

Benefits and Challenges of Forest Education in Primary Schools in the Canton of Zurich, Switzerland



Sarah Knecht

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Supervisors: Dr. Petra Lindemann-Matthies

Prof. Dr. Bernhard Schmid



Institute of Environmental Sciences
University of Zurich

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Abstract

Frequent outdoor experiences strengthen children's empathic relationship to nature, and are essential for a later connection with and care for the environment. However, there is growing concern that children's outdoor experiences with nature are decreasing, especially in urban areas. It has been suggested that schools should emphasise the outdoors as a place to educate. Forest education is a pedagogical method which lets children explore, investigate and discover their natural surrounding, and learn about the environmental and economic importance of forests in a constructive way. However, hardly anything is known about forest education at primary school level in Switzerland. The present study investigated benefits and challenges of forest education in view of almost 300 primary school teachers (1st - 3rd grade) in the Canton of Zurich. Main objectives were to investigate (1) how often forest education is conducted, (2) the teachers' motivation to educate in the forest, the obstacles they face, and the methods they use, (3) how forest education could be promoted, (4) how primary school children profit from forest education and what they think about it, and (5) whether the location of a school as well as experiences, and education of teachers influence the probability that forest education is conducted. The study was carried out by using three approaches. In the first approach, teachers were asked about their activities in forest education with the help of a written questionnaire. In the second approach, 15 teachers engaged in forest education were interviewed in-depth about their experiences. In the third approach, the classes of these teachers were observed during their time in the forest, and the children asked about their experiences with forest education and knowledge of forests.

More than two third of the teachers carried out forest education, and the distance from a school to the nearest forest did not influence their decision to conduct forest education. However, with an average of eight visits per year, pupils do not receive many opportunities to explore forests during normal lesson hours, at least not in the Canton of Zurich. Teachers were less likely to conduct forest education at all or to visit a forest regularly, the less training they had received during teacher education, the less supportive they felt children's parents to be, and the more they perceived forest education as an additional workload. However, forest-experienced teachers perceived the additional workload and other items as much less challenging than forest-inexperienced teachers. A lack of discipline was mentioned as major problem of forest education. However, forest-experienced teachers felt that over time children become more quiet, focused and also more willing to accept rules. Setting rules was regarded as a main predictor for a successful forest education.

Movement, the exploration, observation and investigation of nature as well as sensory experiences and play were named as basic needs of children which can be fulfilled in the forest, and most of these needs were at least moderately met during the forest education units observed. Teachers assigned ample time to unguided, playful and sensory exploration activities which strongly matched the interest of the children. However, they considered forests clearly as educational settings which, in addition, have the advantage to foster children's personal and social skills, especially the community feeling. During the observations, pupils were perceived as balanced, happy and relaxed, and their teachers attributed these features to the forest environment. Children enjoyed their forest education and were keen and curious to learn about forest species. They had at least some knowledge about forest species, the uses of forests and why forests should be conserved.

Pre- and in-service teacher education was not regarded as a source of information about forest education. Suggested by many teachers, forest education should be included in teacher education curricula. This would secure background knowledge, especially on how forest education could best be carried out. Beside the inclusion of forest education into teacher education curricula, help and support for inexperienced teachers by those already familiar with forest education was seen as a valuable strategy. This might help to counteract some of the perceived obstacles to forest education. Experienced forest teachers could act as role models who demonstrate successful methods in forest education but also point out the benefits for the children. However, "novice" teachers should also be communicated that forest education needs strict rules and rituals to maintain discipline.

1. Introduction

Frequent outdoor experiences and contact to nature strengthen children's empathic relationship to nature (Palmberg & Kuru, 2000), and are essential for a later connection with and care for the environment (Ward et al., 2004; Meinhold & Malkus, 2005; Bögeholz, 2006). However, there is growing concern that children's outdoor experiences with nature are decreasing, especially in urban areas (Thomas & Thompson, 2004; Nützel, 2007). In recent years, daily habits of children in western countries have changed. Children are increasingly less occupied in play and free movement activities in the open and less present in public areas, being confined to the house and occupied in programmed activities and under adult surveillance (Malone & Tranter, 2003; Prezza et al., 2005; Louv, 2006). Studies carried out in many countries of the European Union, in the United States and in Australia have warned of the dangerous progression of this phenomenon (Prezza et al., 2005). An important factor that limits children's autonomy outdoors is parental perception of social danger and traffic danger (Valentine & McKendrick, 1997; Prezza et al., 2005; Robertson, 2006). Another factor is the actual loss of "wild" habitats children would like for outdoor play and nature investigation activities (Louv, 2006). Moreover, electronic/video games and television keep children insight and thus contribute to a reduction of children's independent outdoor experiences (McKendrick et al., 2000; Aitken, 2001).

The lack of independent mobility, the reduction in outdoor play and in getting around on foot has an effect on children's development and well-being (Prezza et al., 2005). Richard Louv (2005) calls the disconnection between children and nature "Nature-deficit disorder". He directly links the lack of nature and nature experiences in the lives of today's wired generation to some of the most disturbing childhood trends, such as the rises in obesity, attention disorders, and depression. The lack of independent mobility has also negative consequences on children's development of spatial, motor and analytical skills, their sociability and their motor and social development (Hüttenmoser, 1995; Hüttenmoser, 2004).

The reduction in outdoor play and outdoor nature investigations also has negative effects on children's environmental knowledge. Unfortunately, nature-deficit disorder comes at times when people are needed who care for the environment in order to make a move towards sustainable development (Barker et al., 2002). Outdoor activities at primary school level should be especially emphasised because children in primary school are at a suitable age range for awareness development (Piaget & Inhelder, 1983). Moreover, children like to be actively engaged in the investigation of nature, particularly outside the classroom (Malone &

Tranter, 2003; Lindemann-Matthies, 2006). Thus, the primary school years seem to be the most opportune time for emphasising affective, emotional concern for living species (Chawla, 1998). In a frequently cited study by Tanner (1980), environmental/conservation professionals such as environmental educators or staff members of conservation organisations were asked to reflect about their most significant life experiences for the development of their conservation interests. The results of this and other related studies show that early childhood experiences in nature significantly influence people's interest in environmental issues and their later engagement in conservation issues (e.g. Tanner, 1980; Palmer et al., 1998; review in Chawla, 1998). Primary school teachers should therefore be encouraged to engage their pupils more often in the active investigation of nature outside the classroom (Lindemann-Matthies, 2005). It has been advised to make more use of easily accessible settings like school grounds or the near surroundings of schools (Malone & Tranter, 2003; Braund, 2004; Rowe & Humphries, 2004; Lindemann-Matthies, 2005). A short distance between school and study site not only saves money for transportation, but also valuable teaching time, two factors that might otherwise restrict the teachers' willingness to engage in outdoor education (Keown, 1986; Lock, 1998). Repeated visits to a site were found to produce the best learning results at all ages, but particularly for young children (Falk, 1983). However, as long as teachers themselves do not realise the necessity of outdoor nature experiences and the advantage of easily accessible sites for teaching, children will continue to have fewer opportunities for outdoor investigations (Lindemann-Matthies, 2005; Louv, 2005).

Childhood experiences in near-by nature can take place at numerous sites such as school grounds and school gardens, urban green spaces, and forests (Rickinson et al., 2004). In Switzerland, for instance, forests are a good option for nearby nature education, as about 30% of the country is covered with forest (Swiss National Forest Inventory LFI, 2004). Forests are often within walking distance from schools, both in cities and rural areas. In recent years, forest education has become increasingly popular (Massey, 2004). The Forest School initiative¹ originated in Scandinavia in the 1950s. The aim was to encourage children to learn social, physical and educational skills while encouraging an appreciation and understanding of the environment (Swarbrick et al., 2004). A forest school is a secure area of woodland, which acts as an outdoor classroom where children can explore, investigate and discover the natural environment with all senses, and learn about the environmental and economic importance of forests in a constructive way (Massey, 2004; Bolay & Reichle, 2007;

¹ <http://www.forest-schools-east.org/Resources.htm>

BAFU, 2008). By doing so, children develop an understanding of the complexity of natural processes and natural interactions, a sensibility for nature and its protection, and positive feelings towards forests and forest conservation (Reidelhuber, 1993). Moreover, forest education increases children's self-confidence and self-esteem, improves their ability to work co-operatively, counteracts a lack of motivation and negative attitudes towards learning, while offering the opportunities to take risks, make choices and initiate learning for themselves (Rickinson et al., 2004; Swarbrick et al., 2004). Forest education also trains children's gross- and fine motor skills as well as their stamina by being active and walking over rough terrain (Fjørtoft, 2004; O'Brien & Murray, 2007).

Several obstacles can impede forest or, more general, outdoor education (Rickinson et al., 2004; O'Brien & Murray, 2007). In most countries, forest education is not explicitly mentioned in the school curricula (Rickinson et al., 2004), and not part of pre-service teacher education programmes either (Kyburz-Graber & Robottom, 1999). In Switzerland, for instance, the primary school curriculum of the Canton of Zurich wants children to gain insights into the complex interactions in nature, and also to explore and investigate different natural habitats. However, forests as a place of learning and forest education as an approach are not explicitly mentioned (Lehrplan des Kantons Zürich, 2008). In consequence, teachers may be reluctant or lack the necessary skills and knowledge to provide outdoor (forest) education (Lock, 1998). A lack of background knowledge has been found to be a major obstacle for conducting forest education (Van Petegem et al., 2005). In addition, fear and concern about the pupils' health and safety, a lack of time and financial resources, and a lack of support by the education system might impede forest education (Rickinson et al., 2004).

Few studies have investigated the willingness of kindergarten and primary school teachers to carry out forest education in Switzerland, their perceived obstacles and benefits of the approach, and methods of good practice (Hüttenmoser et al., 2004; and references within). The present study therefore investigated benefits and challenges of forest education in view of almost 300 primary school teachers in the Canton of Zurich. The study was carried out in three steps. In the first step, all teachers in the Canton of Zurich were asked with the help of a written questionnaire about their school activities in forest education. In the second step, selected teachers were interviewed in-depth about their experience with forest education. In the third step, the classes of these teachers were observed during their time in the forest, and the children were asked about their experiences with forest education and knowledge of forests. The main objectives of the study were to investigate

1. how often primary school teachers (1st - 3rd grade) in the Canton of Zurich conduct forest education,
2. the motivation of teachers to educate in the forest, the obstacles they face, and the methods they use,
3. how forest education could be promoted,
4. how primary school children profit from forest education and what they think about forest education,
5. whether the location of a school as well as experiences and education of teachers influence the probability that forest education is carried out.

2. Methods

2.1 Study design and data collection

Questionnaire study

In spring 2008, primary school teachers (1st – 3rd grade) in the Canton of Zurich were asked about forest education with the help of a written questionnaire. The names and addresses of the teachers were provided by the local education authorities. Teachers were contacted through the head teachers of the schools. Head teachers received a detailed explanation of the aims and design of the present study, and were asked to pass on the questionnaires, information letters and pre-paid return envelopes to the respective teachers. The information letter was designed to explain the purpose of the study and to encourage a response. This letter also included a web-address where the teachers could download the questionnaire in case they wanted to fill it in electronically.

In March 2008, 950 questionnaires were sent to the schools. Overall, 262 teachers filled in the questionnaires (return rate = 28%). Anonymity was guaranteed to the participants. However, teachers engaged in forest education were asked whether they were willing to participate in subsequent in-depth interviews and an observational study and, if so, to state their name and address (Fig. 1).

Interviews

Main aim of the interview part of the present study was to gather detailed information on the methods used but also on the strength and weaknesses of forest education. Overall, 57 teachers stated their address and were thus willing to be interviewed. Of these, 15 teachers were selected (Fig. 1). Selection criteria were different teaching experiences, age, sex, and surrounding of schools (urban, rural). Moreover, teachers who had added extra comments in the questionnaire, i.e. indicating a special interest in forest education, were also included in the interview sample. Teachers who were not selected for the interviews but had stated their address received a letter and a package of wildflower seeds to thank them for their willingness to participate in the study.

The interviews were carried out on 13 days in May, June and July 2008. All interviewees received the interview questions in advance by e-mail. The half-hour interviews took place in the respective schools or, in some cases, in restaurants or the teachers' home. At the end of

each interview, the interviewees were asked if they were willing to participate in a subsequent observation study (Fig. 1). All interviews were tape-recorded, translated into English and transcribed into protocols. To thank teachers for their corporation they received a sunflower.

Observation study

Between May and September 2008, 15 classes were observed on 14 days during their time in the forest (Fig. 1). The behaviour of the children but also their environmental knowledge and opinion about forest education was investigated. Two classes were observed during a visit to a forest school (only available for classes in the city of Zurich), while the other classes were observed during a normal half-day visit to a forest close to school (0.1 - 2 km distance). Classes spent between 40 minutes to five hours in the forest. During the observational study, the weather was normally fine; only on two days it was raining.

During the forest visits, the researcher took notes on the activities undertaken. During each observation, some pupils were asked to participate in a group interview. In some classes, the teacher designed some time to these group discussions, whereas in other classes, the children were asked during their free time. The number of children who were interviewed varied from class to class (3 – 16 children). Overall, 56 children were interviewed.

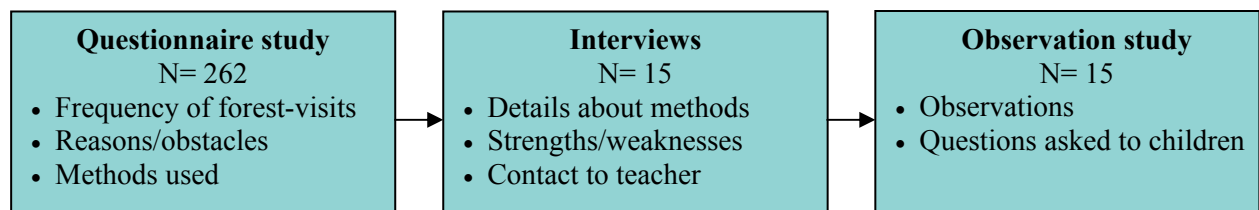


Fig. 1: Study design

2.2 The instruments

Questionnaire

The questionnaire was divided in two parts: the first part had to be answered by all teachers, whereas the second part had to be answered only by those teachers who actually carried out forest education with their biology² classes (questionnaire in Appendix I).

The first part consisted mainly of closed-ended questions. To gather some general information about the study participants, all teachers were asked about their age and gender, the grades they were teaching and the class sizes. Moreover, they were asked in which year they had finished their teacher education, and how many years of experience they had as a teacher.

To gather information about the catchment area of the schools and its coherence with forest education, all teachers were asked to state whether the surrounding of their school is rather urban or rural. Moreover, they were asked to estimate the distance from their school to the nearest forest, and whether this distance would prevent them from visiting the forest with their classes. It has been recommended that some biology lessons should be spent in the classroom (1st and 2nd grade: 4 lesson hours per week, 3rd grade: 5 lesson hours per week; Lehrplan des Kantons Zürich, 2008). However, the real number of lesson hours that is spent inside or outside the classroom depends on the teacher and might reflect his or her priorities. Therefore, teachers were asked how many hours per week they were teaching biology.

Literature has shown that several obstacles can impede outdoor environmental education (Rickinson et al., 2004; O'Brien & Murray, 2007). Therefore, all teachers were asked to state their opinion on seven close-ended statements about potential obstacles to forest education by using 5-step scales, ranging from 1: no obstacle at all to 5: very strong obstacle. They were then asked to estimate the proportion of pupils in class who felt more (a) comfortable, (b) distracted, and (c) challenged in the forest than in the classroom. They were also asked to estimate the proportion of pupils who were familiar with forests (through kindergarten education or parents). Finally, teachers were asked whether they themselves had experienced forest education in school, whether forest education was part of their teacher education and, if so, how much they had liked it (by using a Swiss school mark with 1: worst to 6: best).

²In the Canton of Zurich, the subject is called 'Mensch und Umwelt'. It is about the relationship between humans and the environment and it includes biology, ecology and environmental sciences.

Teachers who had stated to carry out forest education were then asked to proceed with the second part of the questionnaire. In this part, teachers were asked to estimate how many days per year and how long (whole day, half a day, less than half a day) they are teaching in the forest and to name at least three reasons why they are teaching in the forest. Moreover, they were asked to name three needs of children that forest education meets especially well. They were also provided with ten different approaches in forest education and asked to estimate the amount of time they spend on these approaches with the help of 6-step scales, ranging from 1 (never) to 6 (very often). Moreover, they were asked to rank-order four sources of information on forest education by importance (other teachers, teacher education, in-service teacher education, literature).

At the end of the questionnaire, teachers were asked whether they were planning a forest visit during May and September 2008, whether they would allow the researcher to accompany them, and, if so, to write down their name and address.

Interview guideline

In the interviews, teachers were asked about their years of experience with and motivation for forest education (interview guideline in Appendix II). They were also asked to discuss the goals they want to achieve with forest education.

Literature has shown that own experiences during childhood influence adults' attitudes towards nature (Tanner, 1980; Palmer et al., 1998; Ward et al., 2004; Chawla & Flanders Cushing, 2007). Teachers who had stated in the questionnaire that forest education was part of their own school education were thus asked to describe how they had experienced it and whether it had influenced their decision to carry out forest education themselves. Interviewees who had neither received forest education as a pupil nor as part of their teacher education were asked to explain why they feel close to the forest.

All interviewees were asked to discuss whether they observe differences between children's behaviour in the forest and in the classroom, and, if so, to describe these differences. They were also asked whether they observe changes in children's development over time, and, if so, to discuss such changes. Moreover, they were asked to describe which children are supported most by forest education. To gain insights into strength and weaknesses of methods used in forest education, all interviewees were asked which methods they use now, whether

they had changed their methods over time, and, if so, to explain why. The teachers were also asked which methods they think children like best, and to describe these methods.

One aim of the present study was to get insights into obstacles of forest education but also to make recommendations on how it could be improved. Therefore, the interviewees were asked about (their) problems with forest education, and to discuss why their colleagues or other teachers might not carry out forest education. With regard to an improvement of forest education, all interviewees were asked to discuss support measures for teachers who would like to carry out forest education. They were also asked to discuss how the idea of forest education could be further spread in the education system, and how teachers could be motivated to engage in forest education. Finally, all interviewees were asked whether they had already planned their next visit to the forest, and if it would be possible to join them for an observation study.

Observation protocol

At the start of each observation study, the name of the teacher, the number of pupils in class, the proportion of girls, the grade, and the date of the current but also the previous forest visit were recorded (observation protocol in Appendix III). During each observation, the length of the forest visit, the weather condition, the overall teaching content, the type of activities undertaken and the duration (minutes) were recorded. Moreover, the number of children who were distracted or did not pay attention to the teacher's explanations was counted. This was done to measure children's discipline in the forest. Berthold and Ziegenspeck, (2002) named twelve general needs of children in their book. These needs were listed in the observation protocol and it was recorded how well each need was met during the forest visit (not at all, moderate, greatly).

To gain insights into children's attitudes towards forest education, single children or in some classes groups of children were asked to describe what they liked and what they disliked during a forest visit. To gain insights into the children's environmental knowledge and their knowledge gains during forest education, they were asked to explain what they had learned during their forest visits, and to show and name some forest plants. They were then asked to discuss what a forest is good for and why humans need trees and other plants. To investigate the children's understanding of environmental complexity and consciousness, they were

asked what they think would happen if someone would cut down all the trees in the forest, which actions might disturb the forest, and how they could help to conserve a forest.

At the end of each forest visit, *all* children were asked four questions. The four questions were: (1) Do you prefer to play in the forest or on the schoolyard? (2) When you are in the forest, do you play with the same or with different children as in the classroom? (3) How often would you like to go to the forest during a school year (never, every now and then, once a week, three times per week)? (4) How many trees do you recognize, and how many can you identify by name (answer possibilities were no trees, 1, 2, 3, more than 3 trees)?

To prevent peer pressure, second and third graders were given the questions on paper. They were asked to indicate their answers by circling a corresponding “smiley”. First graders were asked orally. They were asked to gather in one place and then to walk to a pre-defined spot which stood for one of the possible answers to each question. The number of children in each spot was then counted.

2.3 Study participants

Questionnaire study

Teachers who had answered the questionnaire (88% women) were between 23 and 65 years old (mean age = 43 years). They had between one and 41 years of working experience as a teacher (on average 16.9 years). About 47% of the study participants were teaching in the first grade or below, 39% in the second grade, and 35% in the third grade. Class size varied between six and 27 children per class (mean class size = 20.1 children). The amount of time spent on biology and ecology teaching in the classroom varied between one and eight hours per week (on average 4.0 hours per week).

Interviews

The 15 interviewees (2 men) were between 24 and 65 years old (mean age = 47 years). They had between two and 41 years of experience as a teacher (mean = 21 years). On average, teachers had 12 years of forest experience. Nine teachers had between ten and 41 years of experiences, and four teachers had between five and nine years of experience. Only one teacher had no previous experience with forest education.

Observation study

All teachers who had participated in the interviews were also willing to participate in the observation study. Overall, 289 pupils (47% girls) were observed. They were from five 1st, six 2nd and four 3rd grade classes. However, some children were very shy and did not answer the questions. Only 52 pupils contributed actively to the conversation.

2.4 Data analysis

Questionnaires

Differences in the responses of forest-experienced and forest-inexperienced teachers towards obstacles for and perceived feelings of children with forest education were analyzed with single analyses of variance. Moreover, differences between teachers from rural and urban schools in their estimates of the proportion of children in class with previous forest experiences were also tested with single analysis of variance. Differences between the responses of teachers who had experienced forest education as a pupil or during in-service teacher education and those who had not were analyzed with chi-square tests.

To test whether certain variables influenced the annual number and duration of forest visits, the data were analyzed by multiple regression analysis. Because multiple regression analysis does not allow strong correlations between explanatory variables, Pearson correlations were tested first between the explanatory variables. Only variables with $r < 0.35$ were then included into the models (Crawley, 2005). The following variables were initially included in the models: sex, professional experience as a teacher (years), own experience with forest education as a pupil (yes, no), experience with forest education during teacher education (yes, no), surrounding of the school (urban, rural), distance to the nearest forest (km), whether the distance was regarded as an obstacle for forest education (yes, no), lesson hours in biology/environmental education taught per week, estimated proportion of children already experienced with forests when entering school, estimated importance of obstacles to forest education (scores on 6-point scales) such as additional workload, parents and weather, and the estimated proportion of children who feel comfortable, distracted and challenged in the forest. The final minimum adequate models were obtained by backward elimination of non-significant ($p > 0.05$) variables (Crawley, 2005).

To investigate whether teachers' experience (years), sex (coded as 1: male, 2: female), experience with forest education as a pupil (coded as 1: yes, 2: no), experiences during

teacher education (coded as 1: yes, 2: no), the location of the school (coded as 1: rural, 2: urban), the distance to the nearest forest (km), the proportion of children in class who were challenged (%), their degree of agreement with certain obstacles (rating scores) influenced the probability that forest education was carried out, the data were analyzed by binary logistic regressions with backward elimination of non-significant variables. All analyses were carried out with SPSS for Windows 16.0.

Interviews

The interviews were tape-recorded, transcribed and translated into English. The answers to the open questions were content-analysed and sorted into categories according to the type of responses given. Coding was discussed between the researcher and the research project leader, and reliability judged by comparing their categorizations. Due to the small sample and qualitative nature of this part of the study, no further analyses were carried out.

Observation study

The different activities observed were recorded and sorted into categories. The time spent on the different activities was calculated. The interviews with the children were translated into English, and the answers to the open questions were content-analysed and sorted into categories according to the type of responses given. Coding was discussed between researcher and the research project leader, and reliability judged by comparing their categorizations. Due to the small sample and qualitative nature of this part of the study, no further analyses were carried out.



3. Results

3.1 Questionnaire study

Information about participants

About 70% of all teachers stated that they were engaged in forest education. However, with increasing experience as a teacher, the probability that teachers carried out forest education decreased ($b = -0.804$, Wald = 6.27, $p = 0.012$).

About 52% of the teachers stated that their school was situated in a rather rural surrounding, whereas 48% described their school environment as rather urban. The mean distance from a school to the nearest forest was 1.2 km (estimates were between 100 m and 7 km). Schools in more rural areas were closer to the nearest forest than those in more urban areas (mean distance of 0.9 ± 0.07 km and 1.4 ± 0.11 km, respectively; $F_{1,238} = 13.99$, $p < 0.001$). About 92% of the teachers felt that the distance between their school and the nearest forest would not hinder them to visit the forest with their class. Neither the distance of a school to the nearest forest nor the surrounding of a school influenced the probability that a forest was visited.

Previous experiences influenced whether a teacher carried out forest education or not. Forest education was more conducted by teachers who had experienced forest education as a pupil than by those who had not (79% and 66%, respectively, Chi-Square value = 4.40, $p = 0.036$). Overall, 30% of the teachers had experienced forest education as a pupil. Moreover, forest education was more conducted by teachers who had participated in courses/activities on forest education (79% and 64%, respectively, Chi-Square value = 6.14, $p = 0.013$). Overall, 30% of the teachers had received training in forest education. They rated their training experiences as quite satisfying (mean score of 4.7 on the 6-step scale).

In the logistic regression model, neither the professional experience of teachers nor their own experiences with forest education as a pupil influenced the probability that forest education was carried out. However, teachers were more likely to conduct forest education, if they had learned about it during teacher education ($b = 1.23$, Wald = 7.52, $p = 0.006$), and the more of their pupils might profit from it ($b = -0.02$, Wald = 4.31, $p = 0.038$). However, the more strongly teachers felt that forest education also meant more work, the less likely they were to conduct it ($b = 0.56$, Wald = 14.22, $p < 0.001$).

Frequency and lengths of forest visits

On average, teachers visit a forest eight-times a year with their classes (range from 0 to 40 days per year; Fig. 2). About 32% of the teachers who conduct forest education, spent less than eight times a year in a forest.

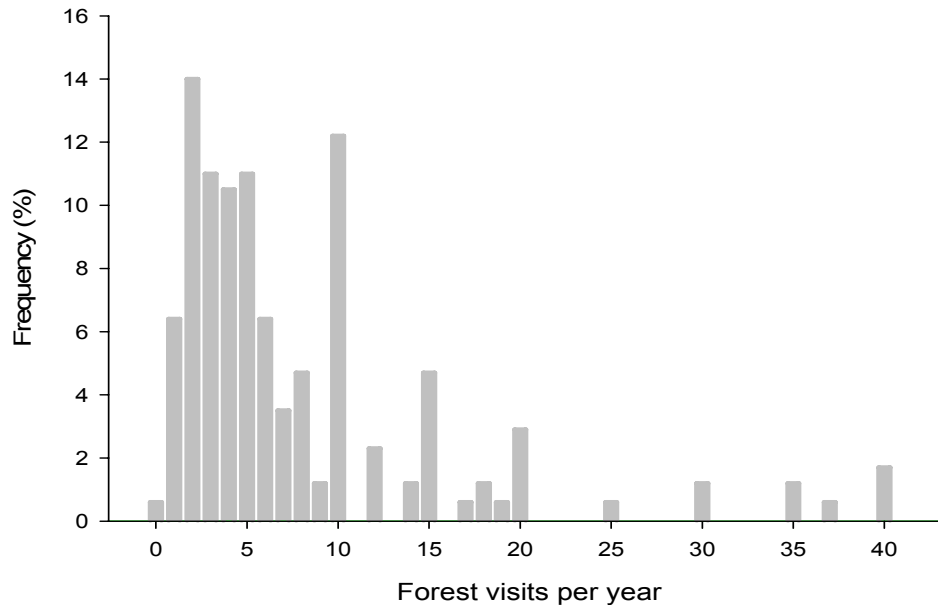


Fig. 2: Forest visits per year. 172 teachers answered the open question.

In the general linear model, several variables influenced the annual number of forest visits. The number of forest visits increased with a decreasing feeling that forest education means more work ($b = 1.81$, $F_{1,161} = 7.95$, $p = 0.006$; Fig. 3), an increasing willingness to visit the forest in any weather ($b = 1.63$, $F_{1,161} = 7.99$, $p = 0.006$; Fig. 4), and an increasing feeling that the parents support forest education ($b = 2.37$, $F_{1,161} = 4.86$, $p = 0.030$). Moreover, the more children in a class were thought to feel comfortable in the forest, the more visits were conducted ($b = -0.17$, $F_{1,161} = 5.25$, $p = 0.024$).

About 62% of the teachers spent half a day, 27% a whole day, and 11% less than half a day in the forest. The length of the stay did neither depend on the distance to the nearest forest nor on the experience or age of a teacher.

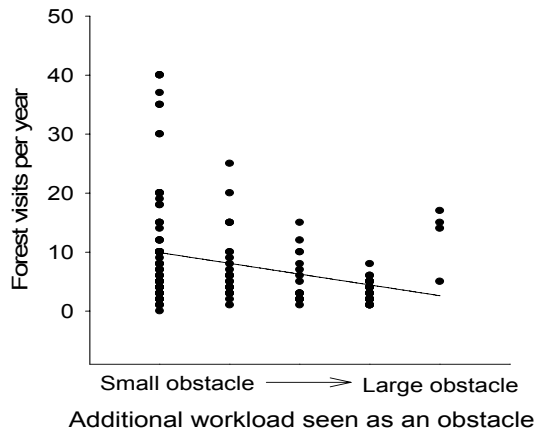


Fig. 3: Number of forest visits per year in relation to the perceived additional workload by 252 teachers.

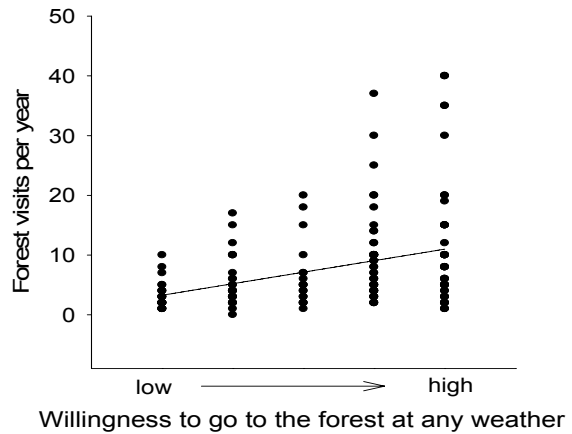


Fig. 4: Number of forest visits per year in relation to the willingness of teachers (n = 252) to visit the forest in any weather.

Feelings of children in the forest

In view of the teachers, about 87% of children in a class would feel comfortable, 48% more challenged, and 37% more distracted when educated in the forest instead of the classroom. Teachers who carried out forest education gave higher estimates in the comfortable and challenged, and lower estimates in the distraction category (Table 1). The more children in a class felt comfortable with forest education, the more strongly teachers agreed to visit the forest in any weather ($r = 0.22$, $F_{1,240} = 13.07$, $p < 0.001$).

Table 1: Effect of forest education on children’s feelings. Teachers (n = 262) were asked to estimate the proportion of children in class who feel comfortable and – in comparison to classroom education – more challenged or distracted during a forest visit. F-values are based on one-way analyses of variance (df are 1 and 210-250).

Feelings of children during a forest visit	Estimated mean proportion of children in class (%)			F- value	p-value
	Overall	Forest-experienced	Forest-inexperienced		
Comfortable	87.2 ± 0.83	88.9 ± 0.86	84.1 ± 1.77	7.56	0.006
Challenged	48.3 ± 2.01	54.0 ± 2.49	37.3 ± 3.12	15.49	< 0.001
Distracted	37.2 ± 1.78	35.0 ± 2.24	43.0 ± 2.87	4.41	0.037

In view of the participating teachers, approximately 49% of children in a class had pre-school experiences with forests (either through their parents or the kindergarten). Teachers from schools in a rural surrounding estimated that, on average, $58.0\% \pm 2.67$ children in a class had previous forest experiences, whereas teachers from schools in an urban surrounding estimated that, on average, $40.4\% \pm 2.72$ children had such experiences ($F_{1,240} = 21.32$, $p < 0.001$). However, the proportion of children in class with previous forest experiences did neither influence the probability that forest education was conducted nor the number of forest visits.

Perceived obstacles to forest education

All teachers were asked to answer various questions regarding obstacles to forest education. Bad weather was seen as a major obstacle (highest mean score on the 5-step rating scale; Table 2). Teachers unfamiliar with forest education scored more strongly on all pre-given obstacles (higher mean agreement scores, see Table 2).

Table 2: Answers to seven items regarding obstacles to forest education. Teachers were asked to rate each item on a 5-step scale, ranging from 1: hardly any obstacle to 5: very large obstacle. 252 teachers answered the question. F-values are based on one-way analyses of variance (df are 1 and 244 -248).

Obstacles for forest education	Teacher attitudes (mean score)			F-value	Significance
	All teachers	Forest-experienced	Forest-inexperienced		
Bad weather conditions	2.8 ± 0.09	2.5 ± 0.11	3.3 ± 0.16	13.57	< 0.000 ***
More dangerous than education in the classroom	2.6 ± 0.09	2.5 ± 0.10	2.8 ± 0.16	1.67	0.198
Increased workload	2.2 ± 0.09	2.0 ± 0.10	2.8 ± 0.16	22.04	< 0.000 ***
More dangerous than education in the schoolyard	2.2 ± 0.08	2.1 ± 0.09	2.5 ± 0.15	8.64	0.040 *
Lacking support of the authorities	1.9 ± 0.05	1.8 ± 0.06	2.1 ± 0.11	9.25	0.003 **
Lacking support of parents	1.9 ± 0.06	1.8 ± 0.06	2.0 ± 0.11	6.17	0.014 *
Lacking support of head minister of school	1.5 ± 0.05	1.5 ± 0.05	1.6 ± 0.09	2.58	0.110

* p < 0.05; ** p < 0.01; *** p < 0.001

Approaches to forest education

Ten possible approaches to forest education were shown to the teachers. They were asked to estimate the amount of time they spend on these approaches by using 6-step scales, ranging from 1: never to 6: very often. Hands-on investigations of nature by using all senses and the collection and investigation of forest species were the most frequently undertaken activities (Fig. 5).

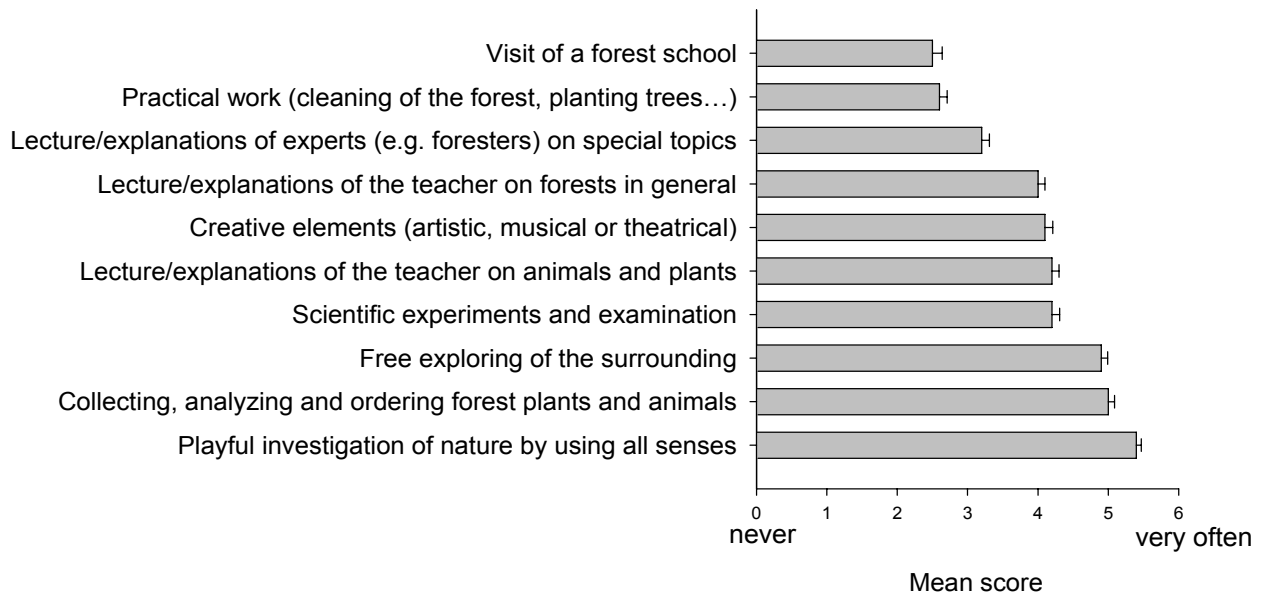


Fig. 5: Amount of time spent on different approaches during forest education. Teachers were asked to estimate the amount of time they spend on each approach on 6-step scales, ranging from 1: never to 6: very often. Between 169 and 176 teachers answered the questions.

Sources of information about forest education

Experienced teachers in forest education were asked to rank-order four pre-given sources of information about forest education by importance. Books and other teaching materials were considered as the main information source, whereas the initial teacher education received the lowest mean ranking (Table 3).

Table 3: Sources of information about forest education. Teachers were asked to rank-order four sources of information by importance (1: most important, 4: least important). 176 teachers answered the question.

Source of information	Mean rank
Books and other teaching material	1.9 ± 0.08
Other teachers	2.0 ± 0.07
In-service teacher education	2.6 ± 0.07
Pre-service teacher education	3.4 ± 0.07

Reasons for forest education

In an open question, teachers were asked to name at least three reasons why they teach in the forest. On average, 3.4 reasons were named. Almost 50% of the teachers answered that forest education improved their teaching (Table 4).

Table 4: Reasons for forest education. 176 teachers answered the open question. Multiple answers were allowed. The answers were sorted in broad categories.

Reason	Responses (%)	
	Subcategory	Category
Didactical and methodological considerations		46.0
The ecosystem "forest" is a topic in the curriculum	15.3	
Making use of forest material	12.0	
Practical education instead of theory	7.4	
Brings variety to the classroom	6.2	
Possibility of forest school visits	2.3	
Other answers	2.8	
Promotion of nature experiences		34.1
Contact with nature	21.0	
Respect of nature, environmental consciousness	9.1	
Relationship with nature	7.4	
Promotion of scientific skills		29.5
Discovery and observation	14.8	
Identification	6.3	
Understanding complexity of nature	6.3	
Observations of seasons	5.7	
Promotion of movement		25.0
Promotion of experiences, adventure		18.1
Promotion of social welfare		18.1
Promotion of sensory experiences		17.0
Promotion of well-being		8.0
Promotion of creativity		5.7
Other (e.g. teacher's love for the forest, silence...)		13.0

Children's needs

The teachers were asked to name three needs of children that can easily be fulfilled in the forest. About two third of the teachers felt that children's basic need for movement is well met in the forest (Table 5). The exploration and observation of nature was also frequently mentioned (Fig. 6 and 7). About a quarter of the respondents named children's general need for nature.



Fig. 6: Children exploring the forest with lenses



Fig. 7: Children analyzing the content of their bug eye viewers

Table 5: Needs of children that can be fulfilled in the forest. In an open question, all teachers were asked to name three needs. 184 teachers answered the question.

Children's need	Responses (%)
Movement	64.0
Exploration and observation	34.8
Nature experiences	24.5
Sensory experiences	16.8
Play	13.0
Fresh air	9.8
Group experiences	8.5
Creativity	7.6
Curiosity	7.6
Freedom	4.5
Other answers (peace, joy)	5.1

3.2 Interviews

Experiences with forest education in school and during teacher education

When asked about their own school experiences, six interviewees stated that they had experienced forest education as a pupil. However, they mainly remembered special occasions such as orienteering hikes or school trips. Only one teacher, who had been to a private school (Rudolph Steiner School), had experienced regular forest visits.

Four teachers had heard about forest education during teacher education. However, only two of them had learned *how* to teach in the forest. One of these teachers did her teacher education in Holland.

Motivation for forest education

All interviewees were asked about their motivation to introduce forest education into their classes. Most often they stated a personal interest and need as the reason to educate in the forest (Table 6).

Table 6: Motivation for forest education. 15 teachers were asked to discuss their personal reasons for introducing forest education into their classes. The answers were content-analysed and sorted into broad categories.

Motivation for introducing forest education	Responses (%)	
	Subcategory	Category
Personal interest and needs		66.7
Personal connection to the forest	40.0	
Allows new ways of teaching	26.7	
Advantage for children		60.0
Allows new experiences for children who are no longer close to nature	40.0	
Makes children feel good	6.7	
Allows movement	6.7	
Has advantages for “difficult” children	6.7	
Extrinsic reasons		40.0
Support and initiative of experienced colleagues	13.3	
School is close to a forest	13.3	
Offer of forest schools	13.3	

The first group of answers referred to personal reasons for forest education. Typical answers included:

“I think my personal background plays an important role: I grew up in a house in the forest, I grew up with the forest.” (Female teacher, 46 years old)

“When I had my own children, I spent a lot of time in the forest walking. By doing so I sort of discovered the forest again. I recognized that the forest has so much to offer, and that it is really good for children. Now I want to show the forest to my pupils. I want to show them its potential as a playground and place for recreation.” (Female teacher, 56 years old)

“We were looking for new ways of teaching. We were discussing how to meet the children’s needs and thinking about how good education works. That is how it emerged.” (Male teacher, 44 years old)

The second group of answers focused more on the benefits for the children. Almost every second teacher felt that children lack experiences with the environment "forest". Typical answers included:

“With time we got the feeling that more and more children never go to the forest. At the weekends, they spend most of their time in front of the TV. They are missing some basic experiences.” (Male teacher, 58 years old)

“I just noticed that it is so good for the children. They are much more harmonised and get so many sensory experiences.” (Female teacher, 62 years old)

In some cases, it was neither a personal motivation nor a focus on the benefits for children that motivated teachers to educate in the forest. Extrinsic offers were the impulse for starting forest education. In the city of Zurich, for example, schools can visit so-called forest-schools which are managed by the City of Zurich. Each class is allowed to visit a forest school once a year.

“When I started as a teacher in Zurich, I heard of forest schools. Since then, I make regular use of this offer because I think it is a good thing to do.” (Female teacher, 49 years old)

Aims of forest education

All interviewees were asked to discuss what they wanted to achieve with forest education. Most often, the teachers wanted their pupils to know about nature and to be conscious about it (Table 7).

Table 7: Aims of forest education. All interviewees (n = 15) were asked to discuss what they want to achieve with forest education. The answers were content-analysed and sorted into broad categories.

Aims of forest education	Responses (%)	
	Subcategory	Category
Cognitive aims		100.0
Knowledge gains	66.7	
Improvement of observational and orientation skills	33.3	
Affective aims		93.3
New experiences for children	33.3	
Contact to nature	26.7	
Consciousness about nature	20.0	
Careful interactions with nature	13.3	
Interpersonal and social aims		46.7
Social improvement	20.0	
Community feeling	13.3	
Getting to know each other	13.3	
Taking responsibility for oneself and the class	6.7	
Physical and behavioural aims		33.3
Improvement of motor skills	33.3	

For many teachers, cognitive and affective aims were central. Typical answers included:

“The forest is a great place to learn about interactions in nature. Since one year we are visiting the forest on a regular basis. The children have learned to observe how the trees change from season to season.” (Female teacher, 46 years old)

“I want to raise awareness that humans are linked to nature, that we are nothing without nature, and that we depend on nature. I want children to know that we can only exist if nature is doing well, and to remember that we have to take care of our environment.” (Female teacher, 65 years old)

“My goal is that children learn how to orientate themselves in the village and the surroundings. Many children today are accompanied by their parents on their way to school, and they only know this one way. Whenever they are somewhere else in the village, they do not know how to get home. We visit different forests and in the forests different places. I am sure that now every child finds their way home from wherever we are in the forest. This helps them to root themselves in the village.” (Male teacher, 58 years old)

Other teachers regarded forest education as an opportunity to foster children’s social and physical development. Typical answers included:

“One aim is movement. Due to insufficient capacities we do not have many gym lessons. The social life can also be fostered in many ways. The children get to know each other. And I want them to experience nature, for instance by observing tadpoles and caterpillars. I also want them to observe the seasonal changes of trees. Children can see how a walnut tree looks without leaves and then some months later see the same tree with nuts hanging everywhere.” (Female teacher, 47 years old)

“In the first grade it is mainly the promotion of a community feeling. I want children to get to know each other. Therefore it is nice if the class is in a different surrounding.” (Female teacher, 56 years old)

Behaviour of children in the forest and classroom – a comparison

All teachers were asked to discuss whether pupils behave differently when taught in a forest instead of the classroom. Most often, positive changes were observed from classroom to forest education (Table 8).

Table 8: Perceived differences in the behaviour of pupils when educated in a forest instead of a classroom. All answers are listed that were named more than once. 14 teachers answered the question.

Behaviour difference when in the forest	Responses (%)
Positive	
Children are more relaxed and quiet	35.7
They interact more socially	28.8
Children with poor knowledge perform better	21.4
Children with behavioural deficiencies are more relaxed	14.3
Children are more open	14.3
Negative	
Children are louder, more distracted	28.8

In view of the interviewees, children are less stressed and show more social behaviour when being in the forest. Typical answers included:

“Some children are just more concentrated in the forest. Not in terms of being silent, but in terms of longer attention spans when doing things. They immerse in something, for instance a game. When we observed the squirrels, everybody was completely quiet - even the most boisterous boys. I have the feeling, the children are more themselves. And they listen well to what I say, and remember what I have told them.” (Female teacher, 41 years old)

“Some pupils differ strongly in their behaviour. Overall, I would say that children are quieter in the forest than in the classroom. However, it could also be that I care less about noise and about children running around when we are in the forest. The children are also more open. Some kids tell me so many things on the way to the forest or in the forest itself. In the classroom there is often no time for this.” (Female teacher, 27 years old)

One teacher compared the behaviour of pupils who had already experienced forest education in kindergartens with those of pupils who had not:

“The difference between the forest-experienced kids and the others: that is like two different worlds. For the experienced children it is much more natural, they have more knowledge, they are more independent, they treat the material differently and they do not care if their clothes are getting dirty.”
(Female teacher, 60 years old)

Also some negative aspects of forest education were mentioned. Four teachers discussed that children have more problems with discipline when they are in the forest:

“In the forest, children are more easily distracted. Problems in group dynamics are more obvious. It is more difficult to achieve discipline.”
(Female teacher, 46 years old)

Children’s progress over time

All teachers were asked to reflect about children’s developmental changes which might be due to forest education. Three teachers found it difficult to distinguish between age-induced developmental changes and changes that are induced by forest education. Most often, advances in motor skills and discipline were observed (Table 9).

Table 9: Developmental changes in children due to forest education. 14 teachers answered the question. The answers were content-analysed and sorted in categories according to Rickinson et al. (2004).

Progress in children’s development	Proportion of teachers answering (%)	
	Subcategory	Category
Affective impacts		64.3
Curiosity for nature	28.6	
Appreciation of nature, carefulness	21.4	
Less care about dirt	14.3	
Physical/behavioural impacts		64.3
Knowing the rules	35.7	
Motor activity, endurance	28.6	
Cognitive impacts		21.4
Interpersonal/social impacts		14.3

Some teachers pointed out that forest education might lead to a greater affinity of children to living beings:

“They lost their timidity towards many things, for instance they now touch insects and show them to me. They are more careful with them and know how to handle plants and animals.” (Male teacher, 44 years old)

Other teachers noticed some physical and behavioural impacts of forest education (Fig. 8). Typical answers included:

“In the beginning, the children stumbled over branches and had difficulties to walk all the way to the forest. We even had to take a bus. With time they got used to walking. We now walk the whole way, 50 minutes in total, and even obese children can do that. Forest visits strengthen their endurance.” (Female teacher, 47 years old)



Fig. 8: Children walking over a fallen tree

“When we walk to the forest, I have some rituals (for instance the so-called march of silence). In the beginning, that was very difficult for the children. However, now they can manage it without any problems. In the beginning, they also struggled a lot just to listen. Someone was always rustling or moving. Now they are quiet and listen.” (Female teacher, 56 years old)

“In the beginning they were always close to my side. With time they started to move around. However, they know that I am always there when they need me.” (Female teacher, 25 years old)

Additionally, teachers were asked to discuss whether all children profit in a similar way from forest education or not. More than 50% of the interviewees stated that each child profits in its own way (Table 10). Some teachers saw advantages especially for children who would otherwise not visit a forest.

Table 10: Responses of 14 teachers to the question which children profit most from forest education. Only answers which were given more than once are listed.

Children profiting the most	Responses (%)
All children	57.1
Children unfamiliar with the forest	35.7
Children with motor deficits	14.3
“Intelligent” children	14.3

Methods used

The 14 teachers who were already experienced with forest education were asked if they had changed their methods over time. Half of them stated that their methods are flexible, and that they depend on the class they teach.

„I always change something, or try out new things I have read or learned about in a course.” (Female teacher, 45 years old)

Three teachers mentioned that over time they had included rules, rituals and more structure in their forest teaching.

“In the beginning, I was more relaxed and had fewer rules. With this class, I set rules from the beginning on. It is now easier for me.” (Female teacher, 27 years old)

The teachers were also asked which methods and activities their pupils like best. The majority of teachers (79%) mentioned free play. Collecting forest material was also named as a popular activity (by three interviewees). Other favourite activities were observation tasks, story writing, and investigations by using microscopes or magnifying glasses. One teacher mentioned that the children were quite shy during their first visit to the forest and unsure about what to do. However, with time and experience, children started to enjoy climbing trees and getting dirty.

Obstacles

About 50% of the teachers named bad weather, ticks but also a lack of discipline as obstacles to forest education (Table 11).

Table 11: Perceived obstacles to forest education. Teachers (n = 15) were asked to reflect about difficulties they experience with and obstacles that may hinder their colleagues to perform forest education. Only answers which were given more than once are listed.

Perceived obstacle	Proportion of teachers answering (%)	
	For interviewees	Assumed for colleagues
Bad weather, ticks	53.3	
Lack of discipline	53.3	
Inappropriate clothes of children	20.0	
Lack of time	13.3	46.7
No helpers, assistants	13.3	20.0
Additional workload		46.7
Fear of responsibility		40.0
Other priorities than forest education		33.3
Insufficient background knowledge		26.7
No emotional connection to forests		20.0
Unsupportive parents		13.3

Most often, teachers were concerned about ticks and the weather. Typical answers included:

“One problem is the fear of the ticks. But it is not such a big problem; one has to inform the parents. Sometimes the weather bothers us too, especially when children are not dressed appropriately. Not all parents realise that their children need different clothes when we are going to the forest.” (Male teacher, 44 years old)

“The weather can be an obstacle. However, it very seldom prevents us from going to the forest. The problem is that the material gets wet. It is then difficult for the children to document their observations.” (Female teacher, 45 years old)

Some teachers mentioned the lack of discipline in their classes as an obstacle. However, two interviewees pointed out, that teachers might also face discipline problems in the classroom. Typical answers included:

“The children do not always stick to the rules. One day some boys even went back to school without telling me. They thought that this was okay. Children who are not familiar with forests have problems to estimate the risk. Especially in the beginning they do not know what they are allowed to do and what they are not allowed to. A teacher has to learn to trust the children. We cannot always watch them.” (Female teacher, 62 years old)

“One has to accept that pupils are not always focusing on the teacher. There are so many things that attract their attention when they are in the forest.” (Female teacher, 27 years old)

The two youngest interviewees felt that forest visits require a lot of time which is otherwise needed to fulfil the subject requirements of the curriculum.

The interviewees were also asked to discuss why their colleagues / other teachers might not want to conduct forest education. The interviewees most often named fear, lack of time and the additional workload as obstacles (see Table 11).

“Time is an obstacle. Already the way to the forest takes time. Many teachers do not want to spend a full morning in the forest, as they think that they do not have enough time for other subjects such as math.” (Female teacher, 24 years old)

How to promote forest education

In view of the interviewees, forest education should be included in pre-service and in-service teacher education. The possibility to get help and support by teachers already experienced in forest education was also seen as a valuable strategy to foster forest education (Table 12).

Table 12: Strategies on how to promote forest education in primary schools in view of 14 teachers experienced in forest education. Only responses that were given more than once are listed.

Strategies to promote forest education	Responses (%)
Inclusion in teacher education	42.9
Providing helpers, assistants	35.7
Advertisements	35.7
Provision of teaching materials	14.3
Inclusion in school curriculum	14.3

Most often, teachers felt that forest education should be an essential part of teacher education.

Typical answers included:

“Forest education is clearly missing in teacher education. We had some biology classes where we learned how to grow plants. Practical outdoor education was missing.” (Female teacher, 47 years old)

“I think forest education should be part of teacher education. As long as this does not happen, every teacher has to acquire knowledge on how to do it by his or her own.” (Female teacher, 45 years old)

3.3 Observation study

Activities

Most of the time, children explored the forest either on their own or guided by their teacher (Fig. 9). They, for instance, investigated the bottom side of leaves with a mirror or searched for objects with particular shapes. In some classes, the teacher provided the children with books or magnifying glasses, and asked them to find animals. In other classes, children were not encouraged to explore the forest, but were given free time to play.

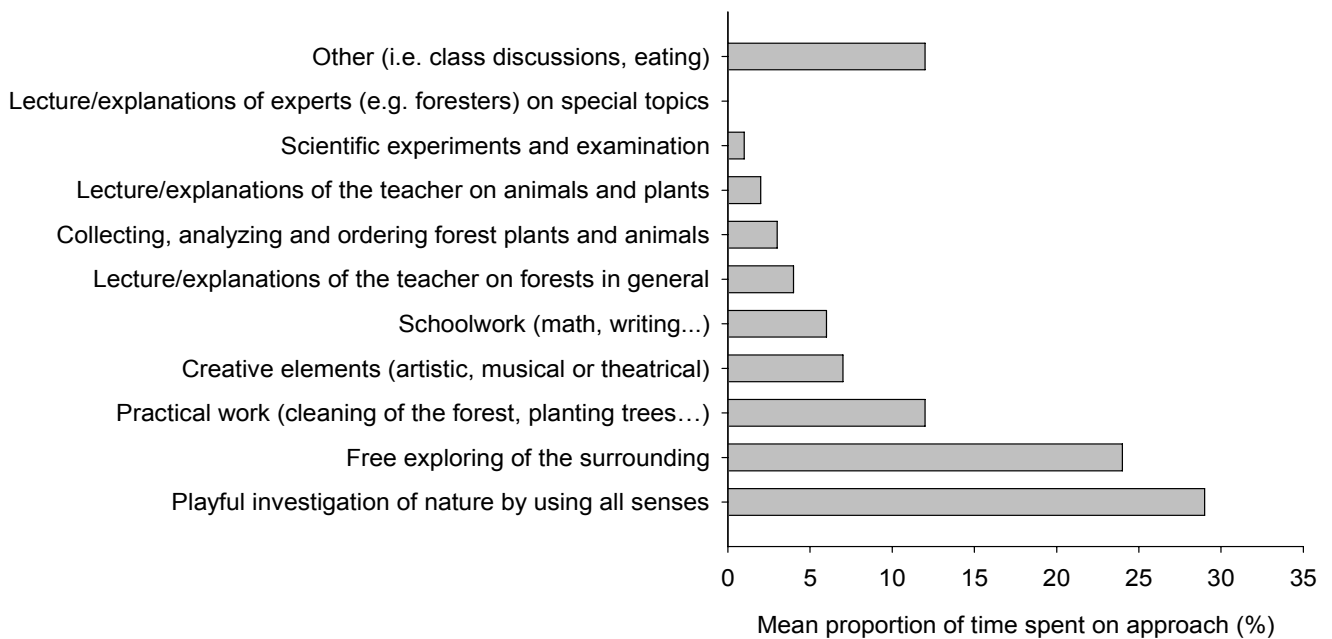


Fig. 9: Average time spent on different activities. The activities were sorted in broad categories. 15 classes were observed.

In one class, the children especially liked to collect different plant material. They put it on the forest floor and walked over it (Fig. 10). With the help of a fixed rope they could even walk over it without looking. In another class, the children collected different leaves and decorated plastic cups with it (Fig. 11 and 12). In more than half of the classes observed, all children paid attention to the given tasks. Just about 9.7% of all children were not attentive.

Children's needs

For each forest visit it was estimated how well the different needs³ of children were met. Most of the twelve needs were moderately met (Table 13). The needs to express experiences and to be alone as well as the needs for love and security were not met well.

³ According to Berthold and Ziegenspeck (2002).



Fig. 10: Girl walking on a „bare feet path“



Fig. 11 and Fig. 12: Children showing their cups which they had decorated with plant material from the forest

Table 13: The needs of children and their fulfilment by forest education. For 15 classes the degree of fulfilment was estimated (hardly, moderate, very well).

Need of children	Number of classes meeting the need		
	Hardly	Moderate	Very well
Responsibility	0	14	1
Movement	0	13	2
Connection with nature	0	11	4
Discovery of the world	1	8	6
Social activity	2	11	2
Adventure and risk	3	11	1
Play	3	10	2
Perception with all senses	5	9	1
Building, creating	6	7	2
Expression of experiences	8	4	3
Being alone	11	4	0
Love and security	11	4	0

Interviews with children

At the beginning of the interviews, children were asked whether they enjoy forest visits. Only nine out of 52 children did not enjoy it. Children were further asked which activities they liked or disliked. Children liked to play games and to build things with their own hands, for example a tree house (Table 14). Children also liked to have “tree-friends”. In this approach – used by six teachers - children were told to find a tree they especially liked. In some classes, each child had to find his or her own tree, in other classes they searched in groups. Once they had discovered their tree-friend, they had to observe, draw and identify it. The pupils also liked to do handicrafts with material from nature. The walk to the forest was quite unpopular. However, 15 children stated to like everything.

Table 14: Forest activities liked and disliked. 52 children answered the question. The answers were roughly categorised. Answers stated by more than 3 children are listed.

Activities during forest visits	Proportion of children answering (%)	
	Liked	Disliked
Playing games	50.0	
Building, creating something with their own hands	25.0	
Making a fire	21.2	
Recesses	14.4	
Visiting their personal tree	14.4	
Discoveries	13.5	
Catching and observing animals	9.6	
Sport/Walking to the forest	7.7	13.5
Touching insects, ticks, stinging-nettles		17.3
Being in a circle/listening to the teacher		11.5
Having conflicts with friends		3.8

The children were also asked what they had learned. Most often, children referred to cognitive learning gains such as the ability to identify certain trees and flowers (Table 15). Some children had learned that forests produce oxygen, other children had learned more practical things:

“I have learned that during the day, trees take in bad air. And then, at night, they give us good air.” (8 years old child)

“Trees are living. We are not allowed to tear down branches.” (7 years old child)

“I found out that is not possible to make a fire with wet wood.” (8 years old child)

Table 15: Learning gains during a forest visit in view of 52 children. The answers were sorted in categories. Only answers given more than once are listed.

Learning gains	Responses (%)
Ability to identify plants	25.0
Behavioural rules in the forest	21.2
Functions of forests	17.3
Knowledge about particular animals	11.5

The written questionnaire also included one question about the acquired knowledge. All children were asked to count how many trees they were able to identify. About 20% of all children were not able to identify any tree. However, about 38% of the children stated that they could name more than three trees. One teacher placed great importance on the identification and classification of plants. Her pupils could identify at least ten plant species.

The trees most often named were fir (44% of the children), beech (44%), oak (35%), maple (16%), ash (14%), cherry tree (12%) and spruce fir (12%). The pupils were keen on learning names and quite curious about their environment (Fig. 13).



Fig. 13: "Dear Mrs. Knecht. I have learned a lot. The questionnaire was a great idea. I had a lot of fun. I realised that I can identify 20 trees and bushes." (9-year old girl)

Benefits of forests, damage to forests, and measures to preserve forests

More than half of the children stated that forests are important because they produce “good air” (Table 16). Children often mentioned that humans cannot live without trees. They also stated frequently that forests harbour various animals. Other children saw forests as a place where they can spend their (leisure) time.

“Squirrels are protected and do not need to be afraid.” (6 years old child)

“There has to be some space on Earth where it is nice and where nature can be.” (7 years old child)

“It is nice for humans: no noise from the streets, fresh air.” (7 years old child)

The children were also asked to imagine what might happen if someone would cut down all the trees in the forest. 20 children answered that it would be bad for the animals because they would lose their home, have nothing to eat anymore, and would die. Bad air or no air at all was mentioned by 15 pupils. Three pupils gave very personal answers:

“I would call the police and beat the people who do this.” (7 years old child)

“I would cry.” (7 years old child)

“I would tell the people from the municipalities.” (8 years old child)

Finally, the children were asked what forests do not like. Most often, they named obvious damage like cutting down the trees, tearing down branches or damaging the bark (see Table 16).

“The forest does not like it if we hurt it.” (6 years old child)

Table 16: Benefits of forests, damage to forests, and measures to preserve forests in view of 52 children. The answers were sorted in categories. Only answers which were given more than three times are listed.

	Responses (%)
Benefits of forests	
Production of (fresh) air	59.6
Home for animals	36.5
Place for recreation	25.0
Production of fire wood	11.5
Good for nature	11.5
Origin of paper	7.7
Food production	7.7
Damage to forests	
Cutting of trees	46.2
Damage to single trees / plants	34.6
Waste disposal	25.0
Fire	17.3
Preservation of forests	
No waste disposal	28.8
No damage to trees	17.3
No cutting of trees	7.7

Many children were not able to answer the question how they (or humans in general) could help and support the forest. Three children gave a simple, but true answer:

“We have to be kind to the forest.”



Happy tree

All children were asked with the help of a written questionnaire whether they prefer to play in the forest or in the schoolyard. About 64% of the children preferred to play in the forest, and 64% stated to play with the same friends when in the forest or in the schoolyard. In a closed-ended question, children were asked how often they would like to go to the forest (Table 17). More than 90% of the children would like to visit the forest. However not all agreed, to do it on a weekly basis.

Table 17: Preferred amount of forest visits in view of 257 children

Amount of forest visits	Responses (%)
Three times per week	38.9
Once per week	19.1
Every now and then	38.9
Never	8.1

4. Discussion

Teachers play an important role in engaging their pupils in active investigations outside the classroom (Simmons, 1996; Gayford, 2000; Barker et al., 2002; Lindemann-Matthies, 2006). As the present study shows, more than two third of the participating teachers carried out forest education. Moreover, the distance from a school to the nearest forest did not influence a teacher's decision to conduct forest education or not. These are pleasing results because especially in highly urbanised areas such as the city of Zurich and its surroundings, outdoor nature experiences for children are diminishing (Hüttenmoser et al., 2004; Louv, 2005). In the present study, children from urban areas had significantly less forest experiences before entering school than those from rural areas. As children's living surroundings become increasingly dominated by street traffic, they are less likely to freely play and move around and are increasingly hindered in a healthy social and motor development (Hüttenmoser, 1995). Outdoor activities especially at primary school level should thus be emphasized (Lindemann-Matthies, 2005, 2006). Fortunately, unspoiled places like rivers, ponds, or forests are highly valued by teachers for investigations in nature (Simmons 1996). However, it has been pointed out that teachers should be prepared for outdoor nature education during their education and that such education should be an essential part of the pre-service teacher curriculum (Lindemann-Matthies et al., 2009).

Teachers in the present study who actually had received a respective training - which they thought positive about - were more likely to conduct forest education than those who had not. The importance of pre-service or in-service teacher education on teachers' willingness to conduct outdoor nature education in general was also found in other studies (Lane et al., 1995; Lindemann-Matthies & Ranft, 2004). Unfortunately, study participants in the present study could hardly rely on their pre- and in-service teacher education as a source of information. Written material and colleagues were more important. Moreover, as some of the interviewees remarked, just hearing about forest education is not enough. To actually learn *how* to teach in the forest would be a better approach. A teacher's confidence to conduct forest education was also influenced by his or her own experiences with the approach as a pupil. Other studies have shown that own school experiences with outdoor investigation activities positively influence the enjoyment and confidence of student teachers to implement outdoor activities in school (Lindemann-Matthies & Kadji, 2006), and that the time people spend in forests during childhood, positively influence their willingness to visit forests as adults (Ward et al., 2004).

Frequent visits to outdoor educational settings have been found to increase children's environmental knowledge and attitudes towards nature (Hattie et al., 1997; Bogner, 2002), and children's pro-environmental behavior (Bögeholz, 2006). This is in line with results from the present study. In view of the interviewees (all teachers engaged in forest education), children develop an interest in, protective feelings for and an attachment to forests and forest conservation over time. Regular visits to forests should thus be recommended. However, with an average of eight visits per year, pupils do not receive many opportunities to explore forests during normal lesson hours, at least not in the Canton of Zurich. In a comparable study with kindergarten classes in the Canton of Zurich, forests were at least visited 18-times a year (Lindemann-Matthies & Ranft, 2004). One reason for this difference could be that primary school teachers already feel more obliged to do other things in school than outdoor nature education. This would explain why teachers were less likely to conduct forest education at all or visit a forest regularly, the more they perceived it as an additional workload. However, forest-experienced teachers perceived the additional workload and other items as much less challenging than forest-inexperienced teachers. This shows that once the first step is made and forest education is conducted, perceived disadvantages might become less central.

Major obstacles restricting outdoor nature activities were found to be a high number of pupils in class (Simmons 1998), timetable problems (Tilling 2004), and the belief on the part of teachers that nature-based investigations require more specialist knowledge than they have (Brewer, 2002; Van Petegem et al., 2005; O'Brien & Murray, 2007). Timetable problems are especially seen as a constraint to forest education (Harris, 1999; Michie, 1998; Rickinson et al., 2004). However, a lack of time was hardly a concern for teachers in the present study. In the interviews it was mentioned only by two very young teachers. Newly qualified teachers might be challenged enough with the new situation as being a teacher and organizing subjects such as reading and math (Luft, 2007). They might not want to start instruction with innovative approaches they are hardly familiar with. Instead, they are more likely to rely on teacher-centered classroom instruction; something most of them are familiar with from their own time at school (Bianchini et al., 2003). With increasing experience as a teacher they might become more confident and find their time to include approaches such as forest education into their teaching schedule. However, as discussed above, without previous introduction to the approach, they might not think about forest education at all or, as it was guessed in the interviews, might feel too insecure to conduct it due to a lack of background knowledge.

In a study by Rickinson et al. (2004), fear about young people's health and security was stated as the main obstacle for forest education. In general, a teacher's fear of being held responsible in case of an accident has been regarded as a major reason why field trips and outdoor teaching is declining (Barker et al., 2002; O' Brien & Murray, 2007). However, teachers in the present study hardly agreed that educating in a forest is more dangerous than classroom education. The experienced interview partners did not even mention this risk at all, but assumed that the fear of taking responsibility might prevent their colleagues from going to the forest. However, the more teachers felt that the parents - a critical factor in outdoor education studies (e.g. Lindemann-Matthies & Ranft, 2004) - support forest education, the more likely they were to undertake it.

Teachers were concerned about the feelings of their pupils. In general, both forest-experienced and forest-inexperienced teachers felt that their pupils were comfortable in a forest. However, the more comfortable they considered their pupils to be, the more visits did they conduct. The willingness of kindergarten teachers in the Canton of Zurich to visit a forest was also influenced by the number of difficult children in a class (Lindemann-Matthies & Ranft, 2004). A lack of discipline was mentioned as a major problem by the forest-experienced teachers in this study. Moreover, more than a third of all study participants felt that children are more distracted in a forest than in their classroom. A forest contains many things which can distract children's attention from the teacher, and its space makes it harder for teachers to keep track of their pupils (Nützel, 2007). Especially children unused to forests might be distracted, and even develop fear and dislike of the unknown environment (Milton et al., 1995; Bixler et al., 2002; Bolay & Reichle, 2007). However, forest-experienced teachers felt that they could deal with these problems. They observed many positive developments in their pupils which far outweighed the obstacles. Moreover, they reported that with time children learned to be more quiet, focused and also more willing to accept rules. Setting rules was regarded as a main predictor for a successful forest education.

Compared to classroom instructions, theoretical and practical approaches can be more easily matched in forests or other outdoor learning settings (Barker, 2002). In the present study, teachers also felt that forests are good places where theory and practical experiences can be linked. However, hands-on, playful approaches by far outweighed lecture-style explanations during their forest visits which, as the observation part has shown, strongly matched the interest of the children. Teachers assigned a lot of time to unguided, playful and sensory exploration activities which are important components of a healthy development of children.

By playing, children learn to communicate with others, to cooperate and to solve problems (Malone & Tranter, 2003). Moreover, to become independent from family members or other persons, it is important that children can explore their surroundings autonomously (Bixler et al., 2002). In the present study, movement, the exploration, observation and investigation of nature as well as sensory experiences and play were named as basic needs of children which can be fulfilled in the forest (see Berthold & Ziegenspeck, 2002), and most of these needs were at least moderately met during the forest education units observed. However, when the present teacher sample was explicitly asked about their reasons for forest education, the promotion of nature experiences and scientific skills were more often mentioned than the promotion of, for instance, motor and social skills. Even the carefully selected expert teachers in the interviews stated that most of all they had cognitive aims in mind and also wanted to improve children's personal connection to and experiences with nature which might otherwise not be fostered. This shows that teachers consider forests clearly as educational settings which, in addition, have the advantage to foster children's personal and social skills.

Although other aims were prevalent, teachers in the present study wanted to foster pupils' motor skills and, in the interviews, stated to have improved these skills due to forest education. This is a pleasing result as more and more children today already at kindergarten age have motor deficits (Hüttenmoser, 2004). Motor deficits are partly due to a lack of opportunities for children to run around and play in the open, being confined to the house and occupied in programmed activities under adult surveillance (Prezza et al., 2005). However, not mutually exclusive, they are also due to weight problems. In Switzerland, the proportion of overweight children is rapidly increasing (BAG, 2008). Since 1980, it has almost quadrupled and is now 13% for the girls and 16% for the boys (Schmid, 2008). Some interviewees in the present study mentioned the profit of forest education for obese children, and for those who in the beginning were not even able to walk over roots and branches. In their opinion, forest visits strengthens the endurance of children. Fjørtoft (2004) investigated the impact of outdoor play on children's motor skills and found a significant increase in motor development if children could play in a natural instead of a concrete playground. Natural sites such as forests allow children to move around freely and to improve their stamina, but also on rough terrain to exercise their gross- and fine motor skills (O'Brien & Murray, 2007). Unfortunately, walking to the forest was *the* activity which children liked least. This might at least partly reflect infrequent outdoor exercises.

There is increasing evidence that natural settings provide stress-reducing and health benefits (Kaplan & Kaplan, 1989; Ulrich, 1984, 1993). Recent studies have shown that a range of human well-being measures respond positively to the availability of green space (Fuller et al., 2007). In the present study, teachers reported that most of their pupils felt comfortable when being in the forest. During the observations, pupils were perceived as balanced, happy and relaxed, and their teachers attributed these features to the forest environment. They also stated that their pupils behave differently from the classroom by being, for instance, more relaxed and quiet. In today's noisy society the forest is a good place to calm down and recreate from stress (Nützel, 2007). Especially children with behavioral deficits were perceived to benefit from the stress-reducing atmosphere of a forest. As almost 20% of all children in a kindergarten class in the Canton of Zurich have serious behavioral deficits (Lindemann-Matthies, 2004), education in green spaces such as forests is valuable. In the present study, teachers themselves also felt more relaxed when in the forest. In consequence, interviewees reported to care less about noise and (hyper)active children when in the forest.

Several studies have shown the positive effect of forest education on children's social skills (Milton et al., 1995; Nundy, 2001; O'Brien & Murray, 2007). Conversation and interactions with others play a central role during forest visits (O'Brien & Murray, 2007). For many teachers who took part in the present study, the group experience was important, and the interviewees stated to have many possibilities to strengthen the community feeling. Group adventures are considered as important experiences in the development of children, and regarded as an important component of forest education (Berthold & Ziegenspeck, 2002). Although both Massey (2004) and Fjørtoft (2004) observed that during forest visits children form new groups and relationships within the class, this could not be shown in the present study. Moreover, outdoor education was found to provide ample opportunities for teachers to develop a more positive and productive relationship with their pupils (Barker et al., 2002) which was also mentioned by one of the teachers in the present study. Teachers are also more integrated into children's play when in the forest instead of the schoolyard (Dietrich et al., 2002), and, at least in the present study, children prefer to play in the forest.

As one of the first studies in forest education, children's opinions were asked (as recommended in O'Brien & Murray, 2007). The present data are thus not only based on expert opinions but also on the target group itself. Children enjoyed their forest education. Almost all voted for forest visits, although not always on a weekly basis. Most often, children reported to like playing games and to create something with their own hands. Their teachers

reported that most of all children's curiosity was sparked. Other studies have shown that primary school children like hands-on activities and the study of organisms outside the classroom (Kenney et al., 2003; Malone & Tranter, 2003; Lindemann-Matthies, 2006). Forests, especially when in walking distance to schools, are thus excellent locations for children to experience nature at first-hand. As for more and more pupils, hands-on experiences of living organisms are declining (Lock, 1997; Jenkins, 2000; Tilling, 2004), and a general shift to more indoor play takes place (Louv, 2006), forest education can be seen as a possibility to counteract these trends. Even at primary school level, many schools do no longer allow children to experience nature at first-hand and are teaching ecology mainly through books and videos (Barker 2002). This was also observed by some teachers in the present study, and stated as a reason why they themselves conduct forest education. Forest education fosters children's knowledge about the natural world (Massey, 2004; O'Brien & Murray, 2007). The present, although small, sample of children confirms this notion. They had at least some knowledge about the uses of forests and why forests should be conserved. Moreover, the children were keen and curious to learn about forest species and felt that they had learned to identify plants. In terms of conservation education this is important as people can obviously only protect what they know about (Weilbacher, 1993).

5. Conclusions

Effective education strongly depends on the teachers, their motivation and the quality of their training (Kassas, 2002). Suggested by many teachers, forest education should thus be included in teacher education curricula. This would secure background knowledge, especially on how forest education could best be carried out. Secure subject and corresponding pedagogical content knowledge are important prerequisites for effective teaching (Summers et al., 2000). An integration of forest education in pre-service teacher education would be especially effective because of its multiplier effect. Every teacher trainer will educate a large number of student teachers, who in turn will educate a much larger number of students in school (Powers, 2004). Beside the inclusion of forest education into teacher education curricula, help and support for inexperienced teachers by those already familiar with forest education was seen as a valuable strategy in the present study. This might help to counteract some of the perceived obstacles to forest education. Experienced forest teachers could act as role models who demonstrate successful methods in forest education but also point out the benefits for the children. However, “novice” teachers should also be communicated that forest education needs strict rules and rituals to maintain discipline.

As in other studies (Van Petegem et al., 2005), some teachers in the present study pointed out that outdoor education should also be embedded in school curricula. It might otherwise not be taught in schools; even if it becomes part of teacher education curricula (see Lindemann-Matthies et al., 2009). Moreover, if outdoor education is not included in the school curriculum, it might not appear in the teacher education at all (Lindemann-Matthies et al., 2009). Getting in contact with nature, exploring nature, and investigating landscape elements such as forests are already objectives of the primary school curriculum of the Canton of Zurich (Lehrplan des Kanton Zürichs, 2008). However, forest education is not explicit mentioned. In the Canton of Zurich, several forest schools exist in which forest education is offered as an educational supplement. However, due to the success of this offer, teachers are only allowed to visit forest schools once a year with their class, which is clearly not often enough.

The present study has been one of the first studies investigating forest education at the primary school level in Switzerland. The results show that forest education is liked by both teachers and their pupils, and that numerous benefits are attached to it. However, long term

studies on the effect of forest education are missing. Likewise it would be essential to compare classes that are involved in forest education with classes that are not.

One important part of today' education should be the development of a personal association with nature, e.g. by introducing activities that promote awe and wonder of the living world, and a sensitivity to care for organisms and their habitats (Kassas, 2002). This underlines the value of outdoor nature education that ensures contact with organisms and their habitats. Promoting awareness for nature either in forests or other settings for outdoor nature education at primary school level should be especially emphasized. With having the aim of a population that cares about the environment, the contact with nature is essential.

“I think it is a pity that only if you are lucky and have got a teacher who is engaged with the nature, you get in contact with it. If not, and if your parents are not interested in it either, you might not know any bird or tree when you leave school.” (Female teacher, 45 years old)

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8. Appendices

I. *Questionnaire*

Masterarbeit “Effektive Methoden in der Waldpädagogik”
Sarah Knecht, Institut für Umweltwissenschaften, Universität Zürich



Fragebogen für Primarlehrkräfte im Kanton Zürich 2008

1. Allgemeine Angaben

Ihr Alter: _____ Jahre

Ihr Geschlecht: weiblich männlich

In welcher Klasse unterrichten Sie zurzeit? 1.Klasse 2.Klasse 3.Klasse

Klassengrösse: _____ Kinder

Wie lange sind Sie schon als Lehrkraft tätig? _____ Jahre

In welcher Schule haben Sie Ihre Ausbildung zur Primarlehrkraft absolviert?

In welchem Jahr haben Sie Ihre Ausbildung beendet? _____

2. Ihre Schule befindet sich in einer eher

Ländlichen Umgebung

Städtischen Umgebung

3. Wie viele Stunden pro Woche unterrichten Sie im Schulzimmer Mensch und Umwelt?

_____ Stunden

4. Unterrichten Sie Mensch und Umwelt auch im Wald? (Sportunterricht und Schulreisen zählen nicht)

Ja

Nein

5. Wie gross ist die Distanz Ihrer Schule zum nächsten Wald?

_____ Meter oder _____ Km

6. Würde Sie diese Distanz daran hindern, mit Ihren Schulkindern in den Wald zu gehen?

Ja

Nein

7. Beantworten Sie bitte die nachfolgenden Fragen nach Ihrer persönlichen Einschätzung

	Ja ++	+	0	-	Nein --
Ist für Sie der erhöhte Aufwand bei einem Waldbesuch ein Hindernis, dies zu tun?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Haben Sie das Gefühl, dass die Eltern Ihrer Schulkinder Waldbesuche unterstützen würden?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Haben Sie das Gefühl, dass Ihre Schulleitung Waldbesuche unterstützen würde?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Haben Sie das Gefühl, dass die Behörden Waldbesuche unterstützen würden?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Halten Sie Waldunterricht für gefährlicher als Unterricht im Klassenzimmer?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Halten Sie Waldunterricht für gefährlicher als Unterricht auf dem Schulhof?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Würden Sie bei jedem Wetter in den Wald gehen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Schätzen Sie bitte ein, wieviel Prozent Ihrer derzeitigen Schulkinder bei einem Waldbesuch

- a) sich wohlfühlen würden: _____ Prozent
- b) stärker abgelenkt würden als im Schulzimmer: _____ Prozent
- c) stärker gefördert werden als im Schulzimmer: _____ Prozent

9. Wie viel Prozent Ihrer Schulkinder hätten Sie zum Zeitpunkt des Schulantritts als walderfahren bezeichnet? (durch Kindergarten, Eltern, u. a.)

_____ %

10. Haben Sie selbst während Ihrer Schulzeit Unterricht im Wald erlebt?

- Ja Nein

11. War Wald- oder Naturpädagogik ein Thema in Ihrer Ausbildung als Primarlehrkraft?

- Ja Nein

Falls ja: Mit welcher Schweizer Schulnote würden Sie diesen Ausbildungsteil benoten?

NACHFOLGENDE FRAGEN SIND NUR ZU BEANTWORTEN, FALLS SIE EINEN TEIL IHRES UNTERRICHTS IM WALD TÄTIGEN:

12. An wie vielen Tagen pro Jahr unterrichten Sie ungefähr im Wald? _____

13. Wenn Sie im Wald unterrichten, wie lang ist die durchschnittliche Dauer, die Sie dort verbringen?

- Ein ganzer Tag Ein halber Tag Weniger als ein halber Tag

14. Weshalb unterrichten Sie im Wald? (Bitte nennen Sie mindestens drei Gründe)

15. Wie oft verwenden Sie die folgenden Methoden im Waldunterricht?

	Häufig	Eher Häufig	Weder Noch	Eher Selten	Selten	Nie
Vortrag/Erklärungen des Lehrers: Pflanzen und Tiere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vortrag/Erklärungen des Lehrers: Wald allgemein	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vortrag eines Experten (z.B. Förster)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sammeln, analysieren, ordnen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experimente	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nicht angeleitetes Erforschen/Entdecken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spielerisches Entdecken mit allen Sinnen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kreative Umsetzungen (gestalterisch, musikalisch, Theater..)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Praktische Arbeit (Wald reinigen, Bäume pflanzen..)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Besuch einer Waldschule	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weiteres:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Nennen Sie die drei für Sie wichtigsten Grundbedürfnisse von Kindern, die Ihrer Meinung nach im Wald besonders gut befriedigt werden können:

17. Nachfolgend sind einige Informationsquellen für Waldpädagogik aufgelistet. Bitte bringen Sie diese in eine Rangfolge nach Wichtigkeit (1= brauche ich am häufigsten, ist mir am wichtigsten, 4= brauche ich am wenigsten, ist mir nicht wichtig).

- _____ : Informationen von anderen Lehrkräften
- _____ : Informationen aus der Ausbildung zur Lehrkraft
- _____ : Informationen aus Weiterbildungskursen
- _____ : Informationen aus Literatur

18. Für meine Masterarbeit würde ich gerne einige Schulklassen in den Wald begleiten, um Unterricht zu beobachten und mit einigen Schulkindern zu sprechen.

19. Planen Sie zwischen Mai und September 2008 einen Waldbesuch und würden mir erlauben, Sie zu begleiten?

- Ja Nein

Falls ja: Bitte schreiben Sie Ihren Namen, Adresse und e-mail Adresse hin, damit ich Sie kontaktieren kann

DEN FRAGEBOGEN IM VORFRANKIERTEN COUVERT BITTE BIS ZUM **15. APRIL 2008** ZURÜCKSENDEN AN:

Sarah Knecht / Dr. Petra Lindemann-Matthies
Institut für Umweltwissenschaften
Universität Zürich
Winterthurerstr. 190
8057 Zürich

Vielen Dank für Ihre Mithilfe!

II. Interview guideline

Name der Lehrperson:		FB-Nr.:
Schulhaus:		
Gemeinde:		
Datum des Interviews:		
Kontakt:		

Allgemein

- Wie viele Jahre haben Sie Erfahrung mit Waldunterricht?
- Was war ausschlaggebend für den Waldunterricht? Motivation?
- Welche Ziele haben Sie sich gesetzt? Konnten Sie diese Ziele schon erreichen?

Hintergrund der Lehrkraft

- Frage 10/11

Erfahrungen im Wald

- Haben Sie konkrete Unterschiede im Verhalten der Schüler beim Vergleich Wald/Schulzimmer bemerkt?
- Gab es im Verlauf der Zeit bei den Kindern Entwicklungsfortschritte? Veränderungen?
- Welche Kinder werden am ehesten gefördert im Waldunterricht?
- Haben Sie Ihre Methoden geändert?
- Welche Methoden kommen bei Ihren Schülern besonders gut an?
- Was sind Probleme bei Waldunterricht?
- Was denken Sie, wieso gehen Lehrpersonen nicht öfters in den Wald? (Resultate)
- Welche Unterstützung wäre hilfreich? Wo könnte man anknüpfen, wenn man Waldunterricht fördern möchte?

Organisatorisches

- Sind schon konkrete Ideen für den nächsten Waldtag vorhanden? Datum?
- Gibt es ein schriftliches Protokoll, in dem Sie den Ablauf des Tages beschreiben?

III. Observation sheet

Name der Lehrperson:				FB-Nr.:	
Anzahl Kinder:		Mädchen:		Knaben:	
Schulstufe:					
Datum des Waldtages:					
Dauer des Waldtages:					
Thema des Waldtages:					
Wann war der letzte Waldtag?					
Wetter:					

Tagesablauf (falls kein Protokoll vorhanden)

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Beobachtungen

- Wie viele Kinder sind abgelenkt, machen nicht was sie sollten?
- Welche der folgenden Bedürfnisse von Kindern werden im Verlaufe des Waldtages abgedeckt?

	++	+
Liebe, Geborgenheit, Sicherheit		
Spannung, Abenteuer, Risiko		
Freiheit/Grenzen, Verantwortung		
Welt entdecken		
Herstellen, Gestalten		
Spielen		
Bewegung		
Vielfältige Wahrnehmung		
Gemeinschaft		
Friedlich für sich alleine sein		
Erlebtes ausdrücken		
Mit Natur verbunden sein		

Gespräche mit Kindern: Allgemein

Anzahl Kinder:		Mädchen:		Knaben:	
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Woran erinnert ihr euch, wenn ihr an den letzten Waldtag denkt? Was habt ihr da gemacht?
Seid ihr gerne im Wald? Was macht ihr am liebsten?
Was macht ihr nicht so gerne im Wald?

Gespräche mit Kindern: Wissensfragen

Was habt ihr gelernt im Wald?
Könnt ihr mir mal zeigen, welche Pflanzen und Bäume ihr kennt im Wald? Wie heissen sie?
Was denkt ihr, für was ist der Wald gut? Wieso brauchen wir Bäume, Pflanzen, Tiere?
Was würde denn passieren, wenn wir alle Bäume fällen würden?
Was denkt ihr mag der Wald nicht so? Was ist nicht gut für ihn?
Und wie können wir dem Wald helfen?

Gespräche mit Kindern: Frage in Klasse

Würdet ihr lieber auf dem Pausenplatz spielen oder hier im Wald?

- Pausenplatz:
- Wald:

Spielt ihr mit den gleichen Freundinnen/Freunden, wie wenn ihr in der Schule spielt?

- Ja:
- Nein:

Wie häufig würdet ihr gerne in den Wald gehen?

- Nie:
- Ab und zu:
- 1/Woche:
- 3/ Woche:

Wie viele Bäume erkennt ihr und kennt ihr beim Namen?

- 0:
- 1:
- 2:
- 3:
- >3: