Perceived sensory dimensions as a tool in the design process

– encouraging use and physical activity in schoolyards

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Swedish University of Agricultural Sciences, SLU
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Abstract

This master thesis explores the possibility of using the theory of Perceived sensory dimensions (PSDs) as an analysing tool in the design process when designing schoolyards to achieve a schoolyard that encourage use and physical activity for pupils in secondary school.

The number of children and young people who reach the recommended level of physical activity each day decreases with age, while the amount of daily sedentary time increases with age. School has been mentioned as one of three arenas where the community can do an effort, as this is where children and young people spend most of their time during the day.

Pupils at two different secondary schools in Snåsa municipality in Norway answered a survey based on the PSDs, their use of the schoolyard and what they appreciate in and about their schoolyards. The pupils were observed for one day to get an understanding of what activities the pupils participate in during recess, the activity level associated with the activity and which PSD the pupils' activities during recess. The teachers and employees working with the pupils in the secondary schools were also invited to participate in a survey to get a more holistic impression and understanding of how the pupils at each school use their schoolyard year-round.

The findings from the PSD analysis, surveys and observations are presented to give an understanding of today's situation of each schoolyard (how the pupils use their schoolyard and the activity level), and these findings are used in the design process of creating a conceptual design proposal for both schools. Using the PSDs as a tool in the design process, the perceived presence is compared to the value rated by the pupils. In the design proposals, the presence is attempted balanced towards the rated value to create a schoolyard that encourages use and physical activity.

The study shows that the PSDs gave a lot of information on various relevant topics, but the PSDs was a bit challenging for the young target group due to the abstraction level of the dimensions. In a study focusing on physical activity, the PSDs did not contribute efficiently. If the PSDs were to cover physical activity, it is necessary to further develop the theory as a tool for schoolyard design. The PSD theory was a useful tool to get insight on both the perceived presence and value of the different dimensions in the schoolyards, and was helpful in the design process trying to balance the presence to the values.

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Terms and abbreviations

Elementary school: 1st to 7th grade (avg. 6-13 years old).

Gross area: Total of the school area including buildings, parking and roads.

Net area: Total of the school area excluding buildings, parking and roads.

PSDs: Perceived sensory dimensions.

School area: The schools area consists of both buildings, schoolyard and parking.

Schoolyard elements: Elements in the schoolyard that encourages use, such as ballpit, benches, table tennis tables etc.

Secondary school: 8th to 10th grade (avg. 13-16 years old).

Sedentary time: Time spent sitting or lying down.

01 Introduction

Aim and background

The main objective of the study was to explore the possibility of using the PSDs as an analysing tool to understand the needs of the secondary school pupils in the design process of designing schoolyards that encourage use and physical activity. To explore if it is possible, a conceptual design proposal of two schoolyards will be created with a design process based on the results of the PSD analysis. The aim of the design proposal will be to promote and encourage physical activity through meeting the pupils' need defined by results from the PSD analysis, surveys and observations.

Background

Through a mapping of physical activity, sedentary time and physical fitness among children and young people in the project ungKan3, the Norwegian Institute of Public Health (NIPH) and the Norwegian School of Sport Sciences (NHI) found that amount of sedentary time daily increases with increasing age. The mapping revealed that among 15-year-olds only 40% of the girls and 51% of the boys reach the recommended amount of minimum 60 minutes of moderate to high intensity physical activity daily (Steene-Johannessen et al., 2019).

In 2019, Jakob Linhave from The Norwegian Directorate of Health expressed that it was worrying that the activity level of children and young people had not increased. Physical activity has many positive effects on health, but also on learning, while sedentary time increases the risk for multiple sicknesses (cardiovascular diseases, high blood pressure, obesity and type 2 diabetes) – also for children and young people. Linhave reflects upon if we have created a community where children do not have to be active, and if the attractivity of activities that make us sit still is related to the rising number of sedentary time that the ungKan3 study shows (Helsedirektoratet, 2019).

To increase the activity level of children and young people, Linhave points to three main areas where we as a community can do an effort, the first being transportation and developing local environments – to make it easier to be active on the way to and from kindergarten, school, after-school activities and to be active in the local community. The second is to get enough physical activity where the children and teenagers spend their time during the day – kindergarten, school and the after-school programs. The third being to make it easy to be active during free time, both organized and on your own, through lowering the cost level for participating in organized activities (Helsedirektoratet, 2019).

This master study explores Linhave's second main area (physical activity during the school day), and how to give physical activity a larger part of secondary school pupils everyday school life through designing schoolyards that encourages use. On the daily basis, there is approx. 635 000 pupils in elementary and secondary school in all of Norway (Utdanningsdirektoratet, 2022). The outdoor area in the school is a central part of the student's everyday life. Many children do not spend time in other environments than home, school and perhaps an arranged leisure activity, and moving between these. This is part of the reason why it is so important that the schoolyard can offer environments that promote all-round development for the pupils (Boverket and Movium, 2015). Researchers from the Norwegian University of Life Sciences (NMBU) were challenged by The Norwegian Directorate of Health to look at how the schoolyards in Norwegian schools and kindergartens can contribute to work towards the growing inactivity in the Norwegian society, and create good health and well-being (Tverga, no date a). This resulted in updated recommendations for the schoolyards content and size (Thorén et al., 2019). The researchers found that variation in terrain and elements of nature, such as trees and bushes, give both physical and psychological health benefits but also can contribute to play, diverse use, physical activity and motoric development. Thorén et al. (2019) also highlighted good access to physical elements such as play structures and equipment for physical activity, and different land/area cover that contribute to increased use of the outdoor areas – these also have a positive impact for physical activity. Designing the schoolyard with an aim of creating variation, many and small niches instead of few large areas and to give nature space can contribute to give opportunity for several different activities to be carried out and reduce inactivity (Thorén et al., 2019).

Earlier the schoolyards at secondary schools mostly consisted of an asphalt surface, while elementary school pupils have access to qualities such as climbing frames, sandboxes, swings etc. that encourage physical activity (Limstrand, 2000). The needs of secondary school pupils have been neglected in the development of schooolyards, and Limstrand (2000) points to the quality as the most limiting physical factor for more and better outdoor activity. Thorén et al. (2019) discuss in their report that Vollebekk skole have underestimated the needs of the secondary school pupils as there is put a lot of emphasis on the social aspects and possibilities for sitting, but less emphasis on facilities for activities that triggers this age group. It is challenging to get this age group into physical activity, but a positive thing Vollebekk skole has done designing their schoolyard is to place great emphasis on zoning the schoolyard for the various age levels. Looking at the plan overview of Vollebekk skole, one can see that the zone for pupils in secondary school is placed naturally in relation to the placement of each age group in the school building. In the zone dedicated to the pupils in secondary school there are table tennis-tables, some seating opportunities and a work of art that is also included as part of the activities offered. According to the landscape architect the thought behind the design is that the pupils in secondary school are the most mobile age group and they have a bigger radius then the younger pupils at the school.

Limstrand (2000) found that surveys show that schoolyards are not green, but dominated by asphalt- and gravel surfaces, soccer fields and play structures such as slides, sandbox and swings. This problem was bigger in secondary school schoolyards, for the age group that is the most physically passive (Limstrand, 2000; Steene-Johannessen et al., 2019). The school is a central arena for all children and teenagers from 6-18 years old and has a responsibility and potentional to offer an environment for movement learning and physical activity, and the physical education class have a special task to provide meaningful learning in physical activity and health, movement and physical learning through

the school reform in 2020 from the Ministry of Education and Research (Fjørtoft, Kjønniksen and Støa, 2018).

Through looking at some different guides on design of playgrounds and schoolyards, one can observe an overall trend of the guides mainly being aimed towards younger children, and not pupils in secondary school (Jansson and Andersson, 2018). As cities densify, competition for available spaces will increase and economical interests are an important factor in determining what these spaces should be filled with. In negotiations it can be difficult to implement overall plans which ensures densification with quality as they must negotiate with developers, while taking residents considerations and input into account (Hjorteset and Sæter, 2016). Schoolyards could be utilized further and designed to create a space for youth to meet in local environments, that encourages use and physical activity both during school and after school. Through looking at the needs and wishes from this age group and facilitating the schoolyard to meet this, it could increase physical activity in an age group where sedentary time is high. The 1st of January 2012 the Public Health Act in Norway entered into force. The act shall contribute to social development that promotes public health, including equalizing social health differences. The act stipulates that public health is a responsibility in all sectors in the community, not only the health sector (Helse-og omsorgsdepartementet, 2021). There is a need for schoolyards to be facilitated in a higher level towards secondary school pupils, and this is why I want to explore a new way of meeting the older pupils' needs through using PSDs as an analysing tool in the design process.

Location

The study is located in Snåsa municipality in Norway. Snåsa is a small town with about 2100 citizens, located in Trøndelag (Statistisk sentralbyrå, no date). There are two secondary schools in Snåsa, one public school (Snåsa skole) and one private school (Snåsa Montessoriskole) - these are the schools participating in the project.

The municipality describes the values of Snåsa through three words: "Genuine, generous and courageous", and they are used as a motto in all communication and action from the municipality (Snåsa kommune, 2023). Snåsa is a municipality with a lot of areas where citizens can participate in different outdoor activities – and the possibility to do activities such as hunting, fishing, hiking and skiing is a big part of what attracts some people to live in Snåsa. It is also located close to cities such as Namsos and Steinkjer – and some of the citizens commute to work there (Visit Snåsa, no date).

Snåsa is a bilingual municipality, as it is one of the few municipalities where the Norwegian and Southern Sami languages and cultures are equal and blended into the community (Snåsa kommune, 2021).

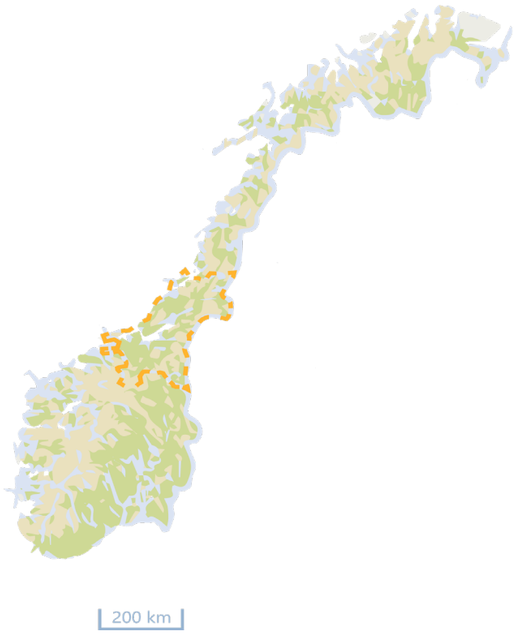
Considering that there are "only" around 2000 citizens, Snåsa has a lot of area as the municipality is 2343 km2. The landscape consists of hills, forests, agricultural land, lakes and mountains, which has over the years led to people settling scattered around the municipality. Because of the landscape and settlements in Snåsa, it can take from a few minutes to around 40 minutes to travel from one citizen in the northern part of the municipality to another in the south-eastern part of the municipality.

Snåsa skole is located between the town center and Viosen marina, which is a popular area in Snåsa as the only sports field is there, and the marina is centrally located on Snåsavatnet - a big lake in Snåsa. The marina is popular for water sports such as fishing, swimming, jetskiing and boating. In the town center of Snåsa we find the train station, library, the Youth House, some stores and two restaurants.

Snåsa Montessoriskole is located about 8 km north-east of the town center, in a smaller community center called Agle. The school is located close to the community house in Agle, which they also use as the gym hall when they have physical education classes indoors.

These are the only two secondary schools in Snåsa.

Why Snåsa?
Part of the reason for choosing Snåsa as the location for the study is because of my own upbringing in the municipality. Growing up in Snåsa being a pupil at both schools, and going to secondary school at Snåsa skole I experienced a wish for outdoor spaces facilitated for secondary school pupils, and not only facilitated for elementary school pupils to explore during recess.



Located in Trøndelag, Norway

Snåsa municipality in Trøndelag

Snåsa municipality

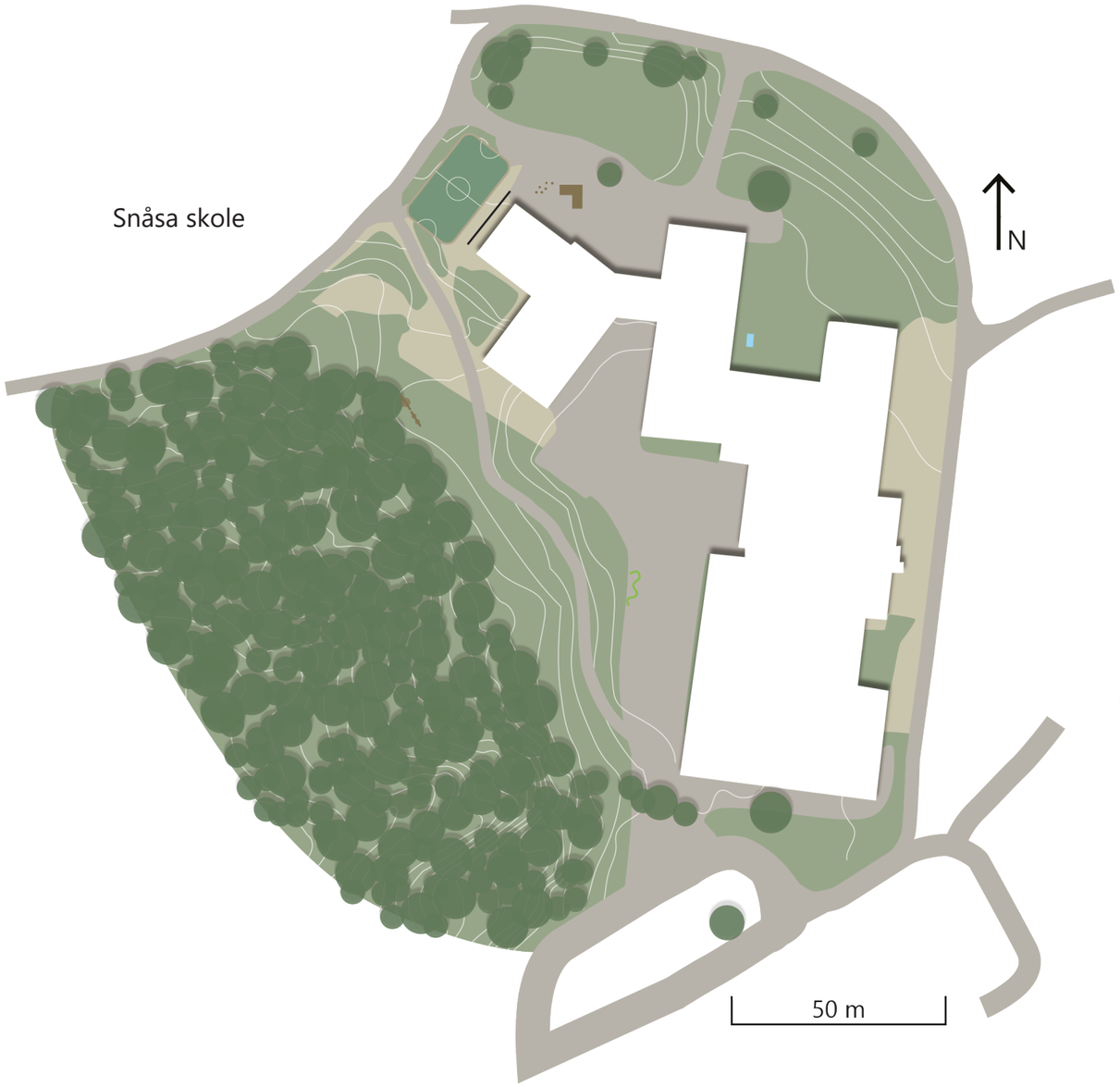
Cases

The secondary schools in Snåsa are interesting for this study as both schools within a similar cultural and geographical context, yet their size and scheduling of breaks makes them an interesting comparison, and comparable.

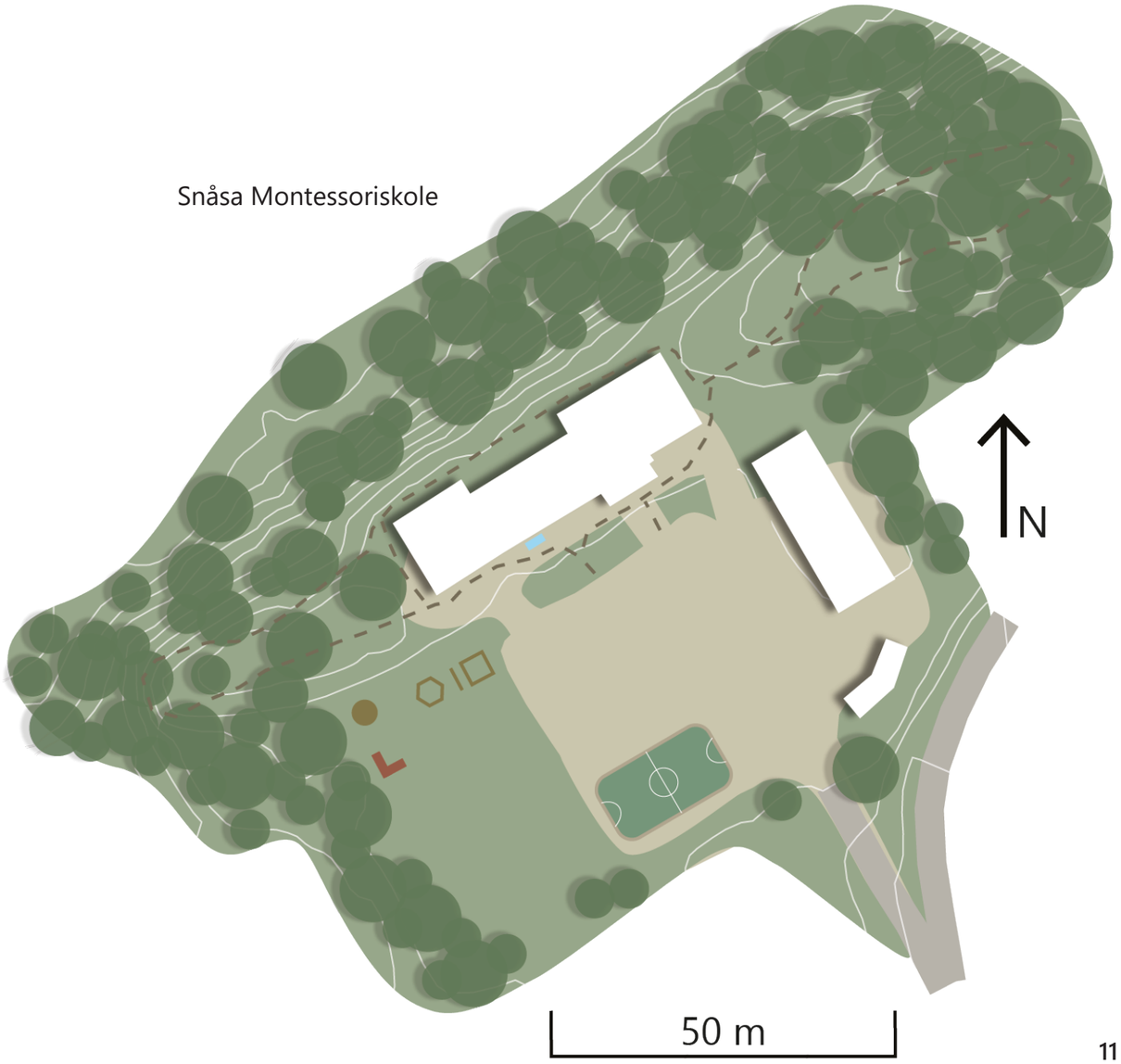
The figures below illustrates the layout of both of the schools' areas.

Buildings
Gravel
Grass
Asphalt
Path
Trees

Snåsa skole



Snåsa Montessoriskole



Snåsa skole

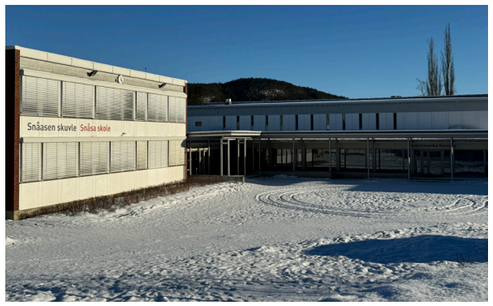
Snåsa skole is a public school, with pupils from 1st to 10th grade. Around 10 years ago, pupils from 1st to 7th grade were moved from two different locations that had buildings that were run down, to the current location. A new extension of the existing secondary school was built to house the younger elementary school pupils. While the school site was being renovated, a lot happened in the schoolyard as it went from a large asphalt surface to a larger schoolyard with playground equipment, grass, toboggan run, soccer pit etc. to give the younger kids a fun environment to use during recess.

Today Snåsa skole has a pupil body consisting of 169 pupils, of which 61 in secondary school. All of the pupils share the schoolyard, except for a grass lawn on the northern side of the building where only secondary school pupils have access. The different age groups have different entrances to the building, which separates the younger pupils from the pupils in secondary school.

The vision for the school is to contribute to well-being, safety and community for pupils, parents and employees, and thus lay a good foundation for learning and knowledge (Snåsa kommune, no date).

The schoolyard contains many elements and qualities that can contribute to play, use and physical activity such as variation in terrain, a soccer pit, a climbing frame, an asphalt surface, a grass lawn, swings, and a zip-line. These qualities and elements make the schoolyard facilitated for activities such as soccer, danish long ball, climbing, bicycling etc. As it can get up to -25 Celsius during the winter season, the elements and qualities also make it possible to make a skating rink and facilitate for toboggan run. In the secondary school pupil's area of the schoolyard, they have the possibility to play table tennis and volleyball.

The gross area of the school is approx. 34500m2, and the net area of the school is approx. 22872m2 (Kartverket, no date). The net area divided by the number of pupils at the school (169) is 135m2 per pupil.



Snåsa skole - Inventory

A. Climbing tower

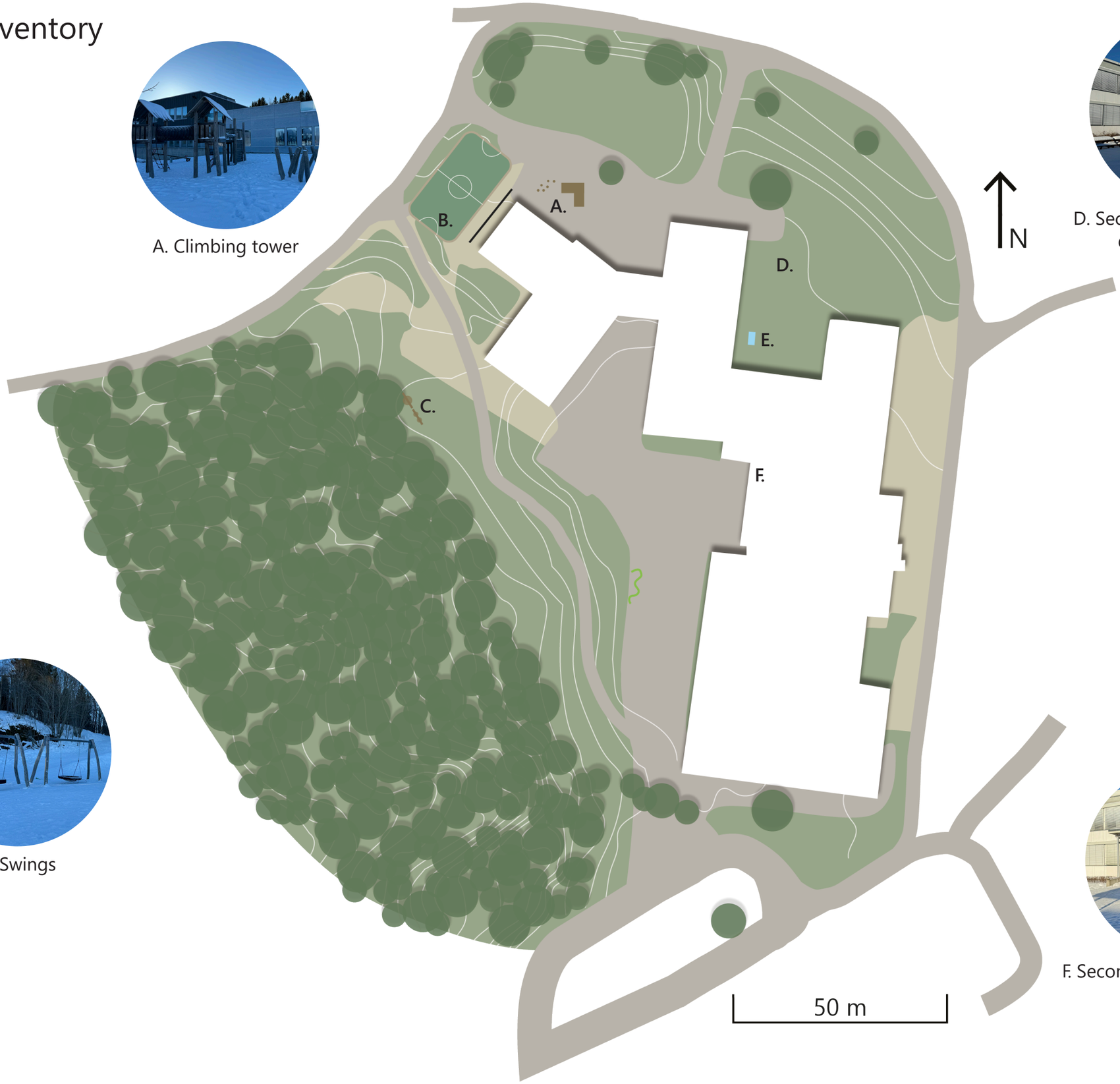
B. Zip line and soccer pit

C. Swings

D. Secondary school pupils designated area

E. Table tennis table

F. Secondary school entrance



Buildings
Gravel
Grass
Asphalt
Path
Trees

Snåsa Montessoriskole

Snåsa Montessoriskole is an academic-pedagogical alternative based on educational principles created by Maria Montessori. The school offers a Montessori alternative for pupils from 1st to 10th grade. On their website it says that the vision for the school is to promote mastery, joy of learning and harmony (Snåsa Montessori, no date).

Snåsa Montessoriskole was established after Agle skole was closed in 2002. The people living around Agle feared that the closing of the school would lead to a dead community in that area in Snåsa, and this led to protests which led to the opening of Snåsa Montessoriskole – which was the first Montessori-school in the region (Manka, 2020). Until the schoolyear 2016/2017 the school only offered a school alternative for pupils from 1st to 7th grade, but since the fall in 2016 the secondary school has been implemented in the school.

Today the small school is running successfully with 60 pupils from 1st to 10th grade, including 19 pupils in secondary school.

Snåsa Montessoriskole mentions the schoolyard on their website and writes about what activities the schoolyard offers (soccer field, ballpit, play elements, table tennis and sandbox) and explains shortly how they utilize the surroundings through school activities and teaching.

The school area is approx. 12700m2 including space for bus, forest, buildings etc. (Kartverket, no date). The schoolyard contains many elements and qualities that can contribute to play, use and physical activity such as variation in terrain, a soccer pit, a climbing frame, a gravel surface, a grass lawn, swings and a volleyball net. These qualities and elements make the schoolyard facilitated for activities such as soccer, danish long ball, climbing, bicycling etc. As it can get up to -25 Celsius during the winter season, the elements and qualities also make it possible to make a skating rink and facilitate for toboggan run. On the balcony belonging to the pupils in secondary school, it is possible to play table tennis and sit together, but in the area outside the balcony is not facilitated for anything specific. With Snåsa being a bilingual municipality, there is also a Sami turfhut in the schoolyard.

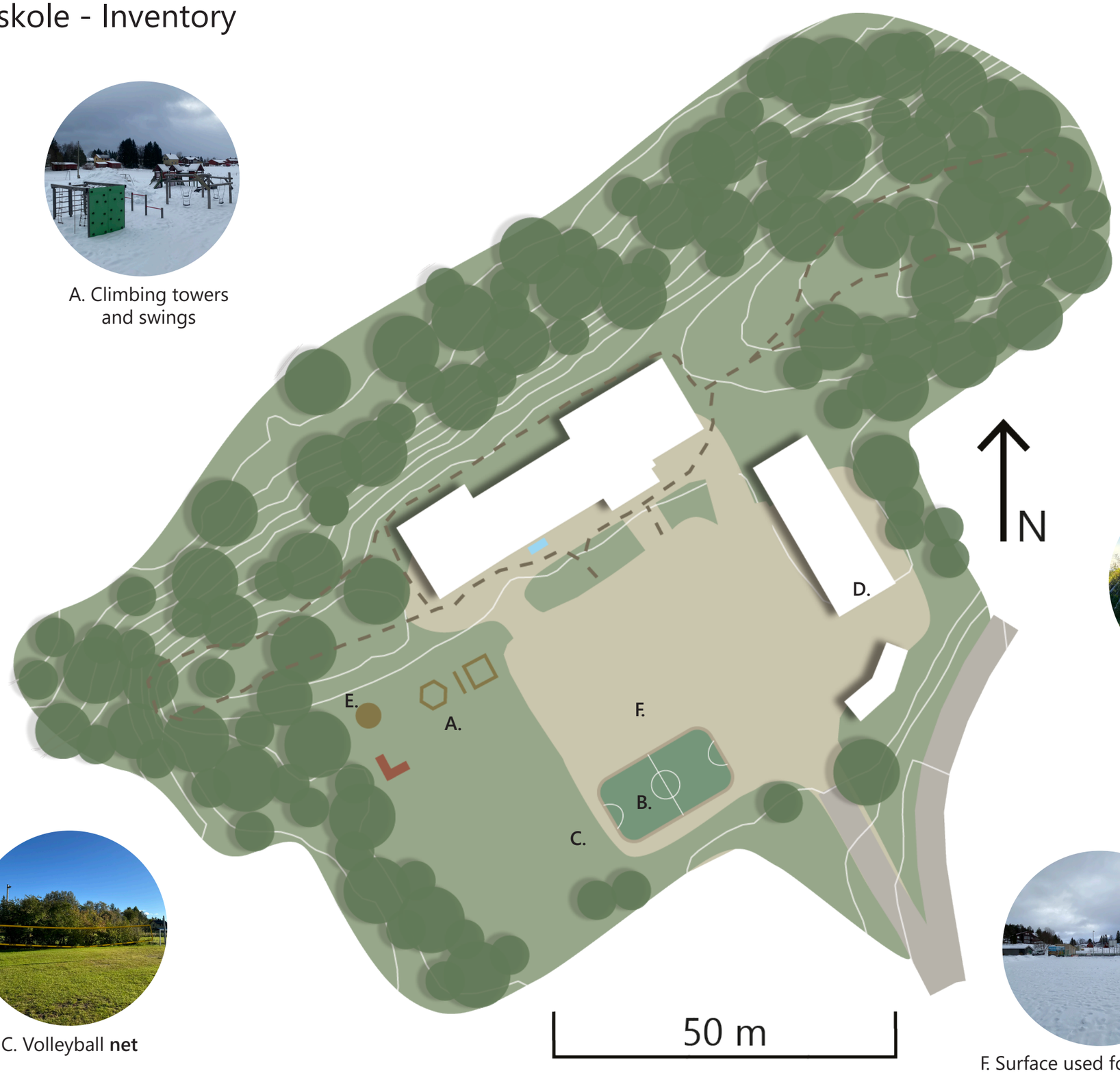
The school area (12700m2) divided by the number of pupils at the school (60) is 211m2 per pupil.

Snåsa Montessoriskole - Inventory

A. Climbing towers and swings

B. Soccer pit

D. Balcony



E. Sami turf hut

Buildings
Gravel
Grass
Asphalt
Path
Trees

C. Volleyball **net**

F. Surface used for ice rink in winter, and danish longball during warmer months

02 Literature and theory

Schoolyard design

As mentioned in the introduction, earlier trends for schoolyard design for secondary schools mostly consisted of an asphalt surface, while schoolyards for elementary school pupils have consisted of qualities that encourage physical activity (Limstrand, 2000). In 2018 Tverga, a voluntary organization was established by “Ungdom og Fritid” and “Oslo Skateboardforening” on commission by the Ministry of Culture to create a resource center for self-organized sports and physical activity. The goal was for Tverga to contribute to increased activity throughout Norway (Kulturdepartementet, 2018; Tverga, no date b).

In Tverga’s work towards increased activity, one of the focuses has been to guide municipalities and volunteers with the development of meeting places to facilitate for self-organized sports and physical activities. Self-organized sports and physical activity is defined through Tverga as all the activities that a person self-initiates to. In this form of activity there are no rules or limitations, as participants have the freedom to decide when, where and how they want to be active (Tverga, no date b). Tverga points to the schoolyard as an important arena for children and young people and one of the most important meeting places. Therefore, they have created a guide for designing schoolyards that meet the need of children and young people for play and physical development (Tverga, no date c).

Tverga’s guide for designing schoolyards takes into consideration how to develop outdoor environments that promote health, well-being, play and learning based on Thorén et al. (2019). Key qualities in designing a good schoolyard according to this guide are area and placement, variety and flexibility, different zones and green spaces (Tverga, 2024). For area and placement, it is important that the schoolyard has sufficient space in the outdoor areas and the correct location of both school and outdoor areas to ensure optimal use. In variety and flexibility, a versatile and varied schoolyard is an important health-promoting arena for physical activity, well-being, motor development and learning. In different zones it is highlighted that to create a holistic and well-working schoolyard it is important to have multiple and varied zones of content. Green spaces are important in schoolyards as play in nature can contribute to a better motor development, increased well-being and life quality, but it can also work as nature conservation, and the green spaces can prevent major damage in the event of torrential rain or with protection against the sun.

Perceived sensory dimensions

Grahn and Stigsdotter (2010) identified and created the eight Perceived sensory dimensions (Figure 1) based on the need to understand and analyze the qualities found in urban green spaces, and to find which qualities are valued and important in green spaces among inhabitants and which qualities are less important. They looked into how people experience and perceive urban green spaces and randomly selected 953 informants from nine cities in Sweden, who worked as representatives of the Swedish population for their study. The informants answered a questionnaire consisting of three parts; personal data, preferences for natural qualities and self-estimations of health status. The study identified and described eight perceived sensory dimensions: Nature, Culture, Prospect, Social, Space, Rich in Species, Refuge and Serene.

Stoltz and Grahn (2021) provided a summary interpretation of research conducted on the PSDs to clarify the underlaying principle of each quality as well as how they can be understood in relation to each other.

Further is a short description of Stoltz and Grahn's (2021) interpretation of each of the eight PSDs:

Diverse
The Diverse dimension is interpreted as an environment with a sense of diversity and variation, and sometimes also of a certain animation or liveliness. The experiences of richness and abundance through a multitude of different shapes and colors, smells and textures, perhaps with the presence of edible plants (fruits, berries or mushrooms) (Stoltz and Grahn, 2021). The Diverse dimension is highly associated with perception of biodiversity and richness in species (Grahn and Stigsdotter, 2010; Gyllin and Grahn, 2015), but it also points towards structural and spatial variation.

Social
Stoltz and Grahn (2021) interprets the Social dimension to primarily revolve around the presence of other people; places where one can interact and meet others, or environments where individuals are not alone. The qualities from Social spaces can be about interactions or meetings, but also to be able to watch and enjoy the presence of others at a distance. In Social spaces it might be possible to hide in a crowd – to feel surrounded by others, or also to actively engage in social interactions – to talk, eat, drink, dance, shop, play, etc.

Cultural
The Cultural dimension refers to all purposeful human activity, this includes spiritual or artistic endeavors, artistic or old artefacts, cultivated land, or socially transmitted living patterns. Stoltz and Grahn (2021) interpret that the Cultural dimension point towards evidence of people's values, beliefs, efforts or toils, through the passage of time.

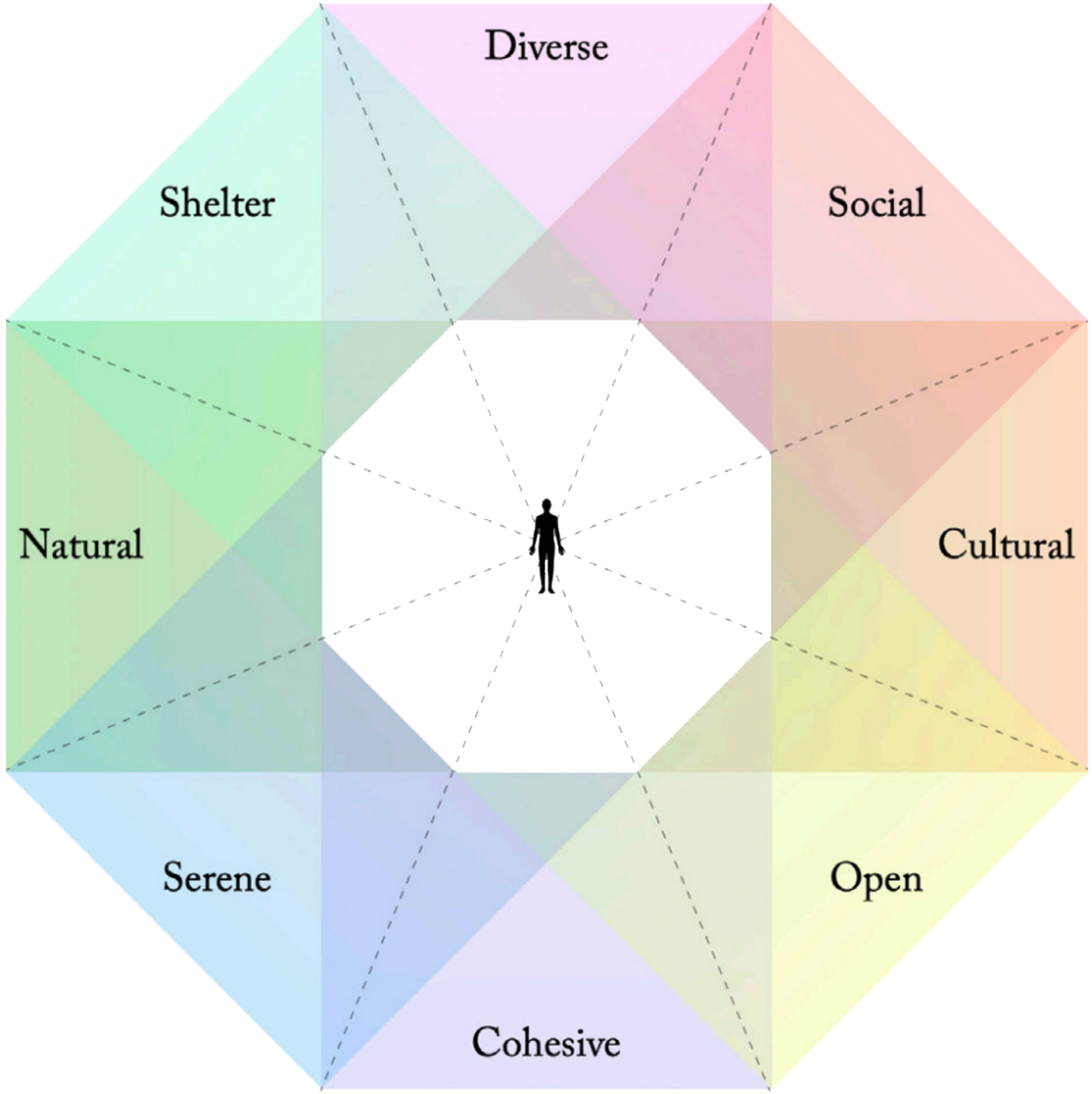


Figure 1. The relation between the eight PSDs. The closer to each other, the closer associations between qualities that emphasizes the dimension. The four axes shows the opposing qualities. Figure by Stoltz and Grahn (2021).

Open
The Open dimension can be interpreted to describe the need for open, unobstructed environments with room for various activities. The PSD also indicates a demand for views, prospects, vistas, and panoramas – the ability to get an overview of surroundings and far distance. But the Open dimension can be seen from two slightly different aspects – a place from which one has a great outlook over surroundings, but also an area where one can enter an open space to roam freely or engage in various activities (Stoltz and Grahn, 2021).

Cohesive
Stoltz and Grahn (2021) interpret that the Cohesive dimension points towards the capacity of an environment to support the experience of a unified whole; to support a sense of spatial cohesion and unity, as well as coherence in terms of structure and content. The Cohesive dimension is emphasized through a potential of an environment to contain and surround an individual, to provide an extended, cohesive space, possible to explore and wander around within for extended periods of time.

Serene
The Serene dimension is interpreted to describe a calm, tranquil, and safe environment, unruffled and unaffected by noise and disturbance. This interpretation can give an impression of a vacuum or complete silence, but Stoltz and Grahn (2021) interprets it as tranquil sounds of nature that reassure a sense of peace and safety are welcome in serene spaces. In Serene spaces it seems important to maintain a good level of maintenance and that the space has no litter, weeds, etc. The qualities that make a space Serene may allow one to let thoughts wander freely, and even to let go of the surroundings, and make individuals daydream or reflect – to focus the attention inwards instead of outwards.

Natural
Stoltz and Grahn (2021) believe the Natural dimension should emphasize experiences of the inherent power of nature. The natural dimension gives the experience of an environment that gives the impression of not being created by humans. Qualities and elements that are associated with the natural dimension are for example bigger green areas, older vegetation (such as trees, moss etc.) and organically shaped stones.

Shelter
The Shelter dimension is interpreted by Stoltz and Grahn (2021) to describe a need for environments that offer a sense of shelter and protection. A statement that captures the essence of this dimension is “To see without being seen”, as it emphasizes the solitary and private aspect of this dimension. Spaces that enhance the perception of this PSD are enclosed spaces, hideaways and refuges of varying size in the physical dimension.

03 Methods

Design research

This project has an aim to study if it is possible to use the PSDs as an analysing tool to understand the needs of the pupils at two secondary schools and use these reflections to propose a new design for each of the schoolyards with an aim of promoting and encouraging physical activity.

To reach the aim of the project, I have chosen to use a design-based method, performing a design process based on data collection through a mixed-method study with surveys and observations centred around the PSDs and how the pupils perceive their current schoolyards. The results from the surveys and observations were then systematically analysed using PSDs as an analysis tool to gain insights, which were further used in a design process where I developed conceptual design proposals for both schools.

Design process

In "Crossing fields – Designing and researching Raumgeschehen" (2019), Hille von Seggern discusses the process of Raumgeschehen – the multiplicity of all that goes on in the living world – in the means of designing, through intertwining, blending and transforming professional spatial design with every day and craftmanship practices as well as with scientific and academic practices and ways of thinking and expressing. Connecting rational thinking with creative intuition and emotion and work transdisciplinary. To achieve this approach, one has to foster a mutual understanding among fundamentally different approaches and schools of thought, and the people and institutions that represent them – in "Crossing fields" Seggern aims to outline such an approach to design research.

Raumgeschehen is a non-hierarchical, performative field of spatial interaction, but for Seggern (2019) it is about the spatial access to a reading of the 'meshwork of interwoven lines' that constitutes our living environment. Geschehen is a broad word that embraces the idea of 'something that happens', which cannot be expressed in all details, which is somewhat blurred in a relational way (Seggern, 2019).

Seggern (2019) establishes that practical, interventionist design work, invention and applied research, theoretical basis, scientific collaboration, knowledge gain and the focus on creating appropriate action spaces are missing links in the design approach, and through integrating these aspects Seggern will plausibly give the design approach a firmer grounding as well as making the objectives and Raumgeschehen as the field of study operational.

According to Seggern (2019) design works as a way of life and as a scientific strategy for gaining insight, how creating knowledge works and can be understood as understanding, and how to transform, often playfully, professional design and artistic, scientific and everyday practices. But the design process to reach this understanding is not a straight path, but a path consisting of creativity to generate insight, knowledge and ideas (Figure 2). Creativity is understanding, and it has the capacity to connect different ways of gaining knowledge which makes it a central mean in the design research process. The process of creativity can be viewed as understanding and as a pathway to knowledge and transformation qualifies creativity and strengthens the role of intuition (Seggern, 2019).

The process of designing consists of an everyday life part and an all scientific and non-scientific discipline's part. Poser (2004, cited in Seggern, 2019, p. 16) describes "design as a way of life" Seggern (2019) interprets this description and "way of life" to mean everything, as it not only concerns humans; an unfolding design process in a frame of potentiality. This describes a design process that cannot be applied as a method as every form of design is about invention.

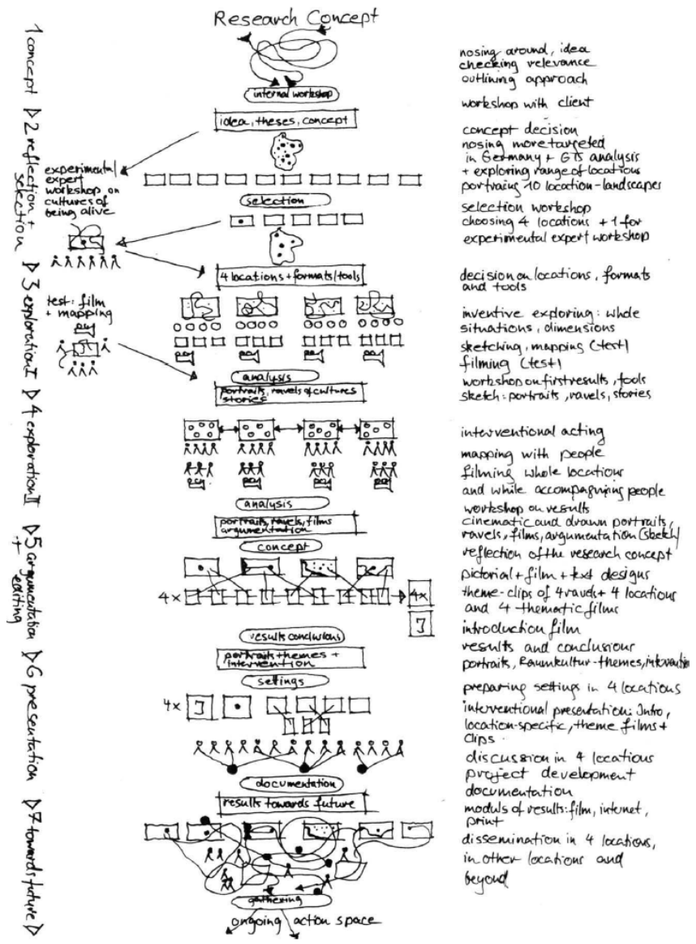


Figure 2. The research concept Seggern designs through researching Raumgeschehen. Figure by Seggern (2019).

Design process for schoolyards

Designing with Raumgeschehen allows for design process that is open to intertwining practices while designing for understanding, which makes it an applicable method for this project.

The design of the schoolyards will be shaped through a mixed-method study with feedback from the pupils at the schools, observations from the designer and the teachers and employees at the schools, while using the PSDs as a method to measure how the design of the schoolyard can be desirable to meet the needs of the pupils to encourage a higher level of physical activity and use between the pupils.

Perceived Sensory Dimensions
The method for this project is inspired by Grahn and Stigsdotter's (2010) theory of the Percieved Sensory Dimensions (PSDs), and uses a similar approach to get an understanding of which qualities are important in outdoor spaces. But in this study the participants are asked directly about each dimension described by Grahn and Stigsdotter. The focus of this study is to use perception and value as the main factors to understand what pupils in secondary school want from their schoolyard and how we could use these in the design process to create schoolyards that promote use and physical activity for pupils in secondary school. The results of the study will shape the process, and the conceptual design proposal for the schoolyards at the schools in the study.

The PSDs are used to provide data to reach the aim of the project. The dimensions will give an understanding of how the pupils in secondary school understand their school outdoor environment and how they want their schoolyard to be – with an aim to encourage and promote use and physical activity during recess in school.

Survey
Two surveys were designed, one for the pupils and one for the school employees and teachers. For the participants to be allowed to participate, they had to sign a consent form. The consent form explained the study, asked for willingness to participate in the study, and described that certain personal information would be gathered through the survey, and how the personal data would be handled (see Attachment 1).

During my individual project in the course "People and environment" during the fall of 2023, the 9th and 10th grade pupils at Snåsa skole participated in a pilot survey. The pilot survey was used to see what questions worked and which ones had to be improved to make them more understandable. When designing the survey for this project, feedback from the teachers were taken into account as some of the questions were rewritten, some were removed, and some were added. To clear up some further confusion, I was invited to present the survey to the pupils – with focus on the perceived sensory dimensions, as the feedback from the teachers stated that the pupils had struggled to understand what and how they were supposed to answer questions about the PSDs in the pilot survey. During week 7 in 2024, I presented the survey for all the pupils at both Snåsa skole and Snåsa Montessoriskole. As the schools have winter break during week 8, we settled on March 1st as the deadline to finish the survey for both schools.

Survey for pupils
The survey for the pupils was designed to collect data about how they perceive their schoolyard (see Attachment 2).

A total of 43 pupils answered the survey, 32 from Snåsa skole and 11 from Snåsa Montessoriskole.

At Snåsa skole 15 of the participants were 9th graders, and the other 17 were 10th graders, 20 of the participants are girls, 11 participants are boys, and 1 participant answered other.

At Snåsa Montessoriskole 4 of the participants were 9th graders and the other 7 were 10th graders, 5 of the participants are girls and the other 6 are boys.

Survey for teachers and employees
The survey for the teachers and employees (see Attachment 3) was designed to collect general data about the school, such as if they have any rules on mobile use, and how the time schedule at the school is. The main goal of the survey for the teachers and employees was to get a general overview on how pupils use their schoolyard. The teachers and employees spend time with the pupils every day during recess and observe how the schoolyard is used through their work, which means they have a deeper insight on the use of the schoolyard and how it differs throughout the different seasons. Teachers and employees can give valuable insights into what they believe could help encourage pupils to use the schoolyard, and also to report which elements or areas are most popular among the pupils. The teachers and employees were also asked if the use of the schoolyard has changed over time, and if so, how it has changed. They were asked if they have any thoughts or ideas about the design of schoolyards, or if they have any ideas on how to design a schoolyard that promotes use and physical activity for pupils in secondary school. As they know the pupils the best and have observed the use of the schoolyard over the years, they might have valuable ideas that should be considered.

A total of 7 teachers and employees at the schools answered the survey, 5 from Snåsa skole and 2 from Snåsa Montessoriskole.

All teachers at the schools were invited to participate, but if they did not work specifically with pupils in secondary school to answer about this age group and not the one they are working with, but this might be why only 7 teachers and employees answered as it is a similar number of adults who are working with the pupils in secondary school at each school.

Observations
Each of the schoolyards was observed over one day. The observation form was inspired by a similar study (Kristiansen, 2016) that also observed what pupils were doing during recess. The purpose of the observation form was to focus the observations and to ensure a systematic approach for the observations. The observation form (Figure 3) focuses on what activities the pupils were doing, where they were staying, how active the pupils were doing that activity (low, medium or high) and what perceived sensory dimension the activity/behavior can be associated with.

Each of the schools were observed during recess for one day in February 2024. The pupils were not informed that they would be observed on what activities they chose to participate in during recess, but were told that observations were about the schoolyard – so that they would not be influenced to choose a different activity than they would have intended to during recess.

Snåsa skole
The observations at Snåsa skole were completed on the 14th of February 2024, on a day with a clear blue sky, almost windless, with -2 degrees Celsius. Light wind from the northeast - 1 m/s (gust 3 m/s) - feels like -2. The sun was shining, and the sun was warming.

At Snåsa skole they have three recesses every day. The first recess lasts 15 minutes, the second recess lasts 20 minutes and the last pause is 15 minutes. With a daily schedule looking like:

1st class	08:50-09:35
2nd class	09:40-10:25
Recess	**10:25-10:40**
3rd class	10:40-11:25
Recess	**11:25-11:45**
Lunch break	11:45-12:05
4th class	12:05-12:50
5th class	12:55-13:40
Recess	**13:40-13:55**
6th class	13:55-14:40

Snåsa Montessoriskole
The observations at Snåsa Montessoriskole were carried out on the 13th of February 2024. The weather was cloudy, and according to Yr.no it was -6, but due to some light wind and gusts around 9 m/s it felt like -12 according to Yr. Precipitation 0-0.2mm, and during the recess it snowed occasionally. "Light breeze" from the southeast.

At Snåsa Montessoriskole they have one longer recess every day (45 minutes), instead of multiple shorter ones. The daily schedule at Snåsa Montessoriskole looks like this:

1st session	08:15-11:30
Lunch break	11:30-11:45
Recess	**11:45-12:30**
2nd session	12:30-14:00

Limitations
For the registration I got help from the teachers and employees at both schools to separate the secondary school pupils from the younger pupils, but even with help I was not able to observe all pupils.

Recess:							
Time	**Amount of students (total)**	**Boys**	**Girls**	**What/activity**	**Activity room**	**Activity level (low, medium, high)**	**Perceived sensory dimension**

Figure 3. The form for the observations.

04 Results

Results

The results from the surveys and observation will be presented in relation to each of the schools, while the chapter will be split into four parts; Perceived sensory dimensions (PSDs), Pupil survey, Teachers and employees survey, and Observations.

The PSD part will include the results from the questions asking about the PSDs in the survey, and will be presented in relation to each of the schools, to get an understanding of how the pupils evaluated the presence and value of the eight dimensions in schoolyard. It is necessary to understand the pupils' perception of each dimension in order to concretize how to use them in the design process. In the survey the pupils were challenged to try to think of how they can relate their schoolyard to the eight dimensions, and the relevant answers are included here. The answers from the surveys are summarized, and interesting points are commented.

Data from the observations are presented for each school, to compare if there is a difference in the use of the schoolyard. In addition, the data are presented side by side to see if there are any trends worth noticing.

To gather the results and to see how the PSDs can be used in the design process of the new proposals of the schoolyards, each dimension is reflected upon in relation to the results gathered through the methods.

Perceived sensory dimensions - Snåsa skole

Pupils' evaluation of presence and value
The pupils ranked the dimensions from 1 (low) to 5 (high) in value and presence. These are the PSD survey results for pupils from Snåsa skole (Figure 4).

The Cohesive dimension scored the same on the pupils' evaluation of how present the PSD is in their schoolyard and the evaluation of how they value this dimension.

The Social dimension scored lower than expected on both the value of the PSD and the level of presence in their schoolyard, as schoolyards should be a social space for the pupils at the school.

The Serene, Shelter and Cultural dimensions scores noticeably higher in how the PSDs are valued by the pupils compared to how the pupils evaluated how present these PSDs are in their schoolyard.

The Natural, Open and Diverse dimensions scores noticeably lower in how the PSDs are valued by the pupils compared to how the pupils evaluated how present the PSDs are in their schoolyard.

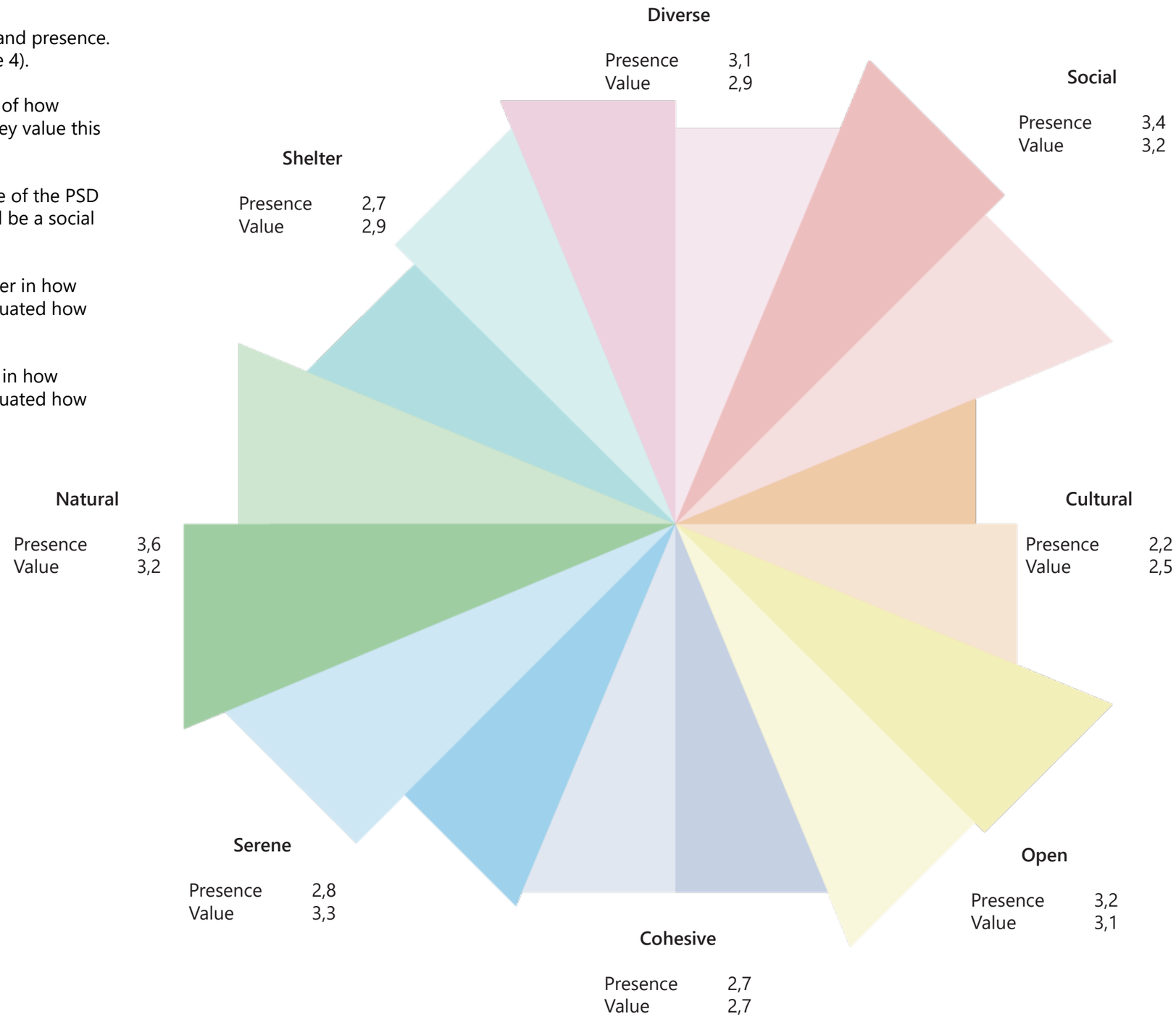


Figure 4. Pupils ratings of presence and value of each of the PSDs in their schoolyard. The rated presence of each dimension is represented with the darker colour, and the rated value is represented with the lighter colour.

Pupils' perception of each dimension in relation to their schoolyard
To understand how the pupils evaluated the existence and value of the eight PSDs we need to understand their perception of each dimension. In the survey the pupils were challenged to try to think of how they can relate their schoolyard to the eight dimensions, and the relevant answers are included here.

The pupils were asked to relate existing elements in their schoolyard to each dimension, and what they like and dislike about their schoolyard in relation to the PSDs. For Snåsa skole the answers looked like this (see Figure 5).

Like about their schoolyard:
11 pupils answered that they like that the schoolyard is big. 5 pupils mentioned the possibility to be under roof, and 3 other mentioned places to sit. 4 pupils said the ball pit, and 6 others mentioned the "Possibility to do things". 3 pupils mentioned the forest. Otherwise the pupils mentioned the location, that the secondary school pupils have their own designated area, greenery, nice view, that there are many places to be, the asphalt in the schoolyard, the grass lawns, that it is possible to walk around. 4 pupils said they do not know, and 2 answered "Nothing", to the question about what they like about their schoolyard.

Dislike about their schoolyard:
7 pupils answered that the schoolyard is boring, and 1 pupil mentioned specifically that the designated area for the secondary school pupils is boring, 1 other pupil mentioned that the schoolyard is grey. 3 pupils answered that the schoolyard is not green enough, and 2 others answered that there is no space to be alone or alone with friends. 2 pupils answered that there is not enough roof to be under, and 2 other pupils answered that there are not enough places to sit. Otherwise the pupils mentioned that there is not a lot to do, that the structures and elements are worn out, that the schoolyard is not exciting, that the schoolyard is too open, that they have to share the schoolyard with younger pupils, and that there are not enough play structures. 6 pupils answered "Nothing", which indicates that they do not dislike anything about their schoolyard.

To relate these answers to the physical environment of their schoolyard elements that they mention they like or dislike in the survey is highlighted in each dimension in Figure 5 with elements the pupils like in italics and elements the pupils dislike about their schoolyard with an underline. The soccer field was mentioned as a something the pupils both like and something they dislike, but is in italics as the reason why the pupil did not like it was because of the state it is in, and not the element itself. None of the elements are underlined, as the answers were more connected to feelings i.e. many pupils answers “Boring”, and the other answers are mentioned because they would like more of elements that are highlighted in italics.

Diverse	Social	Cultural	Open
Forest	*Benches*	Paintings	*Nice view*
Grass	*Under the roof*	None	*Grass lawn*
Roof	*Asphalt surface*	Flowers	*Benches*
Nice view	*Ball pit*	Trees	*Asphalt surface*
Stones	Stairs	Bushes	*Big schoolyard*
Varied vegetation	Amphitheatre	Flower bed	*Ball pit*
Bushes	Green "snake" element	Amphitheatre	Volleyball court
Water	Grass lawn		Amphitheatre
Ponds	A lot		None
Birds	Table tennis		
	Chairs		
	Climbing frame		
	Volleyball court		
	Toboggan run		
	Slide		
	Sitting groups		
	Swings		

Cohesive	Serene	Natural	Shelter
Forest	*Forest*	*Grass*	*Roof*
Benches	*Benches*	*Lawn*	*Forest*
Asphalt surface	Behind the school	*Greenery*	Hills
Grass lawn	Behind the sport facility	*Forest*	Hedges
Road	None	Flowers	Flowers
Terrain	Corners	Different elements	Buildings
Play structures		Sand	Wall
Vegetation		Stones	Bushes
None		A lot	Not a lot
		Bark	Trees
		Climbing trees	Play shed
		Rowan tree	Behind the school
		Moss	
		Sandbox	
		Plants	
		Toboggan run	
		Bushes	

Figure 5. Elements mentioned as related to each dimension in their schoolyard. Elements in italics were mentioned as things the pupils like about their schoolyard.

Perceived sensory dimensions - Snåsa Montessoriskole

Pupils' evaluation of presence and value
The pupils ranked the dimensions from 1 (low) to 5 (high) in value and presence. These are the PSD survey results for pupils from Snåsa Montessoriskole (Figure 6).

The Shelter, Cultural, Serene and Open dimensions scores noticeably higher in how the PSDs are valued by the pupils compared to how the pupils evaluated how existing the PSDs are in their schoolyard.

The Natural dimension scores lower in how the PSD is valued by the pupils compared to how the pupils evaluated how existing the PSD is in their schoolyard.

The pupils at Snåsa skole evaluated the existence of the Cultural dimension higher than the pupils at Snåsa Montessori, which was surprising especially because of the turfhut (Sami "gamme") in Snåsa Montessoriskole's schoolyard.

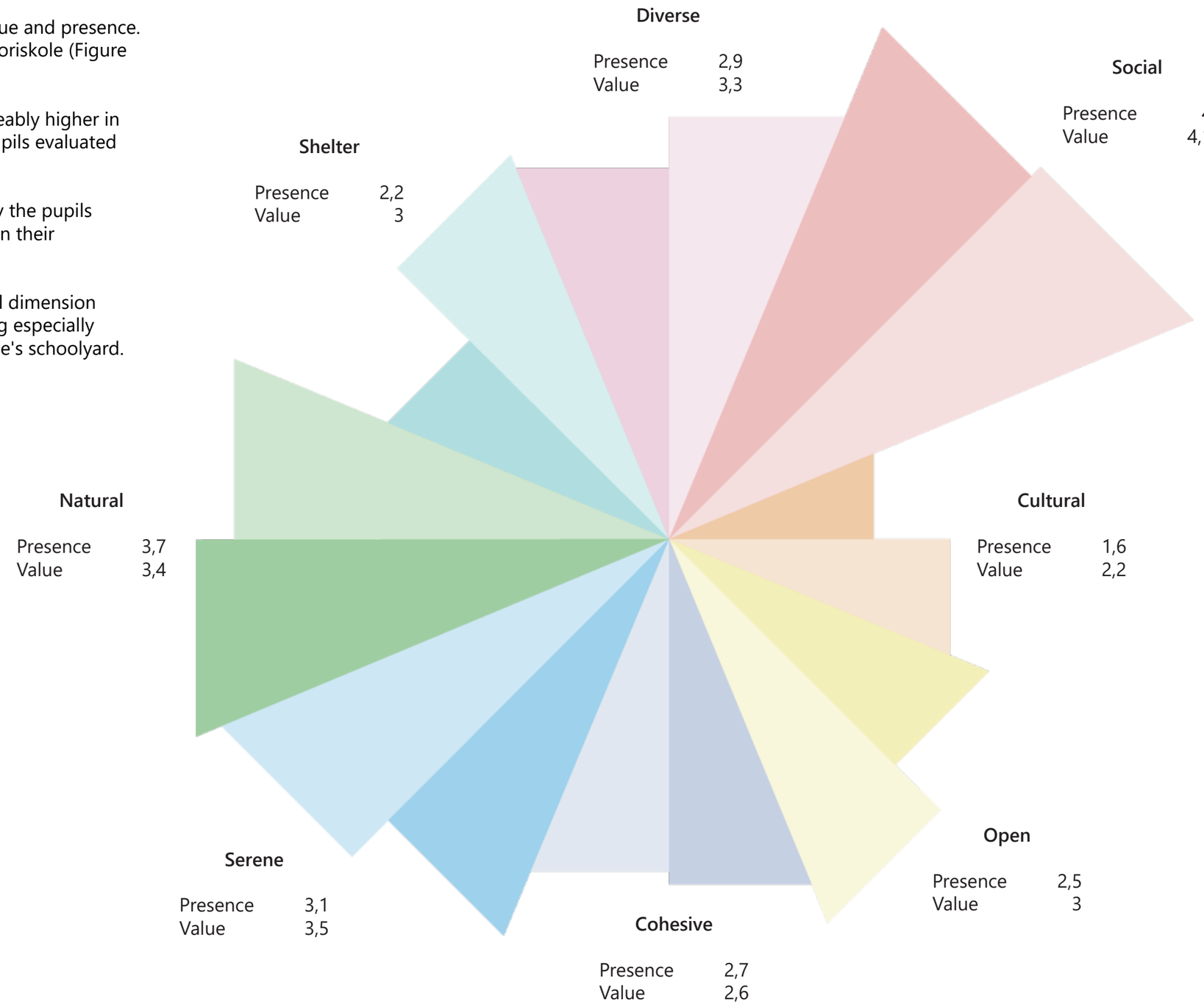


Figure 6. Pupils ratings of presence and value of each of the PSDs in their schoolyard. The rated presence of each dimension is represented with the darker colour, and the rated value is represented with the lighter colour.

Pupils' perception of each dimension in relation to their schoolyard
The pupils were asked about what they like and dislike about their schoolyard in relation to the PSDs. For Snåsa Montessoriskole the answers looked like this, see Figure 7.

In the pupils' perception of each of the dimension in relation to their schoolyard it was especially interesting that the pupils at Snåsa Montessoriskole mentioned the deck in the Social dimension and the Serene dimension, but not in the Shelter dimension as it has a roof and offers some shelter. It might go under "Buildings" as some pupils answered in the Shelter dimension in the survey, but in other parts it has always been specifically mentioned.

Like about their schoolyard:
3 pupils answered that they like the deck they have to hang out on. The size of the schoolyard was mentioned as positive by 2 pupils. Otherwise the pupils mentioned the ball pit, the nature, the soccer field, possibility to play gaga ball, asphalt and the possibility to do activities they enjoy. 1 pupil said (s)he does not know, and 1 other said "Not alot".

Dislike about their schoolyard:
3 pupils answered that they don't like that it is grey and boring, 2 pupils said there was too much gravel, and 1 pupil said that (s)he does not like that the schoolyard "Looks depressing". Otherwise the pupils mentioned the winter, that the schoolyard is empty and that there are not enough activities for older pupils to do. 1 pupil said "The bad soccer field", and one other said that they do not have enough balls to participate in the activities that are offered in the schoolyard. 1 pupil said (s)he does not know.

To relate these answers to the physical environment of their schoolyard highlighted in each dimension in Figure 7 with elements the pupils like in italics and elements the pupils dislike about their schoolyard with an underline. The soccer field was mentioned as a something the pupils both like and something they dislike, but is in italics as the reason why the pupil did not like it was because of the state it is in, and not the element itself.

Most of the elements mentioned in what they like about their schoolyard belong in the Social dimension. In the Diverse and the Open dimension there was one of each, but the gravel surface is the disliked element in both dimensions. The deck also goes into the Shelter dimension as a liked element.

For the pupil's favourite spot in the schoolyard 9 of them answered the deck, two answered the soccer field, 1 pupil answered the ball pit, and 1 answered that (s)he does not know.

Diverse	Social	Cultural	Open
Asphalt surface	*Ball pit*	Flower beds	*Soccer field*
Deck	*Gaga ball*	Currant bushes	<u>Gravel surface</u>
<u>Gravel surface</u>	*Soccer field*	None	Open schoolyard
Wildlife	*Deck*	Turf hut	None
Grass lawn	Stairs		
Bushes	Sitting groups		
Forest	Campfire		
Stones	Volleyball court		
Water	Benches		
A lot			

Cohesive	Serene	Natural	Shelter
Not sure	*Deck*	Trees	Walls
Fields for activities	Forest	Grass	Turf hut
None	None	Tobboggan run	Buildings
		Moss	None
		Blueberry heather	Hills
		Terrain	Bushes
		Old trees	
		Stones	

Figure 7. Elements mentioned as related to each dimension in their schoolyard. Elements in italics were mentioned as things the pupils like about their schoolyard, while underlined elements were mentioned as dislikes.

Value of PSDs based on gender

To be able to meet the needs of all pupils we need an understanding of what is important to them. Boys are on average more physically active than girls (Steene-Johannessen et al., 2019), could this be because outdoor environments are more facilitated towards boys than girls?

To get an understanding of what is important for both genders, the value from the questions on the PSDs are presented based on genders. The boys' value of each dimension is represented with the lighter colour in each dimension, and the girls value is represented with the darker colour. The results are presented for each school; Snåsa skole (Figure 8) and Snåsa Montessoriskole (Figure 9).

Snåsa skole
The Cohesive and Open dimensions were valued similarly among the genders.

The girls at Snåsa skole valued the Diverse, Social, Cultural, Serene, Natural and Shelter higher than the boys.

Snåsa Montessoriskole
The Diverse and Social dimensions were valued similarly among the genders.

The boys valued the Open, Serene, Natural and Shelter significantly higher than the girls.

While the girls valued the Cultural dimension significantly higher than the boys, the girls also valued the Cohesive dimension higher than the boys.

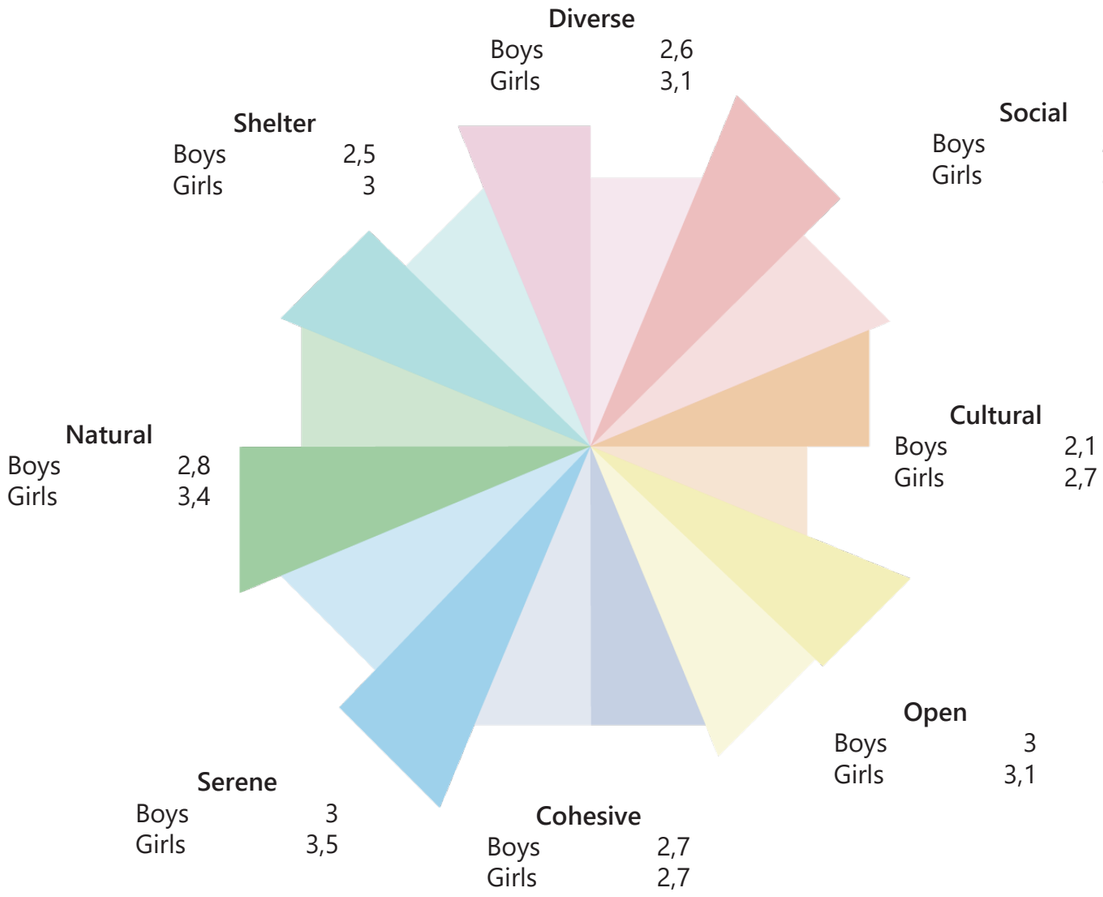


Figure 8. Snåsa skole.

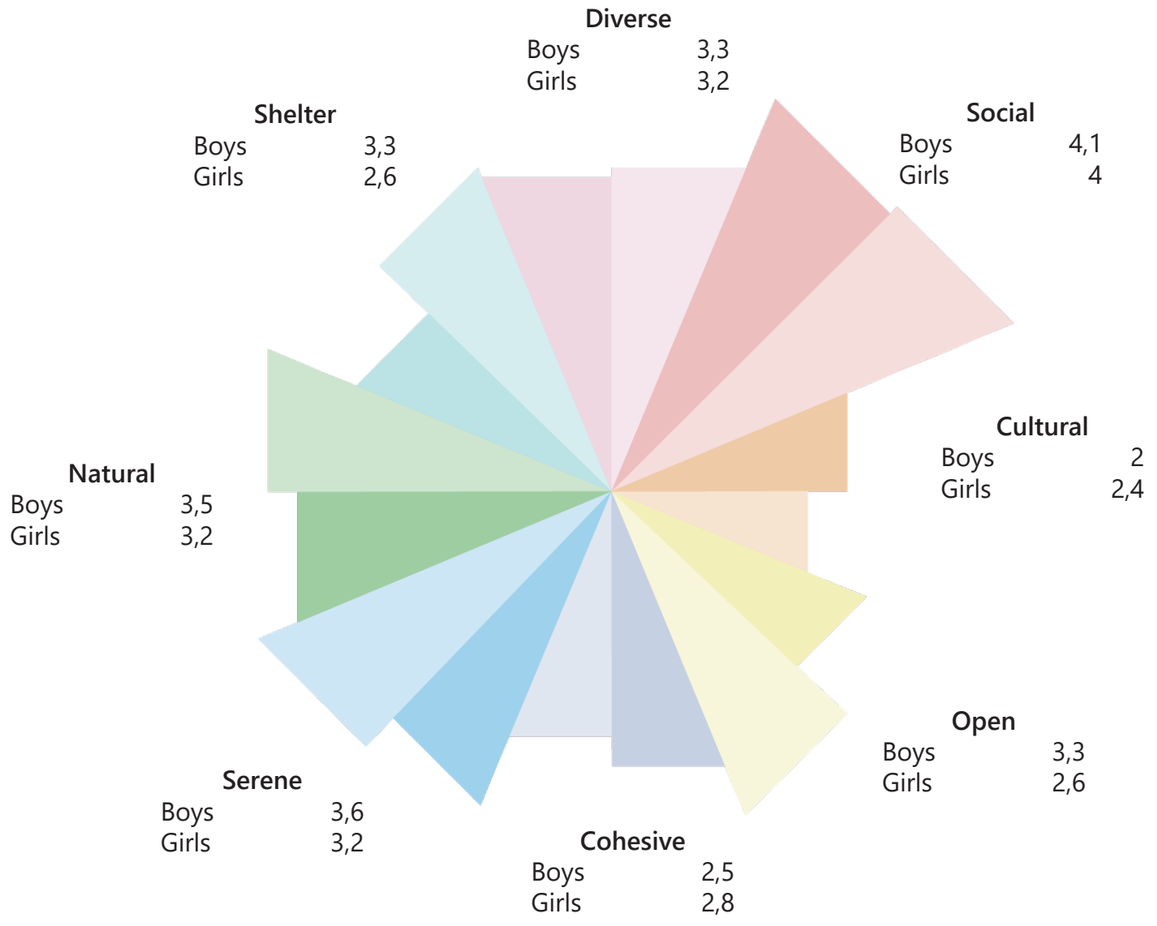


Figure 9. Snåsa Montessoriskole.

Survey

In this part, relevant results from the pupil survey and the teacher and employee survey are presented here, to see all the results from the surveys see Attachment 2 (Pupils' survey) and Attachment 3 (Teacher and employee survey).

Pupils' survey
The results from the survey gave insight on how the pupils value and use their schoolyard, but also some relevant background information.

Most pupils at both schools get to school by bus. Some of the pupils chose multiple alternatives as it depends on the season, and for one of the pupils it depends if she/he is staying with mom or dad.

If a pupil takes the bus, it takes 0-15 min for most pupils at Snåsa skole to get to school one way. As a close second alternative it takes 15-30 min for 9 pupils at Snåsa skole one way. For 3 pupils at Snåsa Montessoriskole it takes 15-30 min, while it takes less for 2 and more for 3 pupils.

At both schools most pupils describe that they spend recess to hang out and talk with their friends. Some pupils say it depends on the weather and mention different activities they do when it is cold outside.

Regarding the question if the length of their recess determines what activities they participate in during recess most of the pupils at both schools said no. At Snåsa Montessoriskole none of the pupils answered yes, which can be explained with them only having one recess per day. While at Snåsa skole it was closer to equal with no as 12 pupils answered yes. One pupil at Snåsa skole answered that during summer the length of recess determined what activities they participated in. At Snåsa Montessoriskole 1 pupil answered that they don't know, 2 pupils answered that they only have one recess, and 1 pupil answered that they don't participate in activities anyway.

Most of the pupils at both schools agreed that the schoolyard is facilitated for the activities they want to participate in. But on average more pupils are happy with the selection of activities which is facilitated for at Snåsa Montessoriskole, as 10/32 at Snåsa skole answers "No", 3/32 answered something else and these answers were "Some", "Need more soccer balls" and "Sometimes". At Snåsa Montessoriskole 0/11 answered "No", but 2/11 answered something else and these answers were "Only 1, volleyball" and "Need more soccer balls".

Most pupils on both schools agreed that the school and schoolyard have enough space for the pupils during recess. Both of the schools have a relatively big schoolyard compared to how many pupils attend the school.

On average, pupils at Snåsa Montessoriskole think the highest and value their schoolyard higher than the pupils at Snåsa skole. Even though the average was very similar, Snåsa Montessoriskole was rated a little higher than Snåsa Skole.

Most pupils at Snåsa skole answered that sharing their schoolyard with younger pupils do not affect their use of the schoolyard. 8 pupils answered it affects their use in a bad way, either because they have to share the elements in the schoolyard with them or because the younger pupils are annoying. One of the pupils from Snåsa skole that answered "Bad", and said (s)he wanted schools to have different zones in the schoolyard to shelter the age groups a bit from each other. The pupils at Snåsa Montessoriskole was on average more negative towards sharing their schoolyard, this could be because the secondary school pupils' designated space in the schoolyard is not sheltered and is often invaded by younger pupils, as mentioned by one pupil in the survey.

Teachers and employees' survey
The results from this survey gave insight in the rules at the different schools, and how the pupils use their schoolyard during recess.

Both schools have a phone ban, and mobile phones are not allowed to use during schooltime, and the pupils' phones are collected at the start of the day, then they get them back once the school day is over. The only exception to the phone ban is if they are needed during lectures. An employee at Snåsa skole mentions that the phone ban can also have an exception for trips, activity days etc.

On both schools most of the participants mention that the pupils hang out and talk during recess, and at both schools the pupils hang right by the entrance to the school building under the roof. At Snåsa skole the ball pit is very popular year-round, but as it is shared with the elementary school pupils there is a schedule where each class has a recess where it is reserved for their use. Because of this, some pupils also play soccer in front of the school on the asphalt slab.

During the warmer months there is a lot more options for activities for the secondary school pupils to participate in at both schools, such as volleyball and table tennis which are especially popular during the warmer months. In the warmer months there are also more places to hang out, such as the grass lawns in the schoolyards which are not used during the colder months.

During the colder months it is mentioned that some pupils at both schools go toboggan riding. At Snåsa skole the pupils have the opportunity to go ice skating, but this is not mentioned as an activity pupils partake in during recess in the colder months. Some days during the winter months, the pupils at Snåsa skole are allowed to be inside during recess – then they have access to the gym hall and can play ball games, table tennis, or just hang out.

Over the years slight changes in the use of the schoolyard have been noticed. At Snåsa skole, one participant in the survey mentioned that when the elementary school was moved down to the secondary school they felt like their territory had been "invaded", as a part of their previous schoolyard area was allocated to the younger pupils. Another participant also mentioned that there is no more skiing

or snowboarding during recess. As the secondary school pupils now must share the ball pit with the elementary school pupils, there has also been a change in how much it is being used by secondary school pupils. At Snåsa Montessoriskole, one participant mentioned that the pupils rather hang out in one bigger group instead of splitting up as much as they did before the deck connected to the school building was built.

When asked about thoughts or ideas on design of the schoolyard, a participant from Snåsa skole mentions the importance of paying attention to creating a schoolyard that invites activities and well-being above thinking of the aesthetic. At Snåsa Montessoriskole, a participant mentions the ongoing process of improving the schoolyard, where they are planning to implement a green house, flower beds, plant boxes, new seating group, fire pit and new paths. One participant also mentions the wish for a school-garden for planting vegetables.

Observations

The results from the observations is presented for each school, and visualized to see the activity level of the pupils (Figure 10 and 11). For the registration I got help from the teachers and employees at both schools to separate the secondary school pupils from the younger pupils. See Attachment 4 for the observation data in the observation form.

Snåsa skole
The observations were done on a Wednesday, where the pupils have elective subjects during the 6th class. Only one elective subject had 6th class that Wednesday, as the other elective subjects chose to save their hours, so they occasionally could have a full day – which led to almost all of the pupils in secondary school going home right after the 5th class. Therefore, results are based on two recesses. For the observations it did not do any difference as they are allowed to be indoors in a social room during the last recess – where they can hang out, play table tennis and watch tv.

Some of the pupils had a habit of trying to sneak in and stay indoors during the two first recesses. This was very visible in the registrations as the number of pupils registered outside during the recess increased as the time passed. The day before I had the observation, the trend of pupils sneaking in and hiding indoors had led to a collective punishment where the pupils had to spend the last recess outdoors as well.

Snåsa Montessoriskole
As the pupils only have one recess at Snåsa Montessoriskole, there is only one recess registered. The trend of sneaking in and hiding indoors was also a trend among the pupils at Snåsa Montessoriskole, and also visible at the registrations with more students registered outdoors as time passed. Two of the secondary school pupils were playing in the toboggan run hill with younger pupils.

Behind and on the eastern side of the building for the elementary school pupils, the schoolyard was a construction site as the building is expanding. This blocked the natural path to the forest in the north-eastern side of the school area, and could potentially keep the pupils from exploring this part of their schoolyard during the observation day.

Both schools
Participating in activities that can be related to the Social dimension was an overall trend at both schools. At Snåsa Montessoriskole most of the activities the pupils were participating in can also be related to the Shelter dimension.

Activity level during recess
The observed activity level among the pupils was higher among the pupils at Snåsa skole than Snåsa Montessoriskole. But there was also a higher number of pupils that had a higher activity level in the second recess than during the first recess at Snåsa skole.

At both schools the boys had a higher activity level than the girls, and at Snåsa Montessoriskole all the girls observed had a low activity level during the recess.

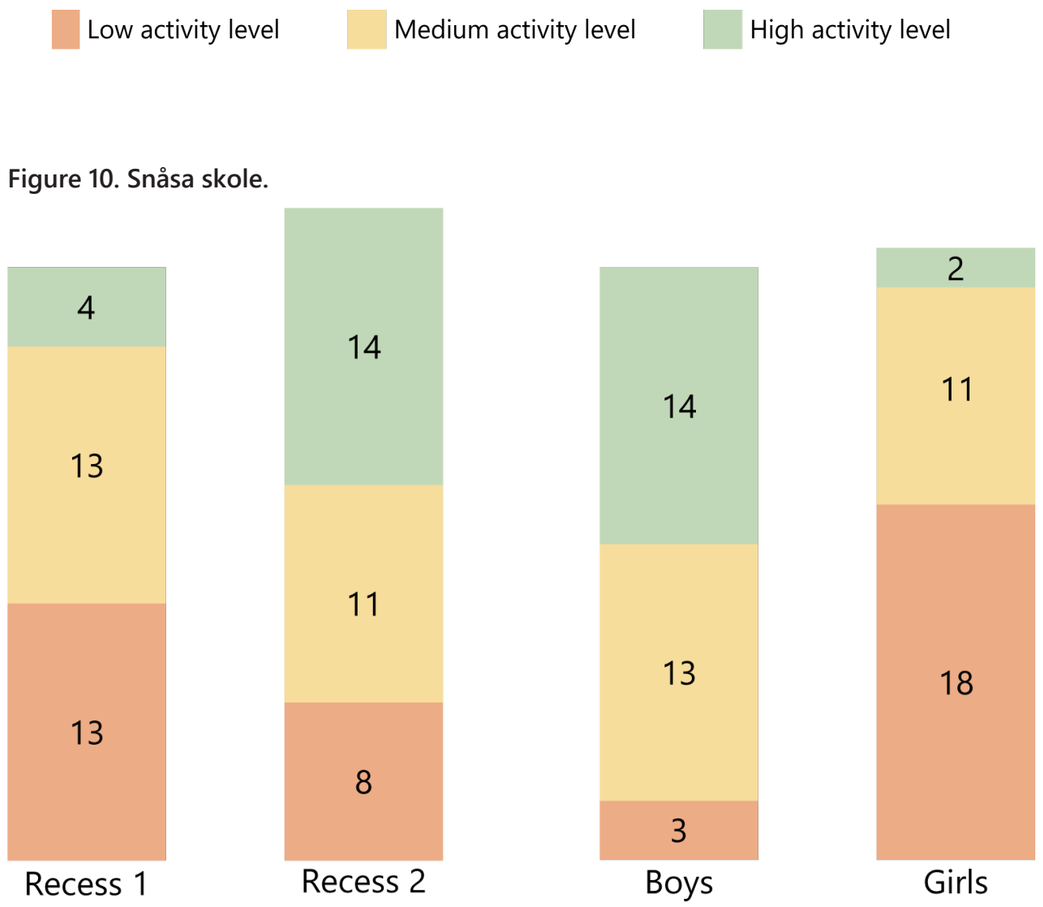


Figure 10. Snåsa skole.

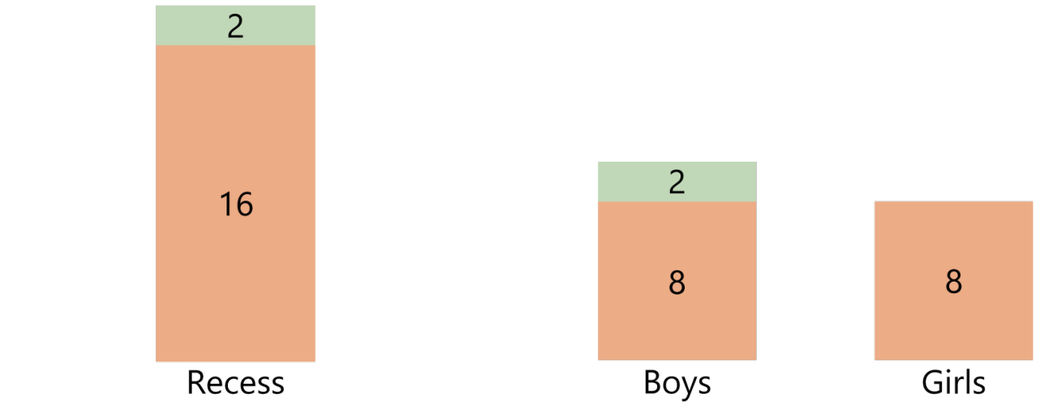


Figure 11. Snåsa Montessoriskole.

Design process

Based on the results from the surveys and observations, I will here interpret and summarize how I can use the results to understand how the pupils want their schoolyard to improve, and how to design a new proposal of the schoolyards that encourage use and physical activity. To connect the results to the design process, I first need to analyse each dimension to understand how I can create a schoolyard where the presence and value of each dimension is balanced and customized to the results gathered through the survey on the PSDs. Figure 12 illustrates if the perceived presence of each dimension has to be increased or decreased to balance the presence to the value at each school.

Diverse dimension
The results from the survey could be understood as the pupils at Snåsa Montessoriskole wants their schoolyard to be more diverse in offering zones for activities, as each of the groundcovers can be associated with more or less specific activities, such as the gravel surface is used for playing danish longball, the grass lawn for hanging out or playing soccer. At Snåsa skole the survey results can be understood as the pupils are satisfied with the presence of the Diverse dimension for now.

Social dimension
For the Social dimension the results can be understood as the pupils at both schools that they express a want to for places to pull back and hide from social interactions, even though schoolyards are spaces built to encourage social interactions, but it could also be interpreted as the pupils want opportunities to engage in social interactions in smaller groups, as the elements mentioned as affected with this dimension are often used by and made for larger groups of pupils to interact. This interpretation is strengthened with the score of presence and value of the Shelter dimension at Snåsa skole. At Snåsa Montessoriskole the value being higher than the presence could express the need for more social zones – which is strengthened with the score of the value of the Open dimension is considerably higher than the presence of the dimension in the schoolyard, as open spaces can be associated with elements that offer social activities (such as a soccer field, volleyball court, grass lawn).

Cultural dimension
At both schools the presence was rated lower than the value but gathering the results from the survey I think it can be balanced more through implementing elements that can be associated with the Sami culture, since the local culture of Snåsa is to embrace the Sami culture as a bilingual municipality. Even though there already is a Sami turf hut in the schoolyard at Snåsa Montessoriskole, it is not placed in the area where the secondary school pupils hang out, and through implementing elements of Sami culture, such as details or colours, in areas where the secondary school pupils hang out at both schools, I think the presence can meet the rated value of the Cultural dimension.

Open dimension
Understanding the pupils' needs from the results of the survey, it seems as the pupils at Snåsa skole are satisfied with the openness of their schoolyard, and the value being higher than the presence of the Shelter dimension could

Figure 12. Necessary adjustments to balance perceieved presence to value at each school.

probably be understood as the schoolyard might feel too open, and that there are not enough places to hide or pull away from the other pupils. Implementing elements to divide the schoolyard at Snåsa skole into zones could slightly diminish the presence of the Open dimension and balance it towards the rated value. At Snåsa Montessoriskole it seems like the pupils want a more open schoolyard, but as the schoolyard is open on the frontside, it could be the pupils are thinking about the other sides of the main school building where there is dense vegetation. Opening some of this dense vegetation could create spaces that feel more inviting and encourage them to explore this part of the schoolyard, which only a few pupils during the observation were observed in, and through this balance the rated presence to the rated value.

Cohesive dimension
The Cohesive dimension might be one of the dimensions the pupils found harder to grasp, as it can seem slightly too abstract for some pupils, and this could be why the results on the rating on the presence and the value from the survey are similar. If there was a more obvious cohesive structure in or throughout the schoolyards or one of the schoolyards the results could probably be looking different and would maybe say more about how to use the cohesive dimension to design a schoolyard that meets secondary school pupils needs to (subconsciously) encourage physical activity.

Serene dimension
As the Serene dimension is more abstract than some of the other dimensions, such as the Cohesive dimension, the results can be different if the pupils understood the dimension in different ways. But the difference is that the results for the Serene dimension from the survey can be understood as a need

for the feeling the Serene dimension can create in both schoolyards. At both schools the lower variety in elements associated with the Serene dimension in their schoolyard can be an indication that the dimension is more about an experience, and it could make it hard for the pupils to see how or if elements in their schoolyard could be associated to the Serene dimension. The mentioned elements in the schoolyard by the pupils seem to be places where they can hide, relax or get the needed space from younger or same age pupils, but it could be reasonable to understand it as needing to pull away from younger pupils as they have mentioned places that are reserved for the secondary school pupils in schoolyards that are shared with elementary school pupils. Perhaps a stronger sense of division that focuses on both age and activity level could provide spaces and elements that highlight the feeling and experience of the Serene dimension and help balance the rated presence to the rated value.

Natural dimension
The Natural dimension scores relatively high in both presence and value at both schools, these results can be understood as the pupils are happy with the perceived presence of the Natural dimension, and as for their rating it would still be fine if there was a little less also. But gathering these results, implementing elements that are associated with other dimensions could maybe decrease the perception of the Natural dimension, but then balance the presence towards the value of the dimension.

Shelter dimension
Because the weather can be cold or rainy for a longer period of the schoolyear, the need for enough shelter for the pupils seems important for the pupils, as the presence is rated lower than the value. In both schoolyards there is one roof at each school to stand under and seek shelter from weather, these shelters are connected to the school buildings. When I visited the schools, quite a few pupils at both schools where either standing under the roof or next to one of the buildings to seek shelter as it was a cold the days when the observations were completed. But there were also pupils playing soccer, but if it was raining it is possible that these pupils also would be standing under the roof instead of playing soccer. To balance the presence to the value, implementing more shelter throughout the schoolyards can encourage the pupils to use more of their schoolyards, and through this have a higher activity level than the current level recorded during the observations.

05 Design proposals

Design proposal - Snåsa skole

Snåsa skole's current schoolyard has a good existing potential to offer activities for pupils in secondary school, but the potential has not been used with how the schoolyard is shaped right now. The schoolyard is big and has more than enough space to facilitate the schoolyard to meet the needs for the secondary school pupils expressed through the PSD analysis. The results from the survey and observations led to reflections and ideas on how to improve the current schoolyard, and to balance the presence to the value of each dimension to suggest a new conceptual design proposal for the schoolyard that encourages use and physical activity between the secondary school pupils.

The plan drawing in Figure 13 shows the conceptual proposal designed with the results from the method.

To slightly diminish the presence of the **Open dimension,** more trees are planted to create and enhance rooms or zones in the schoolyard, and in the designated area for secondary school pupils' trees are specifically planted to hide containers for trash and to further separate the younger pupils and enhance the feeling of the possibility to hide or pull away without being watched. As the the opportunity to hide or pull away from other pupils is increased through the planted trees, the presence of the **Social dimension** can be adjusted closer to the expressed value of the dimension from the survey, as the schoolyard is broken up into zones and allows for smaller groups to not be disturbed by other pupils as they are able to pull away. The increased amount of trees can also provide and enhance the presence of the **Shelter dimension**, and with more trees in the designated area it can make it more appealing to hang out there during the colder months as they can seek shelter from the wind between the buildings and the trees.

To increase the interest in utilizing the designated area for the secondary school pupils, a double swing is implemented to highlight the view of Snåsavatnet and the Viosen area and marina, while creating a space for a smaller group of pupils to socialize and enjoy the view (Figure 14). The placement of the swings can increase the use of the the older pupils designated area it, as it is possible to reach it from two entrances from the school where the secondary school has classes. As there are two ways to reach the swing from the school building, it could increase the use during winter as for now the designated area has not been cleaned from snow and made more unreachable for the pupils as most of them does not want to get wet on their feet, and one of the entrances is only around 13 meters from the swing and could make it more reachable as the pupils do not have to walk approximately 45 meters from the main entrance to the designated area through snow to the swing. As it is more reachable, more pupils can utilize the area and the swing which can in the winter lead to paths in the snow throughout the designated area which can lead to more pupils using and moving throughout the designated area for the secondary school pupils in the schoolyard.

Figure 13. The conceptual proposal for a new schoolyard. The current schoolyard is in the background in greyscale, and the implemented elements are highlighted. The area designated for the secondary school pupils is highlighted in blue. The arrows are the entrances to the school buildings, and the dashed line with an arrow shows the existing path to the Viosen area.

Through highlighting the view to the Viosen area and marina from the designated area with the swing, the **Cohesive dimension** could appear more present, as a natural sightline connecting the schoolyard to the Viosen area is a connection that could be more apparent than it is right now. The Viosen area is often used by the school for different occasions such as in the last days before summer vacation where the pupils are allowed to go swimming, or special days such as the yearly orientation-day, but most often the sports arena with opportunities for track and field, soccer and volleyball etc. is used during physical education classes. As the swing is placed in the outer part of the designated area for the secondary school pupils, and with some new planted trees around, the swing could help strengthen the presence of the **Serene dimension**, as one can pull away from younger and same age pupils as there will be a stronger boundary with the trees between the zones and designated areas.

To further strengthen the **Cohesive dimension** and the connection to the Viosen area and marina, an amphitheatre is implemented to build upon and strengthen the connection and the already existing path that leads down to Viosen while creating a social space that could be used in smaller or bigger groups, or for a day where the weather is nice and the class could happen outside, or during physical education class to execute specific exercises or as a meeting point for the teacher and pupils. The amphitheatre will connection the path to Viosen and the entrance to the school building in the designated area of the schoolyard, this connection will create a shortcut for pupils walking to and from the school from Viosen. During the school year both younger and older pupils walk to school from and to the Viosen area each day, and if the amphitheatre gets used as a shortcut for some pupils, the snow could be kept low and stepped down during winter to make paths through the designated area for secondary school pupils and through this make the designated area more accessible during the winter, when the snow can be deep.

As the **Diverse** and **Natural dimensions** were rated with a lower value than presence in the schoolyard at Snåsa skole, there is no specific implementations that are carried out in specific relation to increase the presence of the dimensions. With new implementations in relation to other dimensions, it could decrease the perceived presence of the **Diverse** and **Natural dimension**, and therefore there will be no specific changes to decrease the perceived presence of the dimensions either.

To enhance the presence of the **Cultural dimension** and give the pupils a stronger ownership of their designated area, the pupils at Snåsa skole are invited to create a mural inspired of the local values and culture of Snåsa through their arts and crafts class. The goal of the mural is to represent the people in Snåsa, but also connected to the values described on Snåsa municipality's website: "Genuine, generous and courageous" (Snåsa kommune, 2023). As hunting, fishing, hiking and skiing is a big part of the local culture, the mural could possibly highlight these activities and connect them through an outline of the mountain chain in the Blåfjella-Skjækerfjella national park. Some of the Sami

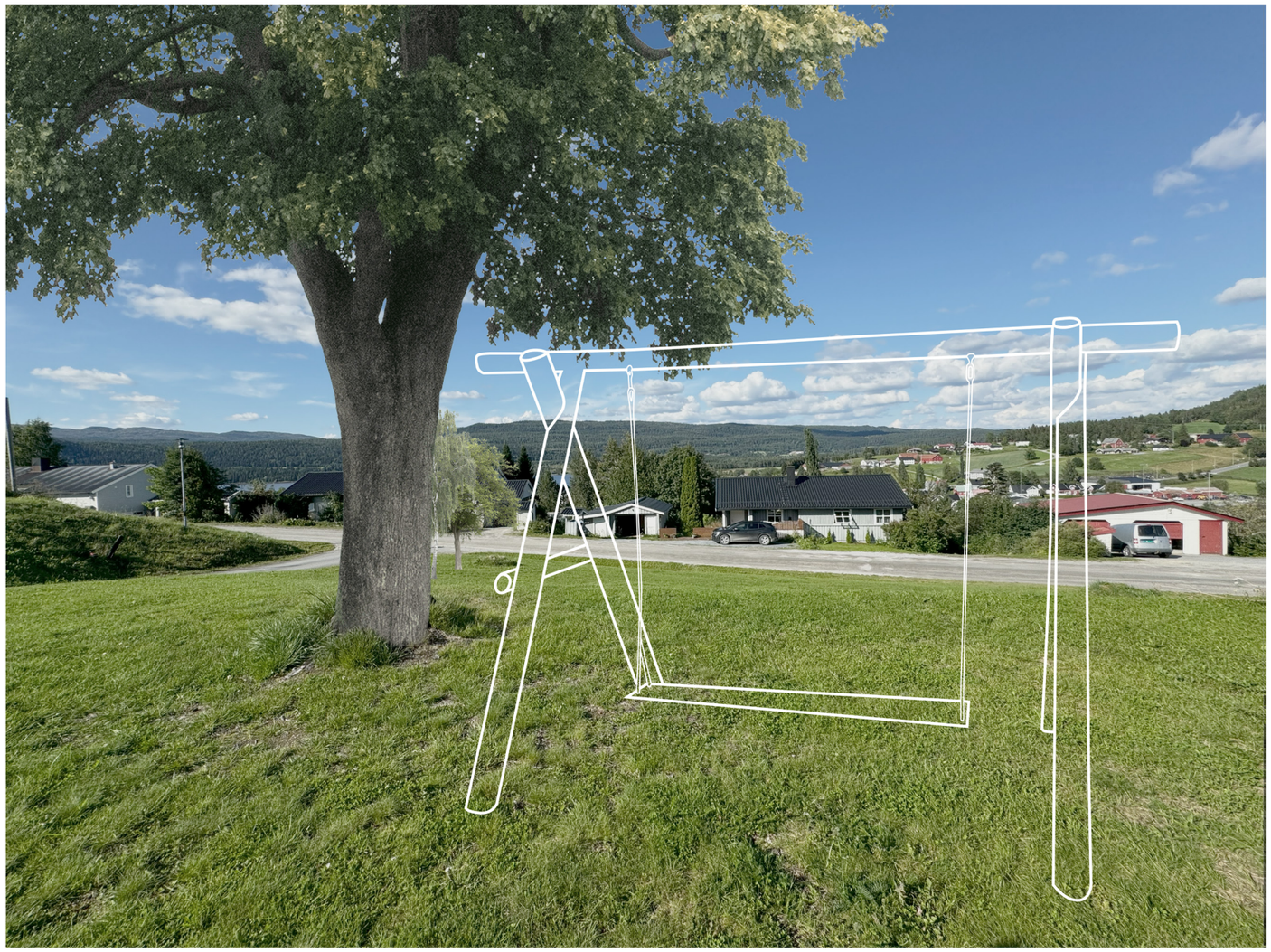


Figure 14. A visuaization of the double swing and how it connects to the Viosen area, the swing is implemented in the designated area for the secondary school pupils to offer the possibility to hang out in smaller groups.

population in Snåsa keeps their reindeers in this national park, which also makes it natural to bring this into the mural as the Sami culture is a central part of the culture in Snåsa as well. The mural will contribute in balancing the perceived presence of the **Cultural dimension** to the value, but also bring some color into the schoolyard, which was called for by a pupil when asked for ideas for their schoolyard. However, most importantly it has the potential to strengthen the ownership and hopefully encourage the pupils to utilize this area as it is a place where they can pull away from younger pupils – which also was requested in the survey. The designated area for the secondary school pupils already consists of a table tennis table, and during the warmer months it is possible to play volleyball on the grass. This area is however not used much during the colder months, which means that a stronger ownership to the area also could increase the interest in using it in the colder months, and maybe lead to pupils' physical activity by playing table tennis during the colder months as well.

As the results from the survey on the **Social dimension** expressed that the pupils wanted opportunities to engage in social interactions in smaller groups, as most elements mentioned are connected to being used and made for larger groups to interact, such as the ball pit or the large and open asphalt slab placed centrally in the schoolyard connecting the entrance to the secondary school and the elementary school. To encourage social interactions in smaller groups a small gravel path throughout the outer edges of the schoolyard is implemented. As the path is not too wide, it will be more appealing to walk in smaller groups as if the group is too large, they will have to walk in a long line instead of walking and interacting closely in a small group. With the path following the outer edges of the schoolyard, it leads the pupils through the forest in the south-western part of the schoolyard, in the forest a small wind-shelter (gapahuk, see Figure 15) is placed to further encourage the interactions between smaller groups, and to further meet the needs expressed in the survey on the **Social dimension**. This wind-shelter will encourage pupils to explore the schoolyard while giving them a space to socialize and shelter from weather, which can make the gravel path more appealing throughout the whole year, while also increasing the presence of the **Shelter dimension**.

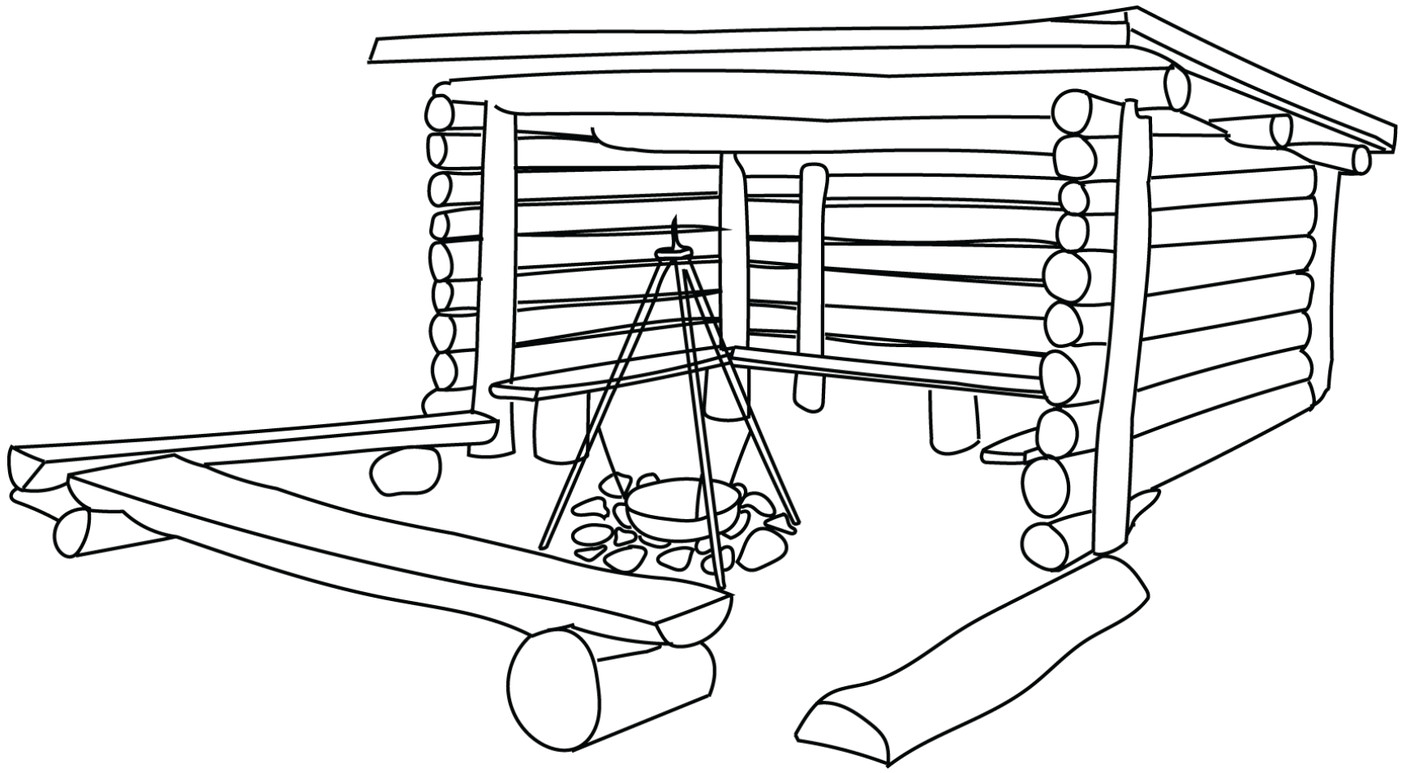


Figure 15. A sketch of the gapahuk and the connecting fireplace placed in the forest in the higher part of the schoolyard. The gapahuk is reached through the path implemented to encourage the pupils to explore further parts of their schoolyard.

Design proposal - Snåsa Montessoriskole

Snåsa Montessoriskole's current schoolyard has a lot of empty space where one arrives when walking to the school in front of the buildings. Behind the school buildings and on both sides of the main building there is forest with some larger glades that has a huge potential to be used to offer activities or elements that can encourage the secondary school pupils to further explore and use their schoolyard. In today's schoolyard the only element specifically for the secondary school pupils is their balcony connected to their school building, and as it is connected to their school building the pupils are not encouraged to explore and expand their reach in the schoolyard during recess. The area of the schoolyard designated for the older pupils does not contain anything except for a small hill up towards the car road that goes by the school, and this area is used for storing snow during the winter which makes it not very accessible for older pupils not wearing proper clothes to play in the snow during recess, and therefore becomes more attractive for the younger elementary school pupils that who wants to use the pile of snow to build caves in. Because of this, the older pupils' space can be thought of as invaded, and since they do not use it, it can feel hard to claim this part of the schoolyard.

The plan drawing in Figure 16 highlights the entrances to the school buildings, the designated area for secondary school pupils, and the proposed elements and the placement of them.

To enhance the presence of the **Serene** and **Shelter dimensions** a wind shelter is implemented in the western part of the schoolyard. This wind shelter is built by the secondary school pupils who are taking a course called "work-course" that pupils who are interested in becoming a carpenter, mechanic, electrician, plumber etc. can take instead of learning a third language. The balcony connected to their school building was also built by the pupils taking this course, and I believe if these pupils build the wind shelter they will also be able to take ownership of it and the younger pupils will have a higher understanding that it belongs to the older pupils even though it is placed in the part of the schoolyard where most of the elementary school pupils spend recess in. This placement could also make this part of the schoolyard feel more accessible for the secondary school pupils. To further enhance the presence of the **Cultural dimension** the wind shelter is decorated with Sami symbols to further connect the local culture in Snåsa to the schoolyard.

To encourage the secondary school pupils to claim their designated area a zip-line is implemented, as it was requested by some pupils in the survey where the pupils were asked if they had any ideas or thoughts for the suggested new schoolyard design. To make sure the zip-line and the designated area is not claimed by the younger elementary school pupils, the seat on the zip-line is raised high enough to make it difficult for the youngest pupils to use it. Some trees are also planted to shelter this area from the big open room in front of the school buildings, even though this can enhance the presence of the **Natural dimension**, it can also participate in slightly diminish the presence of the **Cohesive dimension** through breaking the schoolyard up in zones.

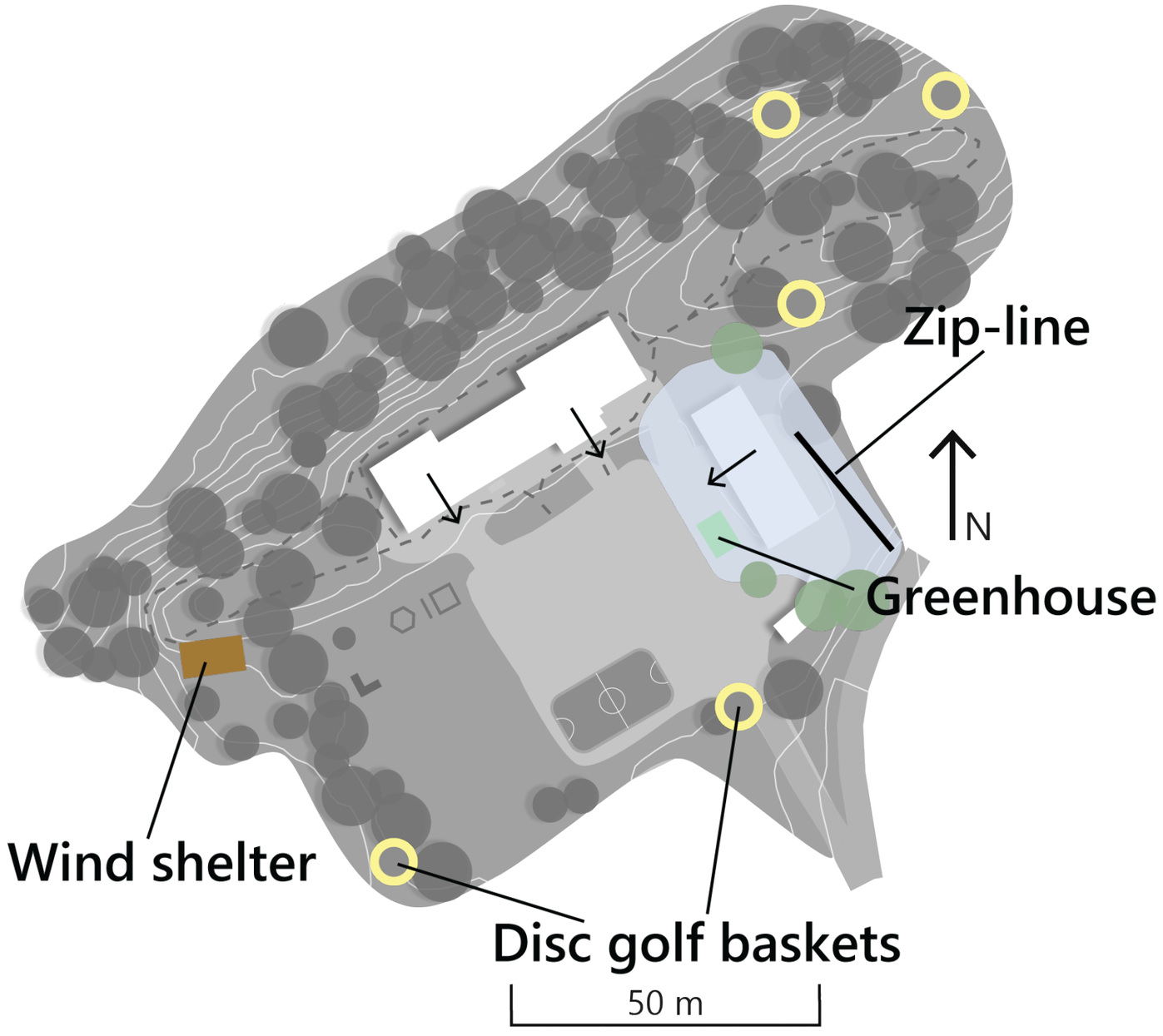


Figure 16. The conceptual proposal for a new schoolyard. The current schoolyard is in the background in greyscale, and the implemented elements are highlighted. The area designated for the secondary school pupils is highlighted in blue. The arrows are the entrances to the school buildings.

To balance the perceived presence of the **Diverse dimension** to the rated value, a greenhouse with the possibility of growing plants or food is implemented in the designated area for the secondary school pupils. The possibility to grow foods was mentioned by both a pupil and a teacher or employee in the surveys. The green house could be used for learning, and to grow food for their food and health class, and can either be maintained through this class or by pupils who have an extra interest for the field during recess As the green house provides shelter, it enhances the presence of the **Shelter dimension**, but planting in the greenhouse can also enhance the presence of the feeling the **Serene dimension** provides.

To encourage the pupils to explore their schoolyard while encouraging the pupils to have a higher activity level during recess a disc golf trail is implemented throughout the schoolyard (Figure 17). Most of the baskets are centred around the eastern part of the schoolyard as it is closer to the secondary school building and to avoid discs flying towards younger pupils. The trail consists of 5 baskets around the schoolyard, and will hopefully be an element that appeals to the secondary school pupils as it is a low threshold activity that all pupils can do and feel the feeling of mastery through participating in. Through implementing the disc golf track some of the vegetation around the schoolyard will have to be cut down, and more glades will appear throughout the forested part of the schoolyard, which can enhance the presence of the **Open dimension**, which was highly valued in the survey on the PSDs. The decrease in the vegetation in the schoolyard could possibly decrease the perception of the **Cohesive** and **Natural dimensions** and balance it towards the value expressed in the survey. Even if the disc golf trail pulls the pupils into the schoolyard, which could enhance the perception of the **Natural dimension**, it could possibly make the pupils perceive how diverse their schoolyard is and contribute to balance the value and presence of the **Diverse dimension** as the pupils move more throughout their schoolyard. Disc golf is an activity that can be done in preferably smaller groups, which could cover a need expressed in the survey in the **Social dimension** as the schoolyard today does not offer activities to be done in smaller groups specifically for the secondary school pupils.

Figure 17. Example of how the disc golf baskets will look in the schoolyard.

06 Discussion

Discussion

The aim of this project was to study if it is possible to use the PSDs as an analysing tool in the design process of improving schoolyards to meet the needs of secondary school pupils to further encourage both use and physical activity. This was pursued using the PSDs as a measuring tool to gather data to see how the pupils felt about their schoolyard, and what they were missing, but also through systematically analysing the data using the PSDs. The conceptual design proposals of the new schoolyards aimed to balance the presence and value of each of the PSDs, while reflecting around the survey and observation results to improve the schoolyards.

While creating the conceptual design proposals based on the results from the surveys and observations, it became clear that the data gathered might be too vague to say with certainty that this would increase the secondary school pupils use and physical activity during the school day, as some of the PSDs are too abstract for the pupils to reflect upon. For some of the dimensions it was hard to gather a clear idea of how this would encourage the pupils to explore their schoolyard, especially for the Cohesive and the Serene dimensions as these are quite abstract. Even though I presented the Perceived sensory dimensions to the pupils before they participated in the survey, it seemed like some of the dimensions were hard to reflect around, and it also seemed like some of the dimensions did not feel very "relevant" in the pupil's idea of what a schoolyard consists of, such as the Cultural, the Cohesive and the Serene dimensions.

In the design process of the conceptual design proposal, I used Raumgeschehen (Seggern, 2019) as a process to intertwine different types of data gathered through the mixed-method study. The goal was to balance the perceived presence to the value of each PSD to improve the current schoolyard. At the same time, the survey and the observation data shaped the design process of creating a schoolyard that encourages use and physical activity. As it is a hypothetical study, it is hard to know if the new conceptual schoolyard designs will increase the activity level of the pupils. Below are some reflections on how each of the conceptual design proposals possibly could change the pupils' use of the schoolyards during recess.

Snåsa skole

Through implementing the elements, I am adjusting the schoolyard to balance the value and presence of each dimension to the PSD ratings from the pupils, and to specifically encourage use of the secondary school pupil's designated area in the schoolyard. As the new suggested schoolyard is a conceptual proposal, it is hard to know if the pupils actually would use their schoolyard in a higher degree. Through further enhancing the zones between the younger elementary pupils and the secondary school pupils, one can however assume that if the schoolyard was more facilitated towards the secondary school pupils it could encourage them to explore and use the schoolyard more – which could increase the activity level among the secondary school pupils who are not playing soccer or participating in other activities during recess.

The implemented elements are placed in areas that are not used during the colder months, as this is the hardest time to motivate the pupils to go outside, and therefore the placement of the elements is strategically chosen to expand the schoolyard for the secondary school pupils during the colder months. Preferably, the snow would be removed by machines. If not (like today), as more pupils move through the designated area while there is snow, paths could appear in the snow which makes it more accessible for pupils to use this area during winter. Placing the gapahuk in the forest above the schoolyard will hopefully pull the pupils up to it during the colder months as it provides better shelter from weather than the entrance area they are currently hiding from the weather in, and as it offers a place to sit together in a bigger group, it could make the pupils seek out to the gapahuk in groups. This is a low-threshold way to encourage the pupils who were hanging out under the roof next to the entrance to be more physically active than some of the pupils were during the day the observations were completed. I am hoping that the gapahuk especially will pull the girls out further into the schoolyard as during the observation there was a clear divide in the activity level between the girls and the boys, with the girls not being as physically active as the boys. As the girls at Snåsa skole rated the **Shelter**, **Diverse**, **Natural**, **Serene**, **Cultural** and **Social dimensions** higher the gapahuk can enhance the presence of multiple of these dimensions through offering shelter (**Shelter** and **Serene dimensions**), getting to the gapahuk on a path through the forest (**Diverse**, **Natural** and **Serene dimensions**), and hopefully pull the pupils, and especially the girls into the social atmosphere of hanging out in the gapahuk (**Social dimension**). In the survey for Snåsa skole multiple pupils mentioned the want for somewhere to sit below roof with friends, and therefore I am hoping that the gapahuk will fulfil this wish and encourage the pupils to further use the schoolyard. As the gapahuk also has a fireplace it can increase the interest in using the schoolyard outside of school time for both the secondary school pupils and the local inhabitants in Snåsa.

The double swing offers the possibility to hang out in a smaller group and pull away in smaller groups and away from the younger pupils as the designated area for the older pupils are further separated in the new suggested schoolyard through vegetation, which also was something expressed in the survey where the pupils were asked if they had any thoughts or ideas on design for their schoolyard.

The implemented vegetation is planted to enhance zones in the schoolyard, to separate the elementary school pupils and the secondary school pupils. Some pupils mentioned in the survey when asked how sharing the schoolyard affected their use that they wanted their area to be sheltered a bit more from the younger pupils. Therefore, in the designated area for the secondary school pupils more trees are planted towards the road that already separates the designated area from the rest of the schoolyard. In the front of the schoolyard some trees are

planted to enhance some more separation, but as it often is used for bigger events such as celebrating the 17th of May or during gym class to play danish long ball not too many trees can be planted there.

With the implemented elements in the schoolyard, I am hoping that the pupils will be encouraged to explore their schoolyard and look more forward to being outside and not try to sneak inside during recess, especially during the colder months as they have the possibility to use their designated area or walk to the Gapahuk to hide from the weather. I am specifically hoping that the suggested design for the schoolyard could encourage the pupils that usually just stand right outside the entrance to feel included and that their needs are met.

Snåsa Montessoriskole

To adjust the perceived presence of each dimension to the value rated by the pupils, I am choosing to implement a wind shelter, a zip-line, a greenhouse and a disc golf course. The implemented elements are centred around the secondary school pupils designated area and the outer edges of the schoolyard. This is to pull the pupils further into the schoolyard and give them activities to participate in both in the designated area and the areas they share with the younger elementary school pupils. The implemented elements focus on offering activities that have a low threshold to participate in, as I believe this is important to succeed in encouraging the pupils with a low activity level during recess. One can think that pupils who already have a higher level of activity during recess, already have their needs met to be active during recess – which is why the implemented elements are more facilitated to offer activities with a low threshold.

During the winter quite a bit of snow is moved away from the open gravel surface in the schoolyard, and this snow is placed in the designated area for the secondary schools which leads to younger pupils "invading" their area to build caves in the snow piles. But with the implementation of the zip-line and the greenhouse in the designated area, the snow has to be placed in other areas which can give the secondary school pupils more ownership of their designated area as it might not be as invaded by the younger pupils as in the current schoolyard.

Overall, the activity level recorded in the observation at Snåsa Montessoriskole was very low, and only 2 of 18 pupils were observed participating in an activity with a high activity level, and the other 16 were only observed participating in activities with a low activity level. So hopefully the placement of the implemented elements will change this, and encourage them to be more active as they can use the zip-line or work in the greenhouse in their designated area surrounding the secondary school building, or create more movement in the outer edges of the schoolyard. They would be more active just walking to the wind shelter than just standing around or hanging out right outside the entrance to their building. The placement of the baskets in the disc golf course is also placed strategically in the outer edges of the schoolyard to encourage the pupils to explore their schoolyard, and to make the wind shelter more accessible as the pupils already are in this area when they do the course.

During the observations, all the girls at Snåsa Montessoriskole had a low activity level in the recess, but they rated the Cultural and Cohesive dimensions higher than the boys. With the placement of the implemented elements, the perceived presence of the Cohesive dimension could possibly be increased as the whole schoolyard is more "accessible", and because these elements are implemented and facilitated for the secondary school pupils. This could possibly create a higher perception of a cohesive schoolyard. The implementations connected to the Cultural dimension is the wind shelter, that will have details connected to the Sami culture, and this will hopefully create some more interest to explore the wind shelter for the girls.

With these implementations I think more of the secondary school pupils will use their schoolyard, and through offering low-threshold activities, more pupils will have a higher activity level during recess. In the current schoolyard the only elements specifically for the secondary school pupils is the balcony connected to their school building, where there is a table tennis table. Through offering activities specifically for and facilitated for the secondary school pupils throughout the schoolyard, more pupils could be more active during recess.

Small differences can have great impact

The pupils who answer that they play soccer or volleyball during recess are not the pupils meant to be reached in the design proposal. The pupils who answer that they try to sneak inside or only talk to their friends during recess are the main target group that could become more physically active if activities with a lower threshold were offered in the schoolyard. These could be the pupils who do not feel so confident or comfortable joining the pupils who play ball sports, but the pupils who wants activities that they feel like they cannot "make a fool out of themselves" in – such as the implemented elements in the proposals.

Most of the suggested implemented elements are maybe not going to encourage enough physical activity to make the pupils meet the recommendation of 60 minutes of moderate-to-high intensity with physical activity each day, but research shows that if the general amount of moderate-to-high intensity physical activity among 15-years-olds increase with only 10 minutes each day, the number of 15-year-olds that meet the recommendation from The Norwegian Directorate of Health of 60 minutes of moderate to high intensity physical activity each day will increase from 46% to 65% (Helsedirektoratet, 2019; Steene-Johannessen et al., 2019). This clearly shows that a small difference can have a great impact in the society, and that schoolyards as an arena where the pupils spend a lot of time possibly could contribute through facilitating for a space where pupils in secondary school feel encouraged to use it and be physically active.

Method critique
In this study I used a mixed-method study to gather data for the design process with the Perceived sensory dimensions as a basis. When I first was introduced to the PSDs in the course People and Environment, I found them interesting as an approach to measure how people perceive a landscape or place. The mixed-method study included a pilot study, survey for pupils, survey for teachers and employees and observations at both schools.

The analysis of the survey data showed that the pupils found it hard to understand the different PSD dimensions, or to see the dimension in relation to their schoolyard, such as the Sami turfhut in Snåsa Montessoriskole's schoolyard only being mentioned by one pupil in relation to the Cultural dimension. After interpreting the results from the survey, the findings give a better understanding of the needs for some of the dimensions, such as the Diverse, the Social, the Open and the Shelter dimensions. Other dimensions are more abstract (such as the Cohesive and Serene dimensions), and this could lead to the pupils interpreting the dimensions different from each other – and not creating a clear indication of how the schoolyard can be improved.

The observations were a good way to get an understanding of the current situation during recess at the schools. The teacher and employee survey did however generate similar data as the observations, which makes the observations less valuable. The teacher and employee survey gave a better insight of the current situation throughout the different seasons, and not just during the winter (more specifically; one winter day).

To work against the disadvantages of the method I went by all the classes while I was visiting the schools for observations and had a short introduction to the project and described the method with a PowerPoint-presentation where I introduced all the PSDs to give them an understanding before answering the survey. In addition, to work against the disadvantages of the method, the extra questions in the survey concerning what the pupils like and dislike about their schoolyard, proved to be valuable. These questions were easy to understand for the pupils.

Using the Perceived sensory dimensions as an analysing tool in the design process has been challenging, as one never knows exactly how each pupil interprets and perceives each dimension, even after explaining the dimensions to the pupils. While I was explaining the dimensions I tried to engage a discussion of how each of them relates to their schoolyard. The pupils did not engage in the discussion, but the teachers helped out and came with examples to relate the dimensions to the schoolyard. The results from the survey still show that the pupils still interpret the dimensions differently, and in some dimensions this is more obvious than in others. Because of the different interpretations of each of the dimensions, the results need to be interpreted and discussed to find an understanding on how each of the schoolyards can be improved.
However, the pilot survey was a great help to see how to avoid some of the misunderstandings, and proved the importance of presenting each dimension to the pupils before the survey was carried out to give them a higher understanding of what each of the dimensions represented and hopefully make them reflect on how the dimensions are associated to their schoolyard.

Working with the schools I attended during my upbringing; I initially approached the study with opinions and ideas on how both the schoolyards could be improved. Being familiar with the local culture in Snåsa, the opinions and ideas are somewhat biased when creating something for the local community. However, working with the design process with data collected through surveys and observations using the PSDs as a tool of measurement, challenged me to take a step back and identify opportunities that I might not would have found otherwise.

Through the observations, it was revealed that the culture of hanging out in the entrance area during recess has not changed since I was a pupil at Snåsa skole, which could indicate that the school has not been able to change this culture on its own. This motivated me to approach the project open-minded while allowing for a different perspective through the method, and was part of the motivation of choosing to work with the schools in Snåsa to make changes in this culture.

Even though I tried to work against bias, it is possible that the study would differ if I worked with an unfamiliar location and had no personal relationship to the schools or local community.

Initially, the background chapter presented the current situation of a documented increase in daily sedentary time with increasing age among young people in Norway. The Norwegian Directorate of Health has a goal of increasing physical activity among children and teenagers, and a possible solution could be to increase the activity level where they spend their time during the day – kindergarten, school and after-school programs (Helsedirektoratet, 2019). As children and young people spend a lot of their time in school, I wanted to design a schoolyard that encourages use – which would generate more physical activity among the pupils in secondary school. Through the observations during recess at both schools, I got insight into how the pupils use their schoolyard, and the current activity level among the pupils on a cold but nice winter day. This insight was used as a starting point to create spaces to hopefully increase the activity level and expand the facilitated areas and use of the schoolyard for the pupils, to help the pupils reach the aim of an increased activity level - especially during the colder months. The focus of the study is not to make the pupils reach The Norwegian Directorate of Health's recommendation of minimum 60 minutes of moderate to high intensity physical activity daily – but to explore the idea of facilitating the schoolyard for secondary school pupils to encourage use and physical activity during recess.

Conclusion

The main objective of the study was to explore the possibility of using the PSDs as an analysing tool to understand the needs of the pupils in two secondary schools in the design process of designing schoolyards to encourage use and physical activity. The two secondary schools in Snåsa municipality (Snåsa skole and Snåsa Montessoriskole) participated in the study, and the pupils answered a survey based on the PSDs, their use of the schoolyard and what they like about their schoolyard. The pupils were observed for one day to get an understanding of the current use of the schoolyard during recess (which activities the pupils participate in and their activity level, which was related to the PSDs). The teachers and employees at the schools were invited to participate in a survey, the results gave valuable insight, especially on the year-round use of the schoolyard.

Using the PSDs as an analysing tool in the design process, the rated perceived presence was attempted balanced to the value of each dimension, to create the conceptual design proposal for each schoolyard that encourages use and physical activity. Findings from the surveys and observations were considered in the design process.

To conclude, the PSD analysis gave a lot of relevant insight for the design process, but it also made it clear that the dimensions were a bit too abstract for the young target group as they interpreted some of the dimensions differently. In addition, the PSDs were not ideal for the design process when aiming to create a schoolyard that encourages physical activity, as the dimensions do not take physical activity into consideration in the perception of the dimensions. To use the PSDs as a tool for schoolyard design that focus on physical activity, it is necessary to further develop the theory. However, the PSDs were useful as an analysing tool to get insight on the perceived presence and value of the different dimensions, which was very helpful in the design process when trying to balance the presence to the rated value.

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08 Attachments

Attachment 1. Informed consent form

Pupils

Samtykke for behandling av personopplysninger i forskningsprosjekt

Vil du delta i forskningsprosjektet

”Design av skolegårder”?

Dette er en forespørsel til deg/ungdomsskoleeleven din om å delta i et forskningsprosjekt hvor formålet er å lage en veileder på hvordan skolegårder for ungdomsskoleelever kan/bør designes for å skape en mer inviterende skolegård som oppmuntrer til bruk og fysisk aktivitet. I dette skrivet gir vi deg som deltager/forelder informasjon om målene for prosjektet, og hva deltakelse vil innebære.

Formål
Formålet med prosjektet er å undersøke hvordan vi kan tilrettelegge for at skolegården oppfordrer til bruk og fysisk aktivitet gjennom design og planløsning. Hvordan påvirker plassering/utvalg av forskjellige elementer i skolegården hvordan den blir brukt? Hvordan kan vi designe skolegårder som oppmuntrer til bruk og fysisk aktivitet?

Lærere ved skolene får også utsendt en kort undersøkelse hvor spørsmålene omhandler trender til aktivitet i friminutt hos elevene. Endrer aktiviteter elevene gjør med endringer i skolegården? Er det forskjell på friminutt hvor ungdomsskoleelevene ikke deler friminutt med yngre elever fra når de gjør det?

Undersøkelsen gjøres i forbindelse med en masteroppgave i Landskapsarkitektur hos Sveriges Lantbruksuniversitet.

Eleven din er invitert til å delta da studien ser på hva ungdomsskoleelever på Snåsa Skole og Snåsa Montessoriskole synes om sine skolegårder.

Hva innebærer det å delta?
For eleven din innebærer deltakelse å fylle ut et digitalt spørreskjema som tar ca. 10-15 minutter.

Data som samles inn om eleven din er:
- Hvilken skole eleven din går på
- Hvilken klasse eleven din går i
- Kjønn
- Hvordan eleven din kommer seg til skolen
- Hva eleven din gjør i friminutter
- Hvor aktiv eleven din er daglig

Hvis du som deltager eller foresatt ønsker å se spørreskjema i forhånd av deltakelse, ta kontakt med meg på ilhg0001@stud.slu.se

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle data om eleven vil da bli sletta. Det vil ikke ha noen negative konsekvenser for eleven din hvis hen ikke vil delta eller senere velger å trekke seg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Data fra eleven din vil kun brukes til formålene beskrevet i dette skrivet. Data behandles konfidensielt og i samsvar med personvernregelverket.

Jeg og veilederen min er de eneste som kommer til å ha tilgang til innsamlet data, og data lagres på serveren til Sveriges Lantbruksuniversitet.

Eleven din vil ikke kunne gjenkjennes i ferdig publikasjon. Enkelte sitater kan bli publisert, men disse skal ikke avsløre hvem som står bak. Presentasjon av innsamlet data vil være i form av statistikk eller figurer som illustrerer helheten av svaret.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Prosjektet skal etter planen avsluttes juni 2024. Ved prosjektslutt vil innsamlet persondata bli slettet.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger,
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Vi behandler opplysninger om deg basert på ditt samtykke.

Hvor kan du finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med meg på ilhg0001@stud.slu.se

Med vennlig hilsen

Ingvill Holmberg
Prosjektansvarlig/Masterstudent

Samtykkeerklæring
Jeg har mottatt og forstått informasjon om prosjektet ”Design av skolegårder”, og har fått anledning til å stille spørsmål. Elever som er 15 år og eldre kan signere samtykkeerklæringen selv, yngre deltagere må ha underskrift fra foreldre. Jeg samtykker til at jeg/eleven min kan:

- ☐ delta i undersøkelsen ved å fylle ut det digitale spørreskjemaet
- ☐ delta i en kort designprosess hvor de kan komme med sine synspunkter og ideer (kun om det blir tid)

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. Juni 2024.

(Prosjektdeltakers navn med blokkbokstaver)

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(Sted /dato /(prosjektdeltaker/foresattes signatur)

Teachers and employees

Samtykke for behandling av personopplysninger i forskningsprosjekt

Vil du delta i forskningsprosjektet

”Design av skolegårder”?

Dette er en forespørsel til deg om å delta i et forskningsprosjekt hvor formålet er å lage en veileder på hvordan skolegårder for ungdomsskoleelever kan/bør designes for å skape en mer inviterende skolegård som oppmuntrer til bruk og fysisk aktivitet. I dette skrivet gir vi deg som deltager informasjon om målene for prosjektet, og hva deltakelse vil innebære.

Formål
Formålet med prosjektet er å undersøke hvordan vi kan tilrettelegge for at skolegården oppfordrer til bruk og fysisk aktivitet gjennom design og planløsning. Hvordan påvirker plassering/utvalg av forskjellige elementer i skolegården hvordan den blir brukt? Hvordan kan vi designe skolegårder som oppmuntrer til bruk og fysisk aktivitet?

Ansatte ved skolene får også utsendt en kort undersøkelse hvor spørsmålene omhandler trender til aktivitet i friminutt hos elevene. Endrer aktiviteter elevene gjør med endringer i skolegården? Er det forskjell på friminutt hvor ungdomsskoleelevene ikke deler friminutt med yngre elever fra når de gjør det?

Undersøkelsen gjøres i forbindelse med en masteroppgave i Landskapsarkitektur hos Sveriges Lantbruksuniversitet.

Du er invitert til å delta i studien fordi du er underviser/ansatt ved enten Snåsa Skole eller Snåsa Montessoriskole og jobber med elevene på ungdomstrinnet, som er ungdomsskolene som blir sett på i forbindelse med prosjektet.

Hva innebærer det for deg å delta?
For deg innebærer deltakelse å fylle ut et spørreskjema gjennom et digitalt skjema som tar ca. 5-7 minutter. Opplysninger og svar samles inn digitalt i spørreskjemaet, og blir registrert elektronisk.

Opplysninger som samles inn om deg er:
- Hvilken skole du jobber på

Hvis du som deltager ønsker å se spørreskjema i forhånd av deltakelse, ta kontakt med meg på ilhg0001@stud.slu.se

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Data fra deg vil kun brukes til formålene beskrevet i dette skrivet. Data behandles konfidensielt og i samsvar med personvernregelverket.

Jeg og veilederen min er de eneste som kommer til å ha tilgang til innsamlet data, og data lagres på serveren til Sveriges Lantbruksuniversitet.

Du som deltaker vil ikke kunne gjenkjennes i ferdig publikasjon. Enkelte sitater kan bli publisert, men disse skal ikke avsløre hvem som står bak. Presentasjon av innsamlet data vil være i form av statistikk eller figurer som illustrerer helheten av svaret.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Prosjektet skal etter planen avsluttes juni 2024. Ved prosjektslutt vil innsamlet persondata bli slettet.

Dine rettigheter
Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger,
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Vi behandler opplysninger om deg basert på ditt samtykke.

Hvor kan du finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med meg på ilhg0001@stud.slu.se

Med vennlig hilsen

Ingvill Holmberg
Prosjektansvarlig/Masterstudent

Samtykkeerklæring
Jeg har mottatt og forstått informasjon om prosjektet ”Design av skolegårder”, og har fått anledning til å stille spørsmål. Jeg samtykker til at jeg kan:

- ☐ delta i undersøkelsen ved å fylle ut det digitale spørreskjemaet
- ☐ delta i en kort designprosess hvor jeg kan komme med sine synspunkter og ideer (kun om det blir tid)

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. Juni 2024.

(Prosjektdeltakers navn med blokkbokstaver)

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(Sted /dato /(prosjektdeltakers signatur)

Attachment 2. Pupils' survey questions and results

1. Which school do you attend?

32 answered Snåsa skole.
11 answered Snåsa Montessoriskole.

2. Which grade are you in?

	Snåsa skole	Snåsa Montessoriskole
9th grade	15	4
10th grade	17	7

3. How do you get to school?

	Snåsa skole	Snåsa Montessoriskole
Walk	11	2
Bike	4	1
Bus	23	8
Car	7	4

4. If you get to school by bus, how much time does it take to get from your house to the school (one way)?

	Snåsa skole	Snåsa Montessoriskole
0-15 min	10	2
15-30 min	9	3
30-45 min	5	2
45-60 min	0	1

5. What gender do you identify as?

	Snåsa skole	Snåsa Montessoriskole
Boy	11	6
Girl	20	5
Different	1	0

6. What do you usually do during recess or breaks at school?

	Snåsa skole	Snåsa Montessoriskole
Talking/hanging	25	10
Soccer	8	2
Relaxing	3	0
Hiding inside	3	0
Bored/Freezing	1	0
Table tennis	2	0
Sleeping	1	0
Drawing	2	0
Reading	1	0
Listening to music	1	0
Walk around	1	1
Sitting under roof	1	4
Toboggan run	0	1
Volleyball	0	1

7. Does the length of your recess affect what activities you choose to participate in during recess, if so how?

	Snåsa skole	Snåsa Montessoriskole
Yes	12	0
No	19	6
Don't know	0	1
Only have one recess	0	2
Don't do activities	0	1
During summer	1	0

8. Which activities do you during recess in the different seasons?

Snåsa skole

	Winter:	Summer:
Volleyball	1	5
Soccer	12	19
Throw snowballs	3	0
Toboggan riding	6	0
Table tennis	4	3
Hang out with friends	4	6
Nothing	7	5
Freeze	1	0
Danish long ball	0	2

Snåsa Montessori

	Winter:	Summer:
Volleyball	0	4
Soccer	0	4
Danish long ball	0	2
Toboggan riding	1	0
Talking with friends	7	6
Nothing	2	1

9. What activities is your schoolyard facilitated for?

Snåsa skole
Soccer, danish long ball, swings, table tennis, toboggan riding, zip-line, climbing, volleyball, basketball, ice skating.

Snåsa Montessoriskole
Soccer, danish long ball, swings, ice skating, toboggan riding, table tennis, volleyball, gagaball, climbing, hang out on the balcony.

10. Is your schoolyard facilitated to participate in the activities you want to participate in?

	Snåsa skole	Snåsa Montessoriskole
Yes	19	9
No	10	0
Other	3	2

11. Does your school and schoolyard have enough space for the pupils for recess (inside and outside)?

	Snåsa skole	Snåsa Montessoriskole
Yes - inside	21	7
Yes - outside	29	10
No - inside	4	2
No - outside	2	1

12. What do you think about your schoolyard (from 1 – bad to 10 – excellent? How do you value your schoolyard (from 1 – low to 5 – high)?

	Snåsa skole	Snåsa Montessoriskole
Think of	5,66	5,82
Values	3,06	3,09

13. What do you like about your schoolyard?

Snåsa skole

The size	11
Ball pit	4
Designated area	1
Places to sit	3
Roof to sit under	5
Things to do	6
Grass lawn	2
Green	2
Nice view	1
Forest	3
Asphalt	1
Table tennis	1
Not sure	4
Nothing	2

Snåsa Montessoriskole

The deck	3
The size	2
Ball pit	2
Roof to sit under	1
Asphalt	1
Nature	1
Soccer field	1
Gaga ball	1
To do activities they like	1
Not sure	1
Not much	1

14. What do you dislike about your schoolyard?

Snåsa skole
Boring (7), nothing special (6), not much to do (5), not sure (4), younger pupils (4), not green enough (3), nowhere to pull away (2), not enough roof (2), not enough seating (2), bad equipment (1), no basketball court (1), too open (1), bad volleyball court (1), too much gravel (1), grey (1).

Snåsa Montessoriskole
Grey (3), boring (2), too much gravel (2), not sure (1), bad soccer field (1), not enough equipment (1), winter (1), that it is empty (1), looks depressing (1), not much to do (1).

15. How does sharing the schoolyard with younger pupils affect your use of the schoolyard?

	Snåsa skole	Snåsa Montessoriskole
Not affected	17	3
Bad	8	4
Sometimes	2	3
Don't know	5	1

16. What is your favourite spot in the schoolyard?

Snåsa skole
Under the roof (7), ball pit (7), no favorite spot (4), behind the school (3), behind the sports hall (2), front side of the secondary school (2), soccer field (2), bench (2), away from the elementary school pupils (1).

Snåsa Montessoriskole
The balcony (9), ball pit (3).

17.What are the perks of being inside during recess?

	Snåsa skole	Snåsa Montessoriskole
Stay warm	8	7
No younger pupils	0	1
Can relax	1	1
No perks	0	1
More social	3	1
More to do	5	0
Everything	1	0

18. What do you usually do in your free time?

	Snåsa skole	Snåsa Montessoriskole
Soccer	12	1
Volleyball	5	2
Social	13	5
Drive vehicles	1	1
Work out	4	2
Gaming	2	2
Watch TV or phone	3	0
Nothing	4	0
Work	1	0
Play music	1	0
Drawing	1	0
Dance	1	0

19. How many minutes are you on average active daily (with moderate to high intensity)?

	Snåsa skole	Snåsa Montessoriskole
0-10 minutes	4	1
10-20 minutes	2	2
20-30 minutes	1	2
30-40 minutes	4	0
40-50 minutes	6	1
50-60 minutes	5	1
More	10	4

20. Do you use your schoolyard during free time?

	Snåsa skole	Snåsa Montessoriskole
Yes	8	3
No	23	5

21. Ideas for your schoolyard?

Snåsa skole

- More activities
- Places to sit with friends
- Offer more for older pupils
- New elements
- Basketball field
- Benches with roof
- Make it nicer to encourage pupils and employees to be outside during recess
- More colors
- More plants
- Warm places and nice benches
- Places to pull away

Snåsa Montessoriskole

- Zip line
- Strawberry field
- Better volleyball court
- The possibility to grow food

Attachment 3. Teacher and employee survey questions and results

1. What school do you work at?

5 teachers/employees from Snåsa skole participated in the survey.
2 teachers/employees from Snåsa Montessoriskole participated in the survey.

2. Is there a phone ban at your school? When are the pupils allowed/not allowed to have their phones?

There is a phone ban at both schools.

At Snåsa skole the pupils' phones are collected at 8:50, and given back at the end of the day at 14:40. There are however some exceptions, such as during trips, activity days, use in lectures etc.

At Snåsa Montessoriskole, phones are collected at the beginning of the school day and given back when the school day is over. However the pupils are allowed to have their phones if it is necessary for learning, but then collected again when not necessary.

3. Will the rules for phone use at your school change after the new national recommendation from the 07. February 2024? If yes, how?

As both schools already have a phone ban, there will not be a change after the new national recommendation.

4. How does the schedule for a normal day at your school look (including lectures, recess, lunch etc.)

Snåsa skole

1st class	08:50-09:35
2nd class	09:40-10:25
Recess	10:25-10:40
3rd class	10:40-11:25
Recess	11:25-11:45
Lunch break	11:45-12:05
4th class	12:05-12:50
5th class	12:55-13:40
Recess	13:40-13:55
6th class	13:55-14:40

Snåsa Montessoriskole

1st session	08:15-11:30
Lunch break	11:30-11:45
Recess	11:45-12:30
2nd session	12:30-14:00

5. What does the secondary school pupils do during recess? How does it vary between the seasons?

Snåsa skole
Multiple participants answered that the pupils stand or walk around and talk, play soccer or table tennis, listen to music, or sit together and talk. One participant also mentioned that it is easier to get the pupils outside when the weather is good.

Some pupils play soccer all year-round during recess, especially in the ball pit. But there is a system for which classes can use the ball pit at all times. During the warmer months, volleyball and table tennis are popular activities.

The pupils are supposed to be outside during all recesses, but from fall break to easter break they are allowed to be inside during the last recess. Sometimes during winter, there can be exceptions, and the pupils are allowed to be inside during all recesses. When they are inside, the pupils have the possibility to play table tennis, ball games or just hang out.

Snåsa Montessoriskole
During recess the pupils can play soccer, volleyball, table tennis or truth or dare. The pupils also hang out and talk, hang out on the swings.

During the warmer months some pupils play soccer or volleyball, otherwise they like best to hang out and talk. During winter, sometimes some of the pupils go toboggan riding, throw snowballs at each other or basking in the snow, but this is not all pupils. Sometimes they are also in the forest.

6. What activities is the schoolyard at your school facilitated for the pupils to participate in?

Snåsa skole
Ball games, table tennis, volleyball, sitting, grass lawn, biking and toboggan riding. There are also climbing elements and swings, but these are not used by the secondary school pupils. There is also a soccer field that is used for ice skating during winter.

Snåsa Montessoriskole
Ball pit, volleyball, table tennis, gagaball, sandbox, biking, danish long ball, toboggan riding, skiing (right by the school), sitting groupd, fireplace and benches. There are also climbing elements and swings, that the pupils sometimes use. The pupils also have the forest around the school accessible.

7. What elements/areas are the most popular in the schoolyard for the secondary school pupils?

Snåsa skole
Most pupils hang out under the roof connected to the entrance. But it is also popular to play soccer, volleyball and table tennis. Toboggan riding during the winter. During the warmer months the designated area for the secondary school pupils is popular to hang out in.

Snåsa Montessoriskole
Most pupils hang out on the deck outside the secondary school building, or on the benches next to the entrance. But the soccer field, ball pit, volleyball court and toboggan hill is also mentioned.

8. Have the pupils use of the schoolyard changed over the years? If yes, how?

Snåsa skole
One participant mentions that the secondary school pupils maybe in a way felt "invaded" when the elementary school was connected to the secondary school, as part of their previous area was taken over by the younger pupils. Another participant also mention that the younger pupils take a lot of space. It is also mentioned that there is no more skiing or snowboarding during recess.

3 participants mentions that there have been minimal changes over the years, but one of these also mentions that since the secondary school pupils have to share the ball pit with the elementary school pupils, they have less time to spend there.

Snåsa Montessoriskole
There was a need for a place for the secondary school pupils to hang out in, which led to the deck next to the secondary school building being built the year before. One participant in the survey mentioned that they have observed that the pupils stick more together during recess at the deck and does not split up in groups as much as they did before the deck.

9. Do you have other thoughts or ideas on design of schoolyards you want to add?

Snåsa skole
One participant mentions the importance of paying attention to creating a schoolyard that invites activities and well-being above thinking of the aesthetic of the schoolyard. One participant mentions sheltered seating groups under roof and planting. Another participant mentions that there is not a lot to do for the secondary school pupils in the current schoolyard, but that the most important thing is for the pupils to get outside and get some fresh air.

Snåsa Montessoriskole
At Snåsa Montessoriskole both participants mention the ongoing process of improving the schoolyard, which includes implementing a greenhouse, flower beds, plant boxes, new seating group, fire pit and new paths. One participant also mentions that they want a school-garden for planting vegetables.

10. Do you have ideas on how to design a schoolyard that encourages use and physical activity between pupils in secondary school?

Snåsa skole
One participant mentions to define areas use, as volleyball, basketball, soccer, benches etc. But also to shelter the secondary school pupils area from the younger elementary school pupils, so they can feel ownership to their designated area.

Another participant mentions seating groups with roof over that are inviting, working with the pupils to hear their wishes, but also facilitating for winter activities such as ice skating, skiing, snow-rugby etc.

Snåsa Montessoriskole
One participant mentions their experience with pupils in this age group, and that activities must be accessible for them to partake in them, such as having a physical connection to the school building and defined areas designated for the secondary school pupils. They also mention that the area should be nice and inviting, and preferably a bit "adult", so that the pupils do not feel like small children. They also mention a need for an offer to hang out under roof for days where the weather is bad.

Another participant mentions the opportunities for different ball games, and an obstacle course or climbing course.

Attachment 4. Observation data

Snåsa skole

Recess: 1							
Time	**Amount of pupils (total)**	**Boys**	**Girls**	**What/activity**	**Acitivity room**	**Activity level (low, medium, high)**	**Perceived sensory dimensions**
13 min	6	1	5	Soccer-ring	Asphalt surface	Medium	Social, Open
12 min	11	0	11	Hanging out and talking	Main entrance	Low	Social, Shelter
8 min	7	5	2	Soccer-ring	Asphalt surface	Medium	Social, Open
4 min	4	4	0	Playing soccer	Soccer pit	High	Social
2 min	2	0	2	Hanging out and talking	Main entrance	Low	Social, Shelter

Recess: 2							
Time	**Amount of pupils (total)**	**Boys**	**Girls**	**What/activity**	**Acitivity room**	**Activity level (low, medium, high)**	**Perceived sensory dimensions**
2 min	1	1	0	Zip lining	Play structures	Medium	Cohesive
12 min	12	10	2	Playing soccer	Soccer pit	High	Social
12 min	8	3	5	Hanging out and talking	Main entrance	Low	Social, Shelter
10 min	2	0	2	Toboggan run	Toboggan run hill	Medium to high	Social, Diverse, Cohesive
8 min	10	6	4	Soccer-ring	Asphalt surface	Medium	Social, Open

Snåsa Montessoriskole

Recess: 1							
Time	**Amount of pupils (total)**	**Boys**	**Girls**	**What/activity**	**Acitivity room**	**Activity level (low, medium, high)**	**Perceived sensory dimensions**
43 min	8	8	0	Hanging out and talking	Hangout spaces connected to building	Low	Social, Shelter
40 min	2	2	0	Toboggan run	Toboggan run hill	Medium to high	Social, Diverse, Cohesive
27 min	3	0	3	Hanging out and talking	Hangout spaces connected to building	Low	Social, Shelter
9 min	2	1	1	Hanging out and talking	Hangout spaces connected to building	Low	Social, Shelter
-	1	0	1	Inside	School building	Low	-
7 min	2	0	2	Hanging out and talking	Hangout spaces connected to building	Low	Social, Shelter
6 min	2	0	2	Hanging out and talking	Hangout spaces connected to building	Low	Social, Shelter