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# Teachers' intentions with outdoor teaching in school forests: Skills and knowledge teachers want students to develop.

## *Abstract*

***There is an interest among Swedish teachers to locate teaching outdoors. This study focuses on four teachers in grades 4-6, to explore their intentions and objectives with regular teaching outdoors. Data sources consist of semi-structured interviews, descriptions on successful activities, and reflections on metaphors. The use of intentional analysis and Bloom's revised taxonomy on teachers' objectives show that the teachers stress the out-of-school learning that draws on the actual world and concrete material. Yet their objectives with these authentic experiences are diverse. Two teachers have mainly cognitive objectives with a holistic view of knowledge where outdoor and indoor interact. To become knowledgeable, each individual student needs teaching in this proper context. The other two teachers primarily have affective objectives, in a dichotomy between learning theoretical knowledge indoors, and learning practical, concrete knowledge outdoors. They consider the outdoor arena as crucial for students with learning difficulties.***

## Introduction

### Teaching outdoors

In developed countries, there is increasing attention on the reduction of time children spend outdoors (Rickinson et al., 2004). Hence, outdoor teaching and learning as part of the school curricula have received a greater awareness in recent decades (Bentsen, 2010). From a tradition of out-

door education within the pre-school and school context, the Scandinavian countries are in this sense often mentioned as pedagogical models in a European perspective (Rea & Waite, 2009). The long tradition of encounters with nature (Sandell & Öhman, 2010), teachers' autonomy, greater possibilities in the curriculum are likely reasons for why Scandinavian teachers are able to locate teaching outdoors (Rea & Waite, 2009). The educational approach is based upon beliefs about the contributing value of outdoor classrooms for teaching and learning (Jordet, 2007) and the possibility to combine theoretical knowledge with experience-based learning (Szczepanski, 2008). The outdoor environment may also enhance learning since the meeting with nature becomes holistic, where knowledge and experience interact with all senses (Jordet, 2007; O´Brian & Murray, 2009). In addition, the importance of outdoor activities to stimulate sensual and experience-based meanings about nature as a supplement to scientific descriptions is emphasized (Sandell & Öhman, 2010).

In Sweden, there is a growing interest among teachers to locate teaching outdoors (Dahlgren & Szczepanski, 2004). This is well in accordance with the current curricula, which provides the opportunity but simultaneously does not require that teaching take place outdoors. Among the objectives in the science curricula are to stimulate interest and curiosity and to create an urge among the students to explore and understand nature (National Agency for Education, 2000). Outdoor Education Centres (www.naturskola.se, Naturskolan), which invite students to visit the centre for one day (Sandell & Öhman, 2010), and Forest in School (www.skogeniskolan.se, Skogen i Skolan), which offers assistance to teachers who wish to integrate the outdoor environment in their teaching and learn more about the forest are examples of Swedish organizations working to promote outdoor learning. The pedagogical core idea in Forest in School is to encourage teachers to use an appropriate outdoor place, preferably a forest area nearby the school, as a complement to indoor teaching. The school can also make an agreement with the forest owner to use this area as their own experimental field. Thus, the school can establish a long-term relationship with a well known place, known as the school forest, where the students can meet nature without being held back by, for example, fear of getting lost (Rickinson, et al., 2004; Szczepanski 2008).

## Learning outcomes

The outdoor arena seems to play an important role for many teachers but from an educational perspective there is a need for knowledge about the pedagogical outcomes and what approaches are effective (Jordet, 2007; Rickinson et al., 2004; Szczepanski, 2008). After reviewing 150 international pieces of research on outdoor learning published from 1993 to 2003, Rickinson et al. (2004) claims that there is substantial evidence that fieldwork offers opportunities to develop skills and knowledge that add value to students' everyday experiences in the classroom, but there are few studies reporting on learning outcome of the outdoor teaching. However, activities in the outdoor environment with youths as creators and active participators seem to facilitate scientific literacy and increase motivation to learn (Braund & Reiss, 2006). The actions do not have to form a major part of the teaching, but in order to be effective, they have to be carefully and purposefully organized (Dahlgren & Szczepanski, 2004; Magntorn, 2007; Rickinson et al., 2004). However, poorly organized outdoor actions can lead to reduced learning (Openshaw & Whittle, 1993). Rickinson et al. (2004) made a distinction between learning domains, such as, cognitive, affective, interpersonal/social and physical/behavioral, and their analysis shows that well-taught fieldwork can lead to reinforcement between the cognitive and the affective domain with each influencing the other and providing a bridge to higher order learning (Rickinson, et al., 2004, p 24). One example is recognized in a comparative study from 11 Californian secondary schools using an environmentally focused curriculum compared to traditional educational methods (SEER, 2000), claiming that students learn more effectively in an environment-based framework. Students using the outdoor environment scored higher in assessment of reading, writing and science, increased engagement for learning, and showed greater pride in their accomplishment than students from traditional schools (SEER, 2000). When comparing outdoor education programmes with a traditional indoor

programme in Canadian schools, Eaton (1998) found that both programs had a positive impact on cognitive learning, but the outdoor classes achieved better result in regards to the post-test and the retention test. Concerning the affective area, neither of the programmes had an impact on changing the environmental attitude, which according to the author, may be due to poor preparation or of a short programme. Such an interpretation is supported by Bogner (1998) who argues that long lasting, continual encounters including authentic experiences and social interaction are vital to change attitudes and behavior in education in environmental issues (Bogner, 1998).

While many Western countries still consider outdoor teaching and learning as separated from traditional educational context, emerging Scandinavian research is of increasing interest due to both emphasis on links between nature and teaching outdoors within school contexts and outdoor learning in environmental education (Muños, 2009). Mygind (2009), presents a three- year study in a primary school in Copenhagen, where 20 % of the regular teaching was located to a forest involving subject-related tasks prepared indoors, carried out in experience- based situations outdoors with follow-up in the classroom. Pre and post questionnaires to students show a positive impact on social and communicational skills which is in line with the studies of Rickinson et al. (2004). In addition, the Danish students expressed positive experiences from the teaching and increased level of physical activity. The teachers' engagement and competence including their ownership of the project played an important role for the positive outcome (Mygind, 2009).

In a Norwegian study of schools that on a regular basis locate teaching outdoors, Jordet (2007) reports that the interaction between theoretical knowledge and realistic, hands-on experiences is crucial for successful teaching and makes a distinction between success and failure for many students. The opinion of the teachers in this study is that the physical and practical learning activities contribute to improve students' cognitive, affective, social and physical development and open new opportunities to learning. However, additional research is essential to demonstrate in what sense teaching outdoors does affect cognitive, physical and practical areas (Jordet, 2007).

Teachers' approaches are valuable for successful teaching and the outdoor arena is of importance to many teachers, which establish two perspectives; the outdoors and the teaching. There are several studies that show positive results from outdoor teaching, but research (Muños, 2009; Rickinson et al., 2004) also reveals that we know too little about these perspectives. Moreover, we have little knowledge about the motives, the objectives Swedish teachers have with their teaching outdoors. Thus, we agree with Bentsen (2010) about the need for a deeper understanding of the interaction of the outdoors and the teaching.

The aim of this study is to gain knowledge about teachers´ educational intentions and objectives with teaching outdoors. To understand why teachers act the way they do, we use theories developed by von Wright (1971, 1979) explaining actions as a result of an individual's interpretation of the motives and prerequisites in the situation at hand, the so-called determinants, to reach a certain goal. The determinants are either internal or external. The former relates to psychological aspects within the individual's emotional, cognitive and physical structure, i.e., the individual's wants, beliefs or abilities that make it possible or set limits to act irrespectively of a present situation (Halldén 2001, p.11). The external determinant is connected to socio-cultural perspectives linking to duties, norms and opportunities as potential actions possible to perform. In every situation the determinants interact (Halldén, 2001). Halldén and Wistedt (1998) have developed a model to analyse and understand the intentions behind an action (Halldén & Wistedt, 1998). This model was further modified by Lager-Nyqvist (2003), when she analysed student teachers' intentions with science education during their pre-service teaching and later during their professional teaching. In this study, we apply the model by Lager-Nyqvist (2003) to analyse teachers' intentions with outdoor teaching, presented in the methods section. We are also interested in how teachers' different views of learning and teaching affect their perspective on knowledge and what knowledge they want to develop by their teaching. One way to explore this is to use Bloom's revi-

sed taxonomy (Anderson & Krathwohl, 2001) which is an analytical tool to categorize educational objectives of teaching in a knowledge dimension and a cognitive process dimension. The framework is considered useful as it works in all academic subjects and enables categorization of general objectives (Näsström, 2008). By analyzing teachers' objectives with activities outdoors, we are able to understand what knowledge perspective and cognitive processes the teaching is aiming at.

In order to develop a better understanding of teachers' educational intentions and objectives for outdoor teaching, this study set out to address the following questions:

1. What intentions do teachers have by locating part of their teaching to the school forest?

2. What types of skills and knowledge do teachers want students to develop by teaching in the school forest?

## Method

### Participants

For this study, teachers with substantial experience of outdoor education were identified and selected from a database of Forest in school (www.skogeniskolan.se, Skogen i Skolan). Teachers from eight schools in different parts of Sweden were contacted and asked to take part in the study. We ended up with sample of four teachers (Table 1).

All teachers have an exam from a teacher education programme and come from different towns. All schools have about 200 pupils (years 1-6). The study pays strict attention to the Swedish ethical principals in research (Lag, 2003:469; Vetenskapsrådet, 2006).

### Data collection

In autumn 2009, empirical data was collected by semi-structured interviews. The interviews varied from 60 to 90 minutes and took place at the respective school. The interview guide is presented in Appendix 1. The main focus in the interviews concerned the school forest, what to achieve by teaching outdoors and views of outdoor teaching and learning. The teacher was also encouraged to describe successful activities experienced in the school forest, including how the planning was realized, carried out and followed up, in- and outdoors. The purpose was to provide an overview of the entire teaching process outdoors as another source of information, to be able to thoroughly examine the teacher's approach to teaching and learning, his/her view of knowledge and the reasons for teaching outdoors. At the end of each interview, the teacher was introduced to six metaphors , three about teaching and three about learning (Appendix 2), that consisted of short descriptions, all with various underlying approaches (modified after Leavy, McSorley & Boté, 2007; Martinez, Sauleda & Huber, 2001). The approaches were a behaviorist/empiricist point of view, a constructivist point of view, a situative/socio-cultural point of view, shown to the teachers

Table 1. The participants with fictitious name, teaching grade, experience and distance to the school forest

| Name | Grade | Years of teaching experience | Distance to school forest |
|---|---|---|---|
| Maria | 6 | 42 | Adjacent to school |
| Sverker | 5-6 | 37 | 1.5 kilometre |
| Johan | 4 | 9 | Adjacent to school |
| Roger | 6 | 5 | 500 metres |

Table 2. Description of research design used to obtain information on reasons for outdoor teaching, identification of objectives and knowledge focused in outdoor teaching.

| Research question | Dataset | Data analysed by | Information obtained |
|---|---|---|---|
| RQ 1:<br>Teacher intentions | Interview transcripts from<br>- General questions<br>- Successful activities<br>- Metaphors | Intentional analysis | Explicit and implicit reasons for outdoor teaching<br>Identification of objectives within different domains |
| RQ 2:<br>Skills and knowledge to develop | Objectives in the cognitive domain achieved by intentional analysis<br>Interview transcripts from<br>- Successful activities<br>- Metaphors | Bloom's revised taxonomy | Identification of knowledge dimension and cognitive processes to develop by outdoor teaching |

in mixed order. The metaphors were used as tools to let the teachers openly reflect upon their views about knowledge, learning, teaching outdoors but also to confirm former replies. The interview setting with general questions, stories about successful activities, and teachers' reflections on metaphors includes three different approaches to collect data about the same aspects. Three months later complementary interviews were done by phone. The informants received questions from the first interview including more in-depth, follow-up questions. This was done to obtain more comprehensive empirical material but also to validate previous responses. All the interviews were carried out in Swedish and the citations presented are translated from Swedish to English.

## Analysis of data

All interviews were recorded and transcribed verbatim. The transcripts were analysed first by using intentional analysis and thereafter some transcripts were analysed by Bloom's revised taxonomy. Table 2 presents the research design to obtain information on reasons for outdoor teaching, identification of objectives and knowledge focused in outdoor teaching.

### *Intentional analysis*

The transcripts were first analysed from the theories on intentional analysis to identify explicit and implicit motives or determinants to locate teaching outdoors (Halldén & Wistedt, 1998; von Wright, 1971, 1979). An individual's intentions can be more or less pronounced and the implicit intentions might be interpreted by the researcher from what is stated by the individual (Halldén, 2001). Hence, each transcript from the teacher's interview was read through several times and all statements of intention marked and interpreted. The internal determinants enable or limit what the teacher considers a possible action to perform, while the external determinants determine the teacher's interpretation of all the potential actions probable to perform in the defined situation (Halldén & Wistedt, 1998; Lager-Nyqvist, 2003).

To categorize the statements into internal and external determinants we used a modified version of the model by Lager-Nyqvist (2003) where both the internal and the external determinants are divided into two subcategories. In this study, the terminology of intentional analysis from von Wright (1971, 1979) and Lager-Nyqvist (2003) is used (Fig.1). The first subcategory of the internal determinants; wants and objectives, relate to teachers' intended teaching in short or long-term

perspective, i.e., what the teachers want the students to improve or develop (Fig.1). The other subcategory consists of abilities to perform the intended teaching.

In the external determinants, the first subcategory is steering and influence. Steering includes the individual's interpretations of possibilities or limitations to locate teaching outdoors in relation to the national curriculum, syllabus or local curriculum. Influence comprises implicit and explicit expectations or limitations from, e.g., parents or students, but also the atmosphere among colleagues towards teaching outdoors. Opportunities and barriers, the second subcategory in the external determinant, the teachers describe teaching materials or available outdoor areas to use as opportunities, but unreliable weather and inappropriate clothing as limitations to perform the intended teaching.

Interpretations of the teachers' implicit and explicit responses to all questions are used to understand teachers' intentions for outdoor teaching. According to Halldén (2001) the interpretation is not validated by the individual from her view of concordance but by how well adapted the descriptions are. It is by the degree of rationality the descriptions are validated. Therefore, a short description of our interpretation of the teachers' intentions is given in the results section.

Further analysis of transcripts revealed teaching objectives in four different domains, cognitive, affective, social and physical. These domains are determined after reading the transcripts individually and discussions in the research group and proved to be similar to the categories made by Rickinson et al. (2004). The objectives within the cognitive domain were further analysed by Bloom's revised taxonomy (Anderson & Krathwohl, 2001) as described below. Different objectives within the affective and social domains that appeared between the teachers are presented in Table 5.

***Analysis within the cognitive domain by Bloom's revised taxonomy***

The transcripts regarding the teachers' objectives with actions outdoors in the cognitive domain were analysed using Bloom's revised taxonomy, a framework for categorizing educational objectives (Anderson & Krathwohl, 2001) to interpret what cognitive process and knowledge perspective the teaching is striving for (Table 3).

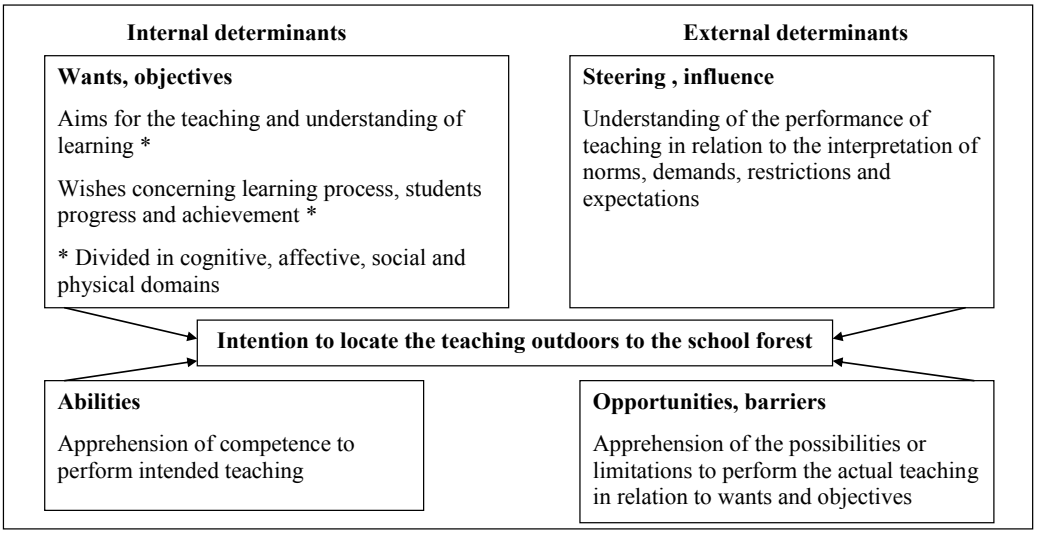


Figure 1. The model for intentional analysis used to identify teachers' intentions to locate teaching outdoors (modified from von Wright, 1971, 1979; Lager-Nyqvist, 2003).

Table 3. Bloom's revised taxonomy, the framework used for categorizing the teachers' objectives with actions outdoors in the cognitive domain (Anderson & Krathwohl, 2001).

| The Knowledge Dimension | The Cognitive Process Dimension | | | | | |
|---|---|---|---|---|---|---|
| | Remember | Understand | Apply | Analyze | Evaluate | Create |
| Factual Knowledge | | | | | | |
| Conceptual Knowledge | | | | | | |
| Procedural Knowledge | | | | | | |
| Meta-Cognitive Knowledge | | | | | | |

By analyzing where the objectives are within the framework we are able to understand what skills and knowledge the teachers intend to develop. The knowledge dimension and the cognitive process dimension represent a coherent continuum from elementary, basic elements to more abstract and complex categories of knowledge or cognitive processes (Table 3). The knowledge dimension in the taxonomy (Anderson & Krathwohl, 2001) proceeds from detailed, factual knowledge, to more complicated conceptual knowledge about categories, principles, theories and structures. Further dimensions are procedural knowledge based on how to do something, and finally the meta-cognitive knowledge which is more abstract and strategic. In the cognitive process dimension, to remember, is considered to be the lowest level of an underlying cognitive complexity and, to create, the most complex level.

Each teacher´s objectives within the cognitive domain were analysed and then placed into a particular cell in the taxonomy table. The interpretations have been validated by allowing each author interpret the statements separately then comparing the analysis and finally having the decision made by the research team. The teachers' detailed descriptions of experienced successful activities in outdoor teaching which provided us with a rich context were also analysed using Bloom's revised taxonomy. These, together with the analysis of the metaphors have given us more substantial insights into the classification of the teachers' objectives within the cognitive domain.

***The metaphors***

The teachers' interpretations of the metaphors (Appendix 2) were analysed with intentional analysis and Bloom's revised taxonomy. The excerpt below is an example of how Roger reflects about the learning metaphors. The analysis of his reflection reveals objectives and knowledge perspective, in this case, the importance of student responsibility for learning, the value of the group to support each individual student on the way, but also the teacher's responsibility to guide the students with intention to enhance learning.

> It is a combination of the group and the house, because you build your own knowledge ... The goal is nothing; the way towards the goal is everything…You make a joint trip but there is still someone who must know the direction of travel. (Roger)

## Results

### Teachers' intentions with outdoor teaching

For all teachers, the overriding intention for organizing outdoor teaching is to create an alternative arena for learning, as a supplement to what students learn in the classroom. The intentional analyses reveal similarities in the four teachers' intentions with outdoor teaching, primarily in the external determinants but also in the internal determinant, abilities. All four teachers emphasize the external determinants as possibilities for having an available school forest and encouraging school leaders. The teachers express similar barriers to outdoor teaching, but emphasize that these are overcome by careful preparation. All four teachers have lengthy outdoor experience and are confident in their abilities to teach outdoors.

All teachers stress the out-of-school learning but their intentions with these authentic activities and experiences are diverse, especially within the internal determinant, wants and objectives. Therefore, we present each teacher separately. The presentation includes teachers' internal determinants, examples of successful activities and the teachers' interpretation of the metaphors. For the first teacher, Maria, all objectives are presented in a figure that shows in which domain each objective belongs (cognitive, affective, social and physical). For the other teachers the domain of the objective is presented in brackets. Examples of how each teacher describes respective objectives are also illustrated. After the description of each teacher a summary of the intentional analysis and Bloom's revised taxonomy are presented, focusing on important findings concerning similarities and differences of the teachers' objectives with outdoor teaching.

#### *Maria*

Maria has a substantial knowledge of nature. She wants to stimulate students' interest about the forest (A) and to evoke positive feelings about being outdoors (Fig. 2).

Often, Maria invites a forester to the school, which gives the students opportunities to learn from an expert in silviculture (C) or to ride in a harvester (A). She considers that these occasions are successful and valuable to encourage students' work (A), particularly the ones with learning difficulties. Successful activities are also when students obtain concrete, practical outcomes, vital to generate feelings of individual success (A) and growth. Thus, studying trees, discussing their habitat for calculating the percentage of trees for thinning are ways to give examples of theoretical knowledge (C).

| | |
|---|---|
| Cognitive | Put theory into practice for better understanding of links in nature (C)<br>Focus on skills and knowledge beyond what is demanded in the textbooks (C) |
| Affective | Stimulate curiosity and interest to discover the nature (A)<br>Relax in a peaceful natural environment (A)<br>Concrete results to generate feeling of success (A)<br>Feel pleasure by spending time in nature (A) |
| Social | Fun exercises with chance to compete (S)<br>Collaboration for well being (S) |
| Physical | Be physically active (P)<br>Opportunities to play (P) |

Figure 2. Maria's wants and objectives to locate teaching outdoors in the school forest divided in the cognitive, affective, social and physical domain, according to intentional analysis.

Maria emphasizes physical objectives to affect students' health (P). Consequently, exercises are used to be physically active often with competitive elements in groups (S). To play is essential (P) and it is important that students consider the school forest as a positive and relaxing environment (A) associated with both school work and playful activities. Maria uses group work to promote well being and to help each other in various tasks as a way to stimulate students (S). The interpretation of the metaphors shows a desire to hand over the responsibility for learning to the students but also doubts about the potential outcome. She uses activities for the students to be able to reconstruct but still controlled by the teacher.

> Achieve results through cooperation...then it is optimal ... but there's a need for guid ance as well and I think I want to be the guide… But I'm probably a bit dominant …. I do not know if I let them make their mistakes before I lead them in the right directions, yes, no, yes.

***Sverker***

Sverker's intention to locate teaching outdoors is; to do is to learn. Hands-on activities with real, visible outcomes to generate feelings of success (A) are considered as successful, especially for the students with learning difficulties. By using a concrete way of teaching, the students can achieve positive experiences to relate to when they are back in the classroom (C).

Sverker mainly expresses goals aimed at providing the students with a sense of fulfillment (A) and to strengthen students' ability in order to transfer a feeling of achievement into theoretical subjects indoors (C). In group work, the students are encouraged to transfer theoretical comprehension to practical knowledge, thus students' different knowledge can complement and support each other. It is also a way to stimulate unmotivated students (S). Activities like problem solving are offered to promote a common experience of nature, to evoke feelings for nature (A) and to gain a positive impact on students' self-esteem and self-confidence. The overall intention– to do is to learn– is in that way confirmed in the objectives of each individual activity, which also is shown in his reflections about the teaching metaphors below,

> The ants work ... fits in the forest ... we cultivate of course things out there.

***Johan***

Teaching outdoors is a way to improve the individual's responsibility for learning (C) for Johan. He uses the school forest as a "trial and error" arena where the students can test their own knowledge, but at the same time Johan can challenge the students and their skills and knowledge by changing the level of difficulties (C). He says: only if the preparatory work has been accurately done together with proper follow up indoors, outdoor teaching can add value to students' daily practice in the learning process (C). Johan provides his students with different problems and theme-based exercises to be solved in groups. According to Johan, in these successful activities the students are encouraged to take responsibility for both own learning and learning in the group, but are also encouraged to improve good spirit (S) and to transfer different skills and knowledge to each other in order to improve the group work. Teaching in the school forest generates more exploratory questions among students than those demanded from the textbooks or by the teacher in traditional teaching. In general, he believes in this elicit curiosity towards learning (C). The outdoor environment provides possibilities for teachers and students to learn about nature together and to really get to know the students' comprehension in a different way than indoor teaching does (C). On one occasion the students caught sight of a newborn fawn in the school forest and Johan is convinced that such an incident opens students' eyes to the exiting nature (A) and creates a need to deepen knowledge on the basis of perceived experience (C). Johan agreed to one of the proposed metaphors,

> Yes, I'm the foreman but I rather call myself a teacher who gives good advice and provides help when needed. Learning is like building a brick house. Students are bricklayers and owners of the house.

This confirms his explorative approach to learning and a focus on students' responsibility for learning. Johan supports, encourages and creates tasks to challenge his students based on students' different prerequisites in order to enhance the learning process.

***Roger***

The preparatory work is usually implemented indoors and is crucial for achieving an effective learning process outdoors (C), according to Roger. All activities follow "the main thread" with the intention to put knowledge in its proper context in order to make it long-lasting and comprehensible (C). Outdoor activities give the students hands-on experiences in the school forest to improve understanding of relationships in nature, e.g., photosynthesis (C). Roger is convinced that the outdoor setting offers students the potential to facilitate the learning process differently, rather than merely with reference to the textbooks and the teacher (C). Students need teaching both outdoors and indoors to become skilled and knowledgeable but for those with learning difficulties the outdoor activities are especially important (C).

For Roger, learning is individual but students need interaction with others to grow in the learning process (C). Thus, successful lessons are mostly carried out in groups with problem-based learning as their focus (S). Affective objectives are to awaken feelings for nature as worth taking care of in a life-long perspective (A). In the school forest, Roger provides students a place to relax in and be themselves without a tough attitude, offering opportunities to express their feelings. This helps to gain self-confidence (A). Outdoor exercises that strengthen self-reliance thus form a frame of reference to relate to in continued work indoors (C).

> You learn in the meeting with others. That's why we have groups at school... But you need to reflect... otherwise you will never improve learning.

Roger expresses in the metaphor above that learning is individual but as a teacher he/she needs to promote opportunities to individual growth via group work. In the activities, students are given opportunities to transform acquired knowledge in another setting to compare and check their own understandings with thoughts that are being expressed in social interactions.

## Summary of teachers' intentions with outdoor teaching

The intentional analysis shows that all teachers have multiple objectives and that there are similarities and differences between the four teachers. The overriding intention for arranging outdoor teaching is to create an alternative arena for learning. The outdoor arena is considered important because it gives the chance to explore and experience with all senses and combine theoretical

Table 4. Distribution of the teachers' expressed wants and objectives into cognitive, affective, social and physical domain according to intentional analysis. The numbers refer to how many different types of objectives in each domain.

| Teacher | Cognitive | Affective | Social | Physical |
|---|---|---|---|---|
| Maria | 2 | 4 | 2 | 2 |
| Sverker | 2 | 3 | 1 | |
| Johan | 6 | 1 | 1 | |
| Roger | 7 | 2 | 1 | |

knowledge with experience-based learning. All teachers stress the out-of-school learning that draws on the actual world and concrete material, but their objectives with these authentic experiences are diverse. A summary of how the teachers' wants and objectives are distributed within the different domains are presented in Table 4. Two of the teachers, who also emphasize the importance of preparation and follow-up in the outdoor learning process, have a majority of the objectives in the cognitive domain whereas the other two have more in the affective domain (Table 4). Maria is also the only teacher to stress physical objectives to affect students' health.

Other essential objectives for all four teachers are to stimulate feelings for nature and to promote collaboration, often with group work. However, the teachers' objectives within both the affective and the social domain have a different focus, as is shown in the description of each teacher and in Table 5. Concerning the affective objectives, both Maria and Sverker emphasize the importance of activities to generate feelings of success, especially for students with learning difficulties. Roger and Johan underline objectives to stimulate interest in and take care of the nature. They consider the outdoor arena important for all students and believe that knowledge in its proper context makes it lifelong and understandable.

In the social domain, Maria and Sverker make use of problem-solving activities for different purposes. She uses them for movement to promote well-being and to stimulate students, whereas he stresses the students' peers as important motivators for each others. Neither of them emphasizes to improve the student's abilities to solve problems. To Johan and Roger, learning is individual but students need social interaction to compare and ensure their own understanding and one such example is problem-solving in groups. Teaching outdoors is an instrument to facilitate the learning process to reach cognitive objectives.

### Skills and knowledge teachers want to promote in the school forest

Teachers' objectives and described successful activities were analysed by Bloom's revised taxonomy. Both Maria and Sverker primarily provide activities to achieve procedural knowledge. When referring to the cognitive process dimension, the teachers view the concrete outcome as vital, successful and the importance of offering students, especially the ones with learning difficulties, opportunities to apply knowledge in practical tasks is strongly emphasized. Maria stresses on the one hand activities to improve basic facts, e.g., collect and categorize certain herbs or species to achieve factual knowledge, and on the other hand activities to attain procedural knowledge of, for example, forestry. She uses the forests' rotation period, from seed to harvest to explain the carbon cycle and the students are involved with planting trees, clearing up the forest and thinning out the trees. Offering students opportunities to apply knowledge in practical tasks by teaching outdoors is considered successful and is underlined in almost every objective. Similarly, most of the activities Sverker mentioned have the objectives to gain procedural knowledge, e.g., how to make

Table 5. Distribution of the teachers' main focused objectives in the affective and social domains.

| Teacher | Affective | Social |
|---|---|---|
| Maria | Generate feeling of success | Promote well-being through cooperation<br>Stimulate students |
| Sverker | | Peers as motivators for unmotivated students |
| Johan | Stimulate interest and caring about nature | Use each other's skills and knowledge in tasks to improve group work and encourage each other to enhanced learning |
| Roger | | Group as a "sounding board" to reflect their own views of the individual |

charcoal from logs. In the cognitive process dimension the objectives are often discussed in terms of applying knowledge with a focus on practical/concrete issues like constructing windshields and building water wheels.

Johan considers successful outdoor activities primarily as an instrument to facilitate the learning process which is reflected in his objectives to create awareness among students about their responsibility and strategies for learning, a meta-cognitive knowledge. However, the activities are also discussed based on conceptual knowledge, for instance, how things are related in nature to a larger physical system in order to create a deeper understanding of nature. The objectives in the cognitive process dimension are mainly focused on understanding knowledge to illustrate the life cycles of certain species or animals or explaining their habitat. Likewise, Roger provides the students with hands-on experiences to improve understanding of, for example, photosynthesis. The activities both concern conceptual knowledge, to use theories from textbooks to solve problems outdoors and to use skills and techniques to build a wind shield in order to achieve procedural knowledge. Furthermore, successful tasks in which older students teach younger, where the difficulty lies in choosing the right strategy for the specific situation to attain meta-cognitive knowledge, are used. Roger often challenges his students in discussions to encourage them to reflect and reconsider their own perspectives with consequences in renewed motivation towards learning in general. This provides the possibility to reach an additional learning level in the cognitive process dimension, from "apply knowledge" to "analyse knowledge".

The metaphors show that all four teachers focus on different objectives in their teaching as a consequence of different views on knowledge. Roger and Johan have a more holistic view of knowledge where the outdoors and indoors interact. To become knowledgeable human beings, each individual student needs to experience teaching in its proper context. Knowledge can be either concrete or abstract and should be located in the best environment for the student. This environment could be in or outdoors depending on the objective of the activities. However, for Sverker and Maria, there is more of a dichotomy between learning outdoors that gives practical, concrete knowledge and learning indoors that gives theoretical knowledge. Moreover, they view the alternative arena as crucial for students with learning difficulties.

## Discussion

The main intentions for using the outdoors as an alternative arena for learning for the four teachers in this study are to combine theoretical knowledge with experience-based learning, to explore real objects with several senses, to stimulate feelings for nature and to promote collaboration. In accordance with earlier studies (Jordet, 2007; Szczepanski, 2008), many of the reasons mentioned are similar to the advantages linked to informal education, e.g., nurture curiosity, engage in socially interactive settings for learning through experience. Here, the school forest is chosen based on its contribution to improve students' cognitive development as well as in affective, social and physical learning domains. These four distinctive learning domains became apparent through the intentional analysis, and are similar to the categories reported in the review of research on outdoor learning by Rickinson et al. (2004).

According to the four teachers, the school does not provide opportunities for all students to succeed; some fail due to learning difficulties and some because they are unmotivated. The outdoor arena is therefore an important alternative for students who do not succeed theoretically indoors to attain the feeling of being good enough. Many objectives in the affective domain are about creating positive feelings, both for nature and the students' achievements, and to improve self-confidence. Three of the teachers evidently use outdoor teaching to enhance learning in theoretical subjects. For them, objectives for students to support each other or to work with challenging tasks to enhance the learning outcome are underlying, in accordance with Nundy's findings (1999).

The effect of objectives in the affective and social domains is reported in an evaluation study of an out-of-school programme in London, UK, where data from 2700 students are reported (Amos & Reiss 2010). The evaluation revealed that students gained self-confidence, a greater sense of independence, and improved relationships both between students and students as well as students and teachers. Amos and Reiss (2010) consider that a positive impact in the affective and social domains seems to be a prerequisite to gain impact in the cognitive domain. The same holds true for Maria and Sverker who stress activities to gain procedural knowledge in order to make the students feel satisfied with something they managed to create. To them, the concrete learning outcome is a measure of a successful student. Openshaw and Whittle (1993) argue that such attitudes to learning with minimal follow-up tend to develop exercises rather than consider the result of what is done and why in a learning perspective. The other two teachers focus primarily on cognitive objectives to achieve a deeper understanding or to apply knowledge, emphasizing the importance of preparation and follow-up to achieve an effective learning process outdoors. Johan clearly expresses that only if thorough preparation and follow-up is carried out, outdoor teaching can add value to students' daily practice, which is also an important theme in Frøyland's research (2010). Both Johan and Roger challenge and encourage students to relate own views to others in order to reflect and reconsider different strategies to reach a goal. For these two teachers, the affective and social objectives are of secondary importance to the objectives in the cognitive domain. They make more use of the opportunities for learning created in the interaction between outdoor and indoor settings (Braund & Reiss, 2006; Jordet, 2007; Szczepanski, 2008, Frøyland 2010).

All four teachers state that outdoor teaching allows the possibility to work with a holistic and authentic view of nature where integration of concepts are possible, even though there are differences between the teachers' choice of what knowledge to focus on. Two of the teachers spend more time on giving opportunities to procedural knowledge or applying the knowledge on concrete issues whereas the other two teachers spend more time on the relation between abstract and concrete knowledge. Furthermore, all teachers talk about life-long learning where the outdoors is used to create interest, curiosity and evoke feelings for nature. Sandell and Öhman (2010) describe that in the 1980s and 1990s the role of outdoor education was to stimulate outdoor experience and to stimulate caring about nature and behavioral change, but in recent years the more pluralistic approach to environmental and sustainable education has developed suggesting further educational potentials for encounters with nature. None of the teachers in this study expressed any ideas about the outdoors strengthening the students' environmental commitment, indicating that the educational potentials for sustainable education with outdoor education are still in its cradle (Sandell & Öhman, 2010).

This study has generated a better understanding of teachers' educational objectives with outdoor teaching. Although the study is small in scope, it contributes more insight into teachers' intentions and the skills and knowledge teachers want to develop through outdoor teaching. The results correspond with previous international research concerning the distinctions of objectives in four learning domains (Rickinson et al., 2004). Also, the students' need of positive influences in the affective and social domain in order to succeed in acquiring knowledge (Amos & Reiss, 2010) and the importance of interaction between in- and outdoors to achieve deeper understanding and renewed motivation towards learning (Braund & Reiss, 2006: Frøyland 2010) are confirmed. Furthermore, this study reveals that teachers' educational objectives differ even though they often use similar outdoor activities. This stresses the importance of reflections, among teachers and in teacher education, about what cognitive processes and knowledge perspectives that may be develop through outdoor teaching. Additionally, the significance of preparatory work, accurate implementation and proper follow up are important in order to enhance the learning process. An interesting question to explore further is; how do different intentions, objectives and views of knowledge affect teaching and students' opportunities for learning in different domains?

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## Appendix 1

### Interview Guide

***Information about background, interests, general about attitude towards work as a teacher***

Tell me about your educational background
Other previous jobs?
Why did you become a teacher?
Do you enjoy teaching?
Which grade do you teach? How many students are there in your class?
Tell me about your interests
Do you see any connection between your interest in the outdoors and how you use the school forest in a teaching context?

***The school forest and teacher's intentions with outdoor teaching and views on learning***

When did you start to locate teaching outdoors? In the school forest?
Has the teaching changed over time? In what way? Why?
How often are you in the school forest for educational purposes?
What time of the year?
In which subjects do you use the school forest?
Describe activities you choose to move out of the classroom.
Describe your reasons for locating these activities to the school forest.
Describe what you want the students to learn in the school forest.

Can you describe any of your successful activities in the school forest?
What is it that makes this a successful activity?
What is most important with the activity? For you as a teacher? For your students?
Have you implemented this activity with many classes? Any similarities or differences?
What happens after the outdoor activities? In what way do you follow up the activities? How do you take advantage of the experience of the outdoors?

Are there subject matters that are more suitable for outdoor education?
Are there differences between learning outdoors and indoors?
Is it possible to achieve the same goals by teaching indoors?
Are there any limits to locating teaching outdoors?
The planning, are there differences between teaching indoors and outdoors?

***Metaphors about teaching shown***

Is there any metaphor that corresponds with your view of teaching? Describe how you think? If not, can you give me your own metaphor about teaching?
Is the metaphor in line with your view of teaching outdoors? Indoors?

***Metaphors about learning shown***

Is there any metaphor that corresponds with your view of learning? Describe how you think? If not, can you give me your own metaphor about learning?
Is the metaphor in line with your view of learning outdoors? Indoors?

## Appendix 2

Below a presentation of the metaphors used in the study.

| Point of view | Teaching | Learning |
|---|---|---|
| Behaviourist/ empiricist point of view | Teaching is like to growing plants. I am the gardener who looks after my plants. I give them adequate food and water in order to develop well. The plants are dependent on me and only I as a gardener can create the best conditions for my plants. If I do not look at giving them the right care they cannot evolve. | Learning is like a sponge in which the learner absorbs as much water as possible. The learning is controlled by water availability. Anyone who distributes water also controls the learning process. Greater access to water means more learning and vice versa. |
| Cognitivist/ constructivist point of view | Teaching is like a guided tour. The guide gives you hints and tips for discovering new places, sights and insights that can be useful for those who have never visited the place. You choose the direction with the guide that provides support and assistance. If you already visited the place the guide's information can give you a new way to explore the place or to understand the culture. | Learning is like building a brick house. The student is bricklayer who adds stone on top of stone so the house gets bigger and bigger. The student is also the owner of the house. As the teacher I am the site foreman who gives good advice and provides help so the house can be steadily and firmly anchored. |
| Situative point of view | To teach is like the ants' work in an anthill. Each ant's contribution is valuable and stimulating for the survival of the stack, but cooperation between them is important. In order to achieve a good outcome the ants cooperate, a result that is beneficial to all in the anthill. | Learning is a journey where the group discusses its path to the goal. The trip is not mapped and the target is not completely known. Perhaps the trip will go in a different direction depending on what we encounter on the route. Within the group the way is traced out and everything new that is discovered after the trip is communicated within the group. |