

Drivers and barriers for outdoor education

An insight from Swedish elementary school teachers

ANJA WALKER 2024
MVEM02 EXAMENSARBETE FÖR MAGISTEREXAMEN 15 HP
MILJÖVETENSKAP | LUNDS UNIVERSITET



Drivers and barriers for outdoor education

An insight from Swedish elementary school
teachers

Anja Walker

2024



LUNDS
UNIVERSITET

Anja Walker

MVEM02 Examensarbete för Magisterexamen 15 HP, Lunds universitet

Huvudhandledare: Anna Persson, Centrum för miljö- och klimatvetenskap, Lunds universitet

CEC - Centrum för miljö- och klimatvetenskap

Lunds universitet

Lund 2024

Abstract

Spending time outdoors during childhood can improve learning, promote pro-environmental behavior, and improve physical and mental health. However, most of our everyday lives are spent indoors and thus a disassociation from nature is created. Paradoxically, a positive relationship between humans and nature is vital for its preservation, and our survival. Through outdoor education in elementary school a connection with nature at a young age, when it is most effective, can be assured. This multi-beneficial teaching approach is however often seen as time consuming, and an overarching need to develop staff confidence in teaching outdoors has previously been identified. Projects aimed at spreading knowledge about biodiversity and supporting outdoor teaching exist in Sweden, e.g. Natural Nations and Så vilda! This study investigated the perceptions of these specific teaching guides, and outdoor education in general, among Swedish elementary school teachers to identify barriers and drivers for outdoor education. Despite having few respondents and interviewees, several barriers and drivers were identified. This study also showed that although many of the teachers did not know of the teaching materials before, they were all positive towards using them. The teachers who have used the materials see them as a helpful tool and guide when teaching biodiversity outdoors if other conditions such as appropriate weather and number of staff are met. This study could have implications for the future development of teaching guides for biodiversity and might act to enlighten school management on the perceived barriers to outdoor education. In doing so we could create an educational system that is more beneficial to both children and the future conservation of our planet's resources.

Populärvetenskaplig sammanfattning

Biologisk mångfald, varför ska vi bry oss? I nyheter och media blir vi alltmer uppmärksammade på begreppet 'biologisk mångfald' som ofta presenteras med en negativ klang kopplad till förlust av naturmiljöer. Naturen som utgör grunden för mänsklig välfärd håller på att försvinna, bland annat på grund av mänskliga aktiviteter som urbanisering och moderna jord- och skogsbruksmetoder. Med den ökade urbaniseringen och minskningen av gröna ytor tappar vi också kontakten med det som är mest naturligt. Att upprätthålla en god relation till naturen är essentiellt för att säkerställa både dess, och i sin tur vår, överlevnad. Därför borde det vara i allas intresse att jobba för att bevara den omtalade biologiska mångfalden. Men hur ska vi göra det?

För att se till att vi inte tappar kontakt med naturen krävs det att vi aktivt arbetar för att upprätthålla den. Att bilda en positiv relation till naturen i vår omgivning vid ung ålder är särskilt effektivt och därför kan en lämplig metod vara att undervisa om biologisk mångfald där den finns, utomhus. Utomhusundervisning är inget nytt koncept i Sverige men möts ofta av många hinder. Trots ett personligt engagemang upplever lärare att det inte finns tillräckligt med tid eller resurser. Stora och stökiga klasser, fler distraktioner i utemiljön och brist på undervisningsmaterial uppges också som hinder för utomhusundervisningen.

Det finns projekt i Sverige som har arbetat för att ta fram undervisningsmaterial och lärarhandledningar för de som vill undervisa om biologisk mångfald utomhus, så som Natural Nations och Så vilda!. Jag har med hjälp av en enkät och intervjuer undersökt om lärare känner till dessa lärarhandledningar och vad deras uppfattning av dem i så fall är. Jag har också studerat lärares uppfattning av utomhuspedagogik i allmänhet för att kunna besvara frågeställningen: Vad hindrar eller möjliggör lärares undervisning om biologisk mångfald utomhus? De flesta lärare kände inte till materialen sedan tidigare men uppgav att de var intresserade av att testa dem. Och lärare som har använt materialen upplever att de har hjälpt dem i undervisning om biologisk mångfald utomhus. Därutöver kunde flera barriärer och drivkrafter till utomhusundervisning identifieras vilka motsvarar vad som visats i tidigare studier.

Resurser och material för att främja utomhusundervisning om biologisk mångfald finns. Informationen om dessa måste bara nå ut. Genom att få insikt från förstahandsutövarna, lärare, kan dagens och framtidens skolförvaltning agera för att minska eventuella hinder och förstärka drivkrafterna för utomhusundervisning. Genom att göra det ökar vi den allmänna miljömedvetenheten i samhället och bidrar till att säkerställa det framtida bevarandet av jordens resurser och mänsklig välfärd.

Table of contents

Abstract 3

Populärvetenskaplig sammanfattning 5

Table of contents 7

Introduction 9

Background 9

Outdoor education 10

Teaching guides 11

Aim and research questions 12

Method 13

Approach 13

Data collection 13

Data analysis 14

Ethical reflection 14

Results 17

Questionnaire 17

Interviews 20

Discussion 23

Perceptions of the teaching guides 23

Barriers for outdoor education 24

Drivers for outdoor education 26

Conclusion 27

Acknowledgements 29

References 31

Appendix 33

Questionnaire 33

Interview questions 33

Introduction

Background

Biodiversity is an essential component of what lays the foundation for human development and welfare (IPBES, 2019). Our very existence depends on the processes it creates, e.g., by providing us with oxygen, clean water, food, and a stable climate to reside in (Charles et al., 2018). Despite this, global warnings about biodiversity loss are being issued (IPBES, 2019). The loss of biodiversity is occurring more rapidly than ever in human history and will have detrimental effects on human welfare if not urgently acted upon (Ceballos et al., 2017). In parallel, most people have now left the rural areas to live in cities, and urban population growth is expected to continue (DESA, 2019). Increased urbanization and the expansion of cities is simultaneously a major cause of biodiversity loss through landscape fragmentation, and a general loss of green space (Ceballos et al., 2017; d'Amour et al., 2017).

In addition to contributing to the loss of biodiversity, urbanization has brought about a disassociation between humans and the natural environment (Dunn et al., 2006; Maller et al., 2006). With spending most of our time indoors, in schools, offices, stores, vehicles etc., daily contact with nature has become a rarity for many (Maller et al., 2006). The situation is one that researchers have attempted to explain with theories such as “Shifting baseline syndrome” or “Environmental generational amnesia” (Soga & Gaston, 2018). According to Soga and Gaston (2018) these theories describe a gradual negative alteration of what is seen as an acceptable state of nature, because of lack of previous information or experience of its condition. The consequences following an ever-lower acceptance level for the state of the environment are, among other things, an increased tolerance for the deterioration of the natural environment and unsuitable baselines from which nature conservation measures should originate (Soga & Gaston, 2018). Another concept that describes the consequences of increased urbanization is “The pigeon paradox” (Dunn et al., 2006). The paradox lies in that, whilst we are facing the potential extinction of thousands of species, the preservation of these may increasingly depend on the ability of people in cities to maintain a good relationship with nature (Dunn et al., 2006). Much of the nature conservation of the future may thus rely on the interactions people have with the nature in urban environments where they spend most of their time (Dunn et al., 2006).

The various theories on human's connection to nature create a faceted picture of a complex subject. Concepts like "The pigeon paradox" are however based on a number of assertions, one of them being that humans are more prone to implement conservation actions if they have direct experiences with nature (Dunn et al., 2006). This assertion is partly corroborated in the literature, where research has shown that visits outdoors are needed in order to form a positive relationship with nature and that it is more likely that individuals with a connection to nature will act to nurture and preserve it (Chawla, 1999; Cronin-Jones, 2000; Ives et al., 2018). When this positive relationship with nature is formed has also been proven important, and a young age seems to be when the establishment is most effective (Chawla, 2007; Charles et al., 2018; Thompson et al., 2008).

Outdoor education

Connecting with nature can occur in many ways and only really requires a space for people to experience nature. Considering findings that young age is optimal for establishing a positive relationship with nature, one such space could be the school ground and might appropriately be accessed through outdoor education. The outdoor education approach is based on using the local environment when teaching an academic subject to understand it in its actual form (Dahlgren & Szczepanski, 1998). For example, measuring and calculating the volume of trees in mathematics (Bentsen et al., 2010), explaining the concept of energy whilst building a fire or illustrating the importance of biodiversity whilst planting native plants. Outdoor education is however not confined to school grounds but can be performed in a variety of settings such as botanical gardens, parks, museums, farms etc. (Dahlgren & Szczepanski, 1998). Dahlgren and Szczepanski (1998) point out that one of outdoor education's central aims is to develop a concern for the natural and cultural environment. It can be practiced by educators of any discipline and in every geographical situation (Dahlgren & Szczepanski, 1998) and thus also invites cross-curricular collaborations.

Teaching in outdoor environments is an educational method with many benefits (Dahlgren & Szczepanski, 1998). It has been shown to promote creative thinking and cognitive development in children (Grahn et al., 1997; Wells, 2000). Cronin-Jones (2000) found positive effects of outdoor education as nature- and environmental education was enhanced through practical experience. Students who received education outdoors also learned more about ecology-related topics than students who received education on the same content topics indoors (Cronin-Jones, 2000). Similarly, Fägerstam (2013) reasoned that outdoor education facilitated an understanding of scientific and mathematical concepts by relating them to everyday interactions with the world outside the classroom. In a study by Chawla (1999), participants recollected how practical teaching experiences and field work left lasting impressions. This could

in turn have been a contributing factor to the participants' pro-environmental actions later in life (Chawla, 1999).

Scandinavian countries are often perceived as references for outdoor education in school-systems up to 16 years of age, where many countries have developed different ideas based on the Scandinavian concept of *utombuspedagogik* or *udeskole* (outdoor school) (Bentsen et al., 2010). However, in a study of Swedish teachers' perceptions of outdoor education, Fägerstam (2013) found that their intrinsic motivation would play an important role in the decision to teach outdoors. This was needed in order to overcome obstacles such as extra time for planning and preparation, because even though they enjoyed teaching outdoors it was perceived as very time consuming (Fägerstam, 2013). Similarly, Carrier et al. (2013) found that despite having a school culture that supported outdoor education, teachers found it difficult to supplement indoor learning with outdoor activities. This was mainly because of time constraints and heavy content demands, i.e., having too much to teach and not enough time to do it (Carrier et al., 2013). In line with this, Dymont (2005) expressed a need for encouraging teachers not to see outdoor education as an addition to the curriculum but rather an alternative method of teaching the same thing. A further need to develop new curriculum materials and guidance for teachers to make outdoor teaching about biodiversity possible has also been identified (Cronin-Jones, 2000).

Teaching guides

Projects aimed at spreading knowledge about biodiversity and supporting outdoor education exist in Sweden. Two of these current projects are Natural Nations and Så vilda!. Natural Nations is an Erasmus-financed project where Naturskolan in Lund, Lund University, Learning through Landscapes UK, Birdlife Malta and Sociedad Española de Ornitología (SEO Birdlife Spain) participated (Lunds kommun, 2024). The project aspires to help teachers and students understand the importance of biodiversity through practical advice and guidance materials containing instructions for conducting inventories as well as playful activities. Another aim of the project is to create awareness of the condition of the schoolgrounds and surrounding areas. Participants can then also get practical advice on how to improve the schoolground for biodiversity. Additionally, teachers and students have the opportunity to contribute to citizen science by sending the data collected through inventories to researchers at Lund University. The teaching materials are aimed at teachers and students in grades 2-7 but can be used by teachers of all grades (Lunds kommun, 2024).

Så vilda! is a project financed by XPIBO, Botaniskas vänner, Gothenburg Global Biodiversity Centre and FORMAS. Similar to the intentions of Natural Nations, Så vilda! aims to spread knowledge about biodiversity and encourage engagement with the local environment. They achieve this by providing teaching materials, enlightening

videos, and intelligible texts, which guide teachers and children in how to sow a flower meadow to benefit Swedish native plants and pollinators. The guides are aimed at teachers and children in preschool and grades 1-3 (Göteborgs botaniska trädgård, 2024).

Aim and research questions

While much research has been done regarding barriers for outdoor education, studies about the effects of using teaching guides when teaching biodiversity outdoors are lacking. The effects of using the specific teaching materials provided by Natural Nations and Så vilda! are also yet to be extensively investigated. The objective of this study is thus (i) to gain an understanding of what influences teachers' initiative to implement outdoor education about biodiversity in Swedish elementary schools in general, and (ii) assessing teachers' experience of using the teaching materials Natural Nations and Så vilda!. In order to identify the potential barriers and drivers for outdoor education, the study is guided by the following research questions:

- What prevents/enables teachers' implementation of biodiversity education outdoors?
- What are teachers' perceptions of Natural Nations and Så vilda! for teaching biodiversity outdoors, and why?
- How do teachers' perception of teaching biodiversity outdoors differ after being introduced to the teaching guides?

Based on what has been shown in previous studies my hypothesis is that the main barrier for outdoor education will be time; for planning and performing lessons outdoors. Lack of confidence and interest will also play a part in whether a teacher decides to hold lessons outdoors or not. I therefore believe that the teaching materials from both Så vilda! and Natural Nations will promote teaching outdoors among those who have accessed it. This, because the guides will enable teachers to overcome the obstacle of time for planning as the guides provide most of the teaching material. The guides might also give teachers more confidence as they are able to follow pre-made instructions during the lessons. Additionally, because intrinsic motivation and interest in the subject might be needed to overcome barriers to teaching outdoors, I expect teachers who have an academic background in biology or environmental science to be more driven to teach outdoors compared to teachers who do not have such a background.

Method

Approach

This study used a combination of qualitative semi-structured interviews and an online questionnaire. This was done to obtain a larger sample of data as well as detailed information about the perceptions about the two teaching guides so that a more nuanced picture of the current status of perceptions of outdoor education could be made.

Data collection

The questionnaire was created using Google Forms (appendix). It was primarily aimed at people teaching natural sciences at elementary schools, but educators of other science subjects were encouraged to answer the questions as well. In order to maximize the number of responses, the questionnaire was developed to be clear and brief and still provide enough information to address the research questions. The questionnaire consisted of 16 questions in total, seven of which were main questions, and the rest were non-mandatory sub questions. A short introduction to the research topic as well as a description of the target group and the teaching materials Natural Nations and Så vilda! were included. To address the research questions, the questionnaire asked for information about the teachers' educational background and which grades and subjects they teach as well as details about their perceptions of outdoor education and the teaching materials Natural Nations and Så vilda!. I asked whether they had taught outdoors, if there is enough support and prerequisites for teaching outdoors at their school, if they have heard of Natural Nations or Så vilda!, what their perceptions of the teaching guides are or if they would like to use the guides after being introduced to them. There was opportunity to elaborate on some of the questions, such as what activities they did when teaching outdoors, why they haven't had lessons outdoors yet and what their perceptions of outdoor education in general are. The questionnaire was shared on social media platforms, with personal contacts, through emails to elementary schools with ages 6-16 in the Lund area and in Naturskolan in Lund's newsletter to teachers.

The semi-structured interviews were held with one teacher who had worked with the teaching materials from Natural Nations and one teacher who had used S  vilda's teaching materials. Both interviews were held over the phone and were recorded, with consent from the interviewees. Notes of the answers were also taken on paper. The interview questions were similar to those in the questionnaire (appendix). I started with asking questions about their educational background, teaching subjects and grades, followed by more specific questions about outdoor education and the teaching materials. The interviews did however allow for more detailed follow-up questions and answers than the questionnaire. The interview questions, 14, were the same in both interviews except for one added question about the materials from Natural Nations. The added question asked whether the teacher had registered their inventories and contributed to the citizen science which was one of the goals with Natural Nations. The opportunity to contribute to citizen science could be considered a driver for using the teaching material and having outdoor lessons or a barrier because of e.g., added time demands.

Data analysis

The answers from the questionnaires were recorded in Google Forms where the responses could be viewed by individual question, individual answer or summarized by question. All categories were analysed. The main points from the recorded interviews were transcribed and compared with the written notes, and the individual responses were categorised by question providing detailed summaries. The interviews and survey were analysed separately, as they contained slightly different questions, but the results will be discussed together.

Ethical reflection

This research might come across some elements that require ethical reflection such as questions related to receiving personal information. One way of mitigating this challenge is through allowing teachers to see a version of the interview in advance. This way, they can start reflections prior to the interview and might provide more thought-through answers as well as determine if they do not feel comfortable answering certain questions. Prior to the interviews, the teachers also received written information about the project and the study's aim. If any confusion about answers to questions occurred these were discussed and clarified during the interview to avoid any misinterpretations. The interview- and survey answers are kept anonymous in all written reports, so that any personal information about the teacher's educational

background and perceptions cannot be traced back to them. Recorded interviews are deleted immediately after transcription. The teachers had the possibility to end the interview at any time.

Results

Questionnaire

The questionnaire was available for approximately 30 days and 10 people answered it. The distribution of teaching-ages was as follows: two (20%) teach grades 1-3, five (50%) teach grades 4-6 and three (30%) teach grades 7-9. The subjects taught by the responding teachers also varied. The subjects recoded were teachers of Swedish language, art, biology, chemistry, physics, mathematics, engineering, social sciences, English language, and crafts. Those who taught younger grades generally had more teaching subjects than those who taught older students.

Three (30%) of the respondents, R1-R3, stated that they had not held lessons about biodiversity with students outdoors. R1 was an extracurricular educator, with a primary teacher education, who experienced lack of time and not having enough support from colleagues or school management as limiting factors. R1 also felt that they did not have enough knowledge about biodiversity to teach it. R2 teaches grades 1-3 in mathematics, Swedish language, social science, natural sciences, and English language. R2 expressed a lack of knowledge, too few staff and an uninspiring schoolground as the reasons for not teaching about biodiversity outdoors. R2 has a primary teacher education. R3 is a mathematics, Swedish language, and English language teacher in years 4-6 and has a primary teacher education. R3 experienced heavy teaching content demand and not having enough time as barriers for teaching outdoors.

When asked if the respondents felt that there are sufficient prerequisites, in terms of physical, time, knowledge, staff etc., to teach outdoors three (30%) answered no. Among those three, two had not held lessons outdoors and one had. The one teacher who had held lessons outdoors, R9 (table 1), also answered that they did not experience enough support from school management or colleagues to teach outdoors. R9 specifically mentioned time for planning and interested colleagues as lacking, as well as viewing unmotivated students as a barrier. R9 and one other respondent, R10 (table 1), had studied biology or environmental science before becoming teachers. The remaining eight (80%) of the respondents had studied a primary teacher education.

None of the respondents had heard about Natural Nations or *Så vilda!*, but they all responded that they would be interested in working with the teaching materials after being introduced to them. The teachers who had held lessons about biodiversity

outdoors described what activities they had done. These included studying various organisms in their respective habitats, having excursions about different ecosystems, collaborating with their local Naturskola (municipal outdoor school support team), and following and observing trees throughout the seasons.

When the respondents were asked what they experience to be the biggest barriers for outdoor education the answers included lack of knowledge about biodiversity, not having enough resources or time for planning, large teaching groups and too few teachers. Bad weather, not being close to inspiring nature, as well as unmotivated and distracted students were also identified as barriers. Only one teacher stated that they do not experience any barriers. The respondents were offered the opportunity to add comments on what their personal perceptions of outdoor education in general are. Some respondents answered that it is difficult to study biodiversity in the schoolground because of a lack of green spaces. One teacher, R10, wrote that there isn't enough time for 'ineffective' lessons outdoors. R10 explained why they experience that the lessons become 'ineffective':

“It is so much more difficult to capture the students' attention outdoors! There are so many easily distracted students who start fighting with sticks, wander off etc instead so the lessons become very scattered and therefore confusing for the students”

Among the positive responses to outdoor education were answers such as: lessons outdoors are often very instructive for students, the teaching method is too scarcely used, teaching outdoors is an excellent complement to classroom teaching and being close to nature is very beneficial when wanting to teach outdoors.

Table 1.

Summary of the respondents to the questionnaire, their academic background, if they experience sufficient prerequisites for teaching outdoors, if they have held lessons about biodiversity outdoors, and their perceived barriers and drivers for outdoor education.

Respondent	Academic background	Prerequisites for teaching outdoors	Have held lessons outdoors	Barriers	Drivers
R1	Primary teacher education	No	No	School organization (management, few teachers, time) Personal (knowledge)	
R2	Primary teacher education	No	No	School organization	

				(management, few teachers) Personal (knowledge) Location (schoolground design, distractions)	
R3	Primary teacher education	Yes	No	School organization (time, heavy teaching content demand, few teachers)	
R4	Primary teacher education	Yes	Yes	School organization (few teachers) Location (distance to green spaces)	
R5	Primary teacher education	Yes	Yes	School organization (time, big teaching groups)	
R6	Primary teacher education	Yes	Yes	School organization (time, few teachers)	Educational benefits (instructive for students)
R7	Primary teacher education	Yes	Yes		
R8	Primary teacher education	Yes	Yes	Weather	Educational benefits (complements indoor teaching)
R9	Studied biology or environmental science	No	Yes	School organization (time, colleagues)	
R10	Studied biology or environmental science	Yes	Yes	Location (time, distracted students)	

Interviews

The first interview (I1), with a teacher who had worked with Natural Nations, was held on April 12, 2024. The second interview (I2), with a teacher who had used the teaching materials from *Så vilda!* occurred on April 18, 2024. The interviews were both approximately 20 minutes long.

Both teachers are currently teaching younger children in Swedish preschools. This means that neither of them teaches specific subjects but rather work with different themes with the children. Nonetheless, both teachers expressed their appreciation for working with themes regarding biology and nature and explained that they spend a great deal of time outdoors. Both teachers are educated preschool teachers and have gained an appreciation for nature from their upbringing. I2 explained how the parents' interest in nature and animals had sparked an enthusiasm in them as a child and had valued always being close to nature and being able to play in the woods. I2 believed that personally realising the effectiveness of 'learning by doing' throughout life had acted as motivation to combine indoor and outdoor teaching methods with children. I1 expressed that an interest in nature had started in early childhood and continued throughout life. I1 also mentioned that *Naturskolan* had inspired to not only implement outdoor education for teaching biology, but also other subjects such as physics and social sciences.

Both teachers performed lessons outdoors regularly, even before being introduced to the teaching programmes *Så vilda!* and *Natural Nations*. Lessons would either be conducted on the school ground, or in parks or green spaces near the schools. Positive effects of outdoor education had been noticed by both teachers. They believed that repeated visits outdoors encouraged creative thinking and curiosity among the children. I1 expressed that they were convinced that the children learn more by being outdoors and through experiential learning. I2 emphasised that indoor and outdoor teaching are best used as complementary to each other.

Having school management and colleagues who supported outdoor teaching was identified as important by both interviewees. I1 had however experienced that fewer and fewer teachers are interested in teaching outdoors and that the new generation of teachers prefer to conduct traditional classroom teaching. When asked why this might be, the teacher speculated that new teachers might be blinded by a need to follow strict protocols and curricula and are thus less able to explore different teaching methods. The traditional classroom methods of teaching usually demonstrated during the internship phases of a teacher's education leave a mark on newly graduated teachers, who may never have been introduced to the alternative of outdoor teaching.

“It's a question of comfort”

the interviewed teacher said. This, as well as unfamiliarity, uninspiring school management, large teaching groups and too few resources were identified as the biggest barriers for outdoor education by the two interviewed teachers.

I1 had a great deal of previous experience of teaching biology-related topics outdoors. Thus, the teacher already had a positive view of outdoor education before being introduced to the program. I1 mentioned in the interview having heard of Naturskolan before and being inspired by their work and ideas for moving education of all disciplines outdoors. When working with Natural Nations, Naturskolan introduced the materials to the teachers and children and guided them through some of the exercises. Teachers and children went around in groups and marked different areas which were then monitored and inventoried throughout the year. But because only a few teachers were present during the introduction day it became difficult for them to conduct lessons with the materials later on. One identified downside with the teaching materials was that the children had found it difficult in the beginning. I1 explained that if more teachers had been present during the introduction with Naturskolan, they would have been better equipped to help the children. Despite their intention to do so, I1 did not report the results and contribute to citizen science. Miscommunication between colleagues led to the material being accidentally discarded before it could be registered.

I2 was inspired by a tv-program to help insects and pollinators. The teacher wanted to engage the children and thus found Så vilda! on their own initiative. They had the ambition to plant a flower meadow and used the videos and instruction guides provided by Så vilda! to do so. The most challenging aspects of teaching outdoors and working with contributing to biodiversity in this way was finding appropriate green spaces not too far from the school grounds. Other limiting factors that were identified by the teacher included weather and appropriate clothing.

Table 2.

Summary of barriers and drivers for outdoor education identified by I1 and I2.

Barriers	Drivers
School organisation (management, colleagues, big teaching groups/few teachers)	Personal (interest)
Location (distance to green spaces)	Educational benefits (students learn more, complements indoor teaching)
Weather	Other (Naturskolan, teaching guides, contribution to citizen science)

Discussion

Perceptions of the teaching guides

According to the hypothesis, the teaching guides *Så vilda!* and *Natural Nations* were believed to have a positive influence on teachers wanting to have lessons about biodiversity outdoors. This is because they were assumed to mitigate time for planning lessons along with giving teachers more confidence when teaching about biodiversity in an unfamiliar environment, both factors described as barriers for outdoor education by Cronin-Jones (2000) and Carrier et al. (2013). The questionnaire revealed that all the teachers who had not heard of the teaching guides were positive towards trying them, regardless of whether they had held outdoor lessons about biodiversity before or not. Both teachers who had used the teaching guides perceived them as being effective tools when teaching about biodiversity. The guides acted as inspiration for the teachers and students in planning projects that could be conducted over longer periods of time, which in turn created a more faceted picture of nature and biodiversity than what could perhaps be achieved in a single lesson. One interviewee did however explain the importance of acknowledging what the children are interested in when teaching outdoors, so that it becomes exciting and meaningful for them. This way, they associate the outdoors with something positive. Thus, it is necessary to note that the teaching guides are just that, guides. They are intended to inspire and guide but not instruct, which is important to consider because teaching in a dynamic environment such as nature requires some flexibility.

As part of using the teaching materials from *Natural Nations*, there was an opportunity to contribute to citizen science by reporting the results from inventories done by the students. In this case it was seen a driver for teaching biodiversity outdoors. The documentation is a component of the teaching materials that might encourage both teachers and children to take the exercises more seriously and therefore they might benefit from it by learning more (Barthel et al., 2018). However, one difficulty when doing inventories with young children is that their imagination could cause false reporting to be made, as mentioned by one of the interviewed teachers. Therefore, it is important that there is enough staff to supervise the children during the lessons outdoors, something that was considered a barrier for many of the teachers in this study. The documentation could also be seen as a barrier for conducting inventories of biodiversity as it requires extra time from the teacher. It is

not mandatory, but unexperienced or uninterested teachers might nonetheless feel discouraged from using the teaching materials.

Since the interviewed teachers taught young children in preschools it is difficult to draw any conclusion regarding how the teaching materials work in relation to existing curricula in older age groups seeing as they do not have the same type of requirements to achieve. What one must accomplish in a single lesson in year 6 could perhaps take half a term with preschoolers. Future studies should include in-depth interviews with teachers of all age groups in elementary school to evaluate the effectiveness of the teaching guides for the targeted grades so that they in turn can be catered to the age specific curricula.

Barriers for outdoor education

Time for planning and performing lessons outdoors as well as a lack of confidence in the subject and teaching method were assumed to be the main barriers for outdoor education about biodiversity. My results indicate that these hypothesized barriers are true for most of the participants, which is similar to the barriers identified by Fägerstam (2013) and Dymont (2005). Other barriers to having lessons about biodiversity outdoors were heavy content demands, weather, distracted students, large student groups and not being close to green spaces.

Regarding time as a barrier for outdoor education, this was mentioned by most teachers. The lack of time was related to time for planning and conducting lessons outdoors. They explained that it takes longer to plan effective lessons outdoors than in a classroom environment and that it can be difficult to hold the students' attention outdoors because of the many distractions. Some teachers related the limited amount of time to heavy content demands. This was also found in a study by Carrier et al. (2013) where teachers felt constrained by this factor and therefore concluded that traditional classroom teaching was the most effective method for teaching science. Perhaps it is a question of habit and experience. Dymont (2005) expressed the need to not see outdoor education as an add-on to the existing curriculum, but rather use it as an educational tool. This was also mentioned in one of the interviews; outdoor education should not be seen as competing with traditional classroom education but rather a complement. One does not replace the other, some things are better illustrated indoors like the comparison of different bee species, and other things are better demonstrated outdoors such as vegetation structures. Fägerstam (2013) found in her study that after a one-year project involving teaching outdoors, the perceptions among teachers were that outdoor teaching could even strengthen indoor teaching. Possible reasons as to why some teachers use outdoor education as a complement to traditional classroom teaching, while others do not, were discussed in one of the interviews. Here the interviewee pointed out that outdoor education is not included in many of the

teacher educations and that this leaves a mark on newly graduated teachers. Those who have never been introduced to the alternative of outdoor teaching might not be comfortable using it, or they might see it mainly as a time-consuming supplement. In the aspect of time, the teaching guides might further aid in mitigating this problem. With the teaching material already provided, teachers will not have to spend as much time on planning meaningful lessons about biodiversity.

One teacher mentioned in the questionnaire that they do not have enough time for 'ineffective' lessons. With this they meant that some students are too easily distracted in the outdoor environment. This teacher also mentioned that they had only had lessons outdoors once and perhaps that is part of what created the perceived difficulty. It was also mentioned by another teacher who has held lessons outdoors that they often receive complaints from the students, probably because they do not do it very often. Fägerstam (2013) identified a similar challenge in her study. The students might need time adjust to the new teaching environment if it is unfamiliar to them. It was also mentioned in one of the interviews that the students had found the exercises from the teaching guides difficult at first but got used to them as time went on. What could also be seen as one of the benefits with the teaching guides, is that they include exercises that can be conducted over longer periods of time and thus provide opportunities for students to adapt to lessons outdoors with a consistent theme. Support from management and staff is also needed for teachers to not become discouraged and overwhelmed if some lessons are perceived as ineffective.

Not feeling confident enough to convey their knowledge about biodiversity was additionally mentioned as a barrier by participants in this study. Here the teaching guides might act as support and perhaps also be an opportunity for the teachers to learn more about the subject themselves as they contain detailed descriptions about different biological terms and species. Having colleagues who are interested in teaching outdoors might further facilitate teaching outdoors. Some participants perceived uninterested colleagues and management as a barrier. This becomes an increasing obstacle if the school grounds do not have adequate green spaces for teaching about biodiversity, or, are situated far from nature. In those cases, teachers who want to teach outdoors might not be able to because of having too few resources. The importance of having green schoolgrounds, for environmental awareness and learning, has also been shown by Akoumianaki-Ioannidou et al. (2016).

One of the interviewed teachers mentioned that they believed outdoor education should be mandatory. They expressed a desire for it to be included in the curriculum provided by Skolverket (National Agency for Education) that children in school spend more time outdoors. Otherwise, it can be difficult for teachers to think that it is okay to use outdoor education as a legitimate teaching approach, because it might be seen as a longer outdoor break. Therefore, it is also important that teachers receive guidance, if they do not find the inspiration themselves, to ensure that the students receive more structured and meaningful lessons outdoors.

Drivers for outdoor education

One goal of this study was to investigate why some teachers decide to teach outdoors and others do not. I expected that teachers with an academic background in biology or environmental science were more driven to teach outdoors compared to teachers without such a background. Unfortunately, the low number of respondents made it impossible to draw any clear conclusions. Nonetheless, based on the results from this study, an academic background in biology or environmental sciences did not seem to be a determining factor. As shown from the interviews, where both teachers had an interest in nature since early childhood, this might be more relevant, even if education and childhood experiences might be related. The importance of personal interest as the main motivation to teach outdoors is also supported by what has been shown in previous studies – a connection and positive relationship with nature is most effectively formed during childhood and can influence a person's pro-environmental behavior (Chawla, 1999), such as teaching biodiversity outdoors. One teacher who had held lessons outdoors but experienced that they did not have enough prerequisites to do so, had an educational background in biology/environmental sciences. The results from this study, and the study by Fägerstam (2013), thus support my hypothesis that personal interest acts both as an important driver and for overcoming barriers such as insufficient support or resources to have lessons outdoors.

Similarly, support from colleagues and adequate prerequisites for teaching outdoors were highlighted as drivers in both the questionnaire and interviews. As mentioned by one of the interviewees these factors would also play a role in whether the teaching guides from Natural Nations were seen as an effective tool in teaching or a hindrance, as they required staff to be properly informed about the materials. One respondent to the questionnaire, and both interviewees, acknowledged how children benefit from having lessons outdoors. The interviewed teachers explained how they had observed that the students learned more and had a positive educational experience when they had lessons outdoors, as long as the weather conditions were acceptable for teaching outside. Being able to combine indoor and outdoor teaching was also a positive aspect as it was recognized as a way of optimizing the learning experience.

Conclusion

Despite the low number of respondents, numerous barriers and drivers to outdoor education could be identified. This study has thus contributed to a greater understanding of what influences teachers' initiative to implement outdoor education about biodiversity in Swedish elementary schools. With all factors considered no definite conclusion could however be drawn regarding the teaching guides' effectiveness in mitigating the perceived barriers to teaching about biodiversity outdoors. For this to be possible, in-depth interviews with teachers should be conducted both before and after having worked with the materials. The teaching materials from both Natural Nations and Så vilda! did nonetheless prove to support teaching about biodiversity among those who had used them and intrigued teachers who had not heard of them. There appears to be a need to further spread knowledge about the positive effects of outdoor education and available teaching support in order to ensure an effective education about biodiversity for all children and increase society's environmental awareness.

Acknowledgements

I would like to express my gratitude towards my supervisor Anna Persson for her support and guidance throughout this project. Thank you to all the teachers who participated in this study and made it possible. I would also like to thank Naturskolan in Lund and Göteborgs botaniska trädgård and Lunds botaniska trädgård for their support and facilitating me in reaching the target groups for this project.

References

- Akoumianaki-Ioannidou, A., Paraskevopoulou, A. T., & Tachou, V. (2016). School grounds as a resource of green space to increase child-plant contact. *Urban Forestry & Urban Greening*, 20, 375 – 386. <https://doi.org/10.1016/j.ufug.2016.10.00>
- Barthel, S., Belton, S., Raymond, C.M., & Giusti, M. (2018). Fostering children's connection to nature through authentic situations: The case of saving salamanders at school. *Frontiers in psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.00928>
- Bentsen, P., Jensen, F. S., Mygind, E., & Randrup, T. B. (2010). The extent and dissemination of udeskole in Danish schools. *Urban Forestry & Urban Greening*, 9(3), 235-243. <https://doi.org/10.1016/j.ufug.2010.02.001>
- Carrier, S. J., Tugurian, L. P., & Thomson, M. M. (2013). Elementary science indoors and out: Teachers, time, and testing. *Research in Science Education*, 43, 2059–2083. <https://doi.org/10.1007/s11165-012-9347-5>
- Ceballos, G., Ehrlich, P. R., & Dirzo, R. (2017). Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *Proceedings of the national academy of sciences of the United States of America*, 114(30), E6089-E6096. <https://doi.org/10.1073/pnas.170494911>
- Charles, C., Keenleyside, K., Chapple, R., Kilburn, B., van der Leest, P. S., Allen, D., Richardson, M., Giusti, M., Franklin, L., Harbrow, M., Wilson, R., Moss, A., Metcalf, M., & Camargo, L. (2018). Home to us all: How connecting with nature helps us care for ourselves and the earth. *Children and Nature Network*. <https://www.cbd.int/doc/strategic-plan/Post2020/postsbi/C&nn2.pdf>
- Chawla, L. (2007). Childhood experiences associated with care for the natural world: A theoretical framework for empirical results. *Children, Youth and Environments*, 17(4), 144-170. <https://doi.org/10.1353/cye.2007.0010>
- Chawla, L. (1999). Life paths into effective environmental action. *Journal of Environmental Education*, 31(1), 15–26. <https://doi.org/10.1080/00958969909598628>
- Cronin-Jones, L.L. (2000). The effectiveness of schoolyards as sites for elementary science instruction. *School Science and Mathematics*, 100(4), 203-211. <https://doi.org/10.1111/j.1949-8594.2000.tb17257.x>
- Dahlgren, L. O., & Szczepanski, A. (1998). *Outdoor education: Literary education and sensory experience: An attempt at defining the identity of outdoor education*. Kinda Education Center.
- d'Amour, C.B., Reitsma, F., Baiocchi, G., Barthel, S., Güneralp, B., Erb, K. H., Haberl, H., Creutzig, F., & Seto, K. C. (2017). Future urban land expansion and implications for global

- croplands. *Proceedings of the National Academy of Sciences of the United States of America*, 114(34), 8939-8944. <https://doi.org/10.1073/pnas.1606036114>
- Dunn, R. R., Gavin, M. C., Sanchez, M. C., & Solomon, J. N. (2006). The pigeon paradox: dependence of global conservation on urban nature. *Conservation Biology*, 20(6), 1814-1816. <https://www.jstor.org/stable/4124710>
- Dyment, J. E. (2005). Green school grounds as sites for outdoor learning: Barriers and opportunities. *International Research in Geographical & Environmental Education*, 14(1), 28-45. <https://doi.org/10.1080/09500790508668328>
- Fägerstam, E. (2013). High school teachers' experience of the educational potential of outdoor teaching and learning. *Journal of Adventure Education and Outdoor Learning*, 14(1), 56-81. <https://doi.org/10.1080/14729679.2013.769887>
- Grahn, P., Mårtensson, F., Lindblad, B., Nilsson, P., & Ekman, A. (1997). *Ute på dagis. Hur använder barn dagbemsgården? Utformningen av dagbemsgården och dess betydelse för lek, motorik och koncentrationsförmåga [Out at kindergarden. How do children use the playground? The design of the playground and its importance for play, motor skills and concentration]*. Alnarp: MOVIMUM.
- Göteborgs botaniska trädgård. (2024, March 4). *Så vilda!: för människor och mångfald [Sow wild!: for people and diversity]*. Göteborgs botaniska trädgård. <https://www.botaniska.se/barn-skola/sa-vilda/>
- Ives, C. D., Abson, D. J., Von Wehrden, H., Dorninger, C., Klaniecki, K., & Fischer, J. (2018). Reconnecting with nature for sustainability. *Sustainability Science*, 13(5), 1389-1397. <https://doi.org/10.1007/s11625-018-0542-9>
- Maller, C., Townsend, M., Pryor, A., Brown, P., & St Leger, L. (2006). Healthy nature healthy people: contact with nature as an upstream health promotion intervention for populations. *Health Promotion International*, 21(1), 45-54. <https://www.jstor.org/stable/45152850>
- Naturskolan. (2024, March 26). *Biologisk mångfald på skolgården [Biodiversity in the schoolyard]*. Lunds kommun. <https://lund.se/personalingangen/for-dig-som-arbetar-inom-forskola-och-skola/naturskolan/biologisk-mangfald-pa-skolgarden>
- Soga, M., & Gaston, K. J. (2018). Shifting baseline syndrome: causes, consequences, and implications. *Frontiers in Ecology & the Environment*, 16(4), 222-230. <https://doi.org/10.1002/fec.1794>
- The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). (2019). *Global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES secretariat. <https://doi.org/10.5281/zenodo.3831673>
- Thompson, C.W., Aspinall, P., & Montarzino, A. (2008). The childhood factor: Adult visits to green places and the significance of childhood experience. *Environment and Behavior*, 40(1), 111-143. <http://dx.doi.org.ludwig.lub.lu.se/10.1177/0013916507300119>
- United Nations, Department of Economic and Social Affairs, Population Division (DESA). (2019). *World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420)*. United Nations. <https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf>
- Wells, N.M. (2000). At home with nature: Effects of greenness on children's cognitive functioning. *Environment and Behavior* 32(6), 775-796. <https://doi.org/10.1177/00139160021972793>

Appendix

Questionnaire

Link to questionnaire:

https://docs.google.com/forms/d/e/1FAIpQLSetbcgD3b4JcL1pHVfzoq9uO_tTQS8RXgonWZD4hH12YghgZg/viewform?usp=sf_link

Interview questions

What age groups do you teach?

What subjects do you teach?

What is your academic background?

Have you held lessons outdoors with any of your classes? If no, why not?

What did you do outdoors?

Did you have lessons outdoors before you heard of the teaching material?

How did you use the material in your teaching?

Extra question about the Natural Nations material: Have you sent in your results from the inventory and taken part in the citizen research?

Has your attitude towards outdoor education changed since you were introduced to the teaching material?

What role does outdoor education have in relation to the curriculum?

What challenges did you come across whilst teaching outdoors?

What advantages have you experienced with teaching outdoors?

Are there prerequisites for you to teach outdoors? If not, what is missing?

What do you experience as the biggest barriers for outdoor education?

Is there anything you would like to add about outdoor education?



LUNDS
UNIVERSITET

WWW.CEC.LU.SE
WWW.LU.SE

Lunds universitet

Miljövetenskaplig utbildning
Centrum för miljö- och
klimatforskning
Ekologihuset
223 62 Lund