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Postprint

This is the accepted version of a paper presented at *ECER Porto 2014 EERA Conference, The past, present and future of educational research in Europe*.

Citation for the original published paper:

Gericke, N., Berglund, T., Olsson, D. (2014)

The effect of ESD implementation in the Swedish school system on students' sustainability consciousness.

In:

N.B. When citing this work, cite the original published paper.

Permanent link to this version:

<http://urn.kb.se/resolve?urn=urn:nbn:se:kau:diva-34824>

The effect of ESD implementation in the Swedish school system on students' sustainability consciousness

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The UN Decade of Education for Sustainable Development (DESD) draws to an end. During this decade, numerous schools in Sweden have implemented *Education for Sustainable Development* (ESD) as an explicit guiding approach in teaching. In this study, we investigate what impact this teaching approach has had on pupils' holistic viewpoint of sustainability in comparison with pupils' taught in regular schools. In order to accomplish the investigation we introduce the concept of *sustainability consciousness* to represent the holistic viewpoint of sustainability.

In order to accomplish a better implementation of ESD in Swedish schools there has been several external initiatives ('Eco-schools', 'Schools for Sustainable Development', 'School on sustainable way' The Global School') that worked together voluntarily with schools to achieve this goal. The schools participating in these endeavors ("ESD-schools"), which include certifications, in-service training and concrete plans to work with these issues in the classrooms, can be regarded as the schools that made most progress with the implementation of ESD in Sweden, and has therefore been selected for the present study.

The globalization process in last decades made it important to educate through an ESD approach in order to broaden the scope of environmental education to also incorporate economic and social dimensions (Borg et al., 2013; Sandell et al., 2005; Walshe, 2008). Moreover, ESD is considered as an action competence approach that aims to empower students so that they can take action in complex issues regarding SD (Mogensen & Schnack, 2010). To nurture this action competence it has also become important to incorporate affective aspects and not just cognitive aspects of learning (Littledyke, 2008; Sandell et al., 2005). The goal for sustainability education is not only to change students' behavior, but to prepare them for sustainable decision-making in their future lives through social learning (Wals 2011). To further emphasize the importance of including both cognitive and affective components in learning Warburton (2003) claim: "Effective education for sustainability prompts students to reflect on their learning and leads to changes in values, attitudes and behaviors" (Warburton, 2003, p. 50).

Research that in a larger scale investigates cognitive and affective aspects of SD from a student perspective is limited. Previous research in Sweden has mostly focused on classroom studies (Rickinson & Lundholm 2008; Rudsberg & Öhman 2010) or teacher perspectives (Borg et al. 2012; Sund & Wickman 2008). Internationally, a number of surveys focus on the effects of environmental education (i.e. Negev et al. 2008; Boeve-de Pauw & Van Petegem 2013) or have a more qualitative approach with fewer students involved (i.e. Walshe, 2008; Summers et al. 2004).

Therefore to be inclusive of the vast goal of ESD-implementation and study it in large scale we have developed the concept of *sustainability consciousness* which investigates the representation of the *environmental, economic and social* dimensions of SD, from students' point of view, by connecting each of these dimensions to aspects of: *knowingness, attitudes and behaviors*, i.e. both cognitive and affective aspects. In that way we hope to reflect a more comprehensive as well as generalizable view of students' capacity building and action competence regarding SD-issues than presented before.

This study aims to investigate the effects that the implementation of ESD has had on students' views on *sustainability consciousness* in comparison to students in comparable regular schools.

Methodology

To investigate students' *sustainability consciousness* we developed a survey instrument. Based on an analysis of available instruments in the literature we found a Canadian questionnaire (Michalos et al. 2011) that met our conditions, i.e. to be related to a holistic view of SD including the three dimensions as well as cognitive and affective aspects. Some of the items in this instrument were removed while other was changed to match the construct of *sustainability consciousness*. Thereafter the items were categorized to measure knowingness, attitudes or behavior within the environmental, social or economic dimension of SD.

The survey instrument was then validated in two pilot studies, as a consequence two versions of the survey were developed: one with more simplistic language for 6th grade respectively another for 9th and 12th grade. Our final versions of the questionnaire consisted of 50 items distributed as; 17 items of the environmental dimension, 13 items of the economic dimension and 20 items of the social dimension. Of our 50 items, 19 belonged to the knowingness aspect, 14 belonged to the attitude aspect and 17 to the behavior aspect.

Based on empirical data registers from ESD-implementing initiatives ('Eco-schools, 'Schools for Sustainable Development, 'School on sustainable way', 'The Global School') the most prominent ESD-schools in Sweden for compulsory school, (18 schools within grade 6 and 9) and upper secondary school (10 schools within grade 12), were selected respectively. The registers have been used to identify schools that 1) worked the longest with ESD implementation, and 2) shown the highest level of activity. 27 reference schools (REF-schools) that matched the ESD-sample were then selected on the basis to match each of the ESD schools in all aspects except their ESD approach. Therefore, school size (number of students), geographic location and socio-economic factors were selected to be similar and fully comparable to the sample of the ESD-group. One class in each school was then randomly selected to participate in the study resulting in; 934 students from grade 6, 841 students in grade 9, and 638 students in grade 12. The response rate was 81 %.

The data was analyzed in SPSS version 20 in order to investigate differences between students from ESD- respectively REF-schools. Multivariate analysis of variance (MANOVA) was used to investigate the full complexity of the students' *sustainability consciousness*, while univariate analysis of variance (ANOVA) was used for investigate differences between students' views of the SD dimensions.

Conclusion

The results indicate small but significant differences in *sustainability consciousness* between students from ESD-schools compared to students from REF-schools. The three-dimensional MANOVA analysis showed that for 6th and 12th grade the students from ESD-schools had significant higher values of *sustainability consciousness* compared to students from REF-schools ($p \leq 0,05$). Even more interestingly the results for grade 9 students were opposite, i.e. ESD-schools in grade 9 had a significant negative effect on students' *sustainability consciousness*.

From the one-dimensional ANOVA analysis we can also see a fragmented effect of ESD-schools on students' views of SD. When comparing each dimension separately we can for grade 6 see significant ($p \leq 0,05$) differences regarding the environmental dimension, which was more recognized among students from ESD-schools. In grade 9 REF-students showed significantly higher mean values for the social dimension, while ESD-students in grade 12 recognized the economic dimension significantly higher. For students from all grades and school types the social dimension was recognized the most. This was somewhat surprising and differs from previous studies (Borg et al. 2013; Summers & Childs 2007). The economic dimension was connected to the largest diversity of viewpoints in this study.

The Cronbach's alpha value for the instrument as a whole was 0,903 indicating a good reliability. By separating the Cronbach's alpha for each grade and dimension the value differs between 0,674 and 0,840, showing that the reliability of the results of ANOVA also were sufficient.

This study raises the question about the proficiency of current ESD-implementation in Sweden. The results of this study show only minor effects of current ESD-implementation, and call for a need to change. However, this study do not reveal what in the ESD-implementation process that break down, therefore more research is needed.

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