Graduation Report

Eline Habraken

AR4MET110 A Matter of Scale Methods of Analysis and Imagination

5229138

A Call to Play!

- rethinking the architecture of a primary school in Tallinn

2025/26
AR4MET110A Matter of Scale
Methods of Analysis and Imagination
Msc3/4 Graduation Studio // Fall 2025

SUPERVISORS
Architectural Design
Klaske Havik

Technical Building Design
Pierre Jennen

FOREWORD

My first experience with education began with a snuffeldag (try out day) at the Elckerlyc, a primary Montessori school in the town I grew up in. It was there that I learned how to learn, by studying the fundamental principles of reading, writing and mathematics. More importantly, I learned to socialise and get to know other individuals in a safe and supportive environment.The schoolyard became a place of imagination, where my friends and I disappeared into different realities of our own creation. A set of trees became a castle, the climbing frame a mountain and the open space a battlefield of chalk.

From that first day on, education became a constant factor throughout my life, from primary and secondary school to now. At the end of my academic journey, it continues to shape my life. Stronger than ever this experience is tied to my knowledge of space and architecture. Looking back on the first period of my educational journey, I realised how strongly the architecture of a school has influenced my everyday experiences. I picture my younger self walking through the hallways, sitting at my tiny desk and potted plant in the back of the classroom, or choosing the hobbit from the library. These experiences shaped my understanding of how deeply architecture and environment affect the way we learn and experience life.

Education plays an important role in the lives of students of all ages, often the classroom becomes a place of comfort, where one discovers there identity and the relation to peers. For my graduation project I chose to explore this relation between architecture and education, with a focus on how architecture could influence the experience of learning.

CONTENTS

INTRODUCTION

PROBLEM STATEMENT

School is one of the most formative factors in contemporary life. Beyond sleeping, eating and sports, children spend most of their day in the confines of the classroom. From early morning until the late afternoon, students are taught mathematics, language and other subjects. Learning at their desk, moving between class rooms, the sports hall, canteen and outdoor playing areas. Together, these spaces form a landscape of routine where one learns, socialises and develops their individual identity. The school as a building, thus serves as a second home. A place of shelter, which reflects its position within its community and context.

Despite this significance, the architecture of the conventional classroom remains rigid and passive. Typically defined by a blackboard, white walls and and rows of neatly arranged desks. This type of space supports education but rarely contributes to the learning experience. The building becomes but the background to the life of its students, rather than serve as an active participant. The project challenges the condition of architecture in schools, exploring how architecture can influence space, experience and learning.

Equally important is the relation of a school and its urban context, for this project resides in the capital of Estonia. Tallinn is a city shaped by its medieval inheritance, periods of oppression and the heritage of the Soviet-era. The meaning of community and its history is deeply rooted in its cultural identity. A school cannot be isolated from this context. It extends beyond its physical barriers and becomes a part of the life of its students, parents and teachers and the wider community. Herman Herzberger describes this phenomena as the learning city, which frames the

Abstract interpretation of Estonia

school as a component of a larger urban network.

The site is situated on the intersection of the Old town and the Kalamaja district, the project investigates the extent to which a school can operate on the scale of the community and its context. Furthermore, it explores how architecture can become a tool for education in specific for primary school eductaction, shaping exploration, play and the interaction with surroundings.

RELEVANCE

The relevance of this project lies in rethinking the role of the school within the borders of the daily life of the child in the urban context of Tallinn. For both teachers and children most of the day is spent within the classroom. The architecture of the conventional classroom is often rigid and uninspiring, functioning as a background for the education rather than an active participant. As a result alternative forms of interaction and exploration are restricted by the limitations of its four walls. This project challenges that convention and proposes a different perspective on how to interpret architecture in educational buildings.

This project challenges the conventional architecture of the classroom and proposes a different perspective on elementary education, one in which the building is considered as an extension of the education. By carefully considering the perspectives of the adult and child, the project reimagines the classroom as an engaging, supportive and dynamic environment.

The relevance of this project is grounded in three key concepts, the school as a extension of its community, the relation to nature and the role of play. As a civic building, the school provides a social centre for teachers, children and parents, creating a sense of community beyond the formal education.

The relation of the project to its community is significant for its program, the chosen site reflects this ambition. Located between the historic old town district and the gentrified Kalamaja neighbourhood, the project occupies a transitional zone between two areas with distinct cultures and communities. In this context the school serves as a connection between these communities. While the building functions as linking element, the school as a building creates its own community of children, parents and staff. As discussed by Herzberger a school will provide more for children than just education but a place to develop social skills with peers. The juxtaposition of these values express the role of a school in a city, by creating its own ‘city’.

Beyond the social and educational significance, the project contributes to the architectural knowledge by questioning the conventional architectural design of the classroom typology. Expanding on the knowledge of alternative forms of educational architecture.

OBEJECTIVE AND MOTIVATION

My motivation for this project stems from a long standing interest in the design of complex social buildings, where spatial, social and logistic factors interlock as puzzle pieces. I am drawn by the challenge to explore the coherence between such elements. The school serves both as an educational environment as a social institution, but even more as a place of comfort for its students.

A school extends beyond its educational function, but transcends its function as an active social element within a city. This project is partially motivated by the gradual shift of everyday public functions from Tallinn’s Old Town, as discussed during a lecture by the city architect, Andro Mänd, who highlighted the shift of the social lives of locals moving from the city centre to other

The treasure map of Tallinn; an abstract analysis map

places. This shift could partly be contributed to the relocation of public functions, such as universities and schools, to other areas of the city. In response to this development, the objective of this project is to reintroduce an educational and social program as a connecting element between the Old town and the Kalamaja district.

A principal aim for the design is to establish a strong relation to the existing urban landscape. Rather than functioning as an isolated building, the school is to be conceived of a sequence of interconnected spaces, that mediate the transition between the city and the space of learning. These transitions anchor the building within its environment. This approach reflects my own understanding of complex social buildings in context. For I believe that architecture gains meaning when it forms a dialogue with its surroundings. Designing a school allows me to create a deeper understanding of how buildings are anchored in their context.

An additional motivation for the project stems from my earlier research into Waldorf schools and the influence of its pedagogy, anthroposophy, on school architecture. Waldorf education emphasizes the development of its student within the context of their age on artistic expression and community. Education is seen as a part of this holistic development. This understanding inspires the project's objective to treat the school as more than just a background character, but as an active participant in the educational environment. Although the architecture is in these type of schools more of an accessory.

A further objective is to approach the project and the design process with a sense of play and curiosity. I think design is strongest when one enjoys their work, leading to improvisation and unexpected. This attitude applies with the design and research methods, that value a sense of playfulness.

RESEARCH AND DESIGN QUESTIONS

The project investigates how to design the relationship between architecture and education, defining space as a tool of learning. A school plays an integral part of the social landscape of its students and surroundings. Understanding a school as a social building, the project should be grounded in the urban context of Tallinn. Based upon this objective the project researches the following research question:

> *How can the interior and exterior spaces be designed to support education in an elementary school in Tallinn, allowing students to learn, play and socialise beyond the classroom?*

The challenges for the design project arise from the research question, ambitions and scope. One of the main challenges of this project is the scale of the site, the size of the location could take the focus away from the need for human-scale design. The perspective of children and adults are essential qualities for the design of an elementary school. Another challenge is grounding the project in the urban landscape, relating the school to its context and surrounding buildings. The site is situated next to the Skoone bastion, which introduces an additional complexity for the project. For one, the school must respect the historical significance of the structure, while acknowledging the place for tourists and locals.

SCOPE

This project explores the relation to architecture and education based upon three structures, the school as a place of community, the relation to nature and playfulness of buildings. These ambitions require different objectives and exclusions. Therefore the scope should be discussed on different scales, as to create a complete understanding.

As discussed the relation of the project to its

community is significant for its program, the chosen site reflects this ambition. Located between the historic old town district and the gentrified Kalamaja neighbourhood, the project occupies a transitional zone between two areas with distinct cultures and communities. In this context the school will serve as a connection between these communities. While the building functions as linking element, the school as a building creates its own community of children, parents and staff. As discussed by Herzberger a school will provide more for children than just education but a place to develop social skills with peers. The juxtaposition of these values express the role of a school in a city, by creating its own 'city'.

The site is situated on the northern east point of the park surrounding the old town, on the side of the Suurtüki tn and Pöhja pst. The project is close to the Estonia Kunstiakadeemia (Estonian art Academy), Tornide park, the bus and train station. The surrounding park is extended into the project, allowing nature to mediate between the interior and exterior spaces. The design draws inspiration from the concept of fun, playfulness and wonder. In school children develop their social skills through play, on their own or with their peers. The playfulness is used for the way of designing the project. For both the perspective of the adult and the child as a user need to be carefully considered.

At the architectural scale of the project the project examines hot the school can serve as a threshold to the city an learning environment. The design focusses on the spatial transitions between functions. The sequence of entrance towards the street is emphasized. The integration of playfulness and the relation to nature emphasize this concept.

At the human scale, the project focuses on the human experience within the school. The needs of students should be taken in account, both as an individual as social group. Different ages require different considerations of scale and perspectives.

APPROACH

METHODS

The project adopts a combination of research and design driven methods to investigate how a primary school can function as an architectural building within its context. For the beginning of the project the focus has lied on the role of learning, understanding similar case studies, the site and reviewing architectural theories on educational institutions. These investigations established a foundation for the project and informed the theoretical framework.

The main research question is explored through an iterative process of sketching and modelling, spatial and architectural ideas are thus perpetually evaluated and refined. While digital modelling is used to support the process, a emphasis is paced on physical model-making and sketching. This approach of physical experimentation is used as a tool to explore materiality, scale and environment more rapidly. The approach also aligns with the strategy of playfulness in the design project instead of the design, enabling discovery and intuitive understanding of space.

The development of the project is supported by a wide range of analytical methods. Literature reviews, precedent studies and contextual analysis. Precedents of school buildings were explored to understand spatial strategies, organisational principles and architectural elements within the learning landscape. The project also builds on my earlier research into Waldorf pedagogy and its influence on the architecture of its schools, in relation to the Goetheanum in Switserland. The project initiated in the context of Tallinn with a two week visit to the city. During this period time was allotted to multiple shorter analyses, on the nature of birds in the park surrounding the old town, a precedent study of the National opera, public spaces and ballet building and a contextual analysis on the thresholds for schools and educational institutions.

Research conducted of Tallinn highlighted the importance of spatial sequence for understanding the threshold of the entrance. This insight became a tool for exploring the design, particularly the interplay of interior and exterior spaces. The process focussed on the intersection of spaces, materiality or elements. Transitions are in this case treated as a important condition to connect different functions and the building to the urban context.

A program of wishes is introduced in the theoretical framework, functioning as a guiding instrument throughout the design process and the multiple scales of the project. The program of wishes is structured through three categories of design strategies, the school as social building, playfulness and the relationship to nature. These ambitions are further developed in the theoretical framework.

THEORETICAL FRAMEWORK

The focus for the theoretical framework was understanding the school as a combination of functions, the program defines the use and the importance of certain spaces. By way of a program of wishes these spaces are researched and architectural defined. In the appendix, multiple analyses are added that were done to understand the context of Tallinn, aswell as the school as a precendent.

PROGRAM OF WISHES

SCHOOL AS A SOCIAL BUILDING

The first architectural strategies are categorised based on their social nature or focus on social interaction. In this the theoretical framework draws the understanding of the school as a social building from work an theories of Herman Hertzberger. Hertzberger has designed several Montessori schools, for example the one in Delft. In the book Alle Scholen Herzberger defines the need to refuse the normal archetype of a school building (Hertzberger & De Swaan, 2009), of

place of welcome
small library
place of performance
open kitchen
accesibility for all
flexible spaces
acoustics
art workshop
circulation as a place of learning
access to daylight
distinction between spaces
independent self care
indoor excercise
open outdoor space
places of shelter
place for excercise
relation to the outdoor
semi space
green places for play
green places for nature
outdoor classroom
vegetable patch
recycling and reuse
visible sustainable technologies

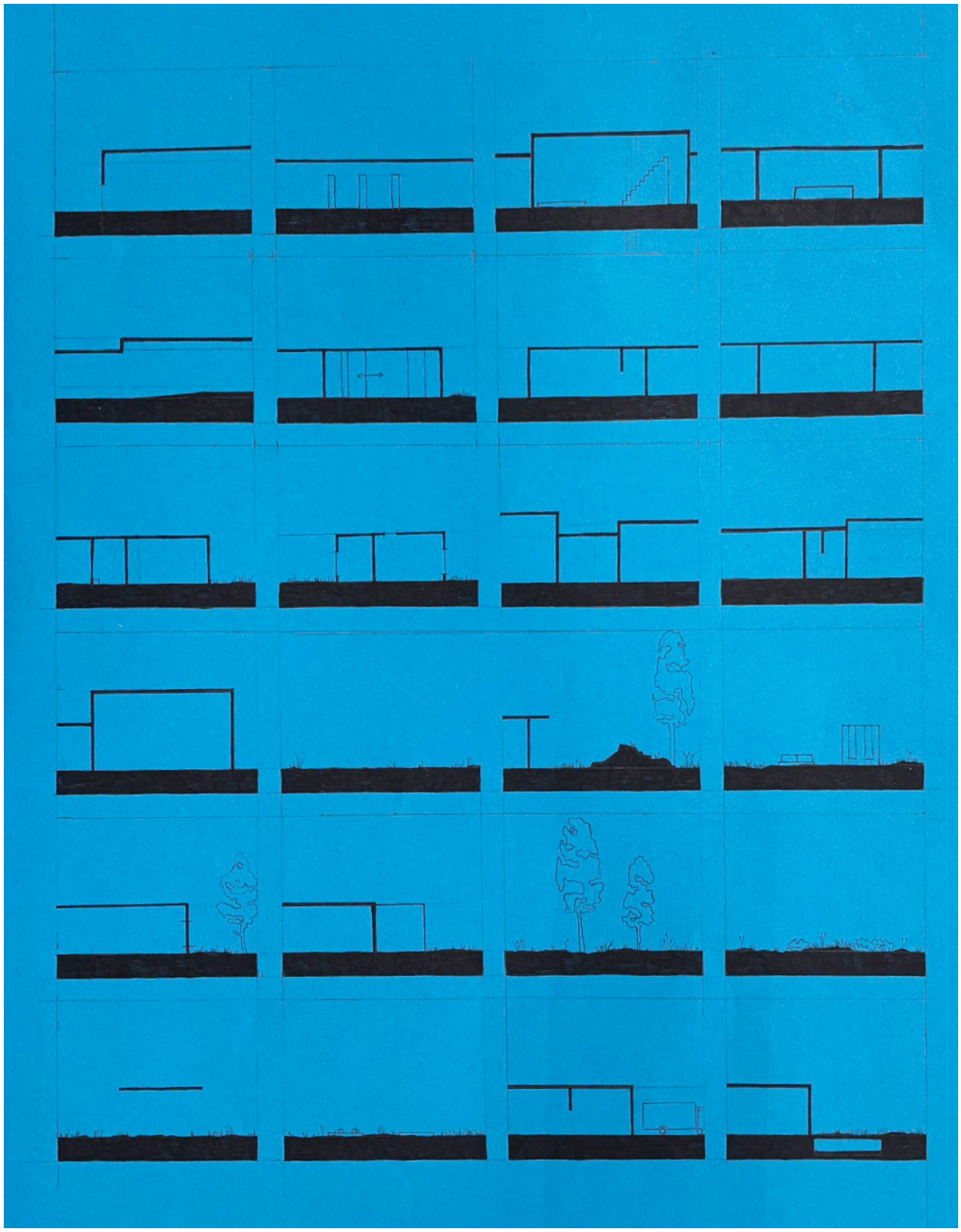
A program of wishes

long hallways and rows of classrooms. Herzberger advocates for directing towards abolishing these archetypal constructs, viewing the circulation space as a part of the classroom. Furthermore, Herzberger states that the design of the school should be viewed as a city, to interpret different functions as a urban elements.

Many of the architectural strategies included in the program of wishes draw from principles found in Waldorf and Montessori schools. These pedagogies emphasize different ways of how to deal with education, in Montessori schools the students are encouraged to become independent. In Montessori Architecture: A Design Instrument for Schools Stæhli en Lawrence indicate elements used in the architecture of Montessori schools (2023) offering valuable insight for this project. This is different in the anthroposophical pedagogy, which is used as a guideline in Waldorf education. The teaching lays a focus on the holistic development of the child, with a focus on creating a strong social foundation.

place of welcome
small library
place of performance
open kitchen
accessibility for all
flexible spaces
acoustics
art workshop
circulation as a place of learning
access to daylight
distinction between spaces
independent selfcare

PLAYFULNESS
The physical environment of the school takes a highly significant part in the development of children, further in how the architectural space is used. Children assign certain areas to specific forms of play (Armitrage, 2005). In relation to the ambition of play in the design I read some articles on the implementation



place of welcome
small library
place of performance
open kitchen
accesibility for all
flexible spaces
acoustics
art workshop
circulation as a place of learning
access to daylight
distinction between spaces
independent self care
indoor excercise
open outdoor space
places of shelter
place for excercise
relation to the outdoor
semi space
green places for play
green places for nature
outdoor classroom
vegetable patch
recycling and reuse
visible sustainable technologies

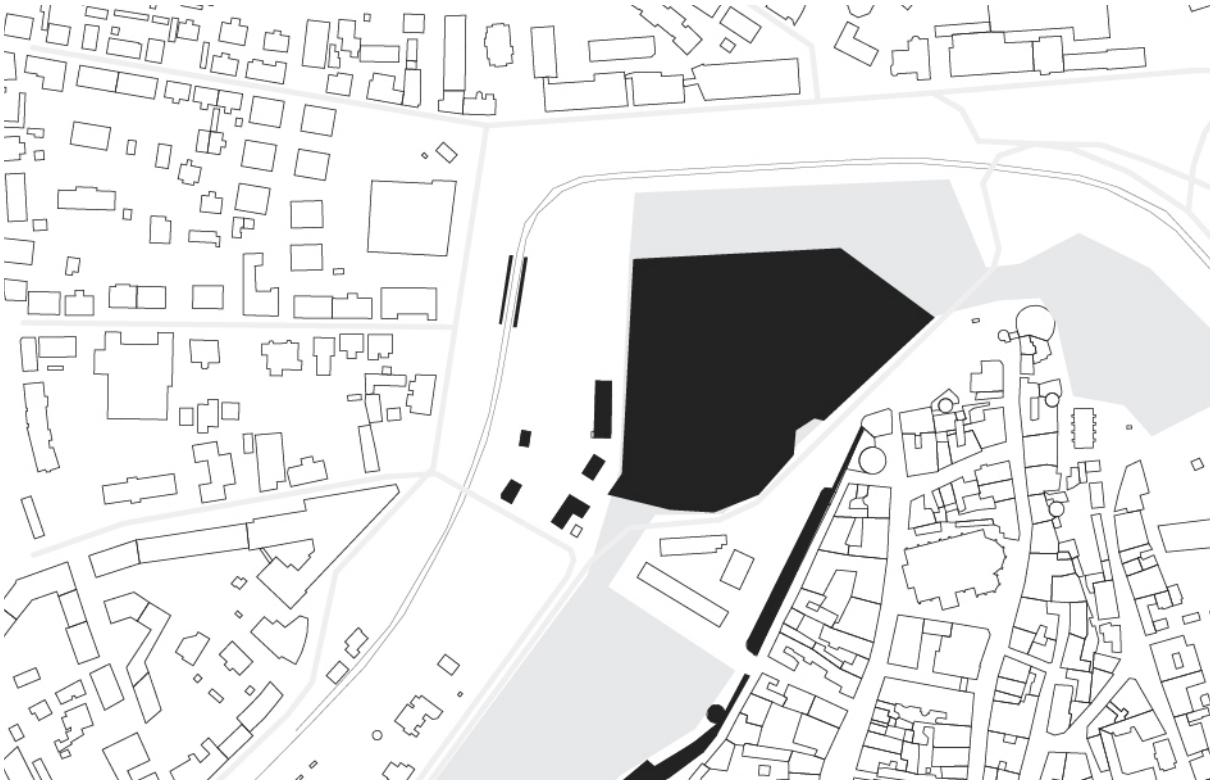
An architectural interpretation of the program of wishes

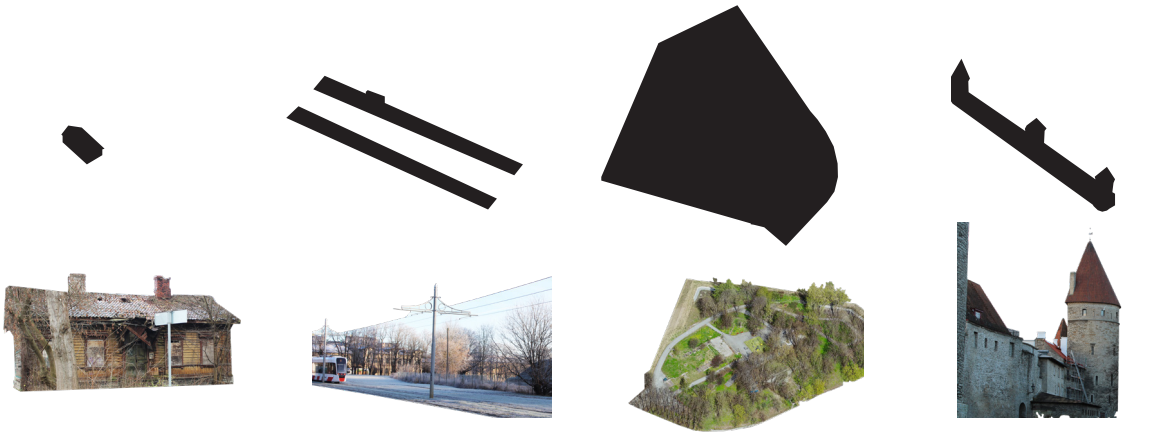
of play, such as the text of Armitrage on the influence of school architecture on the outdoor experience of play. The architectural layout of the schoolyard influences the interpretation and engagement of children. Elements such as materiality, openness and boundaries. For example, large open paved areas are typically appropriated for ball sports, which are typically dominated by boys. Therefore design can unintentionally reinforce gendered patterns of play. By introducing different spatialities the project could reinforce the outdoor space as an inclusive playground.

When discussing play two types of play in the school environment can be associated 'free play' during recess and educational play, in the context of play in education (Armitrage, 2005). Play can be understood as an essential pattern of design of a school. Diverse forms of play contribute to the development of students, for social interaction, creativity and motor coordination. In the text by Souza et al. such patterns of play are analysed. The goal of the project is to design a diverse playscape for the outdoor spaces, which are inspired by inclusivity and types of play.

indoor exercise
open outdoor space
places of shelter/seclusion
place for exercise

ARCHITECTURE AND NATURE
The last ambition for the project is grounded in theories of integrating nature into educational design, theories such as biophilic and environmental design. For the preliminary research into the subject I analysed an article by Chiesi et al., 'Re-naturalizing the built environment. Plants, architecture, and pedagogy in contemporary green schools' (2024). Contemporary city life has limited the daily exposure to natural environments, creating challenges for health and embodied well-being. The





The chosen site and surrounding structures

context of the school present opportunities to reintroduce green spaces as a resource of education. Based upon research Chiesi et al. Hearten the relation between natural activities and nature on enhancing the well-being of students. Furthermore, the integration enhance social behaviours and positive association with green spaces. The latter boosts ecological sensitivity and enhances the school as a community.

relation to the outdoor
semi space
green places for play
green places for nature
outdoor classroom
vegetable patch
recycling and reuse
visible sustainable technologies

SITE ANALYSIS

The site is located on the northern east point of the park surrounding the old town, on the side of the Suurtüki tn and Pöhja pst. The project is close to the Estonia Kunstiakadeemia (Estonian art Academy), Tornide park, the bus and train station. At the moment the place is used as a parking lot, some small bushes stand on the outskirt of the place and there are multiple abandoned brick, sandstone and wooden buildings, a pumphouse from the late 19th century and workplace (early 2000). Furthermore, situated next to the entrance of the bastion are two wooden residences from the early 2000s. The Tallinn municipality is planning to renovate these buildings and possibly dedicate the site to exhibit historical train and infrastructure elements (Säilitatavad Ajaloolised Hooned, n.d.).

The location neighbours the Skoone Bastione, during the middle ages known as the coastal gate hill. The historic bastion dates back from the time when Estonia was a part of the Swedish Baltic Sea empire. The structure was commissioned by the city engineer, in line of the fortification architecture

in the baroque period. In this same plan the city was to be surrounded by 11 bastions. Most of the bastion still stand today, just as the Skoone Bastion the 450-metre long escarpment along the outer perimeter, other parts of the structure have been transformed into a park and playground.

RESULTS

The results of this graduation presents the architectural design of the primary school and demonstrates how the research ambitions have been implemented in the project. This chapter highlights the key principles of the design proposal and reasoning behind them. A detailed account of the design process is given in the logbook, which illustrates the choices made. The logbook can be found in the appendix.

PERSPECTIVE OF A CHILD

At the centre of the project lays the role and experience of children, both inside and outside of the building. The perspective of the child informs the organisation of the classroom, circulation and supporting functions. The programmatic organisation is positioned as a supporting framework to enable the experience of the primary users. Furthermore the architecture is understood not only as a physical environment but as a space for learning and play. The layout of the school is intentionally clear and legible, ensuring that the students can navigate the building intuitively. During the daily tasks and in situations requiring fast egress.

The project distinguishes between three types of learning; individual learning, learning in groups and within the context of the class. This distinction enables a nuanced spatial response within the design. For example, classrooms are complemented by flexible additional spaces, that allow seclusion, concentration or group work. Hallways serve as an extension of the learning landscape of the classroom, extending this gradient of conditions. The designing factor in the threshold of classroom to hallway is the system of storage, offering niches, visual connections and space for collective activity. Together, these elements provide

Abstract interpretation of Estonia

a wide range of learning environments that the children can appropriate based to their needs.

Another differentiation is made based on the age of the students, as the pedagogical needs differ significantly between younger and older children (Sharp et al., 2009). Younger children benefit from higher levels of supervision, a focus on a defined space and more immediate access to supporting spaces. Each classroom in the cluster of the younger classes is accommodated with adjacent toilets and a legible understanding of the threshold to the learning space. Next to the entrance there is space for shoe storage and a place to hang up one's coat. In the program there is more spatial independence provided for the older children, whose autonomy and attention span differ. Toilets and shoe storage are located near the exits, allowing the circulation space to function more fully as a learning environment.

TRANSLATING WISHES

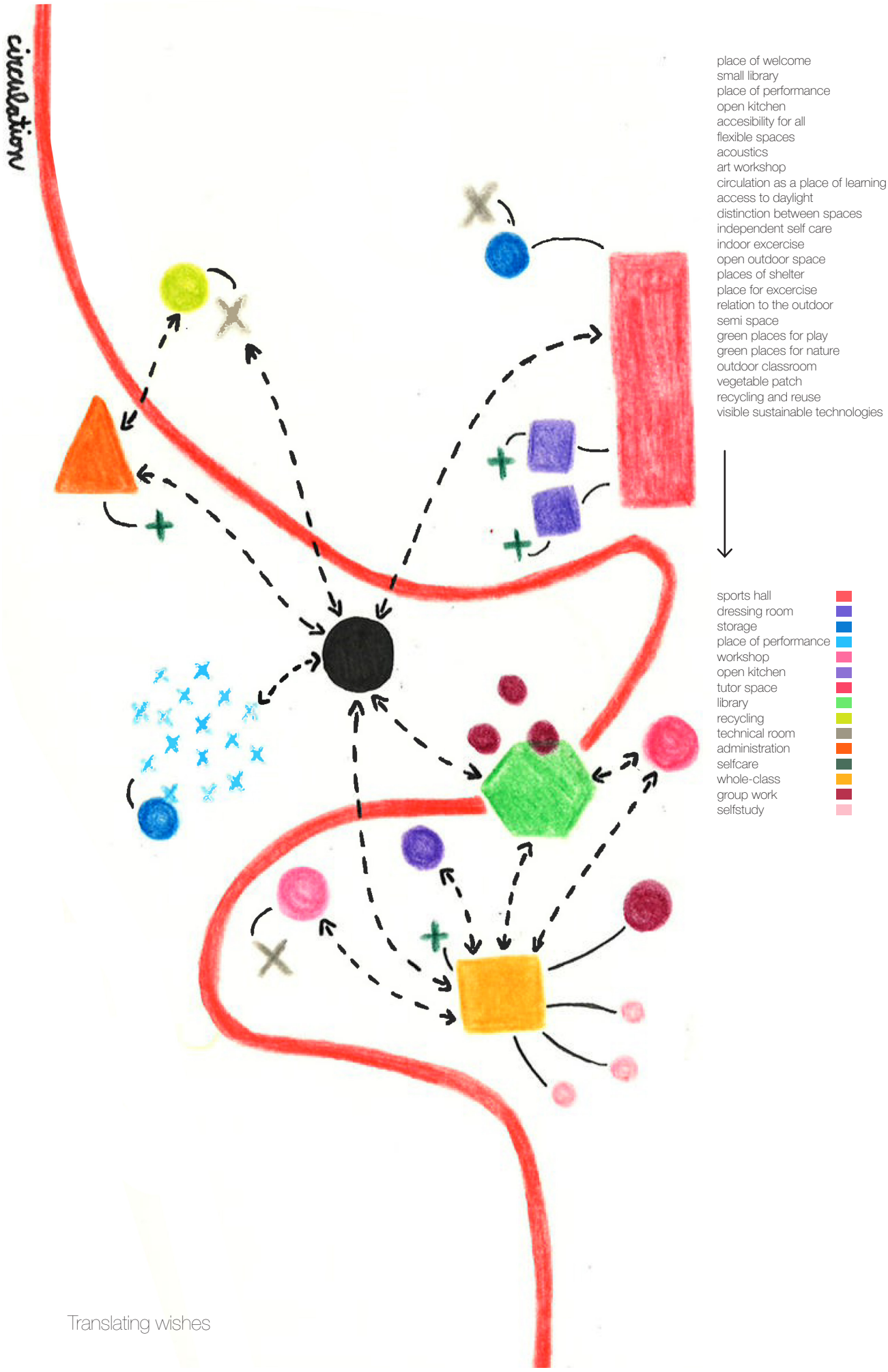
The theoretical framework outlines a set of ambitions, the program of wishes, which assist in answering the main research question. These ambitions address the position of the individual, community and the role of the building. The function as a school entails a strong connection to its social context, encompassing not only students, teachers and parents but also the wider community within the city. The project is designed based on these scales and the architectural interpretation of the program of wishes. As mentioned before, the program of wishes is characterised by three aspects; social community, play and nature. The project establishes itself as a part of the social context. Play constitutes as a fundamental component of the school environment. Undefined space allows imagination indoors and on the schoolyard, by designing multiple places this type of play can be stimulated. Furthermore there is also playfulness in learning, which also requires different elements and detailing. The building serves as an example for this generation and others, thus by designing with and for nature the school becomes an inspirational tool. In this way, the integration of green spaces contribute to the environmental awareness to its users.

SCHOOL AS A SOCIAL BUILDING

The school is fundamentally a social complex building, the first ambition illustrates this role. The classroom is an anchoring space in the everchanging lives of children. In a life full of movement and transitions it is the classroom that provides continuity, familiarity and comfort. The design of the school reflects this principle, although the use of the circulation is shared the classrooms remain separate and private. The individualistic character of the classroom allow one to claim the space as familiar and individual.

The project is strongly inspired by precedents of Montessori and Waldorf schools in Europe. The organization, form and program were established on similar principles. As with Montessori schools, the building is a 'learning city'. The functions are spread and connected by streets. At the centre of the project lays the courtyard, where the smaller groups have recess and outdoor classes are held. Also important for Montessori education is the need for independence, by allowing flexibility and a wide range of functions such needs are met. Further independence is stimulated by the accessibility to nearby (accessible) toilets. For the smaller groups these are located next to the entrance into the classroom, whereas the toilets for the older groups are located near the exits. In the same vain, each cluster of three classes has access to at least one separate disabled toilet.

The public functions are organized as to create two centres within the plan. The sports hall and the welcoming hall form to opposites, each adjacent to one of


circulation
place of welcome
small library
place of performance
open kitchen
accesibility for all
flexible spaces
acoustics
art workshop
circulation as a place of learning
access to daylight
distinction between spaces
independent self care
indoor excercise
open outdoor space
places of shelter
place for excercise
relation to the outdoor
semi space
green places for play
green places for nature
outdoor classroom
vegetable patch
recycling and reuse
visible sustainable technologies
sports hall
dressing room
storage
place of performance
workshop
open kitchen
tutor space
library
recycling
technical room
administration
selfcare
whole-class
group work
selfstudy

the entrances. These spaces serve as thresholds between the school and the wider community. The character of these spaces allows them to be used after school hours and during the weekends. The welcoming hall is a multifunctional space also used as a canteen and for performances, while the sports hall can host activities for the community. Through the open nature of the project the building becomes an extension of its context.

PLAYFULNESS

Next to formal learning a day at school is also defined by play. Within the school environment children learn to socialise with peers, communicate needs and understand social behaviours through play (De Souza. Et al, 2020). Two distinct types of play can be identified; directed play and free play.

Directed play, further known as 'guided' play (Skene et al., 2022), is embedded within the learning process through activities such as drawing, scientific experiments, theatre, reading novels and physical education. Within the project directed play is associated with specific spatial programs, for example the welcome hall, sports hall, workshop with art supplies and library. The spatial proximity of these programs facilitates flexibility in learning and provides a variety of choices for both students and teachers.

In contrast, the role of free play is conceptualized as open and not prescribed by programme. Instead, it emerges through interaction with architectural conditions. The schoolyard and interior areas for play are therefore informed by the intention to encourage exploration without fixed perimeters, creating an open-ended discussion between children and their environment. This interpretation aligns with the concept of affordances, as introduced by psychologist James Gibson, which are described as architectural elements or design that allow a range of possibilities for use (Rietveld & Rietveld, 2018). By designing the schoolyard and interior spaces as a landscape of variety, children are invited to interpret the space in multiple ways. In this context, imagination becomes a key experience of the defined space.

The role of playfulness is further articulated in the design of the classrooms and learning environments. These spaces are defined by walls set at varying angles, generating distinct spatial identities within the broader composition. As a result each classroom becomes recognizable by its form and material characteristics. Other intricate elements of these spaces are the use of openings to the circulation, the use of colour and the incorporation of groupwork spaces. Through these architectural variations, the individual character of each space is established. Hereby, supporting the classroom as a playful and pedagogical environment.

RELATION TO NATURE

One of the most significant principles of the building lies in the relationship to the surrounding context. This relationship is expressed in the transition from the street towards the main entrance, but also in the way that the classrooms engage with the exterior. The outer wall is designed to open fully, allowing for an indirect and direct connection to the surrounding green spaces. In doing so this connection is softened and fosters the interaction with nature and the city as a part of the daily routine. The handling of sustainability factors are made visible through the integration of recycling strategies ad the visibility of climate strategies.

Throughout the building, the architectural space maintains an ongoing dialogue with the landscape. This is an indirect relationship with nature occurs through openable walls, windows and rooflights. The circulation supports this principle. The

render of the courtyard

courtyard serves as an extension and can be understood as an 'in-between space'. A source of inspiration is the Burgerweeshuis by Aldo van Eyck, where the Dutch modern architect and theorist designed outdoor spaces as an extension of the interior. Van Eyck's concept of the 'in-between' refers to this dialogue between the inside and outside (Sack, 2024). For the project of the school, the courtyard becomes this in between space, an extension of the interior.

The exterior landscape of the project is just as thought through as the interior spaces. As the sequence from inside to outside to public follows the green space surrounding the building. Even in this green space program is defined and playfulness explored. The adjacent serves as a transition to the entrance. The green space is used by humans and left alone to its self, the vegetable patch and schoolyard stand as a contrast to the undisturbed green. The high contrast allows use of the land while also stimulating biodiversity in different seasons.

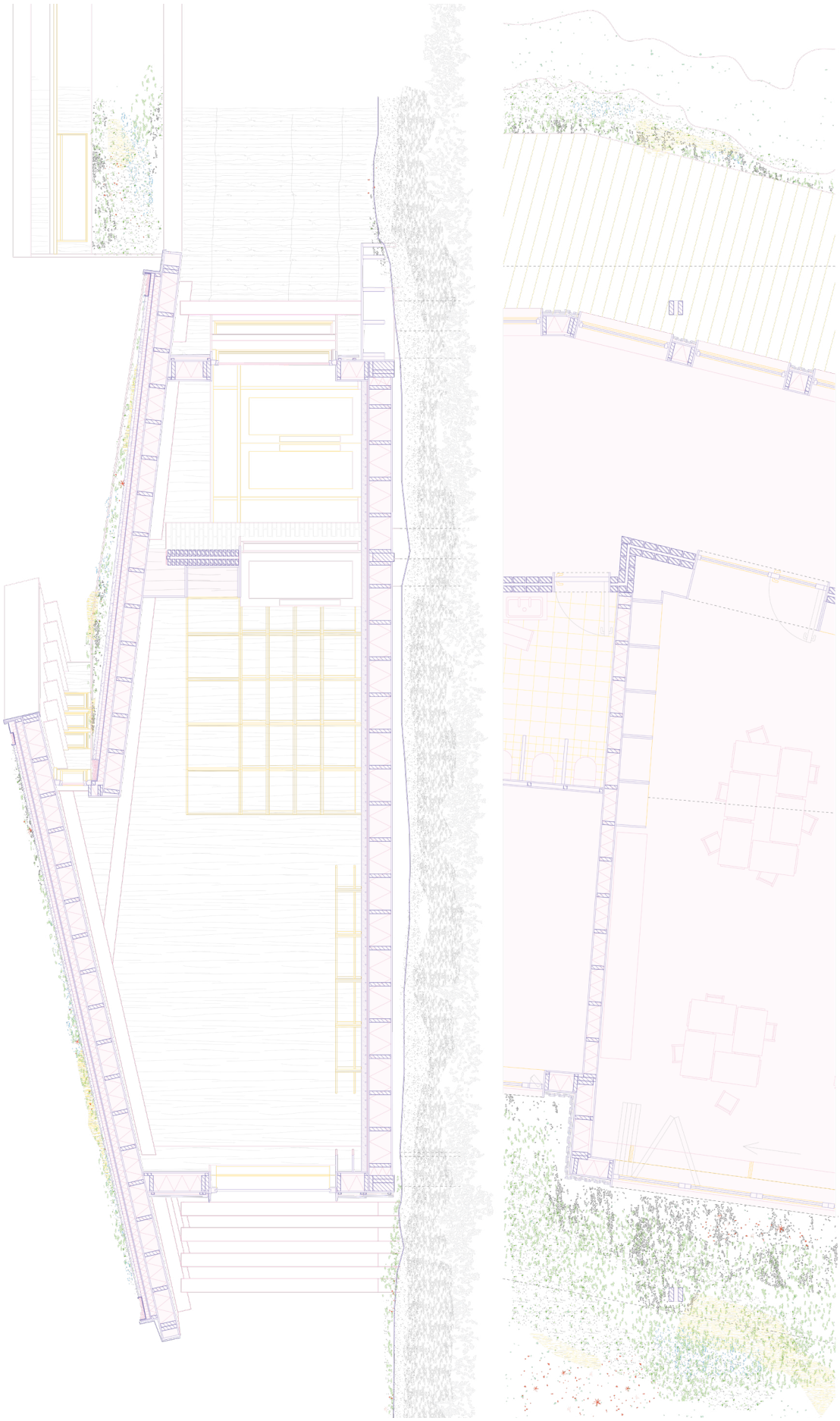
Architectural elements such as the roof overhangs and sheltered courtyard further support outdoor learning by providing covered areas for classes and group activities. The design of the surrounding green spaces follows the strategy of playfulness. For the schoolyard of the older two clusters only the playground equipment and open grass field can be considered as directed play. Most of the schoolyard and therefore the use of plants focusses on affordances. The project encourages environmental awareness, curiosity and positions nature as a central part of its identity.

CONSTRUCTION AND CLIMATE DESIGN AS AN INTEGRAL PART OF THE PROJECT

Both construction and climate design are conceived as integral components of the architectural concept, for they actively support the project's broader ambitions for sustainability, clarity in spaces and environmental awareness. The project aims to serve as an example for its users, surroundings and community demonstrating climate strategies and constructional logic.

The angled walls of the classrooms and circulation require a free-spanning construction of the roof. The form of the roof draws inspiration from traditional Estonian woodwork and wooden buildings. When observing the roof in section one can see how the roof interacts with the supporting structure of glulam beams, columns and supporting walls. The exterior walls support their own weight, making it possible to allow fully openable glass facades as seen in the classrooms. The roof is made from prefab timber frame structures and a green roof system. The edge of the roof allows space for nesting of birds and bats. The two angular planes are separated by a window, allowing indirect sunlight. The design takes the heavy snowfall typical of Estonian winter into account, ensuring that the roof and its supporting structure can accommodate additional snow loads.

Sustainability ambitions are embedded in the choices of the materiality for the building. The project aspires to be largely carbon-free, biobased and locally sourced, using timber as the primary structural material. The insulation is produced by Myceen, a local Tallinn-based company that develops mycelium building products from organic residues, such as sawdust and wood chips with mycelium (MYCEEN, n.d.). Thus when the left over wood from renovating the wooden buildings on site could be used as a rest material, ensuring the reuse in the project. Furthermore just as the timber the mycelium insulation is carbon negative. The supporting interior wall and foundation of piers are constructed from locally sourced limestone. The floors are similarly constructed as the roof, the load of the floor is supported by edge beams. The use of



facade fragment

limestone complements the material palette and coherence of the project. The facade is constructed from hand cleft oak shingles in irregular sizes.

The indoor climate is individually controlled at the level of the classroom, by way of the operable glass façade, micro ventilation in the façade and roof windows. Therefore teachers and students are capable to adjust the conditions of the space. The windows in the hallway adjacent to the courtyard can also be opened to allow a comfortable environment in the circulation.

The surrounding buildings are reused and restored. The square in front of the school thus becomes an extension of the community. These buildings represent the existing context and the need to retain and not demolish what is already there. The wooden facades are rebuilt, with a change of wider windows and a layer of insulation for the kindergarten and green house. The pump station as an exhibition space and the bike parking are not changed from their original building construction. The old workshop is renovated with limestone and serves as an historical and element of affordance in the landscape of the playground.

Through the integration of construction and climate strategies the project demonstrates how technical design reinforces the architectural implementation of pedagogical and environmental ambitions.

CONCLUSION/ DISCUSSION

CONCLUSION

This thesis and graduation project set out to explore the role of architecture within the educational architecture of a primary school in the city of Tallinn, Estonia. The project has focussed on the design strategies to support this understanding of alternative school design. Conventional design of classrooms often function as rigid and passive spaces for education, offering a space with limited opportunities for autonomy, imagination and engagement. This project proposes another architectural approach, where the architecture becomes an active influence on the environment of learning for its students and the school community.

Methodologically, the project combined literature research, precedent studies, site analysis, and sketching and digital modelling. The emphasis on sketching and model-making in the design process allowed for a greater understanding of the use of playfulness within the project. Through experimentation the project was expanded and strengthened based on the need of the architectural components

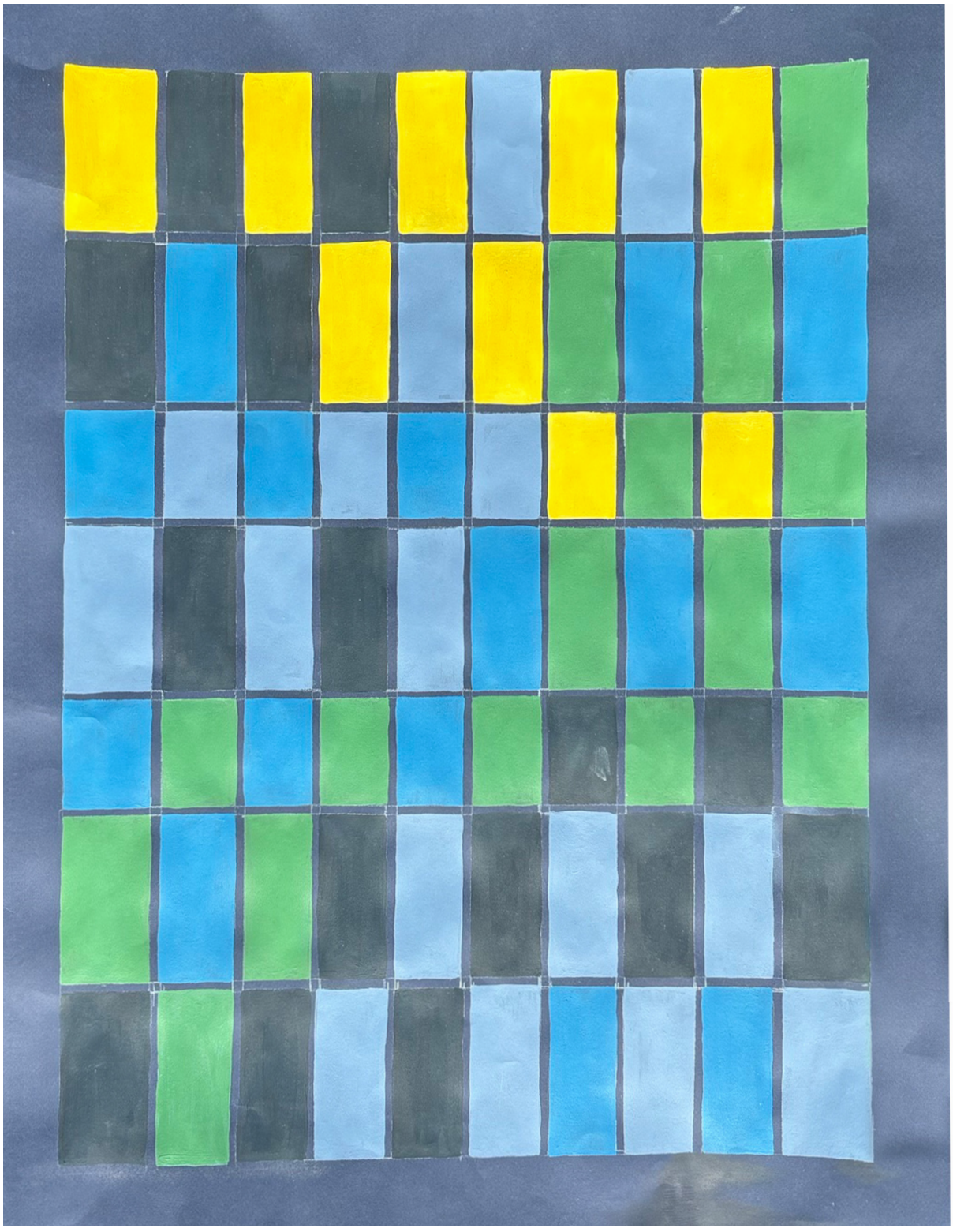
.

Important for the project is the perspective of the child. The project establishes a clear an legible environment where students can navigate easily during the routines of the day or when moments require fast egress. The design responds to three types of learning, as an individual, through a collective activity or as full class. Iin the project this results in a system of niches, openings and storage elements extending from the classroom into the hallways. Differentiation by age further refines this approach, establishing the various needs and behaviour between age groups(Sharp et al., 2009).

Grounded in three design strategies of the school as a social building, playfulness and the relationship to nature, the project rethinks the role and design of the classroom and circulation spaces. These ambitions shape both the programmatic organization as architectural details and the technical aspects. Hereby, decisions are informed by working through multiple scales. In this the building reinforces the school as a strong part of the urban landscape and the social context.

As before mentioned the school as a function is inherently a complex social building, requiring the understanding of different needs of users, logistics and safety requirements. The project works upon this principle and aims to view the school as a second home. In this case it is the classroom and repetition of daily life that creates familiarity and continuity with its architecture. The shared circulation an public spaces intend to provoke interaction, but also allow the flexibility for learning. A certain sense of autonomy is provided in the lay-out of classes and selfcare spaces. Clusters of age groups are separated but still connected by the central courtyard. The multifunctional and flexible character allow the building to serve the community beyond regular school hours, enabling its operation on the urban scale.

Playfulness forms an essential part of the school design, shaping the way children communicate and understand their environment. In the project two types of play are distinguished ‘guided’ and ‘free’ play (Skene et al., 2022; De Souza et al., 2020). In case of the project guided play is provided by the closeness of a sports hall and exercise equipment on the playground. Although most of the interior and exterior spaces are designed to encourage free play and imagination. Playfulness further continues into the building shape and the classrooms. Each classroom has its own unique shape, defining the individual character within the learning scape. Architectural elements, such as the storage system with places of seclusion and openings, and the use of colour for detailing give each space a



interpretation of the layered nature of the project

distinct identity. Thus establishing a learning environment that supports playfulness and autonomy.

The identity of the building is strongly aligned with the role of nature by creating a dialogue between learning and the surrounding landscape. Fully openable facades, roof lights and windows soften the boundary of inside and outside making the exterior an extension of the learning environment. Central to the design is the courtyard, used as a playground for the younger classes, it acts as a central green and in between space.. The roof overhangs further enable learning outside, but also flexibility in relation to the climate or to create a landscape of affordances.

The free spanning timber roof allows the irregular and angular design of the classrooms. The roof is supported by glulam beams, wooden columns and interior supporting walls from limestone. The building rests on a foundation of locally sourced limestone. The sustainable material palette of the building supports the project's environmental ambitions. The indoor climate is regulated by way of natural ventilation and floor heating using heat from a ground source heat pump. The climate can be changed on the level of the classroom to allow the classroom to adapt to the needs of its users.

Ultimately, this project shows that a school is more than just a place of institution, but a place of comfort and familiarity. It is a social anchor in an everchanging reality outside of the schoolyard. Within the user is given a safe and supporting space, fostering imagination, socializing and a greater understanding of their environment.

DISCUSSION

In developing the design strategies, the category of play was prioritised based on my notion that conventional school architecture often fails to inspire students or contribute to the lived experience of students. It is my belief that spatial environments should invite interpretation and transformation by its users. This project therefore acts as a framework how such conditions should be encouraged. Although the playfulness embedded in the design relies strongly on the creative imagination of both students and teachers, acknowledging that real use is not similar to intent. This inherent unpredictability is embraced as a product of school building.

In the chapter of the methodology a focus is laid on the transition between spaces as a leading tool for the design, although this shaped the project it also introduced limitations. By concentrating on the role of the threshold in the main building less attention was given to the surrounding buildings, although they are meant to be conceived as free standing structures the connection to the primary school remains indirect. On the other hand the monumental value of these buildings is actively protected, which aligns with the idea of reuse. The role of nature in the project is shaped by the importance of sustainability for future generations, generations who would inherently use the building. The project strives to be an example of sustainability.

A similar reasoning follows the choice of the pillar of community for the project. The neighbourhoods of the Old town and Kalamaja represent two distinct cultural and social identities. Because of the location of the school, the building requires a need to form a strong connection to the context. Furthermore on a human scale level the building deals with social interaction or seclusion. Because of the use of affordance as a guiding principle in the design of classrooms and circulation spaces the focus shifted away from earlier established ideas about guided learning. Therefore establishing the user, the child, as a leading

factor on how a space is incorporated.

The project's limitations also arise from the understanding of its primary users. Much of the design draws on my own positionality and childhood experiences in school. This perspective informed the project's emphasis on openness, play and imagination, it is inherently personal and possibly not applicable to all children. For future research, I recommend involving children from different age groups to develop a more comprehensive understanding of needs and interpretation of space.

The main research question was explored through an iterative process of sketching and modelling, a methodology that aligns with my own preferences on designing. As I gravitate toward physical rather than digital experimentation. This approach allowed for an intuitive exploration of programmatic organization, shape and massing. The playful nature contributed to my enjoyment of the project.

Finally, the project offers potential contributions to the architectural discourse on educational architecture, as the project already expands on the teachings of Herman Herzberger. Further research into the three design strategies making up the program of wishes could lead to different outcomes or alternative interpretation. Although for this project each is equally considered and integrated on multiple scales. The school demonstrates how such ambitions can inform one another.

REFERENCES

Armitage, M. (2005). The Influence of School Architecture and Design on the Outdoor Play Experience within the Primary School. *Paedagogica Historica*, 41(4–5), 535–553. https://doi.org/10.1080/00309230500165734

Chiesi, L., Costa, P., Ciaravella, F., & Galmarini, B. (2024). Re-naturalizing the built environment. Plants, architecture, and pedagogy in contemporary green schools. *Frontiers in Sustainable Cities, 6*. https://doi.org/10.3389/frsc.2024.1397159

De Souza, L. N., Kowaltowski, D. C. C. K., Woolner, P., & De Carvalho Moreira, D. (2020). School design patterns supporting learning through play. *International Journal Of Play*, 9(2), 202–229. https://doi.org/10.1080/21594937.2020.1757204

Hertzberger, H., & De Swaan, A. (2009). *Alle Scholen*. 010 Publishers.

Hertzberger, H. (2008). *Ruimte en leren*. 010 Publishers.

MYCEEN. (n.d.). Retrieved on 04-06-2026 via https://myceen.com/building-materials

Rietveld, E., & Rietveld, R. (2018). Affordances and Architecture. In Superhumanity. e-flux. https://www.e-flux.com/architecture/superhumanity/179234/affordances-and-architecture

Säilitatavad ajaloolised hooned. (n.d.). Tallinn. Retrieved on 04-06-2026 via https://www.tallinn.ee/et/avalinn/sailitatavad-ajaloolised-hooned

Sack, O. (2024). 'A symbol with what architecture means as such and should accomplish': On Aldo van Eyck's concept of the 'in-between'and its connection with the dimension of Raumbildung. ARENA Journal of Architectural Research, 9(1). Retrieved on 04-06-2026 via https://ajar.arena-architecture.eu/articles/10.55588/ajar.395#references

Sharp, C., George, N., Sargent, C., O'Donnell, S., & Heron, M. (2009). International Thematic Probe: The Influence of Relative Age on Learner Attainment and Development. *National Foundation for Educational Research.* Retrieved on 04-06-2026 via https://files.eric.ed.gov/fulltext/ED508563.pdf

Skene, K., O'Farrelly, C. M., Byrne, E. M., Kirby, N., Stevens, E. C., & Ramchandani, P. G. (2022). Can guidance during play enhance children's learning and development in educational contexts? A systematic review and meta-analysis. Child Development, 93(4), 1162–1180. https://doi.org/10.1111/cdev.13730

Stæhli, B., & Lawrence, S. (2023). Montessori Architecture: A Design Instrument for Schools. *Park Publishing (WI*).

ACKNOWLEDGEMENTS

I would like to express my gratitude to those who supported me throughout my graduation process. My deepest thanks go to Klaske Havik and Pierre Jennen, my supervisors, whose guidance and encouragement shaped my process. Their expertise gave me a greater insight into architecture and academics, but also thoughtful feedback at the moments when it was most needed.

I am also grateful to my family and friends, Thank you so much for your reassurance and understanding. Your support has been a much needed anchor throughout my master's and during the period of my graduation.

Finally, I would like to acknowledge anyone who even in small ways contributed to my design and report.