SHAPING SPACES WHERE CHILDREN BLOOM

CAROLINE VERBOOG

SHAPING SPACES WHERE CHILDREN BLOOM

An architectural approach for the design of elementary schools to flourish the healthy development of children

TU Delft

Research
2023/2024

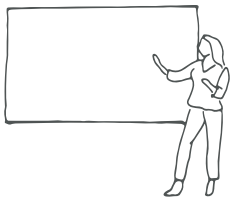
Delft Faculty of Architecture and the Built Environment
Department of Architecture
Graduation studio Explore Lab

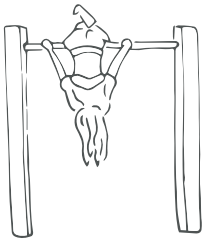
Tutors

Research tutor:	Machiel van Dorst
Design tutor:	Veerle de Vries
Builing technology tutor:	Rufus Van den Ban

Author
Caroline Verboog
4594126

CONTENTS





01

FRAME WORK

A PERSONAL VIEW

As I reminisce about my elementary school years, my mind instinctively wanders back to grade 5 with Miss Esther. I vividly remember my circle of friends, the layout of the school building, and, most notably, the fondness I held for Miss Esther. During this time, my brother, Victor, was in grade 7, going home with homework assignments that filled me with an odd sense of envy. Yes, you might as well call me a bit of a nerd, but I desperately yearned for that academic engagement. Fueled by this desire, I approached Miss Esther to inquire if I, too, could be learning beyond the classroom. Her initial look of confusion quickly morphed into one of enthusiastic agreement, “Of course, you can.” Days later, I was presented with a ‘flippo’ themed binder filled with extra assignments ranging from math to language, all of which I eagerly tackled after school. I wouldn’t necessarily claim I was more intelligent than my peers, but my thirst for knowledge seemed to surpass theirs during that time.

A year on, my family relocated to a new city, necessitating my transfer to a different school. This new environment was less culturally diverse, and my hobbies, such as water polo, coupled with my curly hair, marked me as slightly different. Regrettably, those years were less enjoyable. It was only years later, during my Bachelor studies, that I realized the profound impact those challenging elementary school years had on my development. Bullying, a trauma not confined to the moment but lingering into adulthood, catalyzed my perfectionism—a direct result of my adverse childhood experiences.

Educational environments, as seen through the lens of my experiences with Miss Esther and the contrasting atmosphere of my subsequent school, highlight the critical role that space and place play in fostering a sense of belonging, curiosity, and, ultimately, a positive self-concept. The variance in cultural diversity and extracurricular interests further accentuates the importance of inclusive design in educational settings—a principle that supports every child’s unique path to learning and self-discovery. Primary school is a place of memories and the debut of creating a person.

As my university years progressed, my understanding of architecture, as well as its intimate connection with psychology, deepened. This interplay sparked a passion within me, leading me to wonder whether architectural design could influence bullying behaviors among elementary school children.

Over a century ago, the subject of child psychology has been introduced. Children perceive the world in a magical, imaginary way which is different from adults’ perception of space and events. Researchers acknowledged the stakes of understanding the influences of the physical and social environment for the children’s future development. The purpose of this carefully shaped environment is the promotion of the child’s physical, psychological, and social development, as well as functioning as an educational space for the evolution of pedagogical processes.

The intersection of child psychology and architecture offers a fascinating lens through which to examine the development of children within educational environments. The physical space where children learn and socialize plays a crucial role in their psychological development, influencing their behaviors, emotions, and social interactions. For instance, the design and organization of classrooms, playgrounds, and common areas can either promote a sense of belonging and community or exacerbate feelings of isolation and exclusion. The architectural elements of a school, such as lighting, color, and spatial layout, can significantly affect children’s mood, concentration, and overall well-being. A well-lit, vibrant classroom may inspire creativity and learning, while a cramped, dimly lit space may contribute to anxiety and discomfort. Similarly, the accessibility of safe, inclusive spaces for social interaction can encourage positive peer relationships and reduce opportunities for bullying.

The anecdotal reflections on my elementary school experiences serve as a personal testament to the profound impact of our early environments on our psychological development. It brings to light the lasting impact of peer interactions, whether positive or negative, on a child’s psychological development. As such, architectural and educational frameworks must be designed with a deep understanding of child psychology, aiming not only to facilitate learning but also to nurture resilience, empathy, and a healthy sense of self amidst the diverse challenges children face.

This thesis explores the symbiotic relationship between the intangible realm of child psychology and tanglible world of architecture, advocating for spaces that are not merely places of learning but sanctuaries that support and reflect the multifaceted nature of childhood development. By analyzing the intricate relationship between a child’s psychological development and their physical surroundings, we can begin to design schools that are not just buildings, but nurturing spaces that cater to the diverse needs of all students, laying a solid foundation for their future.

BLOOMING CHILDREN

"Children are like tiny flowers; they are varied and need care, but each is beautiful alone and glorious when seen in the community of peers."

- Friendrich Froebel

Friedrich Froebel, a German educationalist and founder of the kindergarten system, is renowned for his pioneering vision of early childhood education. His profound understanding of children's development led him to draw an evocative comparison between children and flowers, a metaphor that encapsulates the essence of his educational philosophy. Just as flowers require the right environment—soil, water, sunlight—to bloom into their full beauty and potential, Froebel believed that children, too, flourish when nurtured in an environment that is conducive to their growth and development.

At the heart of Froebel's comparison lies the recognition of the individuality and innate potential of each child, much like every flower in a garden possesses its unique beauty and characteristics. He argued that just as a gardener does not shape the flowers but rather provides the conditions under which they can grow and develop naturally, educators should create a supportive and enriching environment that allows children to unfold their innate capabilities and interests. They should observe and understand the unique development rhythm of each child, intervening gently to guide and support rather than to mold and shape forcibly. This diversity necessitates individualized attention and care, tailored to the specific needs and rhythms of each child's development. Just as some flowers thrive in the shade while others bask in direct sunlight, children have varied needs that must be met with understanding and flexibility.

Froebel's educational approach emphasized the importance of play in children's learning, viewing it as the natural, self-directed process through which children explore their world, understand concepts, and express their innermost thoughts and feelings. This mirrors the way flowers turn towards the sun, instinctively seeking the light they need to grow. Through play, children, like flowers, reach towards the light of knowledge, understanding, and self-expression.

Furthermore, Froebel's use of "gifts" and "occupations" - carefully designed educational materials and activities - reflects his understanding of providing the right nutrients for the young minds to absorb. Just as a gardener selects the appropriate fertilizers and regimes for different types of flowers, Froebel designed his educational tools to cater to the diverse needs and stages of children's development, ensuring a harmonious growth akin to that of a well-tended garden.

Friedrich Froebel's metaphor of comparing children to flowers beautifully illustrates his vision of education as a nurturing process that respects the individuality of each child and fosters their natural development. By advocating for an environment that encourages exploration, creativity, and self-expression, Froebel's legacy continues to bloom in the field of early childhood education, inspiring generations of educators to cultivate the potential within each child, allowing them to blossom into their fullest selves.

As Froebel compares children to blossoming flowers, suggesting they can also resemble neglected ones. Just as a flower left untended, with poor soil quality or insufficient sunlight, may struggle to thrive, so too can a child's development be affected if not nurtured adequately. It is likely that the flower will gradually become less vibrant and struggle to maintain its beauty. This analogy extends to human life. Similar to how a flower may gradually lose vitality and struggle to maintain its beauty, a child facing traumatic events or ongoing harm may encounter difficulties in their growth and development. Instances of trauma during childhood (ages 0-17), termed Adverse Childhood Experiences (ACEs), encompass various potentially traumatic events such as violence, abuse, neglect, or exposure to instability within the family environment due to parental issues like substance misuse or mental health problems. Adverse Childhood Experiences (ACEs) can also extend into educational settings, particularly in scenarios where bullying is prevalent or when institutions do not support or celebrate the individuality of each child. Such environments can exacerbate the negative impacts of ACEs, potentially leading to further emotional and psychological distress.

Drawing from Froebel's comparison of children to flowers, it becomes evident that educational spaces must be safe, supportive, centered on play, holistic, and attuned to the unique needs of each child. Creating such environments is vital in counteracting the negative consequences of adverse experiences and aiding in the wholesome development of all children.

Figure 1: *Traumatic event in the bloom of flowers/children*

BACKGROUND

A person's identity is correlated to their experience of a place, especially during childhood; the formative years when personality is being shaped. The accumulation of experiences and knowledge that has been formed during childhood results in who we become as individual adults (Dudek, 2005). A person's development is a continuous process influenced by many factors. Development refers to the process in which the body, brain, abilities and behaviour of the infant, child or adult become more complex and continues to mature throughout life. It involves cognition, memory, attention, language, and communication, as well as feelings, relationships, and sensory-motor skills. A child's brain is not a rigid structure which is solely genetically pre-determined. It allows external stimulations from experiences to form and change neurological connections. Children are actively stretching their own capacities as they observe and interact with people, objects, spaces, and situations in their surroundings. Development is a complex and intertwined process as one domain always influences other domains (Early Education, n.d.).

Children are born with a natural sense of exploration and eagerness to explore their physical world. Psychologist Jean Piaget, known for his theory of cognitive development and epistemological view, argues children begin developing their sense of place during early childhood. A sense of place evolves from experiences in the world and the meaning discovered within those experiences. The definition of the words place and space differ. While space is attributed to a physical location, place is used to describe our attachment to certain locations. Both spaces and places are fundamental considerations in the study of the development of human behaviour and experience. Acquiring this sense of place allows children to acknowledge their importance in the physical world around them, as well as the social and cultural hub they share with others. Children need to develop a sense of place to understand their status in the world and to form a sense of self-identity (Mankiw, 2015).

Amidst all realms of childhood, a child's home is the most important place. However, school and outdoor play areas become more important in the socialisation process of a child's development. Among those domains, school is the sole place where social, cultural, and physical factors interlace. Along with this, a child spends most of it's day in an elementary school setting, including after school hours. Thus, the school becomes a child's second home where a sense of place becomes important. The educational environment is an essential aspect to a child's development (Rieh, 2020). Developing this sense of place is connected to a sense of belonging. This sense of belonging contributes to children's overall social and emotional development and is thus an essential aspect of school design (Mankiw, 2015). Children are born with a natural sense of exploration and that they interpret the realities of the world through their senses of touch, sight, smell and hearing (Piaget). Unstimulating environments tend to dull or deafen the child's perfections. School must be capable of supporting and stimulating sensory perceptions in order to develop and refine them. The arrangement of a classroom space unconsciously communicates expectations for behaviour, which is an essential aspect of education, part of the hidden curriculum (Dudek, 2005).

PROBLEM FIELD

Over the last centuries, the gradual switch from mass education to individual education has taken place. The concept of mass education emerged at the beginning of the nineteenth century. At that time, the Industrial Revolution had created a demand for citizens that would fit into this new industrialised world. Education became a factory where children were taught basic skills and knowledge that would enable them to participate in the economy and society. School was a place to control and discipline children in large groups, with an emphasis on rote learning. The teacher was considered the sole authority figure and the classroom was arranged to reinforce this. Desks faced the teacher at the front of the classroom implying its role and order was maintained through strict rules and punishment. Classrooms were austere spaces with little consideration to the needs of the individual child (Lange, 2018).

As the twentieth century progressed, the philosophy of 'Form Follows Function' also applied to educational buildings. The shape and form of the school's design was fit to its educationists' efficiency needs. School design was focused on functional efficiency where all spaces had a dedicated function with little scope for alternative uses. However, new pedagogical theories also emerged at the same time. Jean Piaget's theory of cognitive development implied children go through distinct stages of development growing up. According to him, education is to facilitate this development instead of exclusively imparting knowledge. He emphasised the importance of active learning where children are encouraged to explore and discover new concepts on their own. Aside from active learning, Piaget also pressed the importance of individualised education where pace and style of learning was adapted to needs of an individual child (Dudek, 2005).

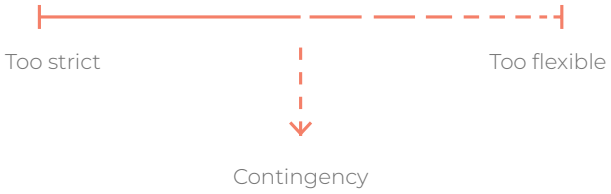


Figure 2: *School design extremities*

Educators began to recognise the uniqueness of all children, regarding learning style, pace, and preferences. The traditional one-size-fits-all method of education was no longer suitable. With a new wave of theories emerging, it became apparent buildings needed to allow activities that did not fit in the primarily function. Attempts at maximising flexibility in education facilities often resulted in children losing their sense of place. Innovating approaches are required to support the expanding possibilities of learning of the twenty first century. A concept of contingency emerged, situating itself between the too strict and too flexible designs. Flexibility offers the opportunity for engaging users in taking creative action. Along with this concept, the Montessori method took its place in the world of educational system and building design. It implied the importance of allowing children to learn at their own pace and allowing them to explore and discover new concepts for themselves. The classroom layout was designed to promote independence and self-directive learning. The aim of the design was for children to understand the space with no teacher's help needed. The teacher became a facilitator rather than an authority figure (Dudek, 2005).

Educational architecture is in constant development aiming to design places where learning and development is the objective. Individualised education is crucial component of modern education systems and is likely to continue to evolve as new pedagogical theories and technologies emerge.

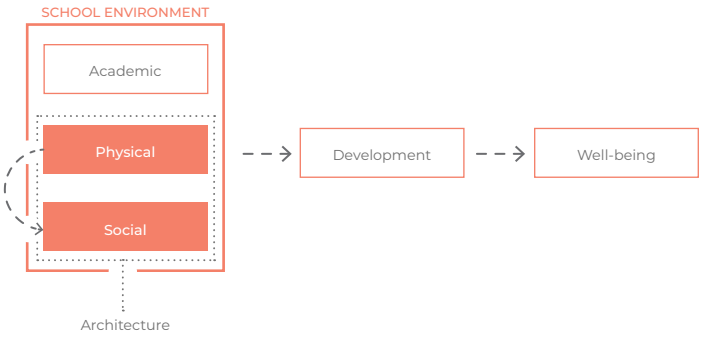


Figure 3: *Influence of school environment on children's well-being*

In the realm of educational research, the impact of school environments on the developmental trajectories of young children remains a topic of keen interest and considerable debate. This area of study is crucial, as it encompasses not only the academic learning that takes place within classroom walls but also the broader social, emotional, and cognitive development that occurs in these formative years. Recognizing the pivotal role that early education plays in laying the foundation for lifelong learning and well-being, I embarked on a journey to explore this complex interplay between school environments and child development. My investigation was driven by a deep-seated belief that understanding these dynamics is essential for creating educational spaces that nurture, challenge, and inspire young minds.

This inquiry led me to pose the following research question:

How do school environments influence the development of children between the ages of 4 to 8 years old?

As my research journey unfolded, I encountered a pivotal shift in focus. Initially, my investigation sought to understand the actual impact of school environments on children's development. However, as I delved deeper into the subject, I became increasingly aware of a significant gap: many schools were falling short of their fundamental role in imparting essential life lessons to children. This realization prompted me to reframe my research question. Instead of exploring the actual influence of school environments, I began to examine the ideal impact these environments should have. Thus, my research question evolved to:

*How **should** school environments influence the development of children between the ages of 4 to 8 years old?*

This shift not only broadened the scope of my inquiry but also highlighted the critical need for educational systems to fulfill their educational and developmental mandates more effectively.

The journey from questioning the current state to envisioning the ideal role of school environments in child development is not just an academic exercise but a clarion call for action towards shaping a more enlightened and inclusive future for all children.

METHODOLOGY

Children spend around fifty percent of their daytime a school; this childhood institutional environment has lots of influence on their development due to interactions with the surrounding on the social and physical ladder. In order to get an understanding on children's behaviour and learning environments, fieldwork will be done at primary schools. Since this methodology requires lots of time and attention, the case studies will favour qualitative research over quantitative research. Various schools will be used as case studies to get a grip on the magical mind of children in during different scenarios within the Dutch educational system. The schools will host around the same number of children but will have essential differences besides the educational system. The differences may lay in the location or advancement to high school level of education. As primary schools often host room for children between the ages of 4 to 12 years old, this age range will be divided into the age group 4-8 and 8-12. The main source of information will be in the age group 4-8 since they belong in the category of ages that has most influence on the development of children. The age group 8-12 could be analysed in future research.

The research will consist of 3 stages:
1. Literature Approach
2. Naturalistic Approach
3. Participatory Approach

At the end of the stages, the different approaches will be combined to determine how children use spaces, deciding on areas of continuity or areas of change, and what places do children see as important.

Stage one: Literature Approach (facts and figures)
Stage one will focus on facts and figures through literature. The architectural background will be approached, as well as the theory of psychology regarding a child's development. The relation between the social and physical environment and the influence of school design on the development of children will be reviewed.

Stage two: Naturalistic Approach (adult view)
The case study research will be divided into two approaches: passive and active. Stage two of the research will focus on the passive approach; I will seek to get an understanding of the world through the eyes of the child with my own viewpoint and observations. This will be done before prior to the active approach during site visit. By means of literature knowledge and background expertise, I will observe the relationship between children and their physical and social environment. Alongside my observation, conversations with parents and teachers could take place. This approach revolves around the exterior outlook, often an adult's, on children's day-to-day life.

Naturalistic observation focusses on the behaviour of participants in the environment where the phenomena occur. This enables me to see the children make choices and react to situations in their natural settings as opposed to structured interviews. The observations are made as unobtrusively as possible, by not interacting with the participants in any way.

Stage three: Participatory Approach (child view)
When doing research with children, traditional methods will not enable young children the possibility to express their 'voice'. Interviews may be too long and intense for children or they find it challenging to express themselves through verbal skills. I would like to find ways of harnessing young children's creativity and engagement with their world, while not over-simplifying approaches. Listening to children and retrieving information is a complex, multifaceted, and sometimes surprising process. Children should not be seen as incompetent and passive objects in research processes or society in general, but as social actors (Qvortrup et al, 1994). They have a unique body of knowledge about living in their environment in comparison to adults in that same setting. The viewpoint of children as competent users and explorers of their surroundings leads to a distinct research method developed by researchers Alison Clark and Pete Moss; the Mosaic Approach. It represents the bringing together of different pieces – or perspectives - to create an image of the children's world using their strengths, local knowledge, attention to detail and, visual and verbal communication skills. Central in this approach is the question "What does it mean to be in this space?". This multi-method allows children with different abilities and interests to take part in the individual and collective process. The participatory approach treats children as the experts of their own lives and enables the children to communicate their feelings and opinions in verbal and nonverbal ways through formal and informal interviews, as well as planned and unplanned interactions.

The central role of children in this research method contrasts the day-to-day position that they must endure where adults take the lead in education and creation of environments. Having children decide the direction of the research can cause the study to be led into unplanned areas. An open-minded and flexible mindset should be applied from the start to discover the unexpected mind of children.

Participatory tools allow children to set more questions, while also providing answers at the same time. These various tools are:

- Child conferencing
- Camera's
- Tours

Child conferencing opens the possibility to have formal conversations with children about their educational institution, in which they are considered the expert of the situation. These one to one or group interviews are conducted in a short, structured manner. In advanced prepared questions guide the conversations but they are not leading. The dialogue will have open questions with a focus on important people, places, and activities they enjoy doing, or find hard. A formal conversation can turn into informal exchanges between peers or me, or be conducted on the move as children take me to places they are talking about.

Not all children are interested in talking in formal conversations. For them, other tools, such as the camera, would be more convenient. This participatory tool allows children to communicate in playful and informal ways. It displays the silent voice of the children behind the camera. They can explore their competency with a camera to represent objects, as well as the context of the object, the space itself. Asking them questions before hand such as "What do you think is important at school?", "What is your favourite area?", "What spot do you not like?". Giving children single use camera's provides children freedom without giving them adult anxiety about expensive equipment. Additionally, they can express pride through photographs, which is not always the case with drawings and paintings (Clark, 2011).

The tools of conferencing and usage of cameras can be combined with the tool of onsite tours directed by the students. They lead the way and decide what route we are talking and what they want to share about the space. This allows me to also observe the routes children take to go from one space to another and hear the different items or areas that does or does not stand out for each child. With this tool, children can point out subjects they are talking about in that specific moment, and I can witness the interesting look of children on their surroundings. Such tours can be done either individually, or with multiple children at the same time which allows them to have discussion amongst each other.

02

RESEARCH

THROUGH CHILDREN'S EYES

The interplay between an individual's development and their environment is multifaceted, encompassing psychological, social, and physical dimensions. The settings in which we find ourselves—our homes, schools, and workplaces—do more than merely house our activities; they actively shape our mental and physical growth. This is particularly true during childhood, a period characterized by rapid development and learning. The architecture and design of our surroundings can have profound impacts on our health and well-being, influencing not just our physical comfort but also our mental and emotional states (Day, 2007).

As adults perceive the world through perception, memory and experience, children are lacking knowledge of the world. Children form a connection to their environment through the use of all of their senses to which their perceptual systems evolve during the period of infancy. Through exploration and unambiguous interaction with their environment, children broaden their mental and emotional abilities. As motion and touch permit children to obtain more information, kinaesthesia becomes an important aspect in designing spaces for children. A child's environment should force a child to be alert to external stimuli by means of movement, and social actions should encourage them to form a connection with that place. Personal connection between a child and its entourage is needed to create opportunities of engagement, discovery, creativity and revelation. Allowance of gradual change or diversity keeps the child constantly fascinated. Adults have the ability to classify spaces and buildings as distinguished functions, whereas children allow their imagination and creativity to transform spaces into their own little worlds (Mistrey, 2011).

Adults tend to view spaces in terms of functionality and purpose. In contrast, children see them as realms of possibility and imagination. To a child, the world is a vast, sensory-rich exploratorium where every element—color, light, sound, smell, texture, and shape—offers an invitation to explore and learn. Whereas adults might prioritize improving or optimizing their surroundings, children are more inclined to immerse themselves in the sensory and imaginative potential of a space. When adults are involved in designing spaces such as schools, their focus often lies on practicality, energy efficiency, aesthetic appeal, and cost-effectiveness. While these considerations are undoubtedly important, they can sometimes overlook how children experience and engage with these environments.

Jean Piaget, a renowned developmental psychologist, argued that knowledge arises from the dynamic interplay between the individual and their environment. He observed that young children, particularly those under six, learn predominantly through direct experience rather than abstract instruction. This hands-on approach to learning underscores the importance of creating environments that are rich in sensory stimuli and opportunities for exploration. When children encounter consistent and coherent sensory experiences, they are better able to integrate these into a cohesive understanding of the world. Conversely, sensory inconsistency or impoverished environments can lead to diminished interest and attention.

Children's innate creativity is fueled by their ongoing exploration of the sensory world. Environments that offer a wealth of sensory experiences and encourage imaginative play can significantly enhance children's creative development. Christopher Day (2007) uses the word 'predictable' to define spaces that are safe and legible, but yet stimulating and flexible. Growing up in predictable environments filled with character, giving children the opportunity to create personal identity along with place identity and emotional security. However, predictable environments can also become unexciting for children causing a lack of identifiable character. When children are placed into such uninteresting spaces, without the overview of an adult, A common issue in many schools can evolve; bullying. This problem can scar children for life, but the bully can also be caused as a result of insecurity due to its environment. It can be argued that bullying could be decreased through the correct formation of scholar architecture. The implementation of defensible space and no unsupervised areas should reduce opportunities of the emergence of aggressiveness. Children attending kindergarten can often distinguish moods to a place and begin to be interested in the usage of space. Once children can be aware of their individuality, they inhabit a world in the midst of themselves and the environment. It is an untouchable space between fact and fantasy, in which they have the power to shape creative thinking and achieve individuality. Imagination guides children to regulate thoughts and feelings, to which fantasy and symbolism is essential for the intellectual and emotional development of children.

With the consideration of imagination in architecture for the young, sterile buildings and rectilinear rooms extract the fantasy out of the child's mind and withdraw the envy to play in a creative manner. Adaptability is necessary for the increase of creative play, and solid buildings can permit a sense of security for children. Experiential possibilities in the surroundings increase their

inventiveness and challenges provide children the option to explore the little world of kindergarten. Simple architecture can convey moods and character recognisable for children. Mood individuality in spaces can transfer distinguishable identities that they can optionally relate to function; cosy and warm, spacious and airy, soft and quiet or light and open. This distinctiveness in spaces has a major significance for the building of identity and character, but it should preserve coherence throughout the whole. A lack of coherence can cause children to feel disjointed and insecure, as they can not understand their surroundings. Creating this sense of spatial individuality has its focus on the usage of form and materials. Hence the broad research about the application of colour in children's environments (Mistrey, 2011).

Children are the main characters regarding their own development in which the environment should be the reactor to allow children to be in a constant interplay of activities that stimulate their development. The cognitive development of children is a reaction of the entire ecological environment in which a child has been placed by external factors. Areas should be distinguished and give children the opportunity to choose a place that matches their current mood. A messy or clean, soft or intense space can correspond to various envies of children, it should engage in their level of activity and physical energy.

Acknowledging the intricate relationship between environment, creativity, and cognitive development, proponents of the multivariate approach in child psychology argue that fostering an environment conducive to creative exploration is paramount for the holistic development of children. They emphasize that creativity is not an isolated faculty but deeply intertwined with intelligence and emotional depth, serving as a catalyst for the enhancement of these faculties. The approach highlights that every child's brain harbors the potential for intelligence, emotional richness, and creative insight. However, for these potentials to be fully realized, children need environments that actively encourage imaginative play and creative problem-solving. Such environments enable children to experiment, innovate, and engage with the world in ways that nurture their intellectual and emotional growth simultaneously. By emphasizing the sustainable development of creativity, this perspective advocates for spaces and caregiving practices that are not only protective and nurturing but are also dynamic and stimulating. This ensures that children are not only cared for but are also challenged and inspired, laying a foundation for them to develop into individuals capable of original thought, emotional resilience, and adaptive problem-solving (Kopec, 2006).

HOLISTIC DEVELOPMENT

Creative domain

Expression
Innovation
Art, music, imaginative play

Language domain

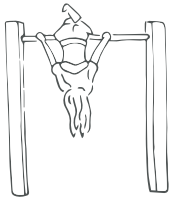
Vocabulary
Syntax
Fluency

Cognitive domain

Memory
Problem-solving
Attention

Social-emotional domain

Empathy
Resilience
Communication



Physical domain

Gross motor skills (large movements)
Fine motor skills (small movements)
Movement, strenght and coordination

Figure 4: *Holistic development domains*

Childhood is the most rapid stage of human development. The first years of the human life cycle, from birth to the age of eight, are the most critical to establish a healthy cognitive, social, physical and emotional development. Early childhood is an influential time for the determination of child growth, and behavioural and mental development. During these years, a range of stimuli influence the prosperity of the human being; their parents, genes, classmates, toys, and the natural environment. Through the sensory mechanisms of the visual, tactile, aural, olfactory and the haptic, a child's evolution is enhanced (Day, 2007).

A child's development is influenced by a continual interaction between the notions of nature and nurture. They contribute to the traits of human behaviour, such as personality, cognitive traits, temperament and psychopathology, a Gestalt for psychiatric disorders (Schultze-Lutter, 2018). Nature refers to biological or genetic influences on human traits, whereas nurture defines the influences from the individual's environment. Early childhood events and entourages have the most impact on what kind of adult we become, in comparison to genetics. Behaviour is a complex phenomenon that cannot solely be defined by a quantity of nature or nurture influences. It can not be expressed numerically or solved in a quantitative manner, but nature and nurture are constantly intertwined. Children cannot be influenced by genetics independently of environmental factors, but always cooperate to form human traits (McLeod, 2018).

The concept of holistic development has grown in popularity in recent years. Academic achievement alone can't guarentee a bright and successful life and profession. It seeks to enhance these skills in the early stage of life, which will prepare them to meet the challenges and difficulties of daily life in the future. These skills also appear crucial not only for success in professional life but also for developing a strong and balanced personality. Every child follows their unique developmental timeline, influenced by various factors like age, genetics and the environment. These developmental domains are interconnected, and progress in one area often supports development in another. A child's growth is a complex interplay of various factors, and achievements in one aspect often positively impact developments in others There are five main domains of a child's development: physical, cognitive, language, social-emotional and creative (Fraser-Thill, 2021).

The *physical domain* covers physical growth, such as increase in height, weight and muscular strength. Additionally, the physical domain consists of the development of motor skills, including gross and fine motor skills and the development of the 5 senses.

Gross motor skills involve moving the large muscles of the body, as the arms, legs, torso and back. Whole-body movements allow us to do physical activities such as walking running, jumping, balancing and lifting. Fine motor skills revolves around the coordination between the eyes and the small body muscles, such as the hands, wrists and fingers. These are necessary to achieve daily activities such as grasping food, turning door knobs and burshing teeth. A child's physical development depends on their physical health and activities. Recieving proper care and having the ability to be active and engage with their environment is necessary for the development of the physical domain.

The *cognitive domain* involves how children think, explore and figure things out as well as their problem-solving skills and acquisition of knowledge. The cognitive domain is also referred to as the intellectual growth of a child, their brain development and their capacity to learn and understand the world around them. Unlike other developmental domains, the cognitive domain involves a classification based on age to assess a child's cognitive abilities. This means that there are age-related benchmarks to gauge a child's cognitive development and understanding of their surroundings. In essence, the cognitive domain is concerned with the mental aspects of a child's growth and their evolving capacity to make sense of the information and challenges they encounter.

The *social-emotional domain* focuses on the interaction and formation of relationships with others and how they experience, express and manage their own emotions as well as emotions of others. The begin to understand ho they are, what they are feeling and how they interact with other people. A healthy development of a child's social-emotional milestone begins at home with their parents and caregivers. This development then extends to the classroom, where children further enhance their social skills and gain more experience in navigating social settings. Essentially, the social-emotional domain encompasses the emotional intelligence and relational abilities that contribute significantly to a child's overall development.

The *language domain* includes a child's ability to both understand what is being communicated to them and to express themselves verbally. Language development plays a crucial role in reinforcing progress in other early childhood domains. To enhance this domain, engaging in activities like reading, singing, and talking with a child is of utmost importance. These interactive practices not only contribute significantly to language development but also foster a child's overall cognitive and social-emotional growth. Reading, singing, and talking create opportunities for language exposure, vocabulary expansion, and the development of communication skills, laying a strong foundation for a child's holistic development.

In the *creative domain*, children are encouraged to express themselves in unique ways, fostering creativity, innovation, and a sense of wonder. Engaging in creative activities, such as art, music, and imaginative play, not only nurtures a child's artistic abilities but also contributes to their overall cognitive, emotional, and social development. The creative domain is a space where a child's imagination flourishes, paving the way for the formation of new ideas and the expression of their individuality.

Understanding and nurturing these developmental domains are essential for parents, caregivers, and educators. By recognizing the interconnectedness of these aspects and providing enriching experiences, we can create a supportive environment that fosters the holistic development of children. Investing in the early years lays the groundwork for a brighter future, as these formative stages shape the individuals they will become, contributing to a society that values well-rounded, creative, and emotionally intelligent individuals (Fraser-Thill, 2021).

STAGES OF COGNITIVE DEVELOPMENT

Developmental psychologist and philosopher Jean Piaget (1896-1980) developed his theory of cognitive development in children which is influenced by the notions of nature and nurture. Similarly, he depicted this development as a combination of continuities and discontinuities that work together from birth to propel forward. Children are mentally active from the moment of birth from which mental and physical activities contribute to their development. Children construct intelligence for themselves in response to their daily experiences. The three most important continual processes are generating hypotheses, performing experiments and drawing conclusions from their made observations. Additionally to this theory, children gain more knowledge through their own successes and mistakes instead of depending on instructions from others. They are intrinsically motivated to learn, but do not need rewards from others when they do so (Siegler et al. 2017).

The theory of cognitive development is based on four stages which are organised in patterns of habits of behaviour in daily life. Each stage represents a coherent whole to understand an individual's experience with discontinuous intellectual transitions from one entity to the next. In each stage, the child exhibits new abilities of understanding the surrounding world. The four stages are: the sensorimotor stage (birth to two years), preoperational stage (two to seven years), concrete operational stage (seven to twelve years) and the formal operational stage (twelve to adulthood) (Siegler et al. 2017).

The first stage of development, known as the *sensorimotor stage,* commences at birth and concludes around the age of 2. During this stage, children experience the world primarily through their own senses and do not comprehend the phenomenon of distinguishment. They view everything as a unified entity, unable to distinguish between their own sensations and their surroundings. They learn by experiencing the world around them without being able to manipulate the information they received.

The second stage, the *preoperational stage*, revolves around the development of linguistic skills and symbolic thinking. However, children still lack the ability for operational thought, which involves logical and systematic manipulation of mental representations. Piaget characterises this stage as egocentric, as children are incapable of perceiving the world from perspectives other than their own. They often assume that others share their thoughts, feelings and viewpoints. As emotional qualities are accorded to things and places, the aspect of being is more important than the appearance of it. Inanimate things are mediators of the soul and will, and thus children use their environment to understand themselves and their social relationships. They engage in symbolic play and start to use symbols as language to represent objects and concepts. Their thinking is characterized by centration, where they focus on one aspect of a situation while neglecting other relevant factors. Between the age of three and five years old, on the edge of the kindergarten frame, children commence to differentiate their own mood from place mood. On the border of the kindergarten period, the usage of space begins to wander in the children's mind. They begin with the creation of spaces with fabrics, furniture and other items which adults assume had other functions.

As space and time consciousness develops, children enter the third stage of development, the *concrete operational stage*. Children between the ages of 7 and 11 years develop self-awareness and begin to form a distinction between the self and the environment to which the concept of the "mine" and the "I" emerges. They seek for their own personal space in their journey of individuality. The decline of egocentrism results in children appreciating that others may have different thoughts and viewpoints. They make substantial progress in their ability to think logically about concrete events and objects as well as performing mental operations, which are reversible actions that they can apply to real, concrete situations. Children no longer duplicate their environment, but distantiate themselves from their surroundings. They are led by feelings accorded to events for inspiration and willingness to learn. Their conscious emotions are emerging and begin to understand the notions of right and wrong. It is only from the age of eight and nine years old that their sense of space rises. They begin to envision space and move around it in their minds. Whereas young children learn through the sense of touch and hapticity, children of this age understand norms and values without the need of bodily experiences. They evolved from the ability to copy and observe to the awareness of the individual. The concrete operational stage represents a crucial step in cognitive development, setting the stage for more abstract and complex thinking.

The *formal operational stage*, is the fourth and final stage in Piaget's cognitive development theory, typically occurring from adolescence onward. Teenagers attribute conscious values to aesthetics of their surroundings. Surroundings can make them feel positive or negative about themselves The stage is characterised by the development of advanced and abstract thinking, contemplating hypothetical scenarios and grasping concepts beyond immediate, tangible experiences.

Metacognitive abilities develop, allowing for introspective reflection and effective planning. According to Piaget, not all individuals necessarily reach this stage (Day, 2007).

It is important to note that not everyone progresses through these stages at the same rate, and some individuals may not reach the formal operational stage. Piaget's theory has been influential, but later research has suggested that development is more continuous and individualised than he originally proposed. Nevertheless, his stages provide a helpful framework for understanding patters of cognitive development in children.

A multitude of researchers have been investigating the development of children, to which they all have a similar outcome. Active construction of knowledge in children can be achieved through discovery and curiosity, which can only be activated through perpetual interaction with the environment and people. Environments in which children are not engaged to be curious to the world around them, will not motivate them to learn by themselves.

SENSIMOTOR STAGE

0 - 2

Cause and effect

PREOPERATIONAL STAGE

2 - 7

Make believe and imagination

CONCRETE OPERATIONAL STAGE

7 - 11

Logical and conceptual

FORMAL OPERATIONAL STAGE

11 - adult

Hypothetical and abstract conceptualisation

Figure 5: *Piaget's stages of cognitive development*

BIOECOLOGICAL SYSTEM THEORY

Understanding human development is a multifaceted concept that requires comprehensive theories which encapsulates more than just the developmental domains of children. Human development is a complex interplay between an individual and their changing environment. One of the most influential theories that examine this dynamic interaction is the Bioecological Systems Theory, proposed by Urie Bronfenbrenner. This theory provides a robust framework for analyzing the various environmental systems and their impact on individual development throughout different stages of life. Originally introduced in the 1970s as the Ecological Systems Theory, Bronfenbrenner's model has undergone significant revisions, evolving into the Bioecological Systems Theory, which emphasizes not just the environmental contexts of development but also the biological nature of the individual as a core aspect of these interactions.

Bronfenbrenner's theory articulates the development of individuals as a phenomenally complex process influenced by different layers of environmental systems, ranging from immediate personal interactions to broad-based cultural elements. The theory categorizes these environmental influences into five nested and interconnected systems: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. Each of these systems plays a critical role in shaping individual behaviors, beliefs, and ultimately, development, through a process described by Bronfenbrenner as the "process-person-context-time" model. This model highlights the importance of interactions within and between these systems, influenced over time, thereby providing a profound understanding of the socio-cultural and biological dynamics that define human development.

At the heart of Bronfenbrenner's model is the concept of *the individual self,* which integrates elements of the classic 'nature vs. nurture' debate within the framework of human development. Beyond the influence of environmental factors, the model also acknowledges immutable biological elements intrinsic to each person. Our DNA plays a crucial role in shaping aspects of our identity such as gender, hair texture, and skin color, personality, among others. This genetic composition interacts with environmental conditions to mold our developmental outcomes, reflecting the intricate interplay between our biological heritage, the contexts in which we are raised and how our context can react on our biological heritage.

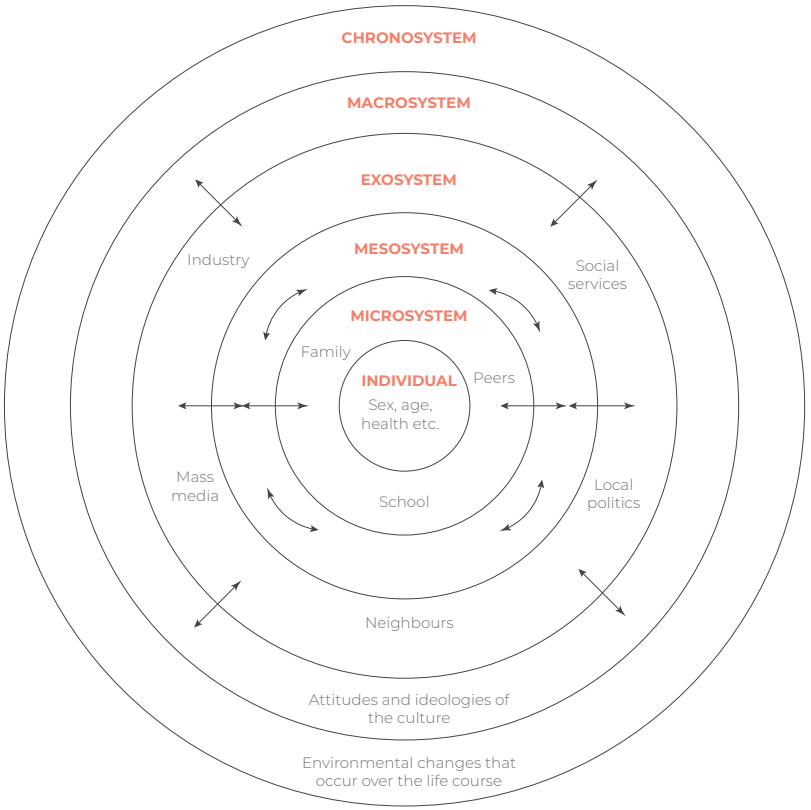


Figure 6: *Bronfenbrenner's bioecological systems theory*

The *microsystem* is the closest layer to the child and consists of environments that the child directly interacts with. This includes the family, school, peer group, and neighborhood play areas. The child's direct interactions with parents, teachers, and peers shape their development in significant ways. The parenting style at home, the educational methods at school, and interactions with friends all play crucial roles in influencing the child's cognitive, emotional, and social development.

The *mesosystem* consists of the interactions between the different parts of a child's microsystem. It is essentially the connections between the child's immediate environments, such as how a child's academic progress might be influenced by the interactions between school teachers and parents, or how the emotional well-being of the child could be impacted by a supportive relationship between the family and the child's friends.

The *exosystem* refers to the broader social system that does not involve the child directly but affects one or more of their microsystems. This includes parental workplaces, community-based health services, the local school board, and other entities that indirectly influence the child's development. For example, if a parent receives a promotion at work, this might lead to changes in family dynamics or available time with children, thereby affecting the child's emotional support.

The *macrosystem*, includes the broader cultural values, economic policies, social conditions, and political systems of the society. It shapes the child's development by influencing the structures and activities that make up the child's microsystem, such as cultural norms about gender roles which can shape the types of play activities children participate in or the subjects they study in school.

The *chronosystem*, though not a spatial layer, encompasses the dimension of time as it relates to a child's environment. Changes or consistencies over time in the child's environment (such as moving homes, changing schools, societal changes, or even global events like pandemics) are part of the chronosystem that influence the child's development trajectory.

Understanding the interactions between these systems helps to appreciate the complexity of influences that contribute to a child's development. Each layer interacts with the others, influencing and being influenced by the changes that occur within them. This holistic perspective emphasizes that child development is not only the result of immediate interactions within a closed environment but also influenced by multiple interconnected social layers and their evolution over time (Härkönen, 2007).

SPACE AND PLACE

The intertwining relationship between place, space, and the human experience shapes our personal identity, self-regulation, and overall well-being in profound ways. Place identity, a core aspect of our self-conception, is formed through our interactions with our surroundings. It reflects the significance of particular places in our lives and how these spaces contribute to our sense of self and personal narrative.

Memories play a pivotal role in this relationship. They anchor our experiences in specific places, infusing them with emotional significance that can alter our perception of these spaces. Positive memories can enhance a place's attractiveness, imbuing it with feelings of privacy, control, and security. On the flip side, negative associations, particularly those formed in childhood, can instill a sense of fear and anxiety, deeply influencing our behaviors and attitudes towards similar environments later in life.

Sense of place

The concept of "place" transcends mere geographical locations to encompass the rich tapestry of emotional, psychological, and experiential connections that individuals or groups form with specific locales. This phenomenon, deeply embedded in human consciousness, underscores the intricate relationship between environment and identity, particularly through the lens of emotional attachment and memory. The formation of place attachment is an emotional process where environments fulfill our emotional needs, thereby gaining meaning and significance in our lives. This bond is a two-way street; our environments shape us just as much as we imprint our identities upon them.

At the heart of understanding place is the acknowledgment that human existence is not just situated in space but is fundamentally interwoven with it. This spatial existence is not static; rather, it gains significance through the infusion of meaning—a transformation from mere space to "place" through emotional bonds and personal or collective narratives. Such a transformation is crucial for cultivating a sense of belonging and purpose, serving as a foundational element of human psychological needs and well-being.

The construction of a sense of place is especially pivotal during childhood, a period marked by rapid development and the shaping of identity. Early experiences with environments play a critical role in forming not only a child's understanding of the physical world but also their place within it. Piaget argued that cognitive development is inextricably linked to how children interact with their spatial and temporal surroundings. This interaction is not merely cognitive but is deeply emotional, suggesting that our earliest bonds with place lay the groundwork for our understanding of the world and ourselves.

Place identity

At the core of our relationship with spaces is the concept of place identity, a critical component of personal identity and self-regulation. Our memories of specific places, imbued with emotional significance, influence our perceptions, potentially distorting or altering how we see these spaces. The attractiveness of a place can be enhanced by our attachment to it, providing a sense of privacy, control, and security. Yet, negative associations, especially those formed in childhood, can instill fear and anxiety, affecting our behaviors in those environments. Forming attachments to particular environments fulfills emotional needs, assigning meaning to spaces. The relationship between humans and their surroundings is transactional and interactional, where both influence each other. Positive or negative meanings associated with a place can determine place attachment. Place identity serves the functions of defining individuals and providing self-efficacy and motivation for learning. Memories, often linked to objects and artifacts, are fundamental in forming meaning. The significance of place is evident in personalization, reflecting self-identity and influencing self-esteem. Place identity fulfills two primary roles: it shapes our sense of self and it boosts our confidence and drive to accomplish tasks, essentially enhancing our ability to learn and grow. The formation of place identity relies on a complex interplay between a person and their surroundings, characterized by a reciprocal and interactive relationship where influence is mutual. This dynamic process is supported by three fundamental elements:

1. Personal Characteristics and Behaviors:
The unique traits and actions of an individual shape, and are shaped by, their environment.

2. Availability of Facilities, Opportunities, and Resources:
The elements within an environment that facilitate or hinder the fulfillment of needs and desires.

3. Sense of Belonging:
The emotional connection or detachment one feels towards a place, significantly influencing place attachment.

Place attachment

Building on the foundation of place identity, place attachment represents the emotional bonds that form over time, connecting individuals not just to the physical aspects of a space but to its social fabric as well. This bond is characterized by feelings of comfort, security, and belonging, and is essential for identity regulation and privacy management. The strength of place attachment is influenced by the duration and quality of time spent in an environment, underscoring the importance of accessible, inclusive spaces like schools remaining open beyond traditional hours. Greater attachment is linked to increased ease in regulating privacy, an essential aspect of identity.

The interplay between the physical and social aspects of an environment crucially shapes the connection individuals form with places, influencing their sense of place identity and attachment. The extent to which an environment can be personalized, mirrors an individual's identity, and provides a feeling of belonging significantly impacts the strength of place attachments formed. On the other hand, environments that limit personal expression or do not fulfill emotional and physical needs can slow down the development of these essential connections, potentially resulting in feelings of detachment or estrangement.

In essence, the concept of place represents a deep and complex relationship between people and their environments, characterized by emotional bonds and memories shaped by experiences. Exploring the notion of place, especially from the perspective of childhood development, unveils profound insights into human nature, highlighting the critical role of supportive environments that encourage positive relationships and foster a strong sense of belonging (Rieh, 2020).

The intricate interplay between psychology and environment is far from a binary narrative of cause and effect. It involves a nuanced, dynamic interaction that shapes and reshapes individual and collective experiences. As we delve deeper into the psychological complexities of place and space, it becomes evident that human experiences, memories, and identities are not just influenced by our environments but are fundamentally co-created with them. Understanding the psychological facets of environmental interactions is not about finding straightforward answers but appreciating interconnected tapestry that forms the human experience in all its complexity. This recognition calls for thoughtful consideration in designing environments, such as schools and community spaces, that nurture positive associations and foster a deep, fulfilling sense of place and belonging.

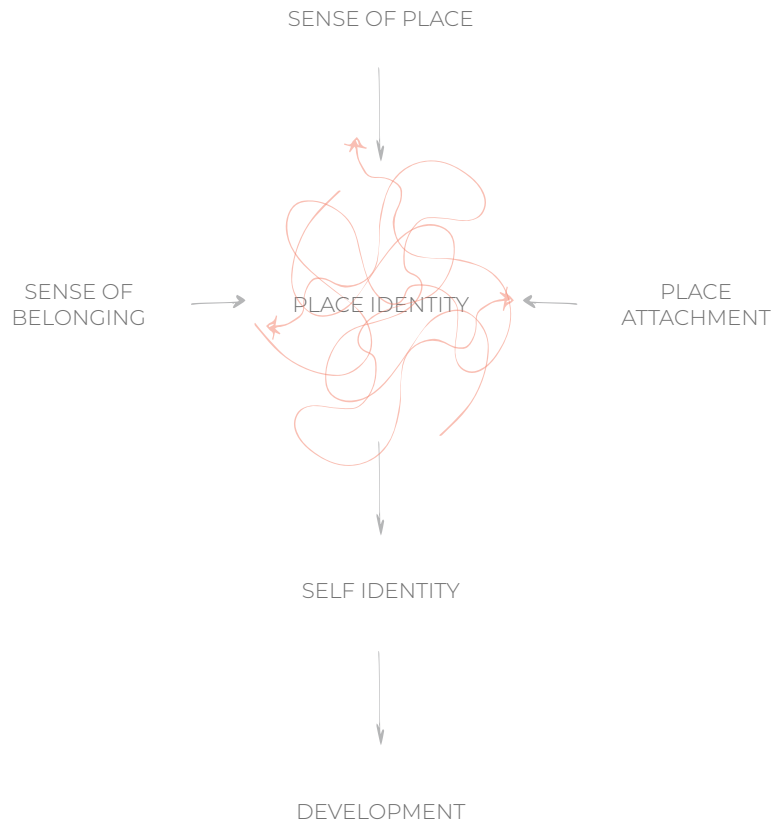


Figure 7: *Complex, intertwined connection from place to development*

SCHOOL AS A SECOND HOME

In the complex interplay of environments and personal identity, the spaces we inhabit play a crucial role in shaping our experiences, emotions, and behaviors. As the microsystem is the closest layer to the child, it has the most direct influence for their development. For most individuals - adults - , this hierarchy of significant spaces is typically organized with the home as the primary space, work as the secondary space, and leisure areas as the tertiary space. However, this order shifts for children, with school taking on the role of the secondary space - emphasizing the dynamic nature of our interactions with these environments - and the neighbourhood being the third space, as most leisure related events for children take place in their neighbourhood.

Figure 8: *Primary, Secundary and Tertiary spaces for children*

Children spend almost half of their day time in school settings and the importance of the sense of place in the school environments is increasing. For many children, primary school becomes a second home, a safe haven where they spend a significant portion of their formative years. This institution is not just about learning arithmetic or practicing spelling; it's a nurturing ground for personal growth, social skills, and discovering a sense of identity within a community (Rieh, 2020).

Each microsystem environment - home, school, and play areas - offers unique contributions to socialization and development. The home provides the initial context for developing a sense of security and belonging. As children grow, schools and play areas become crucial arenas for expanding their social, cultural, and physical horizons. The school, in particular, emerges as a complex ecosystem where cognitive, emotional, and social dimensions intersect, profoundly influencing a child's developmental trajectory.

From the moment a child steps through the school gates, they embark on a journey of self-discovery and learning that shapes their understanding of the world around them. Primary school teachers are similar to second parents, guiding students through challenges, celebrating their achievements, and providing a steady presence in their lives. These educators play a critical role in fostering a supportive and encouraging environment, much like a nurturing home. They teach children not only academic subjects but also life skills such as empathy, teamwork, and resilience, laying the groundwork for their future success.

Primary school is a social hub where children learn to navigate relationships outside their family unit. It is here that they form their first friendships, learning to share, collaborate, and sometimes even resolve conflicts. These early social interactions are crucial for developing interpersonal skills and emotional intelligence. The playgrounds and classrooms become arenas for experimentation and discovery, where children learn about themselves and others, shaping their social identities. Primary schools serve as a microcosm of the wider world, preparing children to engage with society at large. They are places where children learn about diversity, respect, and tolerance by interacting with peers from various backgrounds. This exposure is invaluable, helping children appreciate differences and fostering a sense of community and belonging. The school, much like a home, becomes a place where children learn the foundational values that will guide them through life.

Schools, then, are not merely locations for academic learning but are vital for the holistic development of children, encompassing cognitive skills, social relationships, and emotional well-being.

Creating educational spaces that feel like a second home involves integrating elements that cater to the emotional and psychological well-being of students, much like the thoughtful design of a comforting and functional home. This approach ensures that schools become environments where communication flows freely, where spaces are accessible yet offer privacy, where freedom of movement is a given, where each area is perfectly equipped for its educational purpose, and where relaxation and stress relief are woven into the fabric of the school day. Such an educational philosophy transcends the mere physical layout to address the holistic needs of students.

Key principles in creating such an environment include fostering open communication, ensuring spaces are versatile and inclusive, promoting independence, tailoring classrooms and communal areas to their educational roles, and incorporating areas dedicated to relaxation and quiet reflection. Schools that embrace these principles create an atmosphere of harmony and respect, where the physical environment supports learning and personal development. Beyond merely being places of education, schools become extensions of the students' identities, spaces where they can see their values, cultures, and aspirations reflected and respected.

The bond between students and their school environment develops through a dynamic process, where emotional connections are sparked by positive, supportive experiences. This deepens their attachment to the school, making it a place where they feel genuinely at home. Such a profound connection is particularly impactful in environments that are not only functional for learning but also personalized to meet the emotional and social needs of the student body, emphasizing the critical role of the school environment in shaping students' educational journeys and well-being.

In essence, schools are more than institutions for academic instruction; they are vibrant communities that play a crucial role in the emotional and social development of young individuals. Recognizing the importance of thoughtful design in these spaces highlights the transformative effect a school can have on enhancing students' lives, underscoring the importance of creating educational environments that feel like a home away from home, where students are nurtured, celebrated, and empowered.

LEARNING THROUGH PLAY

"In play a child is always above his average age, above his daily behavior; in play it is as though he were a head taller than himself. As in the focus of a magnifying glass, play contains all developmental tendencies in a condensed form; in play it is as though the child were trying to jump above the level of his normal behavior"

- Lev Vygotsky

Through this quote, Vygotsky highlights the significance of play in child development, suggesting that through play, children operate beyond their usual capacities and developmental stage. Vygotsky's insights into child development, specifically through play, are deeply intertwined with his broader theories on human cognitive and social development. His approach to play, particularly sociodramatic or make-believe play, underlines its fundamental role in advancing higher mental functions in children. This type of play, according to Vygotsky, is critical as it involves children in a rich social interaction that requires the use of symbols and rules, and it helps in the development of cognitive processes such as planning, memory, and decision-making. He focused on the role of social interaction, within the microsystem environment as a vital component of cognitive development, further highlighting the multifaceted nature of learning spaces.

Vygotsky's emphasis on play as a leading source of development in preschool years challenges more traditional views where play is seen merely as a form of entertainment or physical activity. Instead, he positions play as a complex, integral part of cognitive and social development, facilitating the transition from external to internal cognitive functions.

The implications for educational practices are significant. Educators can design environments that nurture this type of play, understanding that it is not just a way to pass time but a critical part of the learning process that promotes self-regulation, problem-solving, and social interaction skills. This involves

Creation of Imaginary Situations: In sociodramatic play, children create an imaginary world where they assign new meanings to objects and engage in roles that don't exist in reality. This ability to think beyond the immediate sensory experience to a more abstract representation is crucial for cognitive development.

Role Playing and Rules: Children in play adopt specific roles which come with predefined behaviors and rules. This aspect of play not only helps children understand social roles and norms but also aids in the self-regulation of behavior, as children learn to act according to role expectations rather than immediate impulses.

Development of Symbols: Play involves the use of symbolic thinking where one object represents another. This is crucial for language development and other forms of abstract thinking. A stick can become a horse, a piece of wood can become a doll, and so on.

Zone of Proximal Development (ZPD): Play creates a ZPD where children can perform tasks with the help of peers or adults that they could not achieve alone. This interaction is critical for cognitive development, as it pushes the child to attain new levels of understanding and competence.

Internalization of Higher Mental Functions: Through play, children start with shared, intermental activities that gradually become internalized as intramental functions. This transformation is central to Vygotsky's understanding of how children integrate and apply learned skills independently.

creating opportunities for children to engage in role-playing games that allow them to explore and negotiate rules, assume different roles, and use symbols in various contexts.

His theory on play provides a comprehensive framework for understanding how children's play activities are far more than mere fun. They are essential for the development of higher mental functions and provide a foundation for complex cognitive processes that they will use throughout their lives. For Vygotsky, play is the mechanism by which children learn to master their environment, interact with peers and adults in socially meaningful ways, and build the cognitive structures necessary for future academic and personal growth. He emphasizes the importance of playing and learning with children and adults of all ages as we learn from more knowledgeable others, as well as more knowledgeable others learn from teaching the younger ones. He encourages collaborative and cooperative learning between children, teachers and peers (Bodrova, 2015).

The perspective emphasizes the importance of mediated learning environments in fostering play among children in school. Integrating play is essential as it serves as a leading activity that supports various developmental milestones in young children, including cognitive and socio-emotional growth. Primary schools should create spaces that facilitate both guided and spontaneous play. The goal is to design an environment that encourages rich, interactive, and multi-dimensional play experiences, which are crucial for the development of complex cognitive and social skills.

THE EDUCATIONAL TRANSITION

"If we teach today's students as we taught yesterdays, we'd rob them of tomorrow"
- John Dewey

The evolution of the Dutch educational system over the past century has been moving from traditional classroom learning with tools like the 'Aap-Noot-Mies' reading board and abacus to contemporary methods that incorporate tablets and educational software. This shift not only mirrors technological progress but also an enriched understanding of learning processes and the necessity for diversified educational strategies.

A century back, classroom setups were straightforward and standardized: students arranged in rows facing the teacher and the blackboard, with learning heavily reliant on memorization through repetition. Playtime involved traditional games such as hoop rolling and spinning tops. The advent of educational reformists like Maria Montessori and Célestin Freinet, coupled with a deeper comprehension of children's learning mechanisms, has paved the way for more learner-centered and experiential teaching approaches. These modern methods prioritize self-exploration, active engagement, and teamwork, starkly contrasting the authoritarian and homogenized education model of the early 20th century.

Yet, certain aspects of elementary education have remained surprisingly constant. The essential pillars of reading, writing, and arithmetic continue to underpin the curriculum. Similarly, the social dimensions of schooling—encompassing cooperation, recreational activities, and the cultivation of personal and social competencies—have preserved their significance. This persistence indicates that, despite significant shifts in methodologies and technology, the primary objectives of education—equipping children for life and fostering civic values—have largely stayed the same.

The journey from conventional to modern educational practices underscores the importance of adaptability and innovation in teaching future generations. Acknowledging the merits of both historical and contemporary educational approaches can aid educators in crafting a balanced and inclusive learning environment that caters to the varied needs of all students. As technological advancements and pedagogical theories continue to evolve, the fundamental mission of education—to nurture well-rounded, informed, and competent individuals—remains a steadfast guiding principle.

When examining the developments in primary education, we can distinguish three periods, each characterized by different approaches and forms of flexibility: the Pre-War period, the Post-War Period and the Period of the turn of the Century.

The Pre-War Period
Before the Second World War up until the 1960s, primary education in the Netherlands was predominantly conducted in a traditional classroom setting with limited flexibility. Adaptations to cater to individual student needs were mostly handled through early tracking into different educational paths, repeating grades, or referring students to special education.

Second Half of the Twentieth Century
The period from 1960 onwards saw two major movements for educational reform in the Netherlands: efforts to tailor education to the needs of disadvantaged students and initiatives for differentiation, particularly in the early years of schooling, targeting all students within the existing legal frameworks. This era marked the first use of assessments to customize education to the needs of specific groups. Instructional and processing levels were introduced, though without modifying the allocated learning time.

It became increasingly recognized that primary education did not adequately consider the home environments of children from lower socio-economic backgrounds. By the late 1960s, compensatory programs were launched in 'stimulation schools' to offer children from less educated families better opportunities.

The concept of the elementary school was formalized in 1986 with the Primary Education Act (WOB), primarily to facilitate continuous learning paths for all students. Though repeating a year remained an option, there was a greater emphasis on adaptive education. The use of assessments grew, leading to the development of systems for tracking student progress.

The movements focused on increasing freedom and independence for all citizens. To achieve this, education had to emphasize the individual development and autonomy of children, fostering a more liberated and socially oriented upbringing and schooling. Ellen Key, in "The Century of the Child," advocated

for a free school schedule. John Dewey argued for cooperative learning and working, while Jan Lighthart, a proponent of 'reform pedagogy,' aimed for realistic education (The Full Life). Maria Montessori was inspired by Ellen Key. In the period before and after World War II, various innovations emerged, including Montessori and Dalton schools, Waldorf Schools (Vrije Scholen), and Jenaplan schools, collectively referred to as 'traditional progressive schools.'

The 21st Century

Around the year 2000, municipalities and school boards began establishing 'brede scholen' (broad schools) in greater numbers. These schools bring together various institutions to provide a comprehensive educational package, supported by government policies. The government later introduced specific initiatives for students facing educational disadvantages, including bridging classes and extended school programs (like summer schools) on a trial basis. Both the broad school model and the extended school programs contributed to a richer and more diverse educational landscape for primary school students.

After 2000, a movement known as 'het nieuwe leren' (the new learning) emerged, driven by a desire to make education more relevant to the 21st-century needs. This approach is characterized by its flexibility, focus on divergent differentiation, and emphasis on individualization in both instruction and learning processes. Innovations included the introduction of learning plazas, a shift towards teachers playing more of a coaching role, and a move away from traditional subject-based structures. The government offered financial support for these initiatives, and schools implementing the new learning approach took full advantage of the autonomy in educational organization provided to them.

From 2008, the government initiated efforts to improve the results-oriented culture in schools, mainly focusing on the didactic professionalization of teachers.

Throughout these periods, the Dutch educational system has increasingly moved towards a model that values student autonomy, diversity in learning approaches, and the holistic development of each child. By acknowledging the past and embracing the future, Dutch education continues to strive for an optimal balance between tradition and innovation, ensuring that all children have the tools they need to succeed in an ever-changing world.

Figure 9: *Evolutiong of classrooms*

EDUCATION IN THE NETHERLANDS

Elementary schools in the Netherlands offer a diverse landscape of educational options, catering to a variety of beliefs, pedagogical methods, and special educational needs. This diversity is reflective of the country's commitment to accommodating different cultural, religious, and educational preferences. The Dutch education system is roughly devided into three categories; Public primary schools, Special schools and Special education.

Public Primary School
Public primary schools in the Netherlands are secular and do not adhere to any religious or philosophical doctrines, making them accessible to children from all backgrounds. This inclusivity means that the student population often mirrors the demographic makeup of the surrounding community. Despite their secular nature, some public primary schools adopt specific pedagogical approaches, such as Montessori, Dalton, or Steiner education, which focus on the individual learning styles and needs of children. These schools are a popular choice, with approximately one-third of Dutch children attending them.

Special Education
Special education in the Netherlands caters to children with special needs that cannot be adequately met in a mainstream classroom setting. These needs may be due to learning difficulties, physical disabilities, or behavioral challenges. Special education schools are equipped with specialized staff and resources to provide a supportive learning environment tailored to each child's specific needs. The goal is to offer every child an education that maximizes their potential and prepares them for participation in society.

The Dutch education system's diversity ensures that there is a place for every child, regardless of their background, beliefs, or special needs, emphasizing the country's inclusive approach to education.

Confessional Special Schools
Confessional special schools are distinct in their integration of education with religious or ideological teachings. This category can be further divided into:

Denominational schools:
These are based on a particular religion (such as Catholic, Protestant, Islamic, or Jewish schools) and incorporate religious teachings and traditions into their curriculum and school activities. Despite their religious foundation, many of these schools are open to students from any or no religious background, provided they respect and participate in the school's religious traditions and celebrations.

Ideological schools: These might be based on specific educational or philosophical convictions that are not necessarily religious but are guided by a set of core principles or ideologies.

General Special Schools
General special schools in the Netherlands are founded on particular pedagogical or didactic principles rather than religious or ideological ones. They focus on innovative teaching methods and often emphasize the development of independence, creativity, and critical thinking in students. These schools are part of what is known as "vernieuwing onderwijs" or innovative education, which seeks to tailor the learning environment and methods to the unique needs and worldviews of children. In recent years, there has been a trend toward increased collaboration between general special schools and regular schools, aiming to integrate innovative teaching methods more broadly and share resources for the benefit of all students.

Around two-thirds of Dutch children attend Confessional or General Special schools, indicating a strong preference among parents for education systems that align with their religious beliefs or value systems and pedagogical concepts.

Vrijeschool (Waldorfschool)
At the Vrijeschool, creativity, philosophy, music and nature play an important role. This method of education is based on Rudolf Steiner's way of working. According to Steiner, the development of a person as a whole - the heart, the head and the hands - should be stimulated. Up to the age of 7, pupils are mostly learning through play. After this period, up to the age of 14, this alters to learning through experience and images. From the age of 14 on, the emphasis is put on philosophy and the role of a teacher becomes an advisor and facilitator. If possible, the teacher stays with the same class throughout primary school.

Montessori school
A Montessori school emphasises pupil independence. The statement "help me by doing it by myself" fits well within this teaching method. It is the teacher's job to recognise what is important for the pupil's self-development. No grades are handed out, the main importance is that the pupil progresses from its own motivation. Classes at a Montessori school are varied with children of different ages.

Dalton school
Dalton education is very similar to montessori education. At a Dalton school, the emphasis is on cooperation and developing pupil independence. Just as a Montessori school, pupils are given weekly tasks which they are free to organise themselves. One difference between Dalton and Montessori education is that a Dalton school is often slightly more specific in how the task should be carried out. The main anchor points are cooperation, independence, and freedom in bondage.

Jenaplan school
In Jenaplan education, self-discovery and investigation are central. Teachers are supervisors of the collective learning process. Classes consist of children of different ages, so that everyone can learn from each other. Besides exploring, this teaching method also focuses on developing creativity and social skills.

Freinet school
Freinet education resembles Jenaplan education. Classes also consist of children of different ages. Pupil development is very important and revolves around children's experiences. Through circle discussions, pupils suggest topics they find interesting and then investigate them. A teacher's role is to add structure and depth to the children's learning process. In Freinet education compared to Jenaplan education, pupils have more freedom and work more independently.

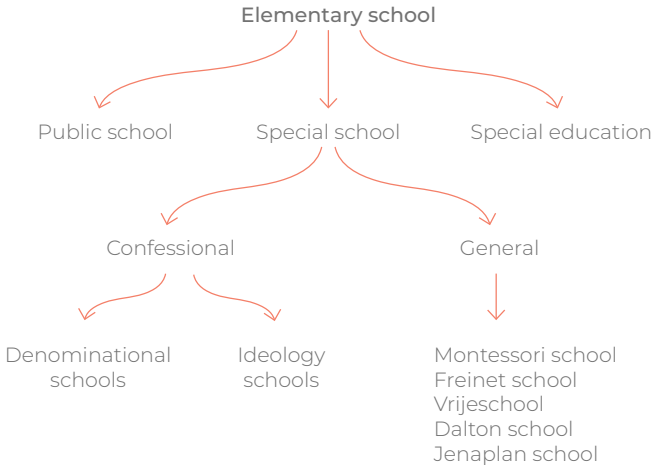


Figure 10: *Dutch education system*

These innovative educational models prioritize individualization and collaboration, accepting differences among students, leading to diverse differentiation. The programs vary from unstructured to loosely structured, encompassing free choice, thematic work, and more planned learning pathways. However, the radical change these complete concepts demand has limited their broader adoption, even though elements have been integrated into traditional education, such as group work (Montessori), task-based learning and projects (Dalton), circle time, level-based math, and celebrations (Jenaplan).

Overall, these schools adjust instruction and assignments to students' interests and levels, except Dalton schools, which typically oppose criterion-referenced or final exams, favoring self-assessment materials. The learning time in these schools varies, accommodating activities like circle time (Jenaplan), individual tasks (Dalton), and communal activities (Jenaplan and Waldorf). Teachers spend considerable time guiding students, especially in core subjects, which may also include level-based instruction (Jenaplan). The structure of classroom and school activities, including the grouping of students and the method of instruction, differs significantly among these progressive education models, reflecting their unique philosophies and goals.

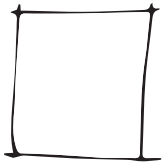
The educational landscape in the Netherlands, as in many countries, has undergone significant transformations over the years, driven by evolving pedagogical philosophies, technological advancements, and societal changes. These shifts aim to better cater to individual learning styles, promote inclusivity, and prepare students for a rapidly changing world. However, one of the challenges that has emerged alongside these educational reforms is that the physical infrastructure of schools—specifically, the buildings themselves—often does not align with the new ways of teaching and learning.

Modern educational methods are increasingly emphasizing collaborative learning, project-based activities, and flexible, student-centered classrooms. However, traditional school buildings were designed primarily for frontal teaching, featuring fixed seating arrangements that face a teacher's desk and blackboard. This conventional layout severely restricts the capacity to modify spaces for group activities, discussions, or hands-on projects, which are essential components of current pedagogies. Unfortunately, many older school buildings are not adequately adapted to the new ways of teaching, limiting the effects and results of this new type of education.

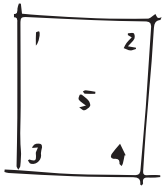
Additionally, there is an increasing appreciation for the educational and wellbeing benefits of connecting students with nature and the outdoors. Yet, traditional school buildings and their immediate environments often lack appropriate outdoor spaces like gardens, greenhouses, or other natural settings that support such learning activities. Moreover, the push towards inclusive education, which aims to cater to a diverse range of learning needs, necessitates physical environments that are both accessible and adaptable. Students with varying abilities and learning styles should be able to learn in spaces that accommodate them, but many older educational facilities fall short of these inclusive design standards, often lacking amenities such as ramps, elevators, sensory-friendly lighting, or suitable acoustics.

In light of these challenges, the disparity between the evolving demands of modern education and the existing physical infrastructure of schools is evident, highlighting a critical area in need of attention and innovation.

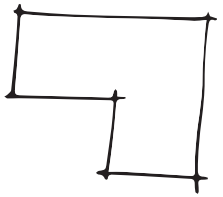
CLASSROOM OR ROOM FOR A CLASS



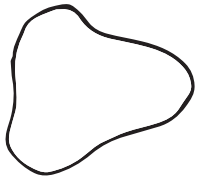
The traditional classroom



Children's perception of the room



Hertzberger's conventional notion on segregating from the traditional four wall classroom



What if classroom learning is not limited to four walls

Adults often think of spaces in terms of their designated functions—such as living rooms, bedrooms, and classrooms. Children, however, experience spaces more fluidly and imaginatively. Due to their shorter stature, what adults might see as a single, uniform space can appear to a child as a complex landscape of distinct zones to be explored and experienced in multiple ways. Their lower eye-level shrinks spatial boundaries and thus creates spaces not by four enclosed walls, but by thresholds.

Herman Hertzberger, a noted Dutch architect, has made significant contributions to school design, advocating for a transformative approach to how educational environments are structured. In his philosophy, the classroom is viewed not merely as a place for traditional teacher-student information transfer but as a dynamic, adaptable environment designed to foster learning, creativity, and personal development.

Hertzberger challenges the conventional notion of classrooms as separate, enclosed spaces. He proposes instead a model where classrooms are fluid "corners" within larger, open spaces, defined by mobile partitions, furniture arrangements, and subtle architectural cues rather than solid walls. This concept of the classroom as an adaptable part of a larger "learning landscape" encourages flexibility, interaction, and a community-oriented approach to education.

The essence of Hertzberger's design philosophy is rooted in the idea that architecture should serve as a catalyst for social interaction and enhance human relationships. By reimagining classrooms as integrated zones that support both focused study and group activities, he aims to create environments that respect individual needs while promoting collaborative learning. His designs often include spaces that can switch seamlessly between quiet, contemplative areas and vibrant group discussion zones, reflecting his belief in the importance of both structured and spontaneous learning experiences.

Hertzberger's architectural principles are closely aligned with structuralism, emphasizing that educational spaces should empower users, allowing them to control and adapt their environment to fit their learning styles and needs. Through his innovative approach to school design, Hertzberger seeks to break down the physical and psychological barriers imposed by traditional classroom setups, thereby fostering a more engaging, flexible, and inclusive educational atmosphere.

I AM NOT LIKE YOU

"There are no children that don't want to learn. There are children that don't want to learn from you."

- Rob Houden, Agora Education

This thesis opened with an anecdote that highlights the complex nature of children's learning behaviors. In our society, there exists a plethora of norms against which children's development is often measured, to assess their conformity with expected educational milestones in regards to peers. However, as illustrated through my personal story at the beginning of the thesis, it becomes evident that not every child adheres to the same pace or prefers the same mode of learning. This observation sets the stage for a deeper exploration of the individual differences that characterize each child's educational journey.

In the diverse landscape of contemporary education, the recognition of each child's uniqueness is not merely a compassionate approach but a critical element in cultivating effective and responsive educational practices. This principle, deeply rooted in modern educational theories and child psychology, asserts that every child is a distinct individual, with a unique set of abilities, preferences, and needs. The acknowledgment and understanding of these individual differences are pivotal for fostering an environment that promotes optimal growth and development. This approach challenges the one-size-fits-all mentality, advocating instead for a more personalized and adaptive education system that respects and harnesses the individuality of each student.

Every child has a distinct way of learning that best suits their intellectual and emotional capacities. Some children absorb information better through visual means like pictures and diagrams, while others prefer auditory information or physical activities to grasp concepts. Furthermore, children also differ in their pace of learning; some pick up new skills quickly, while others may need more time and repetition to master the same skills. Children also vary widely in their emotional and psychological makeup. Some may be more resilient, bouncing back quickly from setbacks, while others are more sensitive, experiencing emotions more deeply. These differences affect how children interact with their environment, handle stress, and relate to others. Schools should enable children to seek for peace and quietness or release energy when needed in order for children to feel comfortable in their own environment. Supporting each child according to their emotional needs is crucial in developing their ability to manage emotions and build healthy relationships. Likewise, each child has unique talents and interests that may not be immediately apparent but can significantly shape their learning and future choices. Whether a child has a penchant for music, a knack for solving complex mathematical problems, or an interest in sports, recognizing and nurturing these passions can lead to profound personal fulfillment and future career success. Educational systems that offer varied programs and extracurricular activities allow children to explore and develop these interests further.

Embracing this diversity within educational settings reflects and promotes broader societal values of inclusion and equity. By fostering an environment where every child's potential can be recognized and nurtured, educational institutions play a crucial role in shaping a society that values and respects individual differences. The commitment to understanding and supporting each child's unique journey is not just beneficial for the individual; it enriches the educational community and society at large, promoting a culture of understanding, tolerance, and empathy.

Nurturing such an open-minded educational culture can cultivate tolerance and appreciation for diversity among children. When students learn to recognize and value the uniqueness of their peers, they are less likely to resort to bullying as a means of enforcing conformity. This positive recognition of diversity can significantly reduce bullying, thereby preventing the associated adverse childhood experiences. Such a nurturing approach not only enhances individual educational outcomes but also builds a foundation for a more compassionate and cohesive society where differences are celebrated rather than suppressed.

TYPES OF LEARNING

There are four recognized types of learners in the educational sphere: visual, auditory, reading/writing, and kinesthetic.

It is crucial to design lesson plans and modify educational environments to cater to the diverse learning preferences of students, enabling them to process and understand information in ways that align with their unique needs. When educators grasp the nuances of various learning styles and the instructional strategies that complement them, they can more effectively meet the educational needs of each student. Additionally, educational facilities should be designed to accommodate a variety of learning approaches, offering spaces and opportunities tailored to different learning modalities.

Given that children and adults alike have distinct learning preferences, the concept of learning styles is a fundamental aspect of classroom management and educational theory at large. “Learning styles” refers to the notion that every student has a preferred method for absorbing, processing, understanding, and remembering information. For instance, while one student may find it most effective to learn through physical activity or role-play, another might achieve better understanding through reading and note-taking.

The VARK Model is a framework that recognizes the diverse learning preferences of students, which can be influenced by their environment, cognitive abilities, and emotional factors. Given the uniqueness of each student, it is advantageous for educators to develop and implement classroom strategies that cater to various learning styles. The VARK model, an acronym for Visual, Auditory, Reading/Writing/Tactile preference, and Kinesthetic, guides teachers in this endeavor.

VARK emphasizes that students process and retain information differently, highlighting the importance of “preferred learning modes” for optimal learning. Providing information in formats that students find comfortable can bolster their academic confidence. It is essential to acknowledge that while individuals may use a blend of learning styles, they typically exhibit a strong inclination towards one.

By understanding and integrating the VARK model into educational practices, the school can create more inclusive and effective learning environments that cater to the diverse needs of their students (Academy, 2022).

Visual Learners

Visual learners excel when information is presented through charts, maps, graphs, diagrams, and other visual mediums. This group benefits from the use of visual aids like patterns and shapes over photographs or videos. Children who are visual processors tend to observe a parent’s or teacher’s body language and facial expressions for content and learn through demonstrations and descriptions. They tend to have well-developed imaginations and often think in pictures. Too much movement or action in a classroom may cause distraction for them. For older children who read, written instructions may help clarify verbal directions.

Auditory Learners

Auditory learners absorb information most effectively through hearing. Lectures, discussions, and verbal interactions are beneficial for this group. Auditory learners often prefer to vocalize their thoughts to understand and organize them. Verbal directions may help clarify instructions or written information. Too much noise may be distracting and children with this strength may learn best in a quiet environment.

Reading/Writing/Tactile Learners

This group favors learning through the use of touch, text, enjoying reading and excelling in assignments that require writing, such as essays or reports. Children who are more tactile prefer activities or projects that allow them to use their hands.

Kinesthetic Learners

Kinesthetic learners thrive on physical activity, through moving and doing. Practical applications of concepts, such as experiments or simulations, significantly enhance their learning experience. These type of learners are grounded in concrete experiences. Providing kinesthetic learners with hands-on examples or engaging them in activities that replicate real-life processes can be highly effective. Children who are more kinesthetic learners may have trouble sitting still for long periods.

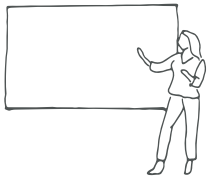
PEDAGOGY TYPOLOGIES

Understanding how space can be used in transformative ways requires an understanding of the affordances of different spaces and how they relate to pedagogy. Dovey and Fisher (2014) suggest a typology of pedagogies for this purpose.

The intricate relationship between educational pedagogies and diverse learning environmentillustrates how pedagogical effectiveness is significantly influenced by factors such as the physical space, furniture arrangements, acoustics, and participant numbers. In today's educational landscape, the concept of learning extends far beyond the traditional classroom boundaries. This shift calls for a broader understanding of how different types of spaces—whether indoor, outdoor, formal, informal, large, or small—can be designed and utilized to support various learning activities.

Given the increasing fluidity with which educational activities now occur, there is a heightened need to explore how various group formations—such as whole-class, small group, or individual work—are facilitated by different environments in primary schools. Each formation serves different pedagogical purposes: whole-class instruction might be aimed at delivering shared content or fostering a collective experience, while small groups could focus on collaborative problem-solving or peer-to-peer learning, and individual work might encourage personal reflection or concentrated study.

As educators and designers continue to experiment and innovate with how space is used in education, the ultimate goal remains clear: to create versatile, inspiring, and effective learning environments that cater to the dynamic and diverse nature of student learning today. The future of education, therefore, depends not just on the quality of teaching or the curriculum, but also significantly on how well our educational spaces are designed to meet these evolving needs.



Presentation

25 - 150 students

Students or teachers present to a largely passive group. Group size may vary from one class cohort to a full form or year. Such activities facilitate efficient communication of information.

Small interactive

2 - 5 students

This is the 'breakout' model of problem-based and peer-to-peer learning with small autonomous groups that may disperse and take responsibility for their learning.

Large interactive

25 - 75 students

Activities that move seamlessly from large to small group and back; often organized in sub-groups of 4-6 that can be subdivided again into 2s or 3s. Facilitates peer-to-peer learning and team teaching.

Creative interactive

10 - 25 students

Interactive activities but with an emphasis on hands-on learning in addition to pens and keyboards, plus access to a range of resources that may include art materials, wet areas, laboratory or outdoors.

Medium interactive

10 - 25 students

Activities with a similar flow of movement of the large interactive, but with a smaller group size and generally one teacher.

Reflection

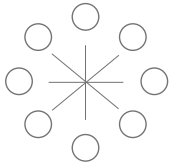
1 student

Singular activities that include reading, writing or hands-on research to meet learning objectives.

LEARNING LANDSCAPES

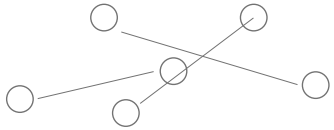
Cave
Concentration

Provides a place for physical or visual privacy



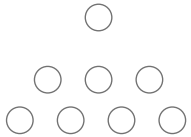
Campfire
Marked territory

Creation of smaller pockets for group work
Creates a feeling of coherence and collaboration



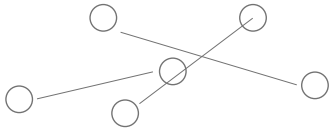
Waterhole
Invitation

Supports informal knowledge
Sharing through free flow and spontaneous meetings



Mountain top
Direction of attention

Supports single way communication
Presentation or stage performance



Movement
Physical activation

Movement moves knowledge from the brain to the body

Hands-on
Creation expert

Using prototyping to gain deeper understanding of theory to practice

"We are natural born creative thinkers. Learning environments need to change from mind-numbing classroom boxes to playful and inspiring spaces that support the diversity of learners and a multitude of learning scenarios."

- Rosan Bosch

The traditional school, designed as a mechanism for a straightforward form of education where teachers deliver facts without room for discussion, stands in stark contrast to today's advanced classrooms. Modern educational philosophies favor project- or inquiry-based learning, emblematic of 21st-century educational strategies. Emphasizing project- or inquiry-based learning, these modern educational paradigms prioritize the practical application and investigation of knowledge over the simple memorization of facts, showcasing the ideals of 21st-century learning.

Rosan Bosch and David Thornby are renowned figures in the design and educational sectors, known for their innovative approaches to creating learning environments that inspire, engage, and facilitate varied learning experiences. Both share a common vision for reimagining educational spaces to support 21st-century learning paradigms. Their concepts, while unique in their applications, intersect on the importance of flexibility, creativity, and inclusivity in learning spaces. Their concepts on learning environments cater different aspects of the learning process (Bosch, 2018).

In 1996, Thornburg's *Campfires in Cyberspace* was released, spotlighting traditional classroom design issues and suggesting fundamental principles for essential learning environments to enhance knowledge acquisition. Thornburg defines four spatial models: campfires, watering holes, caves, and life, deemed pivotal for fostering flow in students within and beyond educational settings. Inspired by Thornburg's education ideas, Rosan Bosch developed a series of learning spaces that step away from the traditional classroom. Instead of making closed of rooms, Bosch creates learning spaces by making furniture pieces - while abstract in form - that are intended to suggest the relationships and postures children adopt in school—or would adopt if not confined to chairs and desks—and hence provide better support for the interpersonal interactions that make up the school day.

Mountain Top
The Mountain Top design principle and learning situation establishes a space for individuals to adress a group and let thoughts, views and knowledge flow from one to many. The speaker or performer stands in front of an audience and becomes an educator.

Campfire
The campfire symbolizes a gathering area for absorbing expertise from professionals, similar to conventional classroom setups worldwide. This ancient space, used for generations for wisdom transmission through storytelling, remains vital for nurturing flow but cannot stand alone in modern education. The Campfire learning situation provides a space for group-based learning situations. It trains students to work effectively in smaller teams, focus dialogue within the group, and develop their collaborative skills.

Watering Hole
The Watering Hole learning situation exploits informal spaces with many passers-through and disturbances. This is a space of disruptions where learners encounter unexpected ideas, astounding skills, and surprising knowledge that inspire and motivate them.

Cave
At the Cave, individuals ponder over acquired external knowledge, enabling deep task immersion and cognitive understanding construction. The Cave learning situation offers a space for individual concentration, focus, and reflection. It is characterized by quietness but not necessarily isolation. Cave spaces are small, strictly defined spaces for one or two students away from areas with activities.

Movement
The Movement design integrates movement as a natural part of all spaces. No matter a human's personality or the subject being studied, movement enhances cognitive skills and energizes the learning process.

Hands-On
Hands-on is an essential design principle that adds an extra non-verbal communication dimension. It offers a link between theory and practice, mind and body, insight and play. It explains relevance, inspires and motivates learners.

Cave

Campfire

Waterhole

Mountain top

Movement

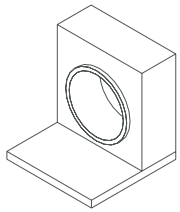
Hands-on

Figure 11: *Exhisting learning landscapes - Vittra School Sweden*

The design principles are applied to construct engaging learning landscapes, transforming the school day into a journey through various destinations within this educational landscape. The day might begin at a symbolic 'Mountain Top' for individual focus, then progress to 'Campfires' for hands-on group projects. For deeper concentration, some students may retreat to a 'Cave', while others might gravitate towards the 'Watering Hole' for informal interactions with peers in the learning community. Interspersed with these activities, opportunities for movement are provided to stimulate both the mind and body, underscoring the importance of a holistic learning experience.

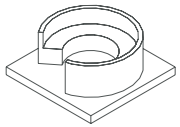
The approach underscores the necessity for students to be more engaged in their learning journey, striking a delicate balance between autonomy and structured guidance. Through strategic interior design that fosters engagement and motivation, the goal is for all learners to realize their full potential. This flexible framework not only accommodates but also promotes the development of essential 21st Century Skills, including creativity, critical thinking, collaboration, and, crucially, the capacity for independent learning.

The learning landscape is designed to stimulate the students' senses, employing vibrant colors, tactile materials, and strategic lighting to capture attention and enhance focus. The expansive and adaptable spaces are crafted to facilitate dynamic learning processes, aiming to make education a more interactive, enjoyable, and effective experience for every student.



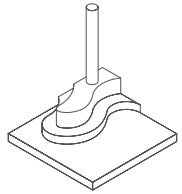
Cave
Concentration

Small enclosed space



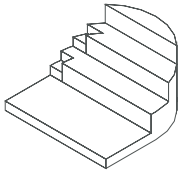
Campfire
Marked territory

Defined space that allows group formation



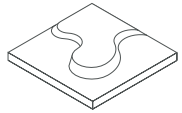
Waterhole
Invitation

Open space where spontaneous encounters can occur. Lets passers-by get distracted by activities



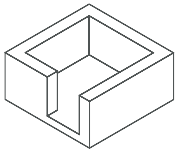
Mountain top
Direction of attention

Elevated space to direct attention



Movement
Physical activation

Open, playfull space that engages children's bodily movements

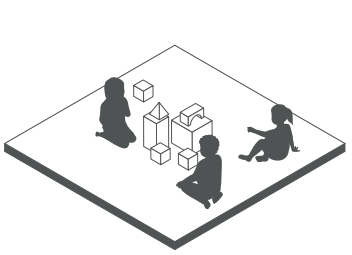


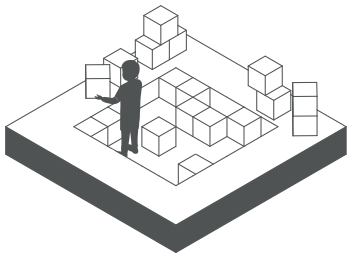
Hands-on
Creation expert

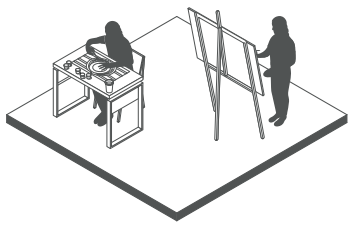
Closed off spaces with a determined activity

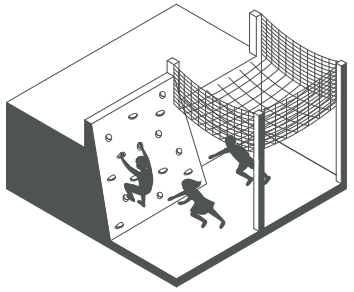
Figure 12: *Translation of Learning Landscape concepts to architectural diagrams*

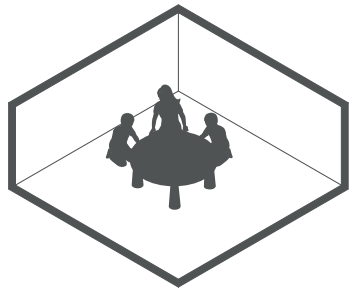
Here are some expanded suggestions on how various spaces can be designed to foster diverse types of learning and support corresponding pedagogical framework within the learning landscapes.

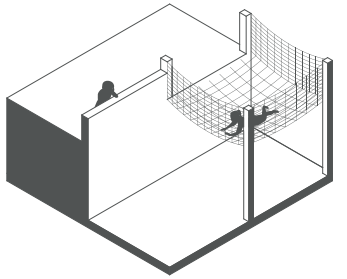


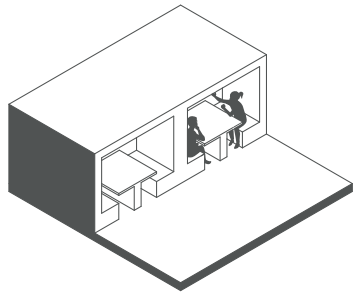


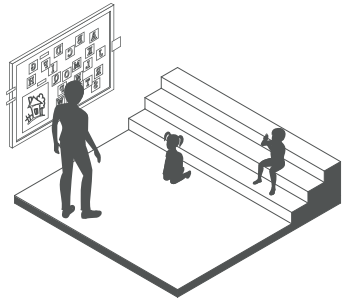


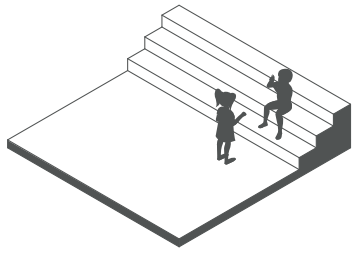












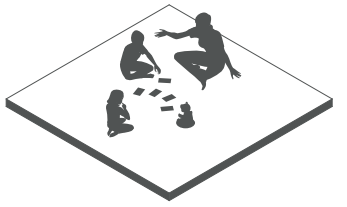


Figure 13: *Space suggestions*

PSYCHOLOGY OF FORM AND COLOUR

The world as seen through the eyes of a child is a vivid tapestry, woven from the bright threads of colors and the bold outlines of forms. This perception is not just a matter of visual acuity but is deeply intertwined with cognitive development, emotional responses, and learning processes. Colors and form- elements fundamental to architectural design - are particularly influential in the setting of a primary school. They are not just aesthetic choices; they play a significant role in how children perceive and interact with their learning environment. By understanding and catering to the unique ways in which children interact with these elements, architects and educators can create spaces that are not only aesthetically pleasing but also conducive to learning and development. .

From infancy, children are drawn to visual stimuli, with a marked preference for high-contrast patterns and bright primary hues. This early interaction with colors and shapes lays the groundwork for later cognitive development, including color discrimination and shape recognition. Such findings underscore the importance of integrating vibrant colors and diverse shapes into the architecture and interior design of primary schools. By doing so, educators and architects can stimulate visual perception and cognitive development from the earliest stages of a child's education.

As children grow, their understanding of and interaction with colors and forms become more sophisticated. They begin to attach meaning to these elements, categorizing objects based on color and shape, which is a fundamental aspect of their cognitive and language development. Young children are attracted to organic forms and shapes, which they find intriguing and engaging. Rounded forms, soft edges, and playful, non-linear arrangements can encourage exploration and creativity. These forms can be integrated into the design of furniture, play equipment, and even the structural elements of the school building itself.

In contrast, rigid, linear forms are often perceived as more formal and authoritative. While such forms might find utility in certain educational contexts, they might not be as effective in stimulating young minds or encouraging playful learning. Integrating organic shapes and forms into the school's architecture can create a more inviting and stimulating environment for children.

Children also perceive colors in ways that are markedly different from adults. Their reactions to various colors are instinctive and can have profound effects on their mood, behavior, and even cognitive development. For instance, bright colors like yellow, orange, and red are often perceived as warm and stimulating, capable of energizing and enhancing concentration among young learners. On the other hand, cool colors like blue and green are seen as calming and can create a serene learning environment conducive to concentration and relaxation.

Primary school design can harness these perceptions by thoughtfully incorporating color into classrooms and common areas by choosing colors and shapes that evoke positive emotional responses and behaviors. Vibrant colors can be used in areas requiring active engagement, such as play areas and sports facilities, to stimulate excitement and physical activity. Conversely, libraries and study areas might benefit from cooler tones that promote calmness and focus. Similarly, the integration of organic shapes and forms can make the school environment feel more welcoming and safe, promoting a sense of well-being among students.

Understanding children's shifting preferences from color to form and the emotional associations with specific hues can greatly inform educational practices and developmental support. Integrating this knowledge can help educators and caregivers create environments that are not only visually stimulating but also supportive of children's emotional and cognitive development. Tailoring learning materials and spaces that provide children with the resources they need to explore, understand, and interact with their world more effectively can enhance educational outcomes and support children's overall well-being (Anbari, 2015).

The place of use	Emotions
Child's play space	Imaginery-creative imagination
Entrance	Caller
Emphasis points and pausing space	Innovation and complexity
Passage	Suggets the status of rejecting
No specific use	Softness and comfort
Passage	Comfort and mobility
	Hard

Form	
Irregular forms	
Concave form	
Static form	
Convex form	
Soft and arched form	
Horizontally expanded form	
Angular and broken forms	

Image 14: *Psychology of form*

How to use it in spaces	Specifications
Usage in environments of play, show and sports	Warm colour and stimulating passion, love and sincerity
Educational spaces due to the prevention of drowsiness and lethargy in children. Lively, invigorating, warm peace of the children	Energizing and stimulating
To make interior decoration happy and bright	Warm and happy color- stimulating thought- making eyes bored more than other colors
To decorate studying rooms, educational spaces and places that needs the ability to concentrate	Cool colour and a symbol of nature. Represents peace, happiness, health and jealousy, while also gaining the ability to read
Usage with combination with other colours in classes and educational spaces	Expresses the sense of relief . It represents peace, security and order, while it also expresses the feeling of sorrow, introspection and isolation.
In combination with other colours and usage in space of rest	Indicating love and romance
Usage in practival and craft classes	Gives peace and happiness to a space

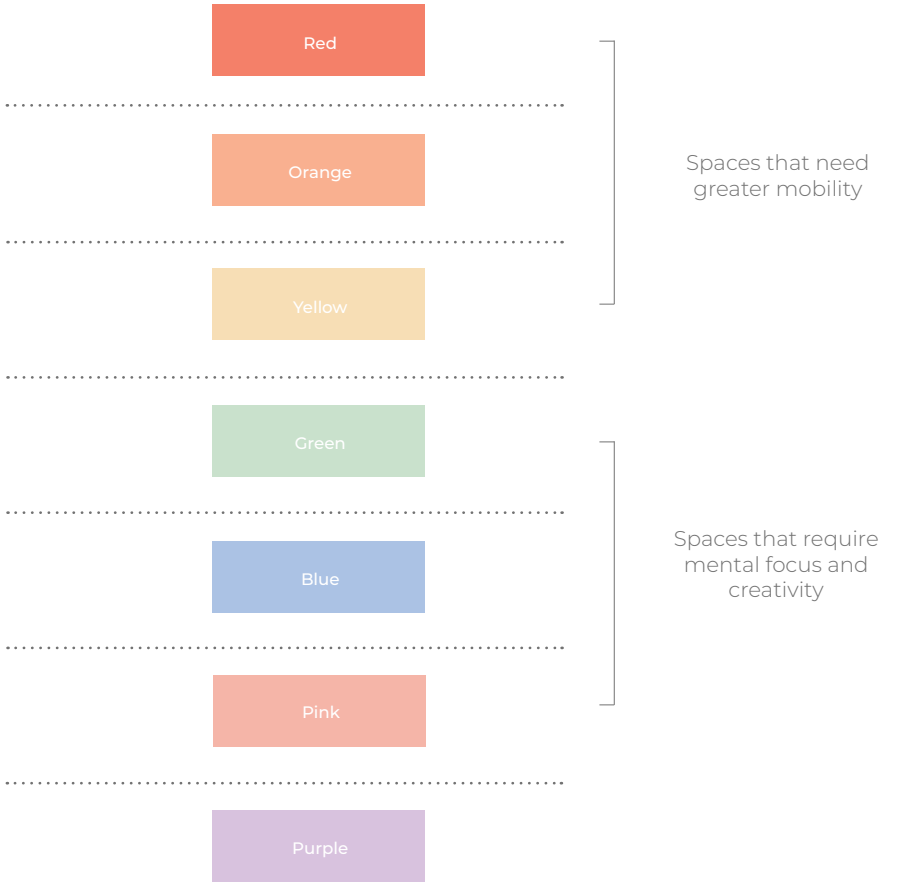


Image 15: *Psychology of colour*

03

CASE STUDIES

Undertaking research on child behavior and school environments requires more than just theoretical exploration through scholarly literature; it necessitates a direct engagement with the environments and individuals being studied. Recognizing this, I embarked on a series of visits to various primary schools to directly observe and interact with children in their educational settings.

Each school visit was tailored to gather specific information. By exploring different types of schools—confessional, private, and special education schools—I aimed to understand how varied educational models and settings impact child development and learning. This comparative approach was critical in identifying unique practices and challenges faced by each school type. For instance, the structural and pedagogical differences between confessional schools, which may incorporate religious teachings into their curriculum, and private schools, often characterized by distinctive educational philosophies and resources, provided insights into how these elements influence student behavior and academic engagement.

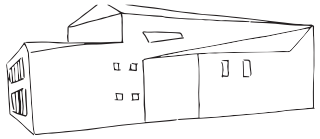
To address the complexities of communicating effectively with children and to capture their authentic experiences and perceptions, I developed a dual approach. First, I had the children guide me through their school environments, giving them the opportunity to speak about places and aspects important to them. This method not only facilitated a child-centered narrative but also allowed me to document these experiences through photography, taken by the children themselves. These photographs provided a visual documentation of their school day as seen through their own eyes. Secondly, I asked the children to create drawings, which served as another expressive outlet, revealing their thoughts and feelings about their school life in a more abstract, yet profoundly insightful, way.

During my visits, I carefully observed and noted details such as the physical location of the schools, the sizes of classes, the range of activities offered, general student behavior, and the utilization of classroom spaces. This comprehensive data collection helped in formulating a nuanced understanding of how environmental and institutional factors contribute to shaping educational experiences.

One case study, in particular, stood out and was developed in-depth due to its distinctive approach and the insights it offered into effective school usage that enhances learning outcomes.

The children's contribution of over 200 photographs and many many stories was invaluable. These images were selectively curated to highlight key observations and to support the findings of the study. This not only enriched the research material but also ensured that the children's perspectives were front and center in the analysis.

Overall, the visits to these schools were not just observational tours; they were a vital part of an ethnographic research method aimed at understanding the complex dynamics of school environments and their effects on children. Such hands-on engagement is essential for anyone involved in educational research, curriculum development, or teacher training, as it provides a real-world perspective that can significantly enrich theoretical knowledge and influence practical applications in educational settings.



PARKSCHOOL

Delft

Freinet school

160 Children

Lower class

Grade 3/4

2.562 m²

Built 2014

VRIJE SCHOOL WIDAR

Delft

Vrije school

200 Children

Open minded

Class 2 (grade 4)

-

Built 1970 + renovations

DE BERGSE ZONNEBLOEM

Rotterdam

Dalton school

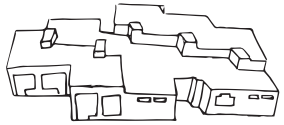
400 Children

Higher class

Grade 4

1.875 m²

Built 1900 + renovations



MONTESSORI SCHOOL

Delft

Montessori school

200 children

Higher class

Grade yellow (grade 3,4,5)

1960 + renovations

VISITATION LOG

SCHOOL	DATE	TIME	WEATHER	WHAT	WHO
Parkschool	11.05.2023	12:15 - 14:14	Cloudy	Observation lunch break, class and school ending	Entire school and grade 3 - 4 and 4-5
Vrije School Widar	12.05.2023	10:00 - 12:00	Sunny	Leerlingraad workshop	Grade 3 - 8
De Bergse Zonnebloem	17.05.2023	10:15 - 12:30	Sunny	Lunch break, workshop, school ending	Grade 4
Parkschool	22.05.2023	13:00 - 15:30	Sunny	Workshop, interview teacher	Grade 3 - 4 and teachers
Vrije School Widar	23.05.2023	12.15 -13:30	Cloudy	Observation lunch and class	Klas 2 (Grade 4)
De Bergse Zonnebloem	24.05.2023	14:45 - 15:30	Sunny	Observation school ending	Entire school
Montessori school	30.10.2023	13:30 - 15:00	Cloudy	Observation class	Klas geel (Grade 3, 4 and 5)
Montessori school	06.11.2023	15:00 - 16:30	Rainy	Workshop	After school care

PARKSCHOOL

Delft, The Netherlands

The Poptahof Community School is located in the heart of the 1960s Poptahof neighborhood in Delft. The building houses five different users, all of whom were involved in the design process: the public school Parkschool, the Protestant-Christian school Horizon, the preschool SDP, the table tennis club DHC, and the municipal sports company. The design also includes provisions for after-school care.

The existing school has been renovated on-site to a level comparable to new construction and has been fully integrated into the new community school. The Poptahof Community School is a building tailored to its users, with different entrances for various age groups.

On the existing site, the school's floor area had to be doubled. Within a site area of 2,090 square meters, 2,562 square meters of facilities were to be realized, including a double-height auditorium and a gymnasium. To preserve play space around the school, the building was constructed in three levels, with the gymnasium located on the second floor above the auditorium. This design approach results in an exceptionally compact building layout.

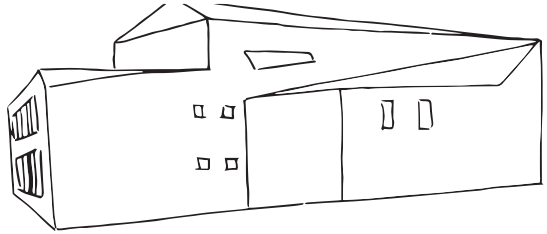


Image 16: *Building site* 1:1000

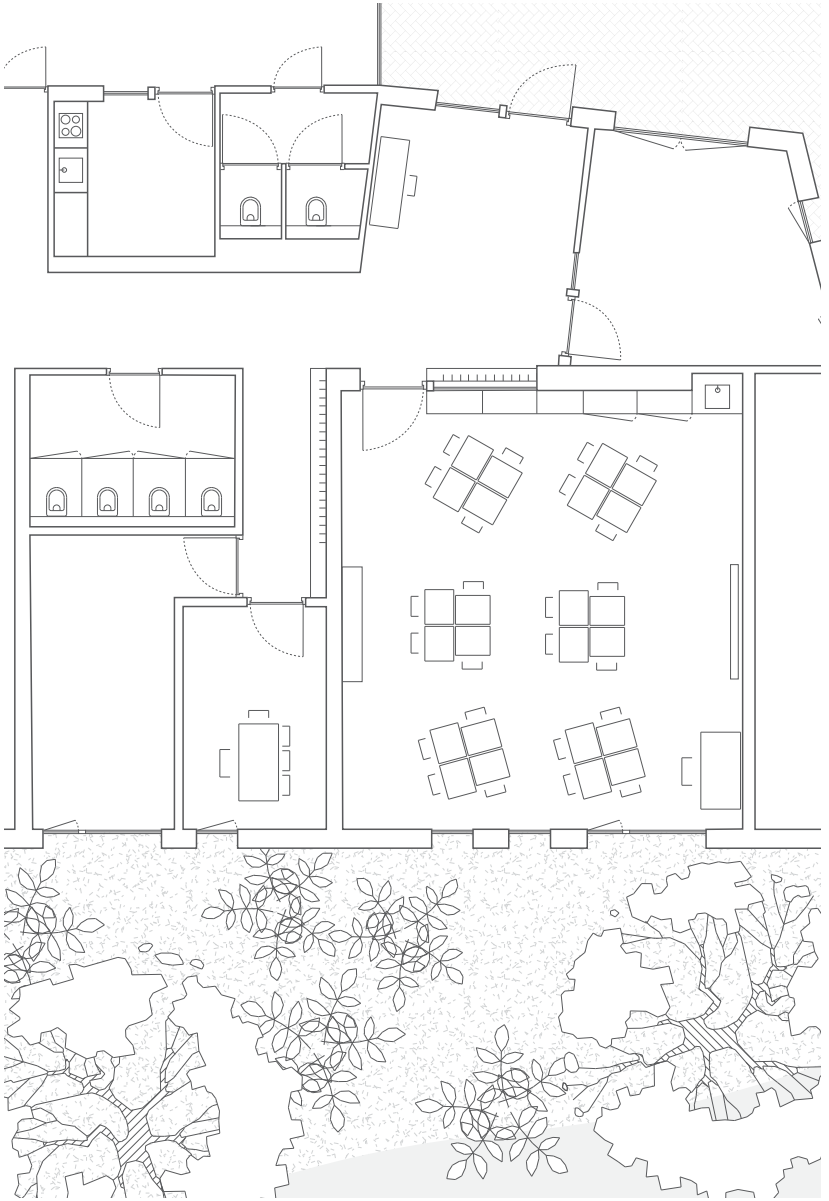


Image 17: *Classroom's environment floorplan* 1:100

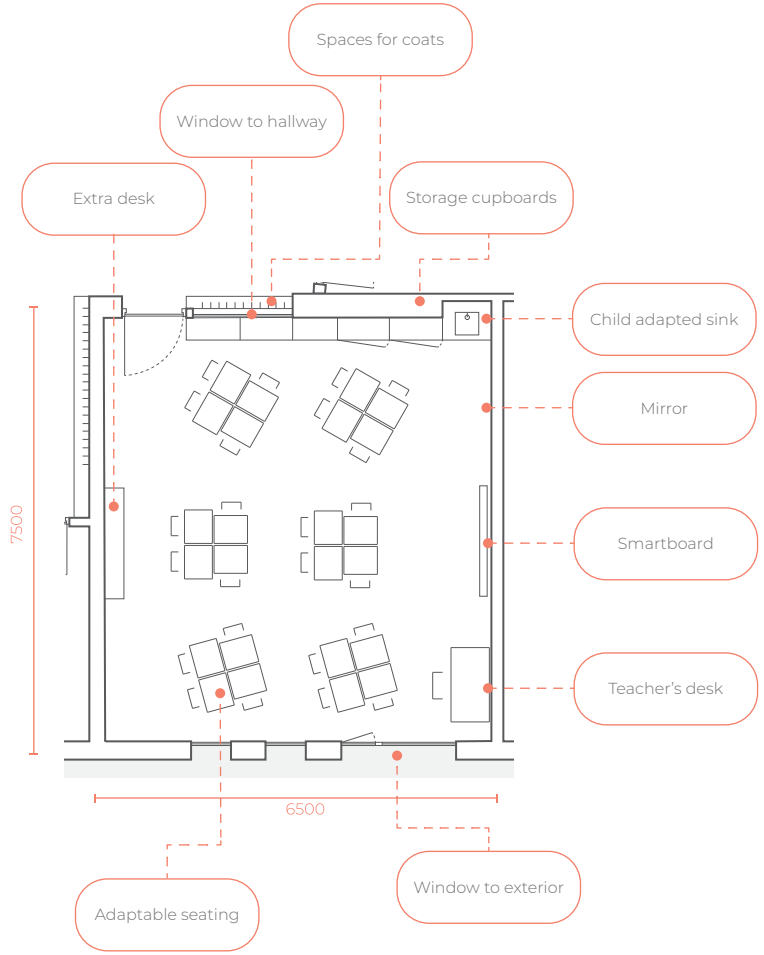


Image 18: *Classroom floorplan* 1:100

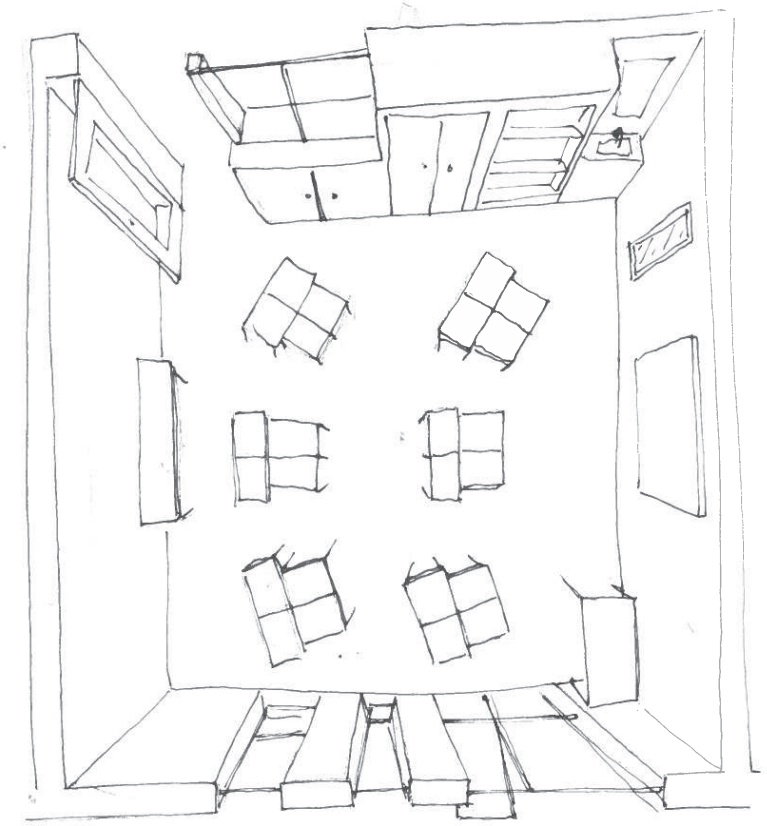
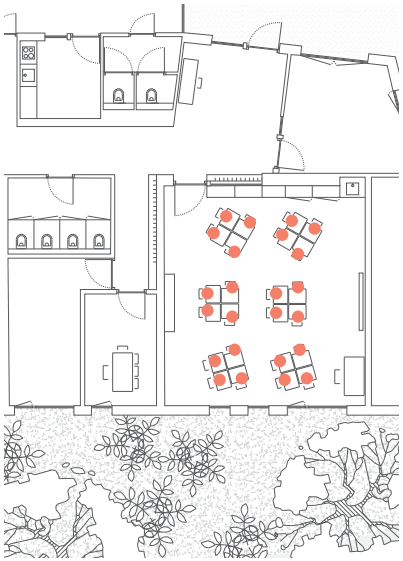
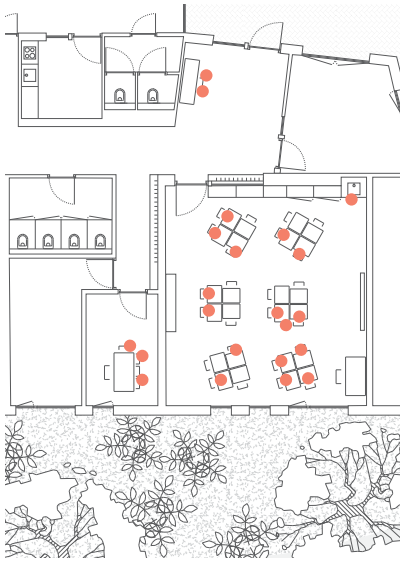


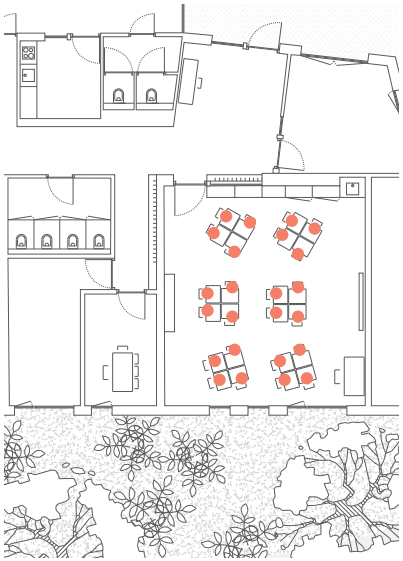
Image 19: *Sketched axonometric classroom*



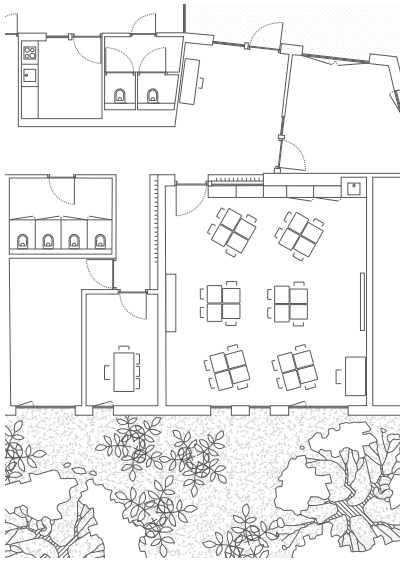
Classical teaching



Free hour for 'groep 4'



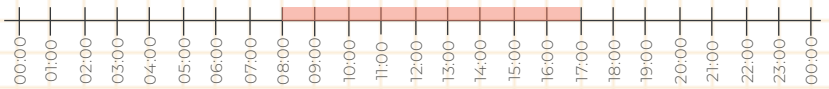
Break lunch time (+ play time rainy day)



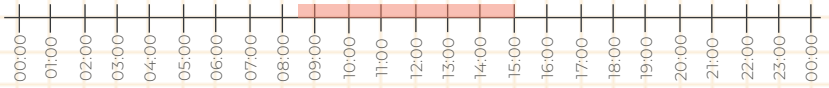
Break play time (sunny day)

Image 20: *Classroom usage during the day*

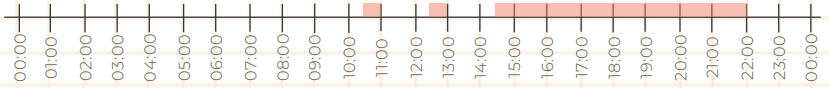
School usage teachers



School usage pupils



Playground usage pupils



The washing machine

The library

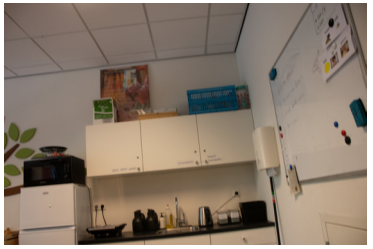
The playhouse

The toilet

The teacher's lounge

The library

The breakfast table



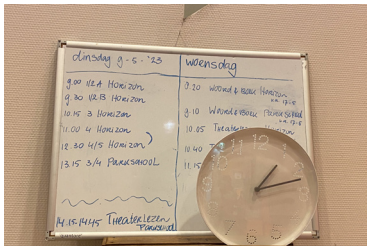
The kitchen

Image 21: *Photos taken by children*

My drawing

The flowers

My bag



The planning

The stairs

The headphones

The playground

The older kid's place

DE BERGSE ZONNEBLOEM

Rotterdam, The Netherlands

The Kleiwegkwartier is a garden suburb in Rotterdam that derives its character from richly detailed and expressive brickwork dating back to the early 20th century. This is particularly evident in the corner buildings within the neighborhood. 'De Bergse Zonnebloem' primary school is one of the original structures that, through its program and architecture, contributes to the neighborhood's identity.

At the start of the project, it became clear that the existing buildings, while valuable, could no longer adequately meet the evolving demands of modern education in terms of space. The Bergse Zonnebloem was established during a time when traditional classroom teaching was the norm. Today, it operates as a Dalton school, an educational approach that encourages children to learn independently and freely. This necessitates not only more space but also different spatial arrangements, especially as the school receives more applications each year.

Expanding a school within an old building comes with challenges. Initially, the proposal suggested expanding on the rooftop, but due to the extensive modifications required to the building, this option proved too costly. Consequently, a swift change in direction was necessary to continue the project. Some portions of the old structure had already lost much of their original quality due to prior renovations. By demolishing this section, space was created for new construction.

VRIJE SCHOOL WIDAR

Delft, The Netherlands

Vrije School Widar is a Waldorf school located in Delft, Netherlands. Waldorf schools, also known as Steiner schools after their founder Rudolf Steiner, focus on a holistic approach to education, emphasizing artistic, academic, and practical skills in an integrated and balanced manner. This educational philosophy aims to develop free, morally responsible, and integrated individuals equipped to respond to the challenges of their times.

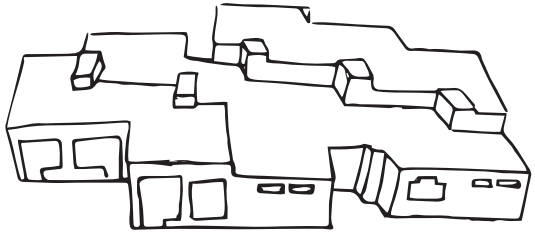
Vrije School Widar serves children from kindergarten through to primary and secondary education levels. The curriculum typically includes a wide range of subjects with a strong emphasis on arts and crafts, music, movement, and languages, alongside traditional academic subjects. Education in a Waldorf school like Widar is usually characterized by a developmental approach that respects the unique stages of a child's development.

The school is situated in an old building, with additional classrooms and spaces constructed in the 70's. The old part of the building is not in line with Vrije School's way of building, as it contains lots of straigth walls.

DELFTSE MONTESSORI

Delft, The Netherlands

The Delftse Montessori is situated in Delft in an average neighbourhood. It is designed by well-known architect Herman Hertzberger. Hertzberger primarily focuses on the people for whom he builds. For example, he has said, “Going to school is actually not fun at all.” Therefore, the architect does everything to make the school a pleasant home for its ‘residents’: children and teachers. Each classroom becomes a little house, grouped around a central hall that serves as a square. With wide stairs, so that the stairs can also be used as a grandstand. And a stage, where children can perform plays. “Because why would you perform a play in the gym?” The architect particularly shows himself to be a master in shaping the details. Everywhere there are small seating areas, niches where children can meet each other. And ledges, which can also serve as benches. This characterizes Hertzberger’s work: designing space without immediately dictating how people should use that space. It also addresses the relationship between public and private space. The classroom as a house is private, the hall is public, like the square. The intermediate area is essentially the lifted boundary between public and private. In this way, a situation arises where the users must determine how to handle these freedoms.



04

PATTERN LANGUAGE

PATTERN LANGUAGE

To foster better learning and development environments in primary schools, it is essential to tailor school spaces to meet the psychological and physical needs of children. This objective is at the heart of the pattern language derived from comprehensive research, which includes an extensive review of literature and field observations. This pattern language adopts the structure proposed by Christopher Alexander in 1978.

Each design recommendation from the research has been transformed into an individual pattern. These patterns are flexible, designed to be implemented across different scales and in various educational projects. Each one includes a title, a direct guideline, theoretical rationale, and practical outcomes. Additionally, each pattern is interconnected with others within the system, creating a ‘pattern field’ that reveals the thematic and scale-based connections among them.

These patterns are not mandatory for every school design, but they provide valuable guidance for creating educational spaces that support child psychology and primary education needs. Implementing any of these patterns contributes positively towards enhancing school environments for better child development.

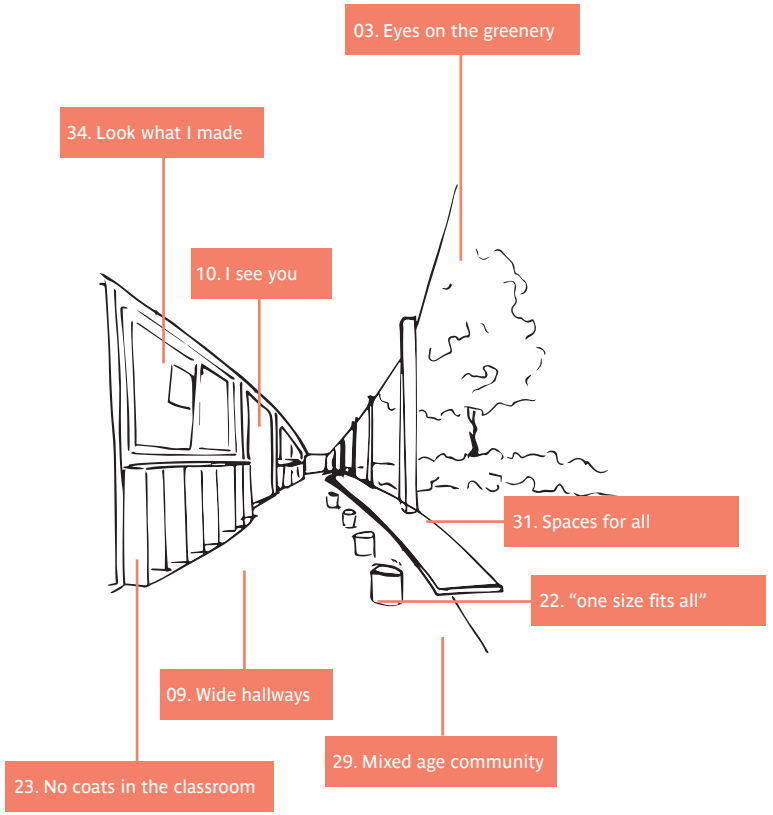
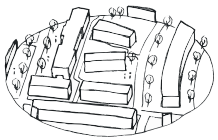


Image 22: *Example of the patterns in practice*



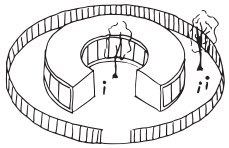
URBAN SCALE

01. Keep distance

15. Kiss and bye

20. Open at all times

21. The heart



EXTERIOR SCALE

04. Fresh air

05. Sharing is caring

06. Match flooring to play

07. Drop and pick me up here

12. A place for noise

14. Arrival

16. Back to the roots

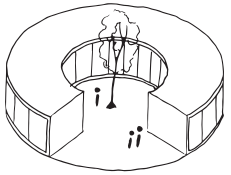
17. I'll pick a flower for you

18. Made of sugar

19. Shelter in the shade

27. Draw the line

33. Take the leap



BUILDING SCALE

08. Wide stairs

24. Room for extra

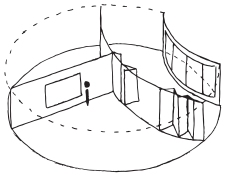
25. Read a book

26. Wide hallway

29. Mixed-age community

31. Spaces for all

32. Take a deep breath

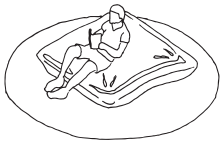


CLASSROOM SCALE

13. Clean your hands

23. No coats in the classroom

28. Undercrowding



OBJECT SCALE

02. A touch of green

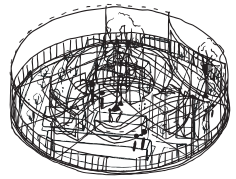
09. Hold on

10. I see you

11. Reaching stuff

22. "One size fits all"

34. Look what I made



ALL OVER SCALE

03. Eyes on the greenery

30. Playing is teaching

01 Keep distance

Schools are better for child health when positioned at a great distance from roads.

02 A touch of green

Plants in the classroom promote learning motivation.

03 Eyes on greenery

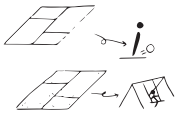
A view on nature enhances children's concentration.

04 Fresh air

Outdoor playing boosts classroom concentration.

05 Sharing is caring

Outdoor playing enhances children's physical and mental health development.



06 Match flooring to play

Different types of ground materials on the playground allow different types of play.

07 Drop and pick me up here

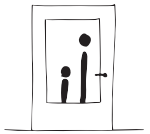
Children are able to be dropped and picked up by their parents in a safe manner.

08 Wide stairs

WIde stairs allow easy accessibility and interaction.

09 Hold on

Stairs must have railings on child and adult height.



10 I see you

Doors should have a window from top to bottom.

11 Reaching stuff

Cupboards should be at child height.

12 A place for noise

Children can maintain higher levels of concentration when they are not exposed to noise from playgrounds.

13 Clean your hands

All classrooms should have a sink at child height.

14 Arrival

The school's entrance is a make-it or break-it element for children's arrival.

15 Kiss and bye

A school must have a kiss & ride to pick-up and drop-off children.

16 Back to the roots

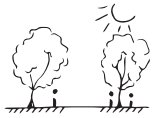
Children need acces to nature during recess.

17 I'll pick a flower for you

Children love flowers.

18 Made of sugar

Covered playing areas enable children to play outside regardless of the weather.

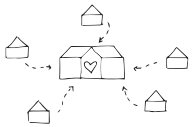


19 Shelter in the shade

Children need shading on the playground.

20 Open at all times

A public playground contributes to the neighbourhood.

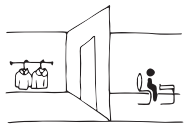


21 The heart

A school is the heart of the neighbourhood.

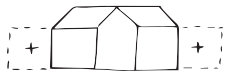
22 “One size fits all”

Comfortable furniture for children results in focussed children.



23 No coat in the classroom

Children need accessible spaces for their coats and bags.

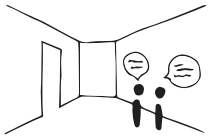


24 Room for extra

Schools need additional rooms for additional functions.

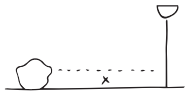
25 Read a book

A school should have a library.



26 Wide hallway

Wide hallways have multiple functions.



27 Draw the line

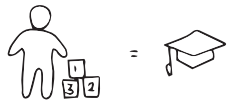
Children understand boundaries.

28 Undercrowding

Reducing class size increases children’s achievement.

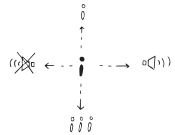
29 Mixed age community

Children learn from each other.



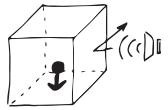
30 Playing is teaching

Children learn through play.



31 Spaces for all

Children have different requirements for learning environments.

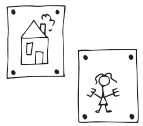


32 Take a deep breath

Children need spaces for relaxation where they can withdraw from the educational aspect of school.

33 Leap of faith

Children need exposure to elements risk to learn to be careful.



34 Look at what I made

Children need exposition spaces for their work.

05
REFLECTION

NAVIGATING THE COMPLEXITY OF CHILD DEVELOPMENT RESEARCH AND EDUCATIONAL SPACE DESIGN

Embarking on this graduation project has been an immersive journey, offering a profound exploration into the world as perceived through a child's eyes. As I reflect on my journey in researching child development and designing educational spaces and buildings, a mosaic of insights emerges, emphasizing the intricate nature of engaging with children, and the symbiotic relationship between research and design. My academic background in child development and psychology, acquired through courses at the Universiteit Leiden in the Netherlands and the École Polytechnique de Lausanne in Switzerland, provided a deep understanding of the multifaceted dynamics shaping a child's growth and the nuances of human behaviour within diverse contexts. This experience not only reaffirmed the importance of engaging with children directly but also highlighted the profound impact that bridging research and design can have on creating enriching educational environments tailored to the intricate needs and perspectives of young learners.

While commencing the Explore Lab studio, my fascination with child psychology fuelled my initial drive. However, I soon encountered the expansive and sometimes divergent landscape of theories within the field. Navigating through the staples of child psychology and development literature, I found myself lost in the range of theories, challenging the notion of a definitive 'right' or 'wrong'. It became apparent that psychology, rather than residing in absolutes, thrives in shades of grey, often suggesting a balance between extremes. This realization mirrored the essence of my design approach—a quest for equilibrium between creating a school responsive to children's aspirations while harmonizing within societal frameworks, fostering an environment conducive to learning.

Methods and methodologies

Researching children poses challenges; their interview process requires carefulness and subtlety due their comfort levels in varying situations. The chosen methodologies—literature review, camera tours, and drawings—offered diverse lenses into children's perspectives, unveiling layers of understanding. Extensive existing literature on child development provided a robust foundation for my research, opening unforeseen avenues of exploration.

While the chosen research approach was effective, improvement were conceivable. It would have been beneficial to segregate methodologies to prevent exhaustion among both children and teachers. During the workshops, children were occupied drawing their school in response to the question, 'What does your school look like?' Meanwhile, small groups took turns joining me in a photo and tour workshop. Their task was to guide me around the school, highlighting what they considered important. Throughout the tour, the children's excitement became evident as they eagerly attempted to give me a comprehensive tour of the entire school. However, after a few groups, I adjusted their task to focus on showing me some of their favourite and least favourite spots within the school to be able to accommodate all group tours within the one-hour timeframe provided by their teachers. The utilization of the camera as a research tool during tours proved to be quite intriguing. While drawings often conveyed certain aspects of their perception of their school environment, the tours conducted with cameras offered a more multifaceted understanding of their thought processes. There was something uniquely informal about incorporating the camera alongside the children's movement. It fostered an informal atmosphere as the dynamic alleviated the nervousness among most of the participants. It transformed the process into a sort of playful interaction—a form of 'interview through play.' The use of the camera sparked enthusiasm among the children. However, as expected, some encountered difficulties using it. While most quickly grasped its basic functions, some struggled, resulting in a few blurry images. Despite this, the quality of the camera work didn't significantly impact the overall outcome of the camera and tour workshop. What did become noticeable was the shift in focus among the children. In some groups, conversations about who should handle the camera or phone became more prevalent than focusing on the primary task at hand—a common expectation when engaging children aged 5 to 8 years old. Ideally, I would have wished to document all group tours using a recording voice device or even a GoPro attached to some children, to perceive the school through their eyes. Regrettably, due to privacy reasons this would have been a very difficult experiment to execute. Instead I noted down noteworthy memorable sentences articulated by children during the tours as well as small sketches capturing various situations.

During the tours, the teachers remained in the room with the remaining children as they focussed on drawing their perceptions of the school. Encouraging children to articulate their drawings in written or oral form would have added depth to the insights gathered, as those who voluntarily shared their thought offered some of the most valuable perspectives. Deciphering the meaning behind children's drawings can be challenging,

and providing explanations would have offered further layers of understanding into their perceptions and interpretations. It could have shed light on details or nuances that might not have been immediately evident from the drawings alone. This approach might have revealed hidden emotions, thoughts, and the significance attributed to different elements within their drawings, which might not have been immediately apparent from the drawings alone. Fortunately, many children wrote down their intentions for their drawings on the back of their paper, thanks to the teacher's suggestion. Building on lessons from earlier case studies, I carried this knowledge forward for the later ones. It was during the final case studies that I actively engaged with more students, encouraging them to share the significance of their drawings.

Combining camera work, drawings and tours offered a layered understanding of the children's perspectives on their school environment. It provided a glimpse not only into what they valued but also into their daily experiences within those spaces. While technical hiccups occurred, they didn't diminish the overall value of the insights gained. In hindsight, the process demonstrated the effectiveness of unconventional research methods in eliciting candid responses from young participants, fostering an environment where they could freely express themselves.

Challenges and Radical Shifts in Pursuit of Progress

Throughout the course of the project, I delved into the educational systems in The Netherlands. Despite this research, I faced a challenge in finding a system that resonated with my vision and the desired outcomes aimed at fostering positive cognitive child development. Using child psychology and didactic knowledge I sought to navigate in the complexities of didactics. Forming a substantiated position on developing a "new" educational system proved to be challenging given my lack of education on pedagogical methods and theories. Consequently, my exploration extended beyond the realms of child development and architectural implications, delving into diverse ways of learning for children and the accommodations for these differing styles. Maintaining caution in staking a definitive position on the didactical aspect of this research became a constraint. It inhibited progress until a pivotal moment when I decided to explore the extremes, curious to discern the potential outcomes. Encouraged by my mentors, I embarked on a journey to explore radical possibilities within educational architecture, prompting a departure from conventional paradigms towards a reimagined educational system.

Societal relevance

This project started off on exploring how bullying in the prime years of development had impact of future mental issues or even psychological illnesses. Despite the existing theories, crafting a comprehensive and complete study supported by concrete evidence and qualitative evidence was beyond reach. Instead, my research pivoted towards fostering an environment to the comfort and growth of children. I aimed to cultivate a space where children could flourish in a relaxed atmosphere. Existing theories underline the significance of this comfort zone: when children feel secure and are empowered to pursue their individual interests, they tend to evolve into resilient individuals. What's intriguing is that within this context, differences among children in terms of learning styles and interests become less defining. It's as if the environment fosters a sense of unity and encourages each child's unique journey without placing emphasis on disparities.

This project underscored the critical need to reconsider modern primary school designs, which often fail to cater to the individual needs of children that significantly contribute to their sense of identity and development. Despite the emergence of new educational systems in the past century, many school buildings remain unchanged and do not adapt to these advancements. Primary schools are frequently structured based on outdated systems where the teacher remains the focal point of the classroom, limiting the freedom necessary for these modern systems. The prevalent use of rectangular classrooms across most buildings seems almost obligatory, stifling creativity and innovation. Therefore the design of a new systematic approach for educational architecture becomes necessary to diverge from this conventional "one-size-fits-all" notion and explore designs that transcend these limitations. This emphasizes a notable absence: the vision of non-adult thinking in envisioning buildings and spaces intended for children. How could we create a building that genuinely caters to children's needs without viewing it through the lens of their requirements and perspectives? Embracing an idealistic notion, this project envisions transcending the boundaries imposed on elementary schools by creating a new typology of primary education spaces. It aims to challenge the traditional classroom setup, offering a framework that adapts to a liberated educational system, devoid of traditional classroom walls. This radical, yet necessary, proposition seeks to explore extremes and alternative options that could revolutionize the landscape of elementary education. The project acts as a springboard for introspection, urging a departure from conventional designs and an embracement of a new paradigm in educational architecture—one that not only

recognizes but champions the diverse needs and aspirations of children.

Academic relevance

The academic significance of this project manifests in its multifaceted exploration of child development, interwoven with the intricate design of educational spaces. It embodies a multidisciplinary approach, bridging the realms of psychology, education, and architecture. This project's academic relevance extends beyond the traditional boundaries of psychology and architecture, encompassing a holistic understanding of child development within educational contexts. Its interdisciplinary nature and innovative methodologies set a precedent for future researches that aim at creating nurturing and adaptive educational spaces for young learners. However, within this academic pursuit, the project encountered the challenge of navigating the multitude of theories in child psychology, revealing the subjectivity and nuances that resist rigid categorization or definitive answers. This mirrors the complexity inherent in architectural design, where the 'right' solution often resides in shades of grey rather than absolute certainties.

The use of unconventional research methods necessary to do research with children. The research methodologies adopted, including literature review, camera tours, and drawings, not only provided novel perspectives into children's cognition but also shed light on the nuances of their spatial interactions. This project's academic relevance lies not only in its scholarly contributions to child development studies and architectural implications, but also in its innovative research methodologies that offer a template for future interdisciplinary research with children. Furthermore, the critical analysis of prevailing educational architecture emphasizes the need for a paradigm shift in designing school environments. By questioning the rigidity of traditional classroom structures and advocating for a more flexible and child-centric design, this research lays the groundwork for transformative educational typologies.

Transferability and Relation to Practice

Amid the evolving educational landscape globally, this research takes on a turning role, offering invaluable insights for the approach into shaping schools that cater to the growth of each child as a unique individual. The proposed design concept, geared toward nurturing individual development, along with the pattern language framework, presents itself as a versatile template applicable across elementary schools worldwide. However, it's crucial to acknowledge that the strategy applied is based off of Dutch educational systems, backed by specific site research and contextual analysis. Adapting these strategies and tools to diverse settings and requirements, while customizing the design patterns to suit varied educational systems, becomes imperative. In the process of tailoring these strategies and tools to different contexts, there exists an opportunity to foster a more inclusive and adaptable educational design approach to educational design. One that honours the diverse needs and contexts of children globally, allowing for a more comprehensive and versatile framework in educational development.

In considering the future advancement of schools, a more intimate collaboration among architects, children, pedagogical experts, psychologists, municipalities and local inhabitants is imperative. While many schools employ pedagogical staff, their input in the design process of school buildings is overlooked. Schools ought to be conceived as interdisciplinary projects, wherein every stakeholder can contribute their expertise nurturing cognitive development and wellbeing of the child. This evolution demands an inclusive approach, recognizing the multifaceted contributions from architects' innovative designs to educators' pedagogical insights and psychologists' understanding of emotional development. Municipalities and the government play an important role, as they should understand investing in educational spaces is more than just an architectural beauty; it's an investment in fostering in the creation of thriving adults who contribute to the society.

Work and private life: Finding balance

As I come to the end of this reflection, it's clear that this journey through my thesis year was as much a personal endeavor as it was academic. Graduation is a tough period in life, where studies and private life intertwine, each demanding its share of attention and energy. As I come to the end of this reflective journey, it's clear that this thesis year was as much a personal endeavor as it was academic. Striking a balance between my studies and managing the complexities of my personal life. The challenge of pushing forward with my thesis while parts of my personal life needed attention was a constant balancing act. It was about finding the right mix of perseverance and self-care, ensuring that neither my academic pursuits nor my personal health were neglected. This journey taught me the critical importance of balance and the need to listen to one's own body and mind. Looking back, this thesis year has been a time of growth and

self-discovery. As this chapter of my life closes, I take with me not just the knowledge gained from my academic research, but also a deeper appreciation for the art of balancing life's various demands.

This year has also been immensely enlightening regarding my understanding and approach to architecture. It's somewhat poetic that only in my final year of studying architecture have I truly discovered the design methodology that resonates with me. This year led me to the realization - quite ironically in light of my thesis on ways of learning in children - that I thrive as a visual and hands-on worker. The revelation that remaining in my thoughts does not propel me forward was crucial. Instead, I flourish when producing tangible outcomes—be it through crafting models or developing 3D representations, as well as the process of hand drawing over and over again in the sketch process. Embracing imperfections and learning from mistakes is truely part of studying architecture and design. This graduation has been a year full of - as the Dutch would say - "vallen en opstaan".

06
BIBLIOGRAPHY

Books
Allen, B., & Hessick, K. (2011). The classroom environment: the silent curriculum. Child Development.

Bosch, R. (2018). Designing for a better world starts at school.

David, T.G., & Weinstein, C. (2013). Spaces for Children: The Built Environment and Child Development. Springer Science & Business Media.

Dudek, M. (2012). Children's Spaces. Routledge.

Dudek, M. (1996). Kindergarten Architecture (1st ed.). E & FN Spon

Kalvaiitis, D., & Monhardt, R. M. (2012). The architecture of children's relationships with nature: a phenomenographic investigation seen through drawings and written narratives of elementary students. In Environmental Education Research (2nd ed., Vol. 18, pp. 209–227). https://www.tandfonline.com/doi/df/10.1080/13504622.2011.598227?needAccess=true&role=button

Rieh, S. (2020). Creating a Sense of Place in School Environments: How Young Children Construct Place Attachment. Routledge.

Siegel, T. J. (n.d.). Low Income Investment Fund. Quality Environments for Children. A Design and Development Guide for Child Care and Early Education Facilities. https://www.liifund.org/wp-content/uploads/2011/03/LIIF-Quality_Environments_for_Children-2010.pdf

Siegler, R. S., Saffran, J., Eisenberg, N., DeLoache, J. S., Gershoff, E., & Leaper, C. (2017).
How Children Develop (Fifth ed.). Worth Publishers.

Websites
Boul, B. (2019, January 17). How Modern School Design Can Reduce Bullying | Ideas | HMC Architects. HMC Architects. https://hmcarchitects.com/news/how-modern-school-design-can-reduce-bullying-2018-09-14/

Centraal Bureau voor de Statistiek. (2011, October 12). Forse bevolkingsgroei in de Randstad tot 2025. Centraal Bureau Voor De Statistiek. https://www.cbs.nl/nl-nl/nieuws/2011/41/forse-bevolkingsgroei-in-de-randstad-tot-2025#:~:text=Bevolking%20Randstad%20groeit%20tot%202025,in%20de%20afgelopen%20vijftien%20jaar.

Centraal Bureau voor de Statistiek. (2016, September 21). Aantal leerlingen blijft dalen, behalve in grote steden. Centraal Bureau Voor De Statistiek. https://www.cbs.nl/nl-nl/nieuws/2016/38/aantal-leerlingen-blijft-dalen-behalve-in-grote-steden

Child development – Birth To 5 Matters. (n.d.-b). https://birthto5matters.org.uk/child-development/

Gieles, J. (2023, February 3). De invloed van je jeugd. Psychologie Magazine. https://www.psychologiemagazine.nl/artikel/de-invloed-van-je-jeugd/

Minero, E. (2018, March 2). The Architecture of Ideal Learning Environments. Edutopia. https://www.edutopia.org/article/architecture-ideal-learning-environments/

Pang, K. (n.d) Toxic Stress: How the Body's Response Can Harm a Child's Development. https://www.nationwidechildrens.org/family-resources-education/700childrens/2017/07/toxic-stress-how-the-bodys-response-can-harm-a-childs-development

Articles
Academy, L., & Academy, L. (2022, August 24). Different learning styles. Enrichment and Tuition to Improve English, Math and Science. https://lkacademy.sg/different-learning-styles/

Bodrova E., Leong D. (2015). Vygotskian and Post-Vygotskian views on children's play. In American Journal of Play (No. 3; Vols. 7–7, pp. 371–373). https://files.eric.ed.gov/fulltext/EJ1070266.pdf

Clark, A. (2005). Ways of seeing: using the Mosaic approach to listen to young children's perspectives. Policy Press EBooks, 29–50. https://doi.org/10.51952/9781447342403.ch003

Fox, S. E., Levitt, P., & Nelson, C. H. (2010). How the Timing and Quality of Early Experiences Influence theDevelopment of Brain Architecture. In Child Development (pp. 28–40). https://doi.org/10.1111/j.1467-8624.2009.01380.x

Härkönen, U. (2007). The Bronfenbrenner ecological systems theory of human development. Scientific Articles of V International Conference Person, Color, Nature, Music.

Ructtinger, L., & Stevens, R. (n.d.). Learning spaces. NSW Government Education.

Scott, S. (2010). Architecture for Children. Aust Council for Education

Research

Septriyani, N. N., Arvanda, E., Kusuma, N. R., & Isnaeni, H. (2020). Architecture and the potential of bullying behavior in elementary school environment. Nucleation and Atmospheric Aerosols. https://doi.org/10.1063/5.0003699

Shonkoff, J. P., & Garner, A. J. P. (2012). The Lifelong Effects of Early Childhood Adversity and Toxic Stress. Pediatrics, 129(1), e232–e246. https://doi.org/10.1542/peds.2011-2663

Tapia-Fonllem, C., Fraijo-Sing, B., Corral-Verdugo, V., Garza-Terán, G., & Moreno-Barahona, M. (2020). School Environments and Elementary School Children's Well-Being in Northwestern Mexico. Frontiers in Psychology, 11. https://doi.org/10.3389/fpsyg.2020.00510

Westberg, N. (2016). Safe in School: When Architecture Tackles Bullying [Master Thesis]. Chalmers University of Technology.

Yerger, W. M., & Gehret, C. (2011). Understanding and Dealing With Bullying in Schools. The Educational Forum, 75(4), 315–326. https://doi.org/10.1080/00131725.2011.602468