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Perceived learning experiences regarding Education for sustainable development – within Swedish outdoor education traditions

Abstract

This article presents results from a Swedish exploratory study investigating perceptions of the learning experiences related to education for sustainable development (ESD) by students 10-12 years old. A comprehensive questionnaire with both open and closed questions asking for the students' cognitive, emotional, practical, social, and situated learning experiences was developed. The empirical material consists of the responses from 209 students from six schools. The schools were selected to get a variety of both school programs regarding ESD and outdoor education activities. The results reported here reveal relationships between areas of students' learning experiences, mainly between the cognitive, emotional, and social areas. Comparisons between the schools illustrate different approaches to teaching as well as the students' diverse perceptions of these practices. The questionnaire developed for the project proved to be a valid instrument for researching the relationships and complexities in ESD learning, thus demonstrating its potential for use in future studies.

INTRODUCTION

The implementation of 'Education for sustainable development' (ESD) has been politically mandated through UN and UNESCO policy as well as evaluated, where different approaches were found (UNESCO, 2009). In accordance with UN and UNESCO policy, many schools, all over the world, have taken on an ecological or sustainability profile (Breiting & Wickenberg, 2010; Eco-Schools-organisation, 2012). Sweden is no exception, as policy documents, curricula, and 'green' schools are readily found also here. For this study, we were interested in exploring how students perceive and experience learning, in other words, how they deal with the content of, and activities related to ESD. Studies investigating the students' thinking about environmental and sustainable issues (Loughland, Reid, & Petocz, 2002; Walshe, 2008), students' emotions towards nature and the environment (Alerby, 2000; Kalvaitis & Monhardt, 2011), and students' experiences of social learning for sustainability (Wals, 2009) have given important knowledge of some perspectives when learning for sustainability. However, there seemed to be a need for more holistic investigations of students' perceptions and experiences of Education for Sustainable Development. This study, therefore, aimed to explore the relationships between cognitive, emotional, practical, social, and situated aspects of ESD.

EDUCATIONAL BACKGROUND

Education for sustainable development in Sweden, and Scandinavia in general, has its roots in environmental education (EE) (Breiting & Wickenberg, 2010; Sandell, Öhman & Östman, 2005), as it has in many other parts of the world (Hart & Nolan, 1999). Environmental education is defined not only through its content: a main focus on ecology, environmental concern, and problematizing of human impact on nature but also through theories of learning practiced in teaching it. Experiential and place-based learning theories (Dewey, 1966; Fien, 1993; Gruenewald, 2008) are often the foundation for environmental learning activities. Within environmental education, researchers argue, outdoor activities engage the senses, increase students' meaningful learning, and develop environmental awareness, often through inclusive and cooperative work in groups (McRae, 1990; Mårtensson, Lisberg Jensen, Söderström & Öhman, 2011; Palmberg, 2000). Sandell and Öhman (2010) describe examples within different Swedish outdoor educational traditions pointing to educational possibilities of encounters with nature in a Scandinavian context. Among their examples are: the living of a simple yet adventurous life; gaining pedagogical advantages such as engaging the senses when learning in the outdoors; and having the ability to reflect over environmental ethical issues while encountering nature (Sandell & Öhman, 2010).

Through the Rio conference, Agenda 21, and the ESD concept of UNESCO, EE was replaced by ESD in many global and local curricula. This was by many educators and politicians seen as a better concept to focus environmental issues since it also included economic and social aspects, as well as relations between the aspects. For Sweden, Sandell et al. (2005) highlight three different traditions of ESD that can be seen both as historical steps that have developed over time, as well as resulting from perspectives in teaching activities today. These traditions are recognized as a fact-based one - learning about nature in nature; one normative - learning pro-environmental behavior; and a pluralistic tradition - emphasizing different opinions and critical thinking in sustainable education.

The Swedish curriculum (Swedish National Agency for Education, 2011) emphasizes both outdoor, environmental, and ESD perspectives for students in grades 1-6. For example, when learning biology, field studies of ecological issues are mandatory. Human relations with nature, environmental problems, as well as those of sustainability focusing on the future, are highlighted in biology, social sciences, and geography curricula. Furthermore, for health and physical reasons, outdoor activities are incorporated into sports and health curricula. Swedish compulsory schools can, within the curriculum, take on different profiles or strive for certification. In the area of environmental or sustainability issues, there is "The Green Flag" award (Keep Sweden Tidy, 2012), in addition to the Swedish National Agency for Education reward 'School for Sustainable development' (2013) and ESD model schools certified through the World Wide Fund for Nature in Sweden (WWF Sweden, 2012).

LEARNING IN 'OUTDOOR EDUCATION', 'EE', AND 'ESD'

Rickinsson et al. (2004) describe the impact of outdoor education across cognitive, affective, social/interpersonal, physical, and behavioral domains. These domains of educational objectives were also seen in a study of teachers' intentions with outdoor teaching (Wilhelmsson, Ottander & Lidestav, 2012). Research on development of social skills such as cooperation and problem solving when learning in the outdoors can be found in a study by Mygind (2009), in which he followed younger students in their outdoor activities and discovered the social advantages they gained in addition to the more cognitive ones. Studies on the effects of the practical/physical domain on children and students have shown positive results for increased health through outdoor activities in both the physical and psychological realms (Gustafsson, Szczepanski, Nelson & Gustafsson, 2012; Söderström, 2011).

Studies of outdoor environmental education activities focusing on children's relationships with nature indicate that they show positive emotions toward nature (Kalvaitis & Monhardt, 2011; Payne, 1998) as well as develop an environmental ethical awareness and responsibility when encountering nature (Mårtensson et al., 2011; Palmberg & Kuru, 2000). Environmental learning in nature has an impact on emotional and affective growth, as well as on cognitive growth, as shown in a study by Brody (2005). Integrating cognitive and affective domains in science education when aiming for environmental awareness (Littledyke, 2008) and to reach eco-literacy through "Reading Nature" in outdoor teaching (Magntorn & Helldén, 2007) has also been suggested.

Teaching and learning the topics around issues of sustainability are considered complex in content, including understanding relationships between 1) the aspects of sustainable development (Jonsson, 2007; Walshe, 2008), and 2) ecological and environmental issues (Loughland et al., 2002; Wylie, Sheehy, McGuinness & Orchard, 1998). ESD is further considered to include values and decision-making, thus displaying different ethical perspectives in complex questions about sustainability (Stenmark, 2002; Öhman & Östman, 2008). Young students' understandings and emotions regarding the ecologic, economic, and social aspects of the content of sustainable development (SD) are described in a previous article through a qualitative content analysis of student responses to open questions (Manni, Sporre & Ottander, 2013). The results showed that students' understanding varied from descriptive, up to complex levels when expressing thoughts about the aspects of sustainable development. Relational understandings were seen both within, and between the ecological, economic, and social aspects of SD. Relational understandings between all the different aspects were the most difficult for students to grasp. Similar results are also presented by Loughland et al. (2002) and Wylie et al. (1998). Students' emotional expressions were integrated in their cognitive understandings, and emotions could be seen as part of their value judgments concerning sustainability issues. Furthermore, uses of value judgments were related to more complex understandings. The analyses also showed that a question asking for emotions could make the students express even more of their cognitive understandings. These findings implied that the cognitive and affective aspects of learning are inter-related (Manni et al., 2013). In Loughland, Reid, Walker and Petocz (2003), students' emotional relations toward the environment were similarly seen as a factor influencing their conceptions of the environment.

FRAMING THE STUDY

According to policy documents, earlier research, and outdoor teaching traditions in Sweden, taking a broad holistic approach seemed relevant when wanting to explore young students' perceptions of ESD related learning activities. To gather empirical data a questionnaire was developed mainly based on experiences from teaching and learning practices. The interest of our study was not effects of teaching or evaluation of learning outcomes but the focus was rather on students' immediate experiences of their learning activities. With respect to theoretically founded holistic learning approaches this study was more inductively explorative recognizing the importance of a broad view on learning. Given such a background five aspects were identified as being of importance (Table 1).

Table 1. *Aspects of learning experiences.*

Aspects	Definitions
Cognitive aspects	When exploring students' understandings of sustainability issues, we wanted to emphasize a relational understanding (cf. Loughland et al., 2002; Magntorn & Hell-dén, 2007). Students' perceptions of 'facts' are also included in the cognitive aspect.
Emotional aspects	This aspect includes students' emotions toward, and valuing of, ESD and nature. Students' valuing of the environment, but also general aspects of environmental valuing and ethics, as described by Stenmark (2002), and Benson (2000) influenced the development of our instrument. The valuing of the different learning experiences by the students was also considered.
Practical aspects	Physical experiences and skills mentioned in the curriculum, e.g., outdoor sports, outdoor, or handicraft skills were included in this aspect as has been done elsewhere (McRae, 1990; Mårtensson et al., 2011; Sandell & Öhman, 2010). The multi-methods approach of the DESD was also considered here.
Social aspects	This aspect includes cooperation, involvement, participation, discussion, and problem solving with peers. Taking into account that learning is not just seen as an individual process, but as a social process where relationships and situations play a part. Social learning is seen as crucial when striving for sustainability (Wals, 2009).
Situated aspects	This aspect focuses situated/place-based learning; given its importance for environmental education where experiential learning activities often are performed in the outdoors. Student learning in authentic contexts has been seen as a key to engage, develop a sense of connection, and relate not only to environmental, but also to cultural and historical perspectives in ESD (cf. Smeds, Jeronen, Kurppa & Vieraankivi, 2011; Stewart, 2008).

The comprehensive questionnaire that was developed contained both closed and open questions. The statistical results of the closed questions are reported here and the open questions regarding students' understandings and emotions of the content of SD are reported in a previous article (Manni et al., 2013).

AIM OF THE STUDY

The study reported in this article aims to explore how young students perceive issues regarding education for sustainable development in a Swedish school context, where outdoor, and environmental educational traditions for some schools play an important role. Students' perceptions of cognitive, emotional, practical, and social experiences are taken into consideration and analyzed.

Research questions

1. How do young Swedish students perceive their learning experiences in relation to education for sustainable development?
2. What, if any, relationships can be found between the different aspects of learning perceived by the students?
3. Can relationships be found between the different schools and the students' descriptions of their learning? If so, what are the relationships?

METHOD

Participants

209 students, 10–12 years of age, from six different schools, participated in this study. The schools were spread out geographically across Sweden, coming from five different regions, as well as being located in towns of different sizes. The sample was purposefully chosen. The participating classes had experience from outdoor education to varying degrees, going from none at all, to extensive. The schools also had different profiles, intentions, and goals, with some of them clearly environmental or sustainability-minded. Background information of the schools was gathered from websites and analyzed. Comparisons were made in order to explore if the described formal school context had some impact on the students' learning experiences. From the formal descriptions on websites, the schools were divided into three different profiles: "Green outdoor schools," "ESD School," and "No green profile". The teachers in each school were also asked to describe the size of the school, the school profile, certifications, school activities, access to areas of nature, teachers' formal and informal education, as well as any extracurricular interests, class activities within environmental and sustainable education, and other information they considered to be of importance. Hence, the sample of participants was not randomized in order to be able to make generalizations, but still be quite representative of Swedish schools in grades 4, 5, and 6, as well as being almost equal in number between boys (105) and girls (104) (Table 2).

Table 2. Participants (N = 209).

School	School profile, formal description	Students (n)
A	Green, outdoor	62
B	Green, outdoor	69
C	Green, outdoor	15
D	ESD	28
E	No green profile	20
F	No green profile	15

Instruments

Useful and valid methods for research in questions of complexity and relations in learning pointed at the use of a comprehensive questionnaire (Gautreau & Binns, 2012; Lederman, Abd-El-Khalick, Bell & Schwartz, 2002; Wilson, Lizzio & Ramsden, 1997). Wilson et al. (1997) suggest questionnaires with closed questions that can be analyzed through factor analysis and correlation, in searching for relationships between the research questions. On the other hand, Lederman et al. (2002) suggest a more open approach for investigating variations of views among students. Considering these two approaches and their respective possibilities for analyses, we constructed a comprehensive questionnaire with both open and closed questions.

Closed questions in the form of statements, were formed building on our framework of learning (Table 1), influenced from educational goals within the formal definition of ESD (UNESCO, 2005), and earlier empirical research. Those questions included cognitive, emotional, practical, and social aspects of learning experiences. The students could choose to agree or disagree on a Likert scale in five steps (1: 'not agree at all' to 5: 'totally agree') when answering questions about their ESD related experiences. In table 3, questions in the questionnaire can be seen as exemplary items. When creating the questionnaire we paid attention to the different possibilities of analyzing variations and relationships. The development of the instrument also took the ages of the children into consideration in such a way that it would capture their attention through a mix of open and closed questions, in order to keep their interest and focus. The wording and the order of the questions were checked and impro-

ved, in both questions and structure, in order to avoid misunderstandings and content bias (Cohen, Manion & Morrison, 2010). The experience of one of the researchers as a teacher in lower secondary school was useful when creating the questionnaire, both in content and form.

Data collection

Invitations to participate were sent out either to principals that recommended teachers, or to teachers directly. Seven teachers from four schools with the green (or ESD) profiles responded affirmatively and took part in the study. Another two classes from schools without the green profile were included in a second step. Recommended research ethics about confidentiality were followed (Vetenskapsrådet, 2002; 2011). We visited the classes that had volunteered to take part, and were present in the classes to answer questions when students were completing the questionnaire, as well as to talk to the teachers, and observe the situation. In two of the schools where we could not carry out the investigation ourselves, we had the help of assistant teachers who were not teachers of the students. We had carefully instructed these persons with regards to instructions of helping students and so on. In the case of reading or writing problems among the students, help was given to them by either the researcher or the teacher. Our intention was for the students to know that our study was not a test, and that every voice counted. Still, the students were asked to answer individually. Generally, students were positive to taking part, and they responded thoroughly. It took the students 30-45 minutes to complete the questionnaire. All questionnaires handed out were answered, though some students did not answer all of the questions. In the first set of questions, the rate of no response was 1-3%, and in the last set at the end of the questionnaire, the rate was 5-6%.

Analyses

The analyses of the closed questions concerning the students' self-perceived learning experiences of ESD related activities are presented and discussed in order to explore the students' perceptions and relationships statistically. SPSS© was used as a tool to do the statistical analyses of an exploratory factor analysis, ANOVA, t-test, and the Pearson's correlation test.

Description of frequencies can be given through counts, medians, or means. In this study, the participating classes were not equal in numbers, which makes counts the wrong way to describe our data. The median would have been the proper measurement for ordinal, non-parametric data. However, to allow comparison with other studies, we chose to calculate mean values and to present them here. Thereby, we assumed the answers on the Likert scale to have equal distance and to be parametric, as accepted in other studies e.g. Ary, Jacobs and Razavieh (1996). In a first step, a factor analysis was carried out with the 38 items in order to identify factors that represent the achieved content of exploration (Agresti & Finlay, 2009). Cronbach's α was calculated to check whether the factors were reliable. Factor means were compared and correlated. A one-way ANOVA test was used to check for significant differences between the different profiles and schools. Correlation analysis through Pearson's correlation test was also done to explore the relationships between answers given at an individual level. By performing this correlation test, we also tried to identify further areas where interesting patterns emerged in our analyses, as e.g. Wilson et al. (1997) had done. The foremost aim of this analysis is to explore relationships and complexities within a holistic construct of learning aspects for further analytic possibilities (Agresti & Finlay, 2009; Cohen et al., 2010).

STATISTICAL RESULTS

The factor analysis resulted in five factors out of 38 items. The identified factors represent the following areas: 1. Perceived learning experiences in the outdoors, 2. ESD as content of experienced education, 3. Emotions toward and valuing of nature, 4. Opinions on experienced activities and methods, 5. Emotions toward and valuing of outdoor education (Table 3).

Table 3. Result of the factor analysis.

Factor	Exemplary items	Reliability Cronbach's α	Factor mean
1, Perceived learning experiences in the outdoors	<i>"I've learned facts about nature."</i> <i>"I've learned what is good and bad for nature."</i> <i>"I've learned to co-operate with others."</i>	0.84	3.8
2, ESD, as content of experienced education	<i>"We've worked with ESD questions in class."</i> <i>"We've worked with animals, nature, and the environment."</i> <i>"We've worked with trade and money."</i>	0.85	3.7
3, Emotions toward, and valuing of nature	<i>"I like nature because it is beautiful."</i> <i>"I like nature because you can do fun things there."</i> <i>"I think it is important to take care of nature."</i>	0.81	4.1
4, Opinions on experienced activities and methods	<i>"I'm part of making decisions."</i> <i>"I get to solve problems with others."</i> <i>"We do investigations in nature."</i>	0.48	-
5, Emotions toward, and valuing of outdoor education	<i>"I like having outdoor activities and lessons."</i> <i>"I think I learn in a good way in the outdoors."</i> <i>"I think it is important to have outdoor lessons."</i>	0.88	3.7

The reliability test calculating Cronbach's α showed for all factors except factor 4 good reliabilities above 0.7, as shown in Table 3. Factor 4, which described teaching activities and methods, would need further exploration and development; possibly due to the diversity of the items in this scale. However, as the items of this factor are still important, they were investigated on the level of individual items instead. The factor means, for all factors, were high with values between 3.7 and 4.1. The ANOVA presented no significant differences between the schools at a factor level; therefore we treat students' perceived experiences as united. When analyzing gender differences in the answers only one difference was found. The independent sample t-test showed significant differences in the factor on emotions towards and valuing of nature (p-value 0.001), with girls showing slightly a higher mean value of 4.2, compared to 3.9 for the boys.

Relationships between factors

The Pearson's correlation test showed three medium correlations (0.4 - 0.6) between four of the factors. All correlations were above 0.5 (see Table 4).

Table 4. Correlation between factors.

Factor	Correlation value	Factor
F1- Perceived learning experiences in the outdoors	0.597**	F5- Emotions toward, and valuing of outdoor education
F1- Perceived learning experiences in the outdoors	0.529**	F2- ESD as content of experienced education
F5- Emotions toward, and valuing of outdoor education	0.551**	F3- Emotions toward, and valuing of nature

** Correlation is significant at the 0.01 level (2-tailed)

The students' positive emotions towards their outdoor activities correlate with their perceptions of their learning. Positive emotions towards outdoor activities also correlate with positive emotions towards nature. Further, learning experiences both in the outdoors and about ESD correlate positively.

Summary of the statistical results

The result of the factor analysis shows that the questionnaire construction was reliable in terms of content structure. Relationships between different factors of perceived outcomes such as learning experiences and emotions towards outdoor education, perceived learning experiences outdoors and ESD activities, and emotions towards outdoor education and emotions toward nature could be identified. However, for this cohort, no significant difference between schools was found.

ADDITIONAL DESCRIPTIVE RESULTS

As the exploration of students perceived learning experiences in the different school settings showed no statistical significant differences between the schools at a factor level, the following additional descriptive analysis will offer insights into school variations of the individual questions. As well the items for the factor failing to show an adequate reliability statistically are analyzed qualitatively. The purpose of this additional description is to show variations, and to provide more of contextual information regarding factors and schools.

The different schools

By exploring the six different participating schools through official website information and descriptions by the teachers, we aimed at getting a description of the formal situated context at each school. From those descriptions, the schools were first divided into the three different profiles: "Green outdoor schools," "ESD schools," and "No green profile schools." (cf. Table 2). The information given by the teachers was used for a richer description of the schools (see Appendix no. 1).

In the following sections descriptive mean values for each school regarding single items within the factors 1, 2, and 4 (see Table 3) are presented. The presentation will start with the factor 'Opinions on experienced activities and methods (Factor 4) in need of more detailed analysis, followed by the factors 'Perceived learning experiences in the outdoors' (Factor 1) and 'ESD, as content of experienced education' (Factor 2).

Figure 1 shows the mean values for items about "*Opinions on experienced activities and methods in the outdoors*". A majority of the students think that the teacher decides about the activities (Q1), and that they themselves are not much part of the decision-making (Q6 - 7). The individual items that score highest regarding experienced activities are physical activities (Q2), problem solving (Q3), and discussions with other students (Q4). Investigations in nature (Q5) are fairly common among all schools in their outdoor activities according to the students. Common activities for all schools were problem solving with peers and investigations in nature. Social and practical activities such as discussions and games were also perceived to occur to a high extent. The pupils in school C perceive themselves as having more influence on their activities than the others, although this item scored low for all. Regarding creative activities such as art and drama we found the largest differences: students from schools describing outdoor pedagogical aims (A, E) had experienced this while the others not at all.

(Likert scale between: 1:'not agree at all' to 5:'totally agree')

Q1	The teacher decides about the activities.
Q2	We are active with our bodies and play.
Q3	I get to solve problems with others.
Q4	We talk and discuss with each other.
Q5	We do investigations in nature.
Q6	I'm part of making decisions about activities.
Q7	Some students decide more.
Q8	We sing and play music.
Q9	We create and have arts and craft.
Q10	We act and play drama.

Figure 1. Opinions on experienced activities and methods in the outdoors. Q1 – Q10 represent questions in the questionnaire.

The items of factor 1 were questions exploring students' perceived learning experiences in the outdoors (Figure 2). The questions included cognitive, practical, social, and value-laden aspects of learning experiences. In spite of Q27 demonstrating a diverse picture (showing differences between the schools) the factor had good reliability, indicating that the students perceived learning in the outdoors in a similar way irrespective of which school they went to.

The perceived learning experiences are, in general, positive. The highest mean was received by (Q21), "I've learned what is good and bad for nature," and (Q22), "I've learned to co-operate with others." Both questions got a mean of 4.3, which shows that the students think they have learned both cognitive and social skills. The biggest difference between schools as well as between questions was found for question 27: "I've learned outdoor skills". The students from School F, the big-city school without a green profile, had a mean of 2.3, while the mean for School D was 4.6, and for school C 4.5. A general

(Likert scale between: 1: 'not agree at all' to 5: 'totally agree')

Q21	I've learned what is good and bad for nature.
Q22	I've learned to co-operate with others.
Q23	I've learned to take care of nature.
Q24	I've learned facts about nature.
Q25	I've learned some outdoor sports.
Q26	I've learned to discuss about important questions of life.
Q27	I've learned some outdoor skills, e.g., making a fire, etc.

Figure 2. Perceived learning experiences in the outdoors. Q21 – Q27 represent questions in the questionnaire.

comparison of schools shows that the students from School B, which had educated outdoor teachers and a green profile, answered quite low in all questions in comparison to the others.

We also took a closer look at the items of factor 2 (Figure 3) in order to reveal the perceived content of ESD in relation to the different schools. Regarding the importance of ESD (Q 31), all the students thought it was an important issue, with a total mean of 3.9. Noteworthy, the students from the school that seemed to have worked the least with ESD issues (School F) thought it was the most important, giving it a mean of 4.6.

Following that specific item analysis, overall results for three different schools are described additionally in the following paragraphs. The schools chosen were B, D, and F where school contexts, teaching approaches, and students' perceived learning experiences differed.

School B is a school with a green outdoor profile, having teachers educated in relation to the profile. Nevertheless, the students only expressed appreciation at a medium level for outdoor activities. Re-

(Likert scale between: 1: 'not agree at all' to 5: 'totally agree')

Q31	I think it is important to learn about sustainable development.
Q32	We've worked with animals, nature, and the environment.
Q33	We've worked with important questions for humans.
Q34	We've worked with ESD questions in school.
Q35	We've worked with trade and money.
Q36	We've worked with sustainable development where we live.
Q37	We've worked with sustainable development in the world.
Q38	We've worked with how the aspects of sustainable development relate.

Figure 3. Education for sustainable development as content of experienced education. Q31 – Q38 represent questions in the questionnaire.

garding emotions toward nature and particular values of care of nature, these students had the lowest rank of positive emotions and values in comparison to the other schools. Furthermore, the students from School B did not think they had learned as much as the other students (Figure 2). They had not perceived themselves as working with ESD (Figure 3), but still showed quite complex understandings of the aspects of ESD and expressed relationships between them in the open questions. The profile of this school and the teacher's intentions seemed not to be completely visible for the students in this study.

School D is the ESD-awarded school. The students had perceived themselves as working with ESD in their school activities and recognized the importance of ESD (Figure 3). Furthermore, in the open questions, 40 % of the students showed understandings of complex relations between ecological, economic, and social aspects of sustainable development, together with appreciative value statements of sustainable development (data not shown). They also show the highest level of values for nature

and all types of learning experiences in comparison with the others (Figure 2). In addition, they also showed appreciation of their outdoor education. This school's profile was obviously well known to the students.

School F is the big city school with the most difficulties in performing outdoor activities. Nevertheless, these students did seem to value nature and appreciate the outdoor activities that they had experienced. They also thought that they had learned quite a lot, except for "outdoor skills" - meaning that they had not experienced the traditional outdoor activities of making a campfire, and so on (Figure 2). The latter point was not surprising according to the background information we had. They had not perceived the concept of ESD as part of the contents of their school activities, but they showed the highest score of all schools when it came to the question if ESD was an important issue (Figure 3).

Summary of additional descriptive results

Contextual descriptions and comparisons between the schools revealed different traditions and approaches towards EE and ESD. Among our schools the following profiles were represented: traditional outdoor adventure, pedagogical outdoor, environmental outdoor, sustainable development, and non 'green'. Teachers' descriptions and students' perceptions of the school activities were not always coherent. Regarding the content of the aspects of sustainable development, as the students had perceived it, a strong focus was put on ecological issues; though less on the relationships between all of the involved aspects. Students from school D, the ESD awarded school, had to a higher degree perceived all aspects of ESD in their educational practice.

Discussion

The aim of this study was to explore how young Swedish students (aged 10-12) perceive their learning experiences related to SD issues while being in different educational settings and traditions, some of them being outdoor educational ones. In constructing the questionnaire we identified five aspects of learning experiences from policy, research, and practice. The results offer information about how the students perceived some of the intended methods of ESD by the UN, namely participation, cooperation, and decision-making (UNESCO, 2005), and whether there was a multi-method approach perceived when working with environmental and sustainable issues in the outdoors. From the statistical results we argue that foremost cognitive, emotional, and social aspects regarding learning of ESD inter-relates.

Quality of the instrument

Regarding the instrument, the results of the factor analysis show that the questionnaire was reliable and valid in relation to our framework and research questions. This opens up for further studies, e.g. one possibility for future research could be to build on the questionnaire construction and perform a large-scale study, thus giving more valid statistics with more participants. It could also be used as an evaluation tool for schools in their daily work as Wilson et al. (1997) have suggested questionnaires could be. Another possibility building on the open-ended questions we developed could be follow-up interviews, or to conduct a case study to gather even more information regarding the situated context including observations of the actual activities. Closer investigations of the situated contexts in environmental learning are something Roth (2009) has recommended.

There were some reactions to the questionnaire from the participating teachers. Several of them spontaneously expressed that ESD is an important field and some made excuses for not having worked with it as much as they had planned. Some also said that they got new ideas for work topics for their classes through the questions. A number of students also said that questions in the questionnaire were important, and though they had been working with sustainable development, they had not had the opportunity to express their thoughts in this way before. Reflecting over this, we found it to be a sign of ESD still not being fully implemented in the studied schools while environmental and outdoor

activities were more common. Similar findings were reported already 10 years ago in an evaluation of implementation of Agenda 21 in Swedish schools (Skolverket, 2002) and in Breiting and Wickenberg (2010) indicating slow progress over the years of striving for the ESD approach.

Relationships between different aspects of learning

This study showed relationships between students' experienced cognitive, emotional, social, and situated aspects of learning. Similar to the relationship of cognitive and affective aspects seen when learning in nature, as documented by Brody (2005), and the interrelationship of students' understandings and emotions of SD (Manni et al., 2013), this study also showed relations between students' cognitive and emotional learning experiences. Positive values towards nature and educational activities outdoors correlated with perceived learning experiences of a content of ESD (Table 4). These findings are in line with Gautreau and Binns (2012) who argue further that place-based inquiry for learning situations is a more authentic experience for students and also more similar to "real" society issues (Gautreau & Binns, 2012).

Regarding environmental valuing, this study also pointed to the students' appreciation of nature as seen before in other studies (Kalvaitis & Monhardt, 2011; Payne, 1998). These students showed high appreciation both towards nature itself but also towards learning activities outdoors. We also examined relationships of emotions towards, and valuing of, nature with emotions towards experienced activities in the outdoors. The detailed, additional descriptive analysis showed both cognitive aspects of learning, and positive emotions being expressed related to participation in outdoor environmental activities, which mainly focused pro-environmental behavior such as caring for nature. Our findings could be enlightened by the understanding of learning and experience developed by Dewey (1966) where learning activities are to be seen as the primary experience in which the whole body is engaged. Emotions are further qualities of that first-hand experience, and through the cognitive reflection the more conscious experience is formed. From this point of view cognitive and emotional aspects are not only related but properties of the same experience (Dewey, 1966) as the results of this study as well point to.

Emotions, values, and ethical discussions in and about our environment seem to engage students as well as contribute to a more holistic learning approach as being expressed in ESD policy and theory (see Figure 2 and Table 4). Similar results were found when analyzing students' own descriptions of their understandings and emotions of the content of sustainable development; young students expressed rather complex ecological understandings interwoven with value-laden statements on human behavior (Manni et al., 2013). Further emotional engagements regarding both economic and social aspects of SD were connected to factual knowledge in the students' writings. Hence, the results of this study point in the direction of environmental discussions of values as a possible point of departure in ESD learning practices. This has also been the argument by Mueller, Pattillo, Mitchell, and Luther (2011) when they argue for a bio-centric pluralism, examining the idea "If nature had rights" as a starting point for ethical environmental discussions, preferably in place-based outdoor classes.

The students in this study perceived social experiences such as cooperation and problem solving with other peers as important, something they had experienced in outdoor teaching activities. Cooperation and social learning experiences are stressed in educational policy documents for the individual as well as for society in general (cf. Dewey, 1966; UNESCO, 2005; Wals, 2009). Another democratic aspect of the educational goals of ESD was probably not thoroughly dealt with, since the students perceived their own involvement to be low in the decision-making process of their activities. In a study by Gautreau and Binns (2012) regarding science curriculum, they show that students must own their work and be allowed to participate in curriculum decision making in order to keep their interest up, which we, based on our results, as well argue should be improved in ESD-education.

Relations between aspects of learning and the different schools – a variation of different teaching traditions

In our statistical analysis we found no significant difference between students' perceptions and schools, but in the descriptive comparison between the participating schools we found different approaches to ESD and outdoor education activities. Traditional outdoor activities of sports and team-building, pedagogical activities engaging the senses, field work in biology, and pro-environmental activities for behavioral change were quite similar to earlier descriptions of the Swedish educational practice (Breiting & Wickenberg, 2010; Mårtensson, 2011; Sandell & Öhman, 2005; 2010). The environmental education approach was found to be more or less implemented and recognized in all schools while the ESD approach was visible only in the ESD rewarded School. This school still works within the tradition of EE and outdoor education but has also included the present educational aim of ESD.

Our study also shows that students' perceived experiences of ESD issues sometimes differed in comparison to the formal description given by the schools. Furthermore, views of the teachers and students were not always consistent. This is not remarkable, Wilhelmsson et al. (2012) show that teachers have different intentions with outdoor teaching, and some of them are not obvious for the students in their educational practice. The ESD certified school in this study describes a clear and visible profile, known to both teachers (as shown in school documents and their descriptive answers) and students (as shown in their answers), and consequently evident in our results of students' perceptions about their learning experiences. This is to be seen in contrast to some of the outdoor green schools where the students were not aware of their profile, nor showed any specific perceived outcomes of ESD. Regarding the result of students' valuing of the importance of learning ESD, the students from the big city school without green profile rated this item highest in comparison to other schools (Figure 3).

FINAL CONCLUSIONS

The overall findings of this study show that the concept of ESD is not visible for most of the students in this study although being part of the common curriculum; rather more traditional environmental education seems to be more visible than ESD. This calls for more explicit approaches when teaching ESD. The results further support holistic theories of intertwined relationships in learning (cf. Dewey 1966). The emotional aspect was found correlating with many of the other aspects in students' perceptions of their learning. Our findings, in line with Loughland et al. (2003), showed furthermore that students' emotions toward their learning in the outdoors and the content of ESD relate in a positive way. Working in the outdoors helped reaching the educational goals of ESD such as participation, cooperation, problem solving, and ethical reflection through the cognitive, emotional, practical and social aspects as described in experiential holistic learning theories (cf. Dewey, 1966). In a similar way, Johnston (2009) studies transformative learning and makes connections between outdoor learning possibilities and the concept of ESD, and Lugg (2007) argues that the formation of sustainability-literate citizens can take place through a holistic outdoor approach. Our study supports the need of taking a holistic, inter-related, and student-participatory approach when teaching for sustainability and developing a sustainable education.

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APPENDIX 1:**Detailed descriptions of participating schools**

School	A	B	C	D	E	F
Location	Village, north of Sweden	Small town, South of Sweden	Small town, North of Sweden	Town, North of Sweden	Town, North of Sweden	Big city area, Mid-Sweden
Profile	Outdoor, 'green' profile (striving for the green flag certificate)	Nature and Culture profile with an outdoor educational approach	Health and outdoor-adventure profile	ESD school, certified by the Swedish National Agency for Education and WWF in Sweden	Montessori pedagogical profile	Profile of openness, order, and knowledge
Access to nature	Yes, in the neighborhood	Yes, in the neighborhood	Yes, in the neighborhood	Yes, in the neighborhood	Yes, in the neighborhood	No easy access
Time spent outdoors	Once a week	Once a week (Grades 0-3), every other week (Grades 4-6)	Several times a week, all seasons	Once a week	Once a week or sometimes every other week	Not on regular basis
Type of activities outdoors	Nature, environmental, and sport	Nature, environmental, and sport	Sport and adventure	Nature, environmental, and sport	Nature, environmental, and sport	Nature and sport
ESD related focus	Describe that they have worked with questions about ESD, but not as much as they thought they should have.	Describe that the school has had weeks with environmental themes (but did not mention ESD).	The teachers did not especially mention education for sustainable development as an area of focus.	The school has well known goals and activities within ESD, and performs some of them outdoors doing different activities.	The school has had weeks with environmental or sustainable development themes.	The concept of "ESD" is not used by the teachers when they describe their school activities.

cont.

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School	A	B	C	D	E	F
Teachers	Several of the teachers have some education in the field of outdoor and environmental education, and an interest of working with these issues.	Some teachers are educated in outdoor education, EE, and ESD. Those teachers are also the ones responsible for activities in this area.	The teachers express interest in outdoor educational activities. Some teachers are educated in outdoor adventure education.	All staff members are involved and familiar with ESD, and are expected to work with it as a perspective in their classes.	The teachers show interest and engagement around these issues, although the school had not yet any formal green profile, nor a certificate.	Some teachers express a wish of more outdoor activities which they feel limited to perform now.