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Utbildning för hållbar utveckling från en lärarhorisont: sammanhang, kompetenser och samarbete

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Education for Sustainable Development in science education: coherence, competences and collaboration

Education for sustainable development, ESD, seeks to elucidate complex problems and interdisciplinary, holistic and transformative teaching and learning are described as possible approaches. All teachers, regardless of what subject they teach or where they are in their careers, must face dilemmas related to educational practice, including sustainability issues.

However, ESD is found to be unsatisfyingly implemented in the Swedish educational system and in teacher education. This gap between the teaching practice, policy documents and research could depend on several factors, including valued outcomes, curriculum, school management, teacher competencies and (lack of) professional development.

The aim of this thesis is to understand how teachers handle the assignment to educate for sustainable development. In the hermeneutic interpretation of data, from open-ended questionnaires, interviews and participating observations, three different analytical tools are used; a model of transformative processes, an interconnected model of continuing professional growth and the idea of professional capital.

The teachers in the study have high ambitions for the outcomes of their teaching related to ESD; they describe student capabilities of higher order thinking as critical ability, analytical and communicative abilities and a thorough understanding of scientific concepts. Some of the described capabilities even go beyond the curriculum, as empathy, courage and rebellious actions. The competencies related to ESD have a considerable ethical dimension, both related to the students, the ESD content and to the teachers themselves. When teachers collaborate with colleagues their different competencies could complement each other. However, the teachers describe how their possibilities to plan and perform interdisciplinary collaboration have decreased. The teachers also describe an increase in the complexity related to their profession.

As a result of the analysis of longitudinal data four different trajectories are constructed and elaborated. These pathways describe changes in teachers' reflections on teaching sustainability issues. The ecological pathway emphasizes the environmental aspects. The holistic pathway emphasizes changes of society and education. The curriculum-based pathway emphasizes writings in policy documents, as the curriculum. The fourth pathway is fundamentally different from the three others; expressing signs of a disillusion, and even talking about leaving the teaching profession.

The thesis illustrates how science education is loaded with values as well as subject knowledge. To work productively with ESD requires several competences beside science, as philosophy and ethics, which the teachers in the study regard as lacking in their training. Therefore teacher education is of particular interest to support teachers to deal with a changing society. So is teacher professional development, as it is impossible to include all future challenges within the limited period of time that is available for teacher education.

One important conclusion is that the external influences on teachers are found to increase during these seven years, whereas opportunities for informed decisions, passion and creativity, vital parts of teachers' professional capital, are found to decrease. Professional development need to be more informed by research and consider the collective capacity of teachers. Particularly, research from areas as scientific literacy, socio-scientific issues and ethics in science education could contribute to frame sustainability issues.

Since individual teachers are the bridge between science, curricula and educational practice an extensive toolbox is essential. The analysis of data from the present study implies that ESD challenges the whole educational system.

Keywords: science education; education for sustainable development; ethical competence; interdisciplinary collaboration; professional capital; teacher professional development; transformative learning.