerequisites in relation to equality in the education; professional competence to realise content inclusion, dynamic inclusion and participating inclusion; realising the double mission of school. The quality of the didactic encounter is affected by how these three interrelated components convey.