LUNDS UNIVERSITET

AROUND THE BOX

By Celine Adolfsson

Around the box
By. Celine Adolfsson

Course
Degree Project for Bachelor of Fine Arts in
Design
Main field of study Industrial Design
From
Lund University School of Industrial Design,
Department of Design Sciences

Examiner
Professor Claus-Christian Eckhardt

Supervisors
Professor Claus-Christian Eckhardt,
Lecturer Anna Persson,
Senior Lecturer Jasjit Singh,
Senior Lecturer Charlotte Sjödell

Year
2021

LUNDS UNIVERSITET

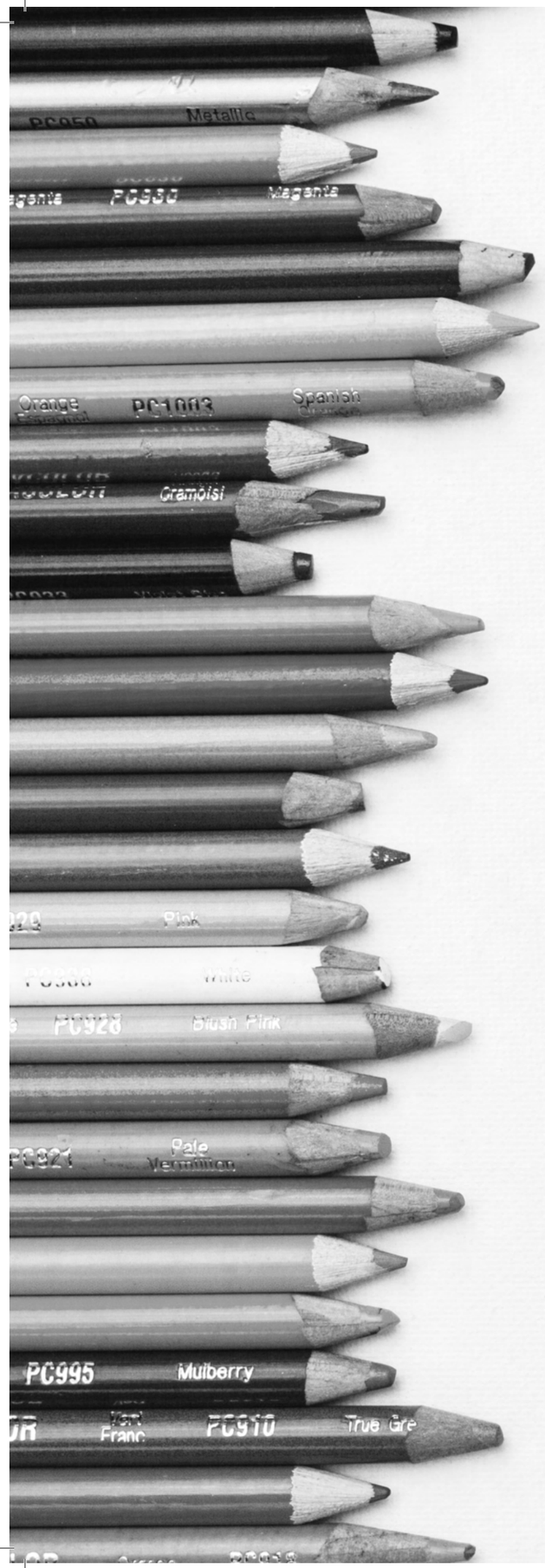
ACKNOWLEDGEMENTS

First of all thank you to the School of Industrial Design at Lund University.

Especially thanks to Senior Lecturer **Jasjit Singh** for acting as my **main supervisor** for this bachelor project.

Thank you to the participants interviewed for this project, that even in these social distancing times, took their time for great conversations.

And thank you to my classmates and the other supervisors a who inspired and helped me through out this project.



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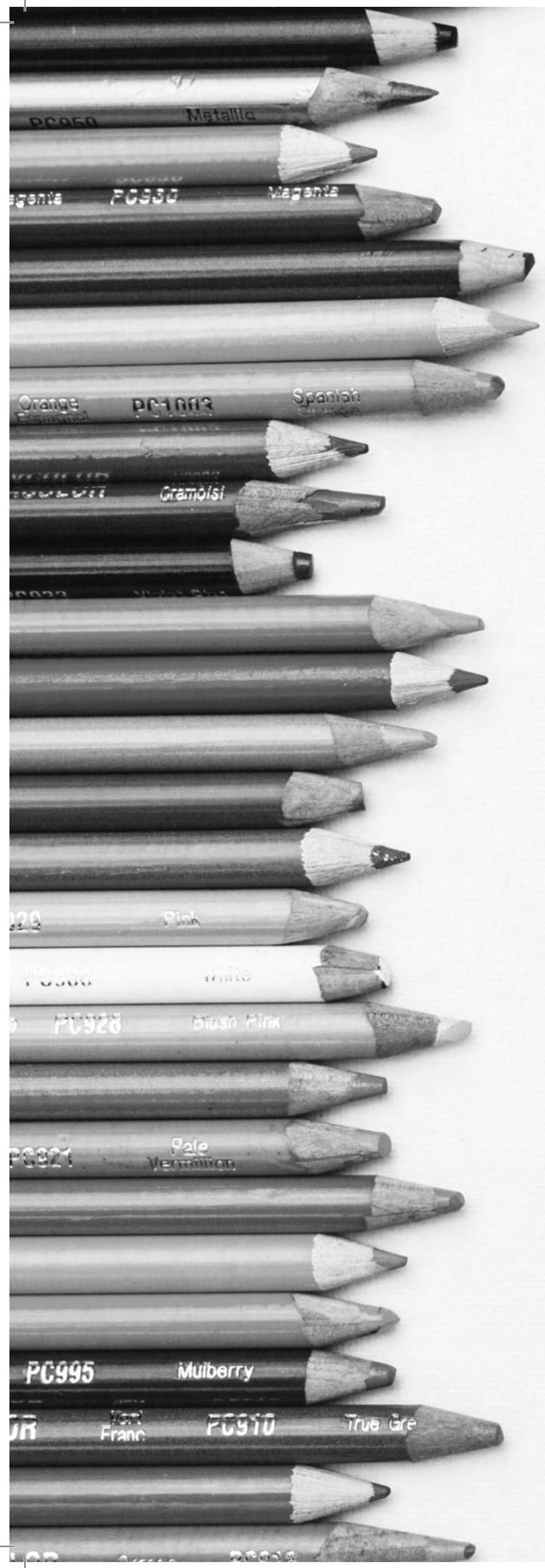
ABSTRACT

Most classrooms today are overcrowded, cramped with static furnitures focusing on functionality targeting one standard sitting position. In the digital era of our time, movement, activity and flexibility are aspects of shortage.

For this project, eight people were interviewed. Four students in the target group of children in the ages of 6-9, as well as two teachers and two parents. The insights from the interviews and research regarding the target group, pedagogics and anthropometrics alongside market analysis formed the basis of this industrial design bachelor project.

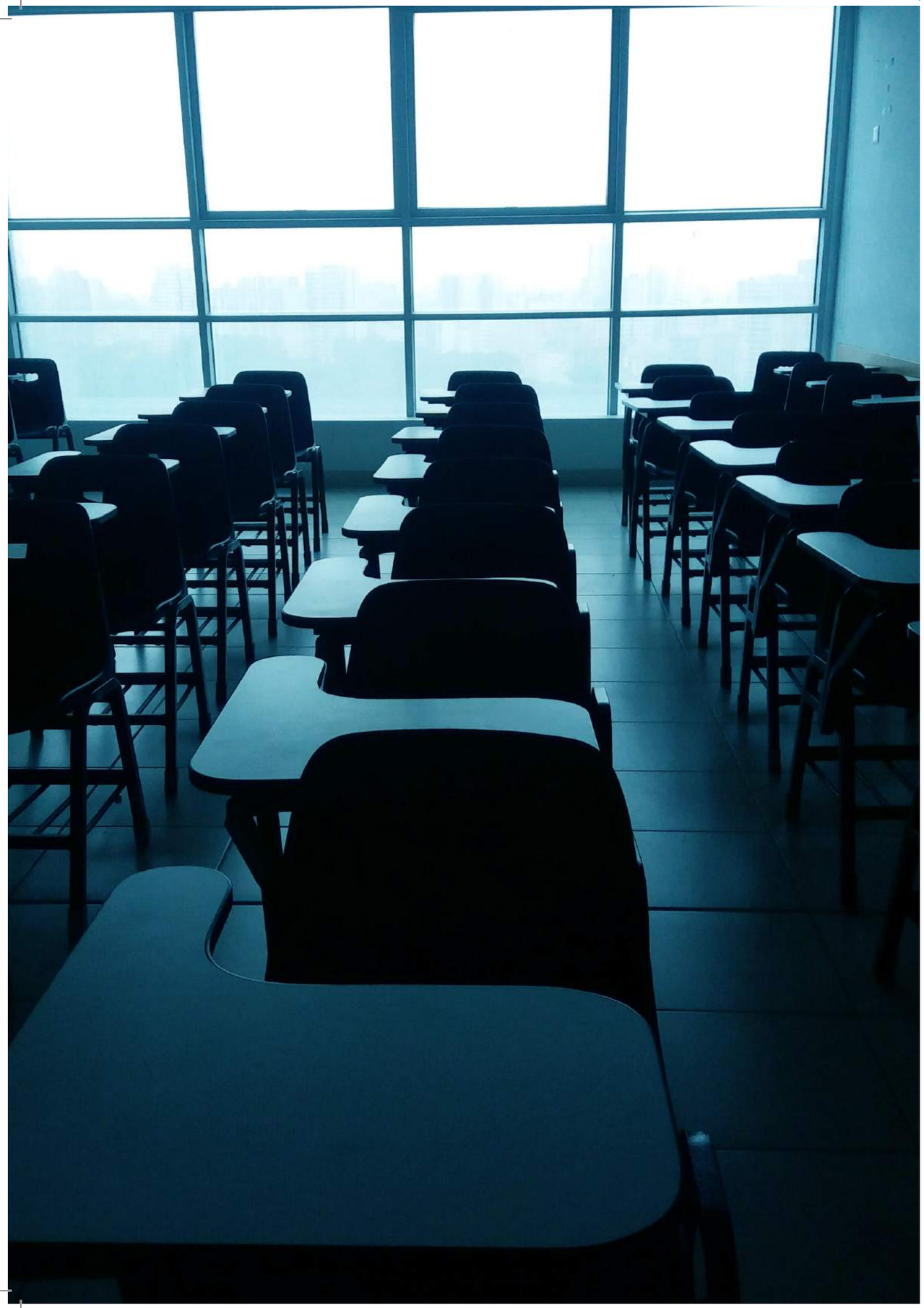
This project resulted in a dynamic school furniture with the concept of a golden proportioned block applied in a section of classrooms allowing four different working positions for a flexible classroom.



1.0 INTRODUCTION

BACKGROUND MOTIVATION

INITIAL BRIEF



1.1 BACKGROUND

MOTIVATION

In Sweden all children have the privilege and obligation to go to school, a law regulated by the Swedish government (SFS nr: 2010:800). The school is not only a place to learn how to calculate, read or write. This is a place for social interactions, group dynamics, respect and mental- as well as physical health.

In the early years of school, a human life develop some the most basic ground blocks to build the future individual. By providing the best possible opportunities for an individual to grow, the future population have a better chance to gather the right tools to deal with any troubles coming their way.

According to a study made by the Swedish heath organization (Folkhälsomyndigheten, 29-04-19) children today are becoming more and more inactive. As a result to this stress increases and over all heath worsens. Long days sitting in school might have been fine when the rest of the hours that day was consumed by play and physical activity. Now when the digital innovations prone children to engage quietly, imbalance occurs.

This digital era offers every choice within the swipe of a finger. A powerful tool that come with responsibilities. It is vital to prepare children for decision making based on analysis, information and own mind. The teaching of autonomous choices and respect are thereby necessary.

In addition to this imbalance, the classrooms built for e.g 1st grade classes decades ago resides 1st grade classes today. Considering the large increase of students each year there are less space portioned to each child which restrains the possibilities for an engaged and dynamic learning experience (siris.skolverket.se) .

This project was initiated by the current condition in the Swedish schools and the relation to the digital era of our time. There are several design opportunities lined up to improve the climate of the classroom as well as providing better learning experiences.

To design an efficient space and develop a dynamic classroom.

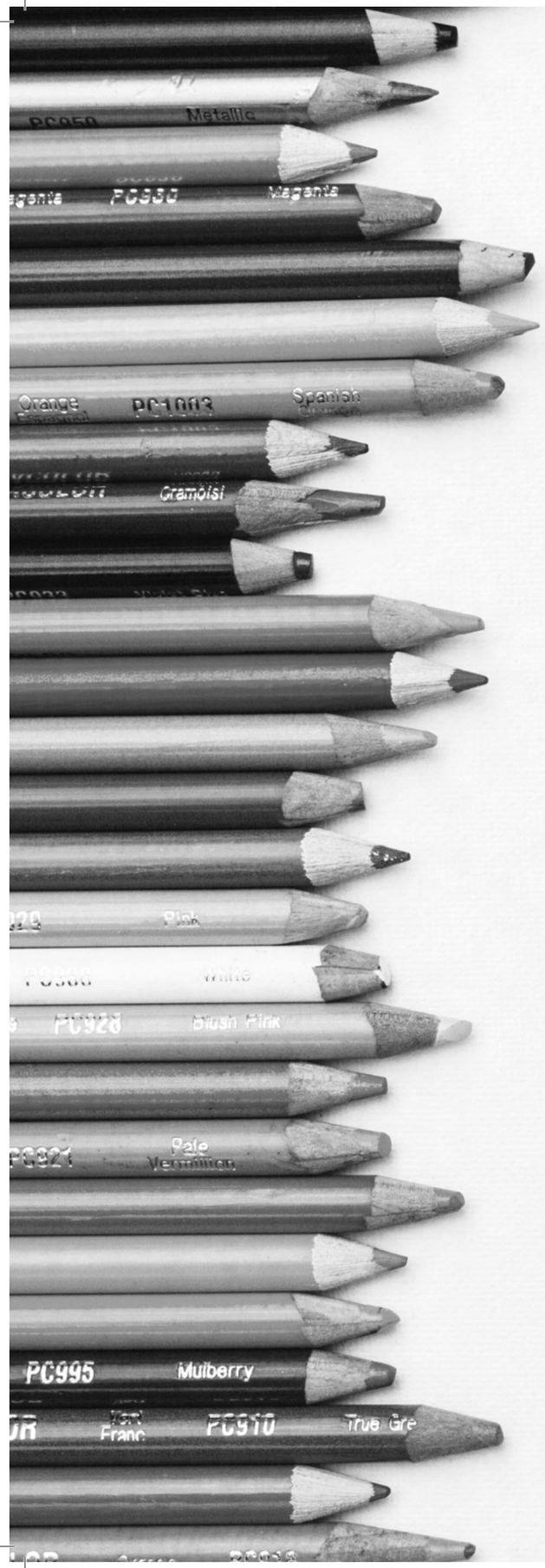
1.2 BRIEF
INITIAL

Conclusions made from the motivation and background to this project, a brief was set. The current school situation offers design possibilities within the four walls of each and every classroom.

The physicality and layout of the classroom would benefit from a more space efficient solution allowing a more active and adaptable layout.

By transforming classroom layouts depending on activity and need, the learning experience grants a higher value of effectiveness as well as more engaged, active and adaptable children.

The initial brief of this project thereby was created as;
"To design an efficient space and develop a dynamic classroom."



2.0 TARGET

TARGET GROUP AND REGION

USER INTERVIEWS

NEEDS IDENTIFIED

GOALS IDENTIFIED

2.1 TARGET

GROUP AND REGION

The target group is children in the ages of six to nine years, an age group which correlates to the first four years in school. The most narrative qualities of this target group are a high value of curiosity, creativity and activity. Characteristics that generates positive and playful individuals who tend to long for belonging and authority as well as they are inspired by their own mind experiencing new sensations.

These individuals are very aware of their surroundings and how the larger group is perceiving them and their actions. To this group it is highly important to make and feel connections with others, alongside exploring their own personality and imagination.

During these years children evolves to be able to make decisions of their own and having more of an own mind. Expressions such as *I like this or I do not like that* has now developed further into *I like or do not like this because...*As this development happens the conscious of how I act and how others perceive and value my actions becomes important. Having a best friend, fitting in and being cool grows to be more and more meaningful.

Considering former stated evolvement of the children the grown ups and teachers in a child's life play a crucial part as moral role models. By implementing a diverse mindset, respect and honesty, children have the possibility to gather the right tools to become great adults. The school and the teacher in every classroom sets the standard of how the class is working and the social climate in the group.

These are also years in a lifetime whereas the most new knowledge can be stored the easiest. New information and habits are quickly programmed.

The geographic region targeted in this project is primarily Scandinavia since the school systems are the most similar and are created by the social philosophy stating that autonomous as well as a grade of individualization generates knowledge. Although every culture and region can benefit from this project. The best possible would be if every child had the privilege to go to school and the opportunity to explore and develop in an environment where this project was implemented.

Teacher

Overcrowded classroom hinders activity.

Move around to help is vital and often hurting due to four corners/legs on the desks.

Engage in dynamic activities is depending on adaptability.
I feel it provides the best learning experience.

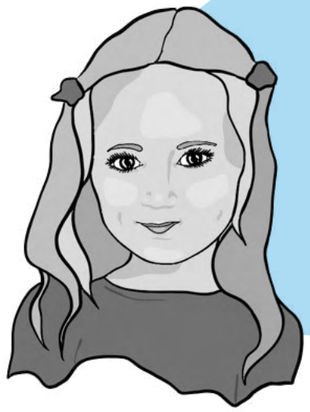
Student 9

I prefer sitting in group a around a table rather than in pairs.

Every other week we change seats and partner but never our classroom layout.

The best part of my day in school is lunch.

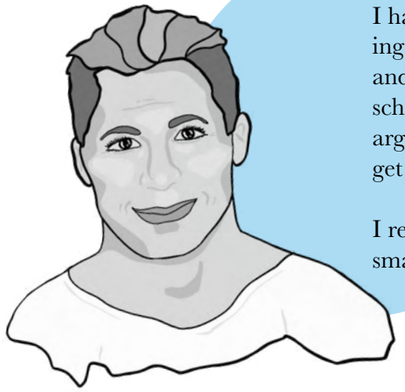
Student 7



We sit one by one but when our teacher does out loud reading we all sit in a sofa.

When I do my homework I always get to sit at the carpet in my room or read to my mom sitting in our beanbags.

Parent



I have always considered learning by doing most effective and I am grateful for what the school provides although I argue that the children does not get enough individual time.

I recognize more activity and smaller classes to be key.

2.2 USERS

INTERVIEWS

For this project, eight people were interviewed. Four students that were seven and nine years old, as well as two teachers and two parents. A larger percentage of children was included since they are the primary target group. By including teachers, a more professional point of view were exposed considering the classroom is their working environment too. The two parents were asked hence they posses a vital influence on the child's life. Equally many women as men were interviewed. The participants were later turned into fictive personas due to confidential reasons.

The participants were selected form different geographical areas in Sweden to gather broader and more accurate insights, less influenced by one school or even one district.

The interviews ranged from 15 to 20 minutes and consisted of six open question to keep the discussion going and generate valuable insights.

The general impressions of the interviews was that the children had come to terms with the static desk and chair classroom setup. But when they themselves had the opportunity to influence their working position they often chose a more flexible setup surrounded by classmates or comfort.

The teachers both pointed out the overcrowding of the classroom which hinders certain activities they would like to implement for a more dynamic pedagogics. Due to the overcrowded classrooms the teachers work as turned more and more difficult. One vital part of the teachers work is to interact with the students not only by the whiteboard at the front but also allowing individual time to help the students at their desk. Moving around is not easy as there is very little space between the desks and the corners of the desks can be hurtful while trying to move from one desk to another.

Parents are allowed to have opinions regarding the school and the classroom since it is their children's workplace, but they do not have the last word. The insights from the parents was that they reckon their children to benefit from activity, authority and individual time.

1 Flexible
2 Ergonomic
3 Active
4 Intuitive
5 Comfortable

2.3 NEEDS
IDENTIFIED

From the background, brief and interviews five main needs were identified. The most eminent features referred to concluded in following areas; *movement, posture, usage, cognitive thinking and experience.*

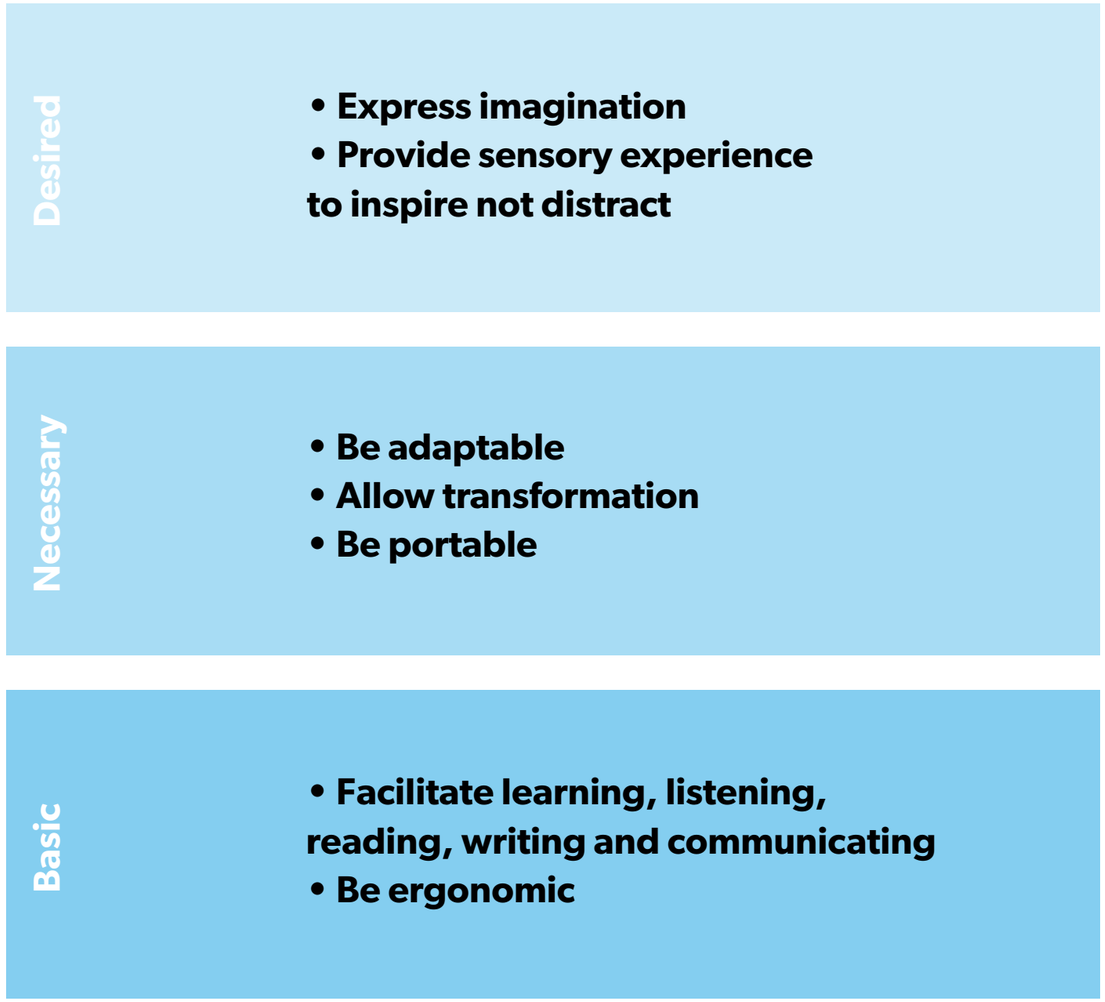
A *flexible* classroom with the ability to transform depending on activity was highly requested by the interviewed teachers. As considered to the intended target group a faster paced adaptability is recommended.

Ergonomic standards are facts never neglected due to the importance of an appropriate posture while working, to prevent injuries.

An *active* classroom does not only connect with the target group but also with the need of active hours throughout the day.

Since the design aims to be flexible, adaptable and of active character the movement has to be strongly supported by *intuitive* affordances and signifiers.

Comfort is one feature deeply requested by children and teachers. For some activities comfort can be distracting, as for other activities and learning experiences a relaxed body and mind can be key.

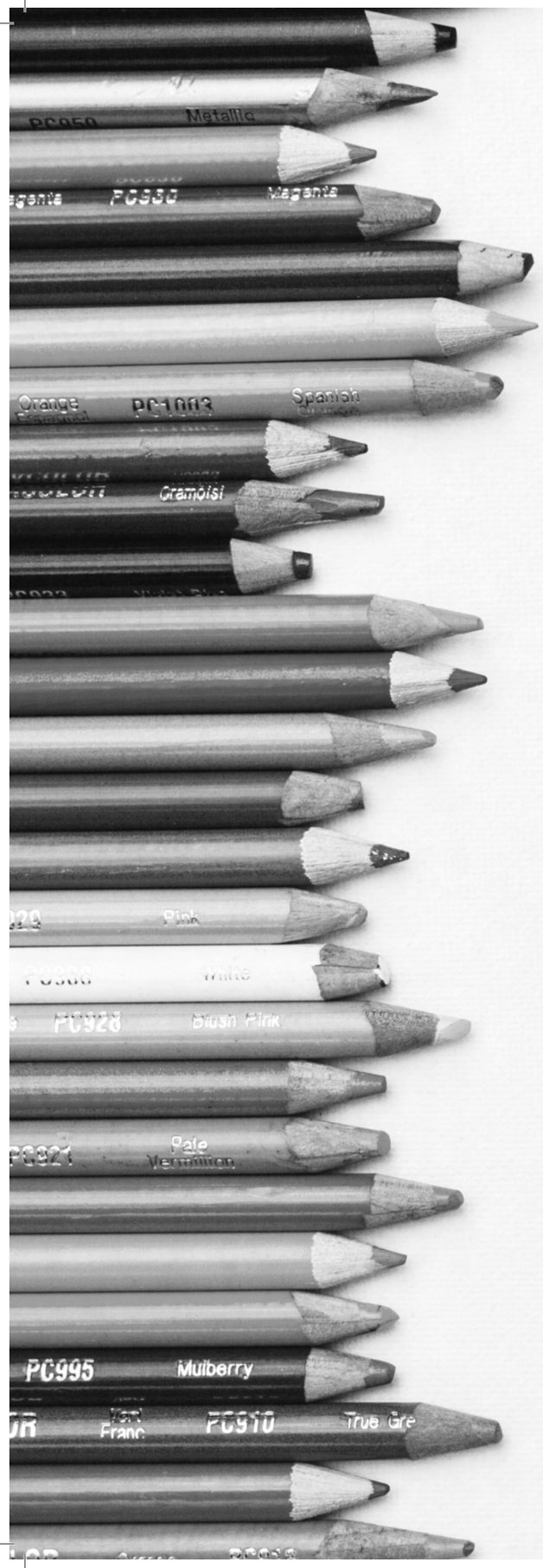


2.4 GOALS
IDENTIFIED

The most basic goals set for this project was narrowed down to; f*acilitate learning and be ergonomic.* In a classroom the central point is to learn, thereby this project has find a way to emphasize learning experiences. Ergonomic standards based on anthropometric data guides design to suit the target group and ensure an appropriate posture for working to encourage good health.

Goals of necessary character was stated as; *be adaptable, allow transformation and be portable.* Adapting the design to the present desired activity and position is crucial for the learning experience. Allowing transformation of the design itself is also necessary since different activities require different demands, in size, hygiene and so forth. Being portable referrers to the demands of different activities. As the classrooms are crowded and in need of cleaning each day, everything in the classroom that can ease and efficient this is necessary.

Features that are desired belong to the aesthetics of the design; *expression and experience.* The expression will represent imagination and embrace creativity without being distracting.



3.0 MARKET

- HISTORY SCHOOL THROUGH TIME
- MARKET ANALYSIS
- SCALE RESEARCH

3.1 HISTORY
SCHOOL THROUGH TIME

Troughout time and history the school has evolved from a strict disciplinary institution into a working place of imagination prone to develop great adults. Adults that do not fit into a restricted normative frame, rather embracing who they are, working together with compassion, respect and sustainable thinking.

Around the 18th century the commonly known school furniture Pulpet was introduced in schools all over the world. The Pulpet is a furniture combining desk, chair and storage a function that can be considered suitable for the overcrowded classrooms of today. In Sweden the Pulpet was taken out of use due to anthropometric reasons. It was a majority of children that did not reach all the functions of the furniture and thereby an ergonomic working position could not be maintained.

The desk and chair was now designed as two seperate furnitures and has been seen in a variety of executions.

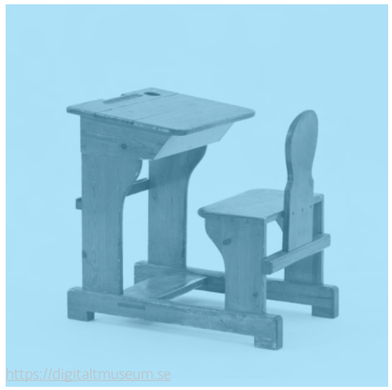
Today the students, teachers and pedagogics require different demands as well as high end materials, sustainable production and ergonomic standards.

Sitting still for hours and hours each and every day has lead to injuries, worsened mental health and less motivation. These issues are highly motivating as it is troubling the future adult population.

Innovations today meeting the needs of sustainability and ergonomic standards are seldomly seen in classrooms by the reason of to high of a price.

Designs at the market are considering height adjustments, angles and space efficiency although comfort, imagination and flexibility are qualities often excluded.

1950 1956 2000s 2021



Pulpet
Combined desk, storage and chair furniture. Often integrated notch meant for pencils. Footrest occupationally used as sitting area for knees.

Grythyttan
Combined desk and storage. Separate chair in the same collection. Made from pine and steel.

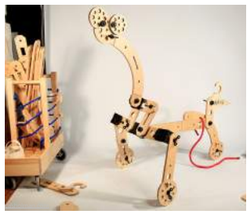
Tranås skolmöbler
Combined desk and storage. Separate chair. Aluminium piped construction with plastic protection for silence.

Dalman, Lekolar
Two legged desk with storage. Separate chair in the same collection. Adjustable hight and integrated sound insulator.

Atlas, form miljö
Two legged desk. Hight adjustable through pedal. Smart feet adaptable to irregular floors.

Ajprodukter

Lekochlar



Rigamajig

Kinnarps

Kinnarps

For restless bodies

3.2 MARKET
ANALYSIS

When analysing the market there are areas more distinct than others that within this project was grouped into four main fields; *playful - clean* and *adaptable - stationary.*

The market analysis included furnitures from companies commonly having schools all over Sweden as their customers. Brands included in this category was brands such as; Lekochlär, Ajprodukter and Kinnarps. Another branch of the market analysis included furnitures designed to question the static and clean commonly seen furnitures. Thereby the collections of *chairs for the restless body by Yuming Hu,* promoted in Dezeen magazine, was included. Lastly a more imaginative philosophy stating that children can create anything out of anything was investigated. The exploitative work- yard kit *Rigamajig designed by Cas Holman* was included.

Considering the project brief, the interviews, identified needs and goals along with further continuous research, the positioning for this project was set.

The intended function and use of the result in this project would be adaptable and varying throughout the day, depending on activity and/or individual. Different activities and individuals demands varying criteria from the furniture, and this is vital to the design.

The design language aim to be playful enough to engage and inspire but still tasteful without triggering silliness or a childish expression.

FLISAT
Width: 240
Depth: 240
Seat height: 280
Max. load: 35 kg

KRITTER
Width: 270
Depth: 290
Height: 530
Seat height: 270
Seat depth: 290
Seat height: 300

YPPERLIG
Min. height: 320
Max. height: 450
Seat width: 480
Seat depth: 290
Seat height: 320

FLISAT
Length: 830
Width: 580
Height: 480

KRITTER
Length: 590
Width: 500
Height: 500

YPPERLIG
Width: 920
Depth: 670
Min. height: 530
Max. height: 720

3.3 **SCALE**

RESEARCH

Considering the vital role of scale and proportions within this project a market research regarding theses factors were made.

The research focused on the children's section of furniture at IKEA targeting specifically table and chairs intended for arts and crafts. This section of furniture targets children at the ages of approximately 3-9 years.

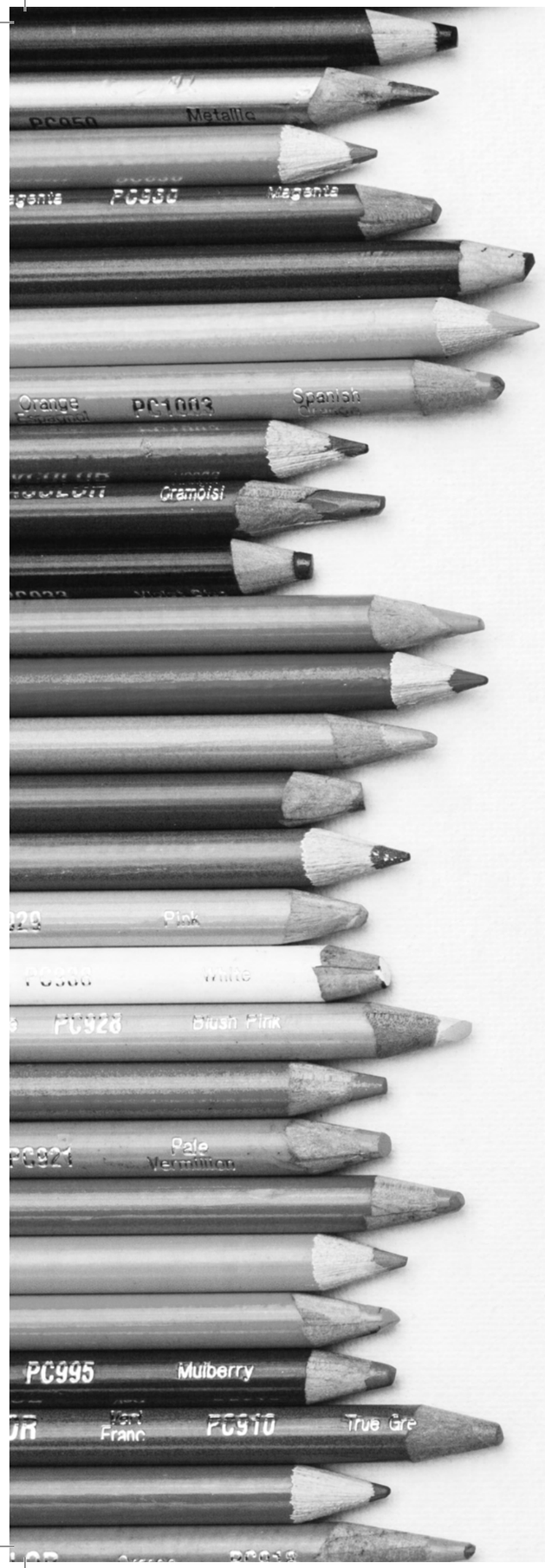
The three collections selected were; *Flisat, Kritter and Ypperlig.* The three collections each represented unique features and three different design languages as well as three types of sitting furnitures; *a stool, a chair and a bench*. The tables of the different collections also had unique features; storage and adjustability.

Measurements of the collections winded up in guiding average data useful for the dimensions in this project.

To this project relevant dimensions of the sitting area can be considered as follows. *Depth; 280mm Width; 270mm Seat height; 300mm.*

To this project relevant dimensions of the desk can be considered as follows. *Height; 500mm.*

In addition to scale research regarding the furnitures of choice exciting classrooms were investigated to get a better grasp of the current layouts and possibilities.



4.0 RESEARCH

- PEDAGOGIC AND PERFORMANCE
- PHYSICAL AND ANTHROPOMETRIC
- ETHICS

4.1 RESEARCH

PEDAGOGIC AND PERFORMANCE

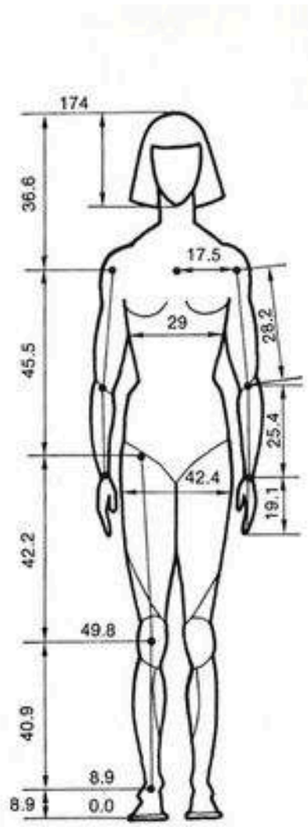
The physicality of the classroom has proven to be of significant purpose to the learning experience, learning curve as autonomy (Holm and Tinderholt, 2006) .

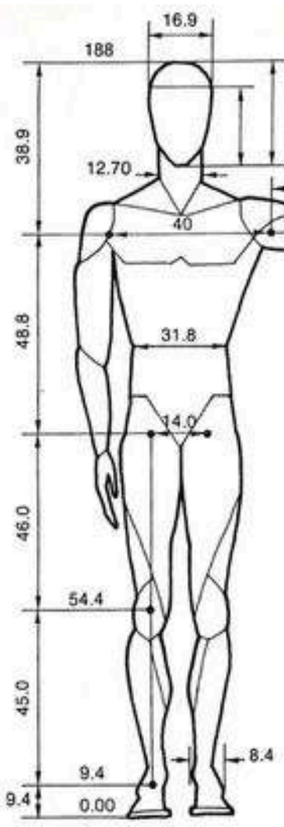
There are not one seating arrangement applicable for every desired learning activity or every student within the classroom. There by flexibility by either creating rooms within the room or transforming furniture are necessary (Henricsson and Hellman, 2018). Research show that flexible seating positions entail emotions of alertness, attention, and motivation (Walsh, 2019), which are a great emotional foundation to build knowledge upon.

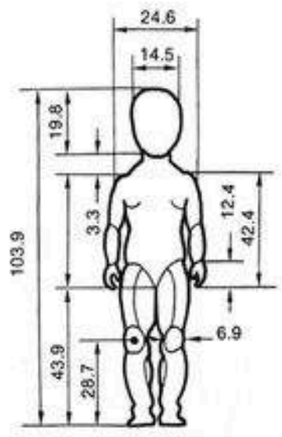
By encourage a dynamic classroom layout social skills are developed since it allows students to work within several different group dynamics. Alongside this the well known philosopher Vygotskij, developed the Social cultural theory which deems the social skills to be vital to create knowledge (Henricsson and Hellman, 2018).

The autonomy accentuated by the flexible and dynamic character of the interior can be overwhelming to some students. Too many choices will then result in indecisiveness. But autonomy is an important part of everyday and being able to choose from own will, analysis and possible consequences is then learned for life (Walsh, 2019).

Flexible seating allows the class to have the sensory stimulation desired while completing educational tasks. Studies suggest that children who participate in shorter physical activities have more on-task focus. The best improvement are seen in students who are least focused initially (Chasity L. Hardin, .







4.2 **RESEARCH**

PHYSICAL AND ANTHROPOMETRIC

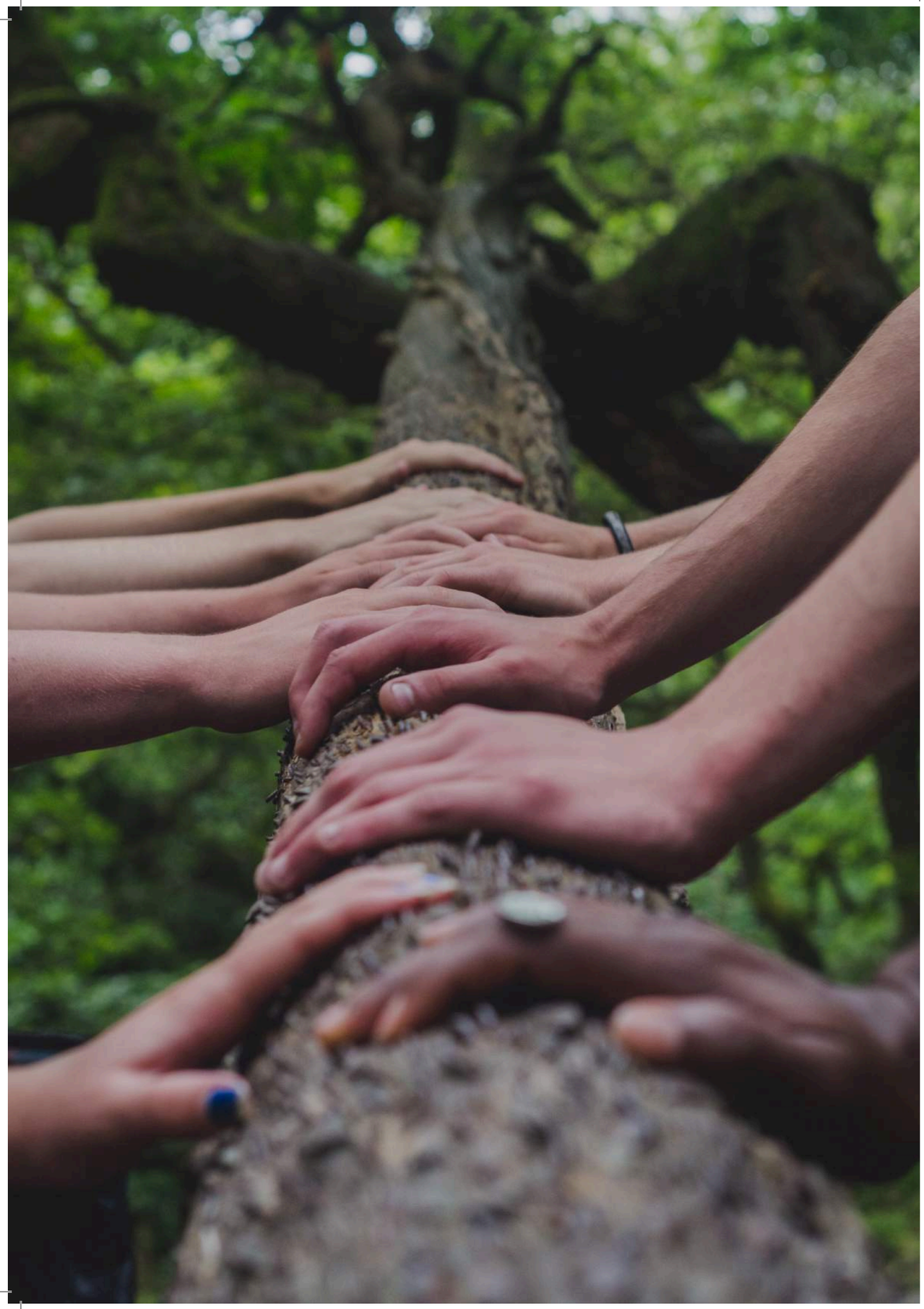
Due to the digital era of our time, humans tend to sit still for most of their awake hours each day. This inactive state is not what the human body was built for, on the other hand this is the future and we must make the most of it.

According to researchers school children are seated for 30% of their time in the classroom. There are studies made, stating several health issues when a child sits for long hours in a regular school chair (Schilling, 2004). The issues concerned regards children's backs, cardiovascular systems and aches and pains through out the body. Although these issues can be prevented with anthropometric guidelines, ergonomic standards, adjustable features, flexible furnitures and design (Freivalds, Haight and Oyewole, 2010).

When including flexible seating arrangements in the classroom several beneficial factors are gathered. Some of the benefical factors are; burning more calories, using up excess energy, improving metabolism, creating a better oxygen flow to the brain, improving core strength and overall posture. The engagement of a flexible seating position also encourages the nerve cells to bind to one another which is the cellular basis for logging new information. In addition to this the active state also releases happy hormones like adrenaline, endorphins and serotonin (Walsh, 2019).

As for the research ergonomic standards in schools today, lots of furnitures lack cushioning contributing to aches and pains. To prevent high pressure on buttocks studies show that leg or foot rests are affective (Freivalds, Haight and Oyewole, 2010).

For this project the anthropometric data of Henry Dreyfuss were used as a ergonomic- and anthropometric framework. Market scale analysis too guided the design forward.



4.3 **RESEARCH**

ETHICS

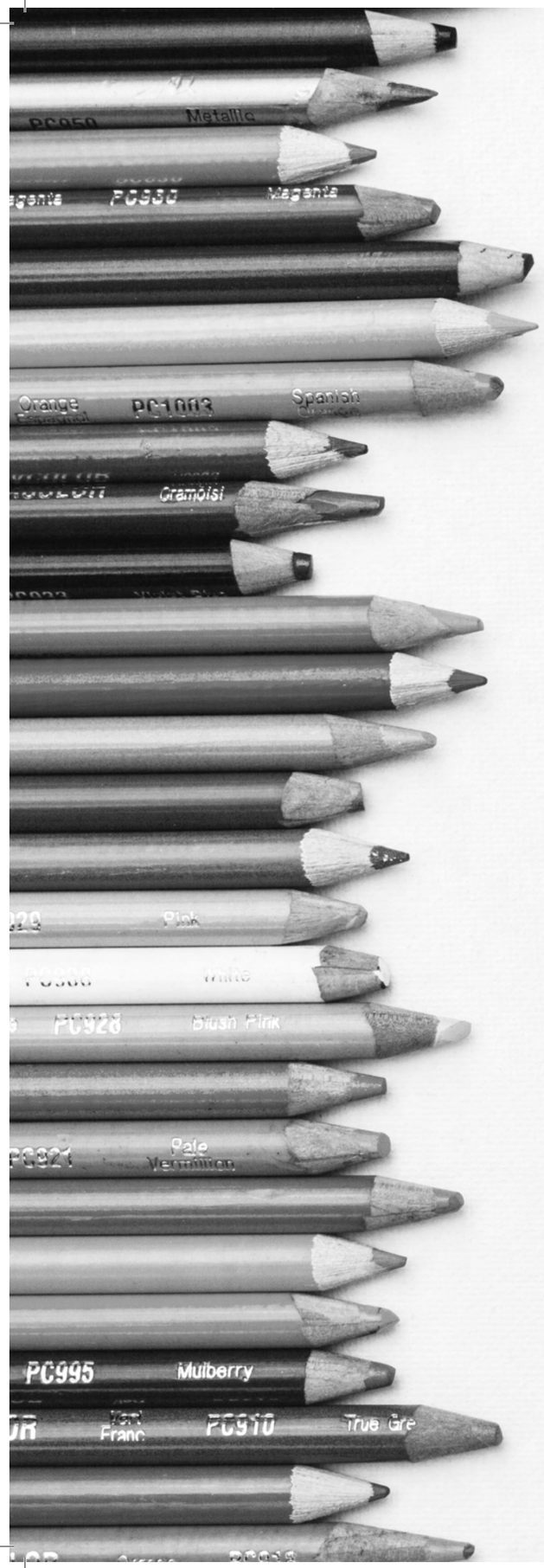
An ethical perspective on design is always necessary for the good intention of the outcome. An ethic perspective is vital in this project for several reasons. Providing children with honest and good products and teaching children that an ethical consideration is the better option. Contributing to society not only by shaping the future more conscious generation but also through sustainable material choices and sustainable production.

This project targets users that occasionally are neglected due to poor economical profit. Would a shifted mindset regarding profit and service be different if the school children were considered paying customers?

All children in Sweden have the privilege and obligation to go to school and the school system possesses the opportunity to shape and grant an ethically well oriented and sustainable thinking population. Qualities such as empathy, consequence analysis, creativity, diversity and respect are prone to be the future necessities in an ever tougher world. Can design provide the learning experience needed to gain these qualities?

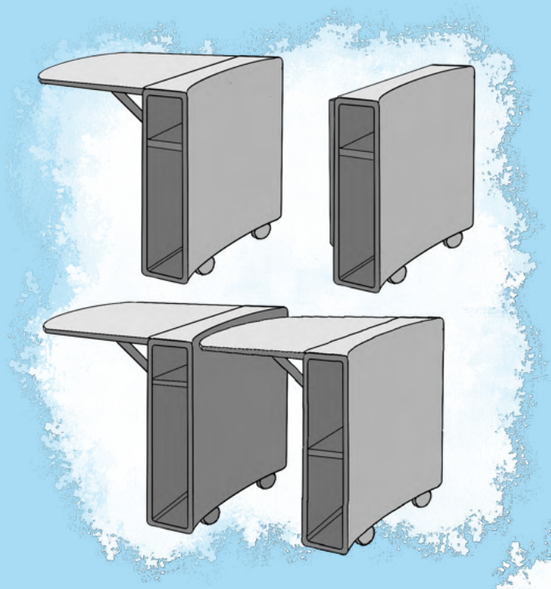
By promoting imagination and creativity in the classroom a predetermined positive approach to issues , can be taught. No one is stronger alone. Thereby along side imagination and creative thinking, diversity and respect through team work becomes central in the aspect of having an ethical discussion within the classroom.

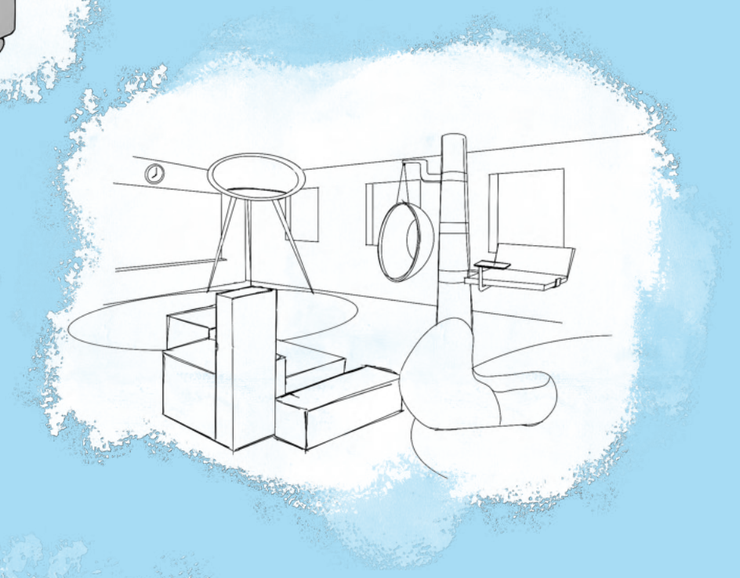
Everyone owns the responsibility of an ethical consideration and moral actions even if designers have a more tangible power to influence.

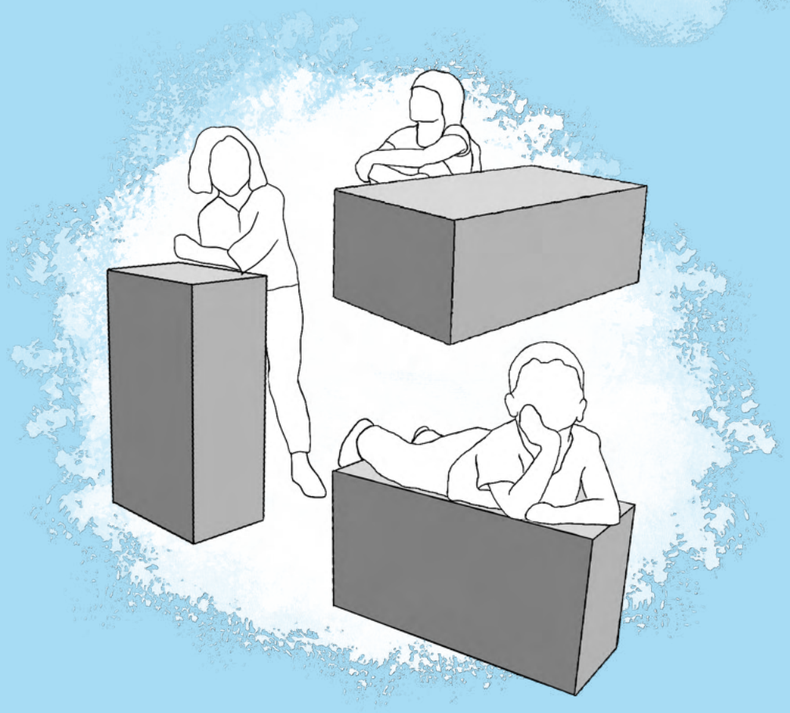


5.0 PROCESS

- CONCEPT EVALUATION
- FINAL BRIEF
- SKETCH DEVELOPMENT
- MOOD BOARD
- MOCKUPS
- CONCEPT FLEXIBILITY
- EVALUATION DESIGN AND FUNCTION







5.1 CONCEPT

EVALUATION

The background, target group analysis, identified needs and research directed this project towards a crossroad of three possible design directions.

Either the aim of the project was leaning towards designing a space efficient furniture allowing open spaces within one minute of putting as furnitures aside.

Or the intention of this project evolved to question the physicality of the classroom itself. By the desire of inviting the colorful mind of the children into the layout design of the classroom, curious of how the learning experience would differ for the static classrooms today.

The third direction targeted an investigation regarding different work positions allowing a more dynamic environment to match and promote the creativity of the children.

With these perspectives in mind the project was continued focussing on the most profitable working postures, reviewing the classroom layout while designing a dynamic furniture.

Design a furniture to develop a dynamic learning experience with ergonomic standards and inspiring sensation.

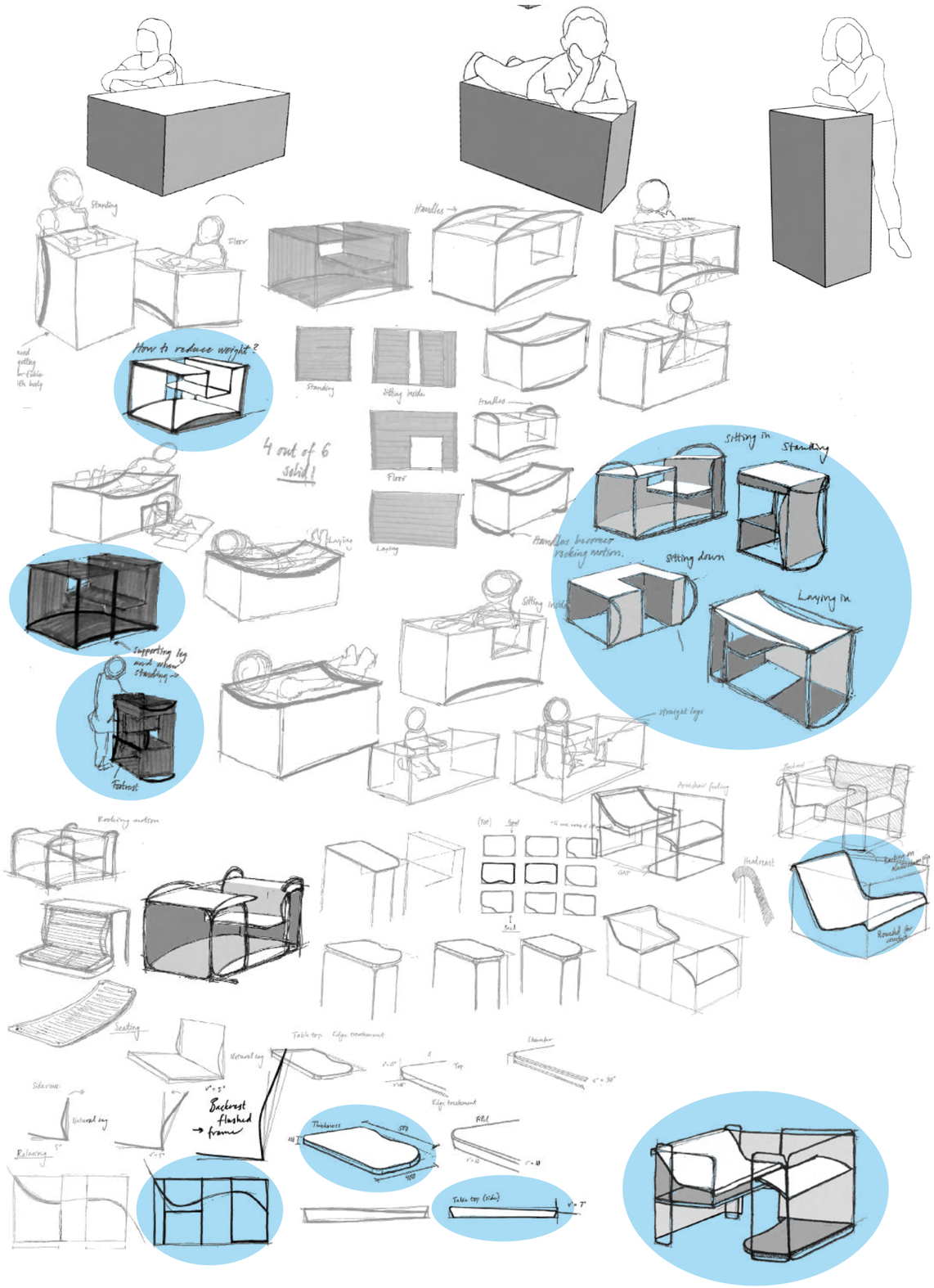
5.2 BRIEF
FINAL

In addition to the background and motivation for this project, further constraints were included to narrow down the initial brief to the final brief; *Design a furniture to develop a dynamic learning experience with ergonomic standards and inspiring sensation.*

The aim of this project is to design a furniture placed in a section of the classroom, offering an alternative more ergonomic seating position as a complement to the traditional static desks.

By allowing a dynamic and flexible furniture into the classroom a more engage, free and inspired working climate will occur. The furniture provides different seating positions shown in transformation and will be of portable character for cleaning and storage purposes.

One desired feature is to include sensations that inspires the children to experience and explore, as these are feeling not promoted enough. The most creative thoughts and salvations are introduced by an open mind of positivity.



5.3 **SKETCH**
DEVELOPMENT

The idea development for this project was initiated with three working positions, commonly preferred in classrooms contributing to a flexible work standard. The three positions constituted in *sitting on floor , laying down and standing up straight*.

Sitting on the floor is a common position for children in their everyday playtime. The choice of either sitting on the knees, on the buttocks or in the yoga position lotus offers an intense interaction to what is placed before the child but also calmness and flexibility.

Laying down comfortably is a position contributing to creativity, calmness and relaxation, emotional states not every school day includes. The frequent activity of silent reading to start or finish off every day with would be a well suited occasion to use the laying down option.

Standing up straight often promotes in ergonomic purposes, to exercise posture, blood flow and act as an antagonist in the constant sitting society.

The concept of having one golden proportioned block furniture for all three positions opened up possibilities as well as constraints. As the furniture joins in on the flexibility and dynamics of the concept, the furniture had to allow easy and intuitive movement along with a hidden and at the same time exposed intended seating functions.

Weight and accessibility became the most prominent factors. Thereby the sides that did not need to be solid were excluded. The initial solid block evolved into a framework, a construction acting as a skeleton for the later design.

Along the exploration of the form and function an additional seating position were exposed. The traditional Pulpet of a combined chair and desk enriched the furniture concept with a common used and known working position.

By creating a furniture made to be flexible, dynamic and rotated several opportunities presented them selves. Features as a backrest can when rotated became a table top and a leg rest in a laying position turns into a foot rest in a typical chair desk position.

5.4 MOOD BOARD

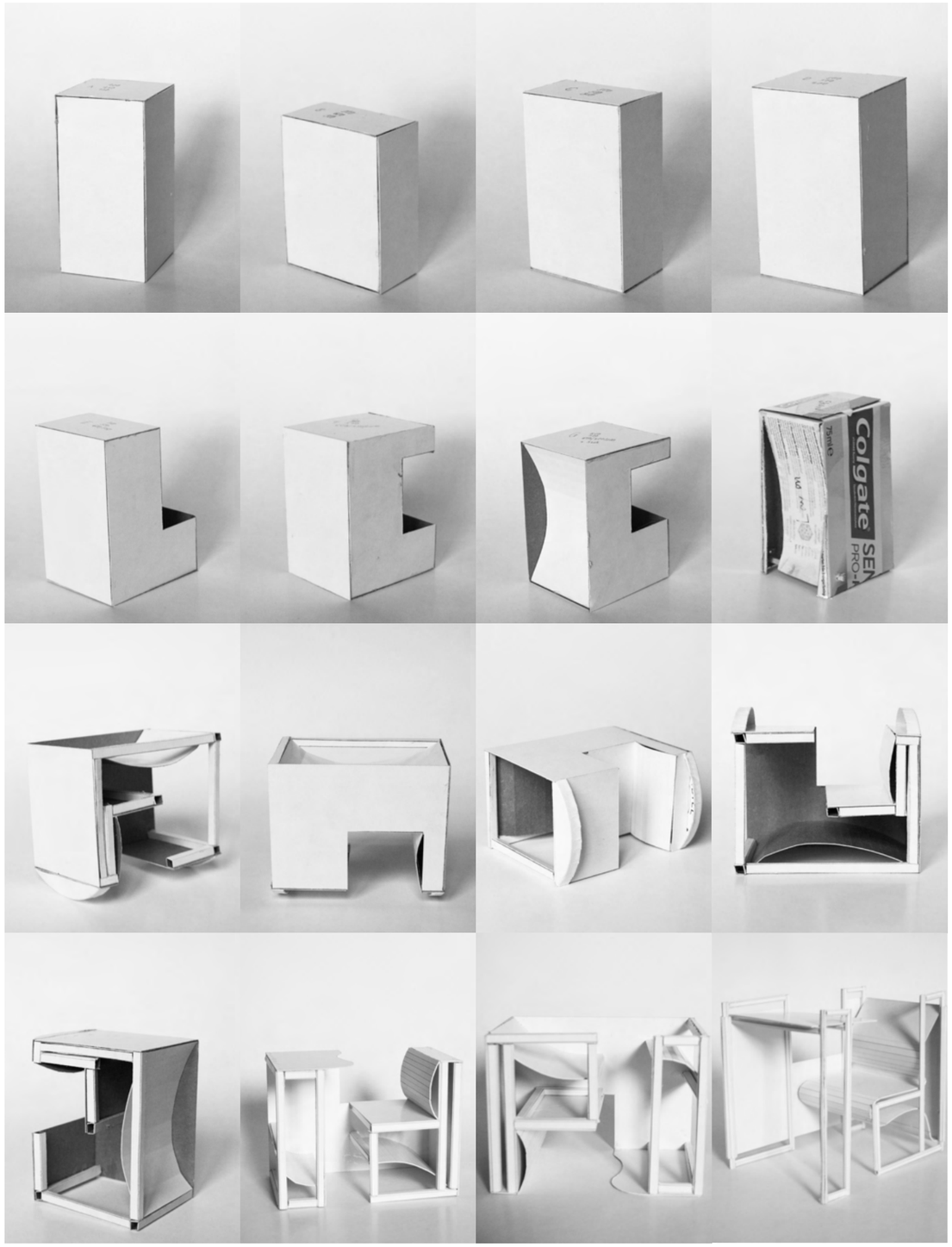
PLAYFUL, FUNCTION, SOFT

The mood board set for this project correlates to the target group, region and intended expression to enhance functions.

The fundamentals of a block visualized through a framework of bent aluminium pipes, color coded to enhance the affordance of graspable handles. A lighter impression due to the hollowness. Detachable seats with cushioning for easy sanitation.

The softness of large radius, flowing through the construction and curvature of the bent wood implying solid areas.

Playfulness expressed through the color coding and the movability itself. A construction deviant from the strict, clean and institutional feel of most furnitures in schools today.

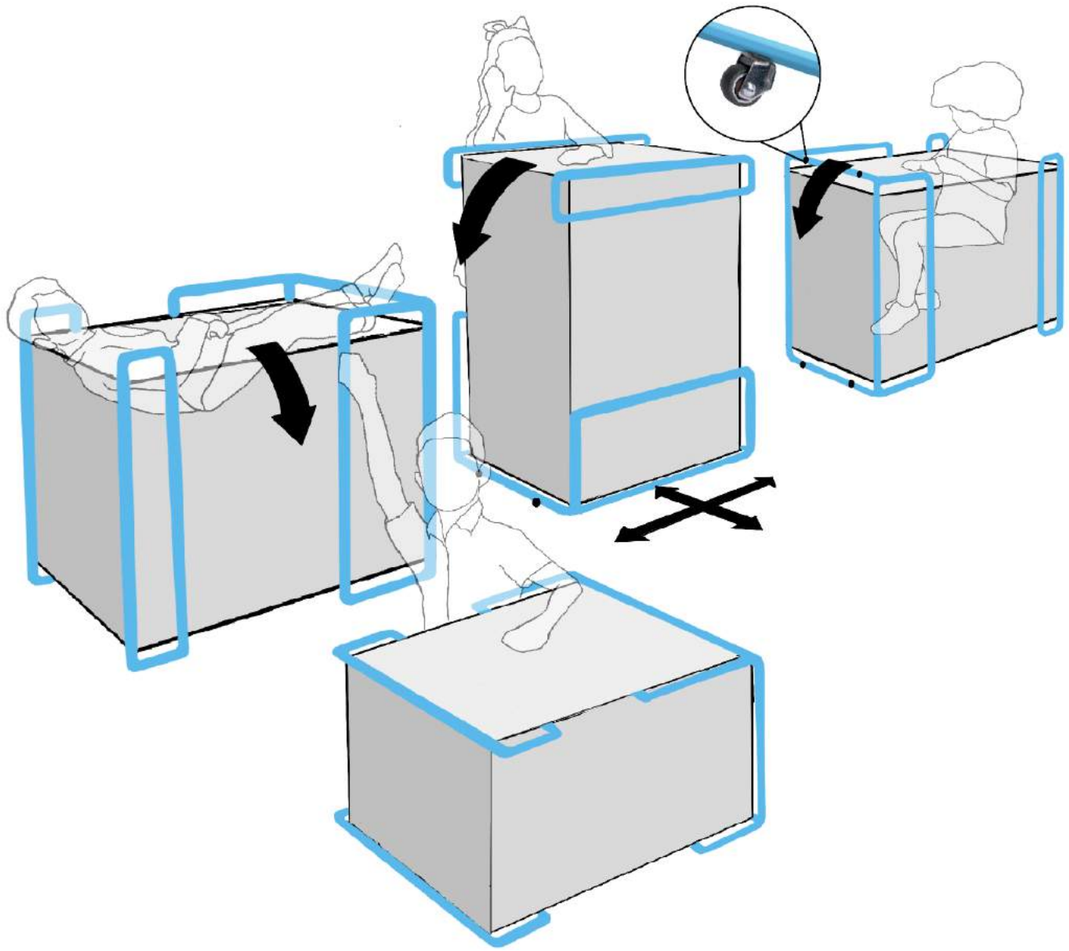


5.5 **MOCKUPS**

SCALE AND PROPOSITIONS

Considering the nature of a furniture for children, ergonomic standards and a golden proportion furniture suitable for four different positions, the scale and proportions were vital.

Cardboard mockups were made in 1:10, 1:5 and 1:1 exploring functions, proportions, scale and construction as well as solidity and movability.



5.6 **CONCEPT**

FLEXIBILITY

To efficiate and provide intuitive and space profitable use, the flexibility and transformation of this furniture had to be designed. The designed movement can be considered the transformation dance.

If the desk and chair posture of sitting inside the block is considered the basic state of the furniture, the user can than tilt the furniture to an up right state for standing position, by standing at front of the furniture grabbing the frame as handles. The radius of the frame then also works as a lever.

The upright state of the furniture takes up the least floor area and is thereby the most space profitable state. By adding wheels to the frame at the bottom of the upright state allows easy movement, storage and grants a smaller transformations area since the furniture can be moved to the original area from the basic state of the furniture. The wheels results in a furniture demanding less area to transform between states.

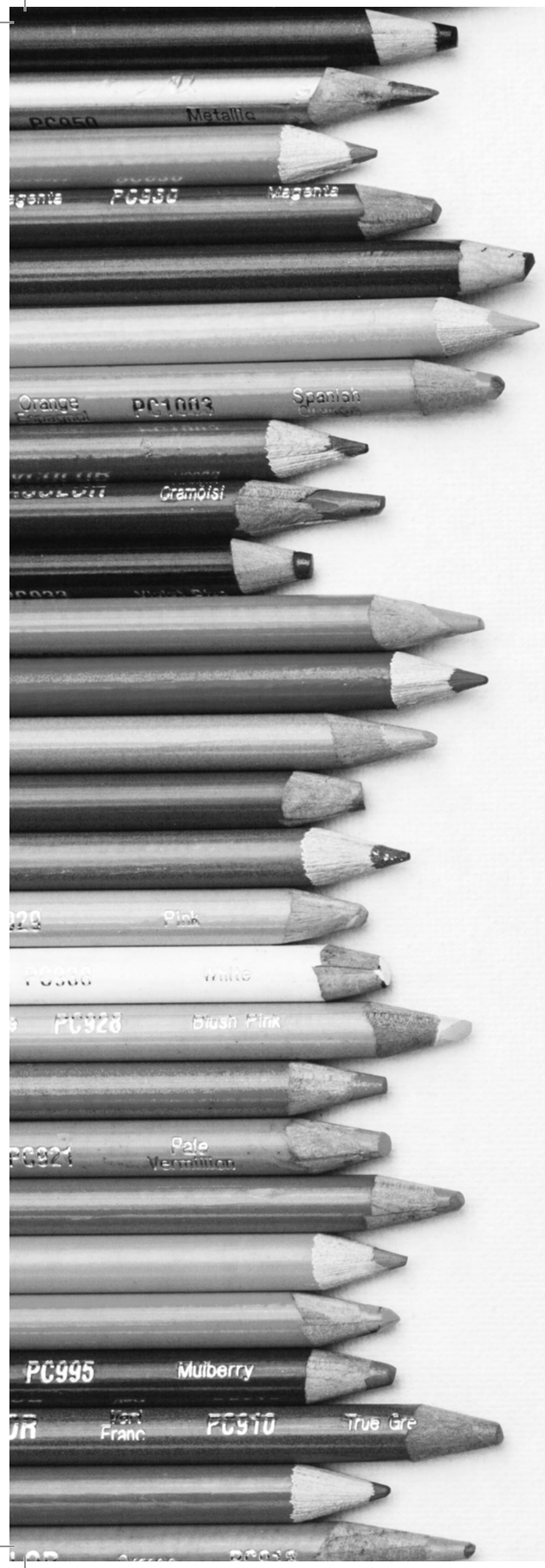
5.7 EVALUATION

DESIGN

This design concept correlates to the intended functions although some consideration of form and joining can result in a better furniture.

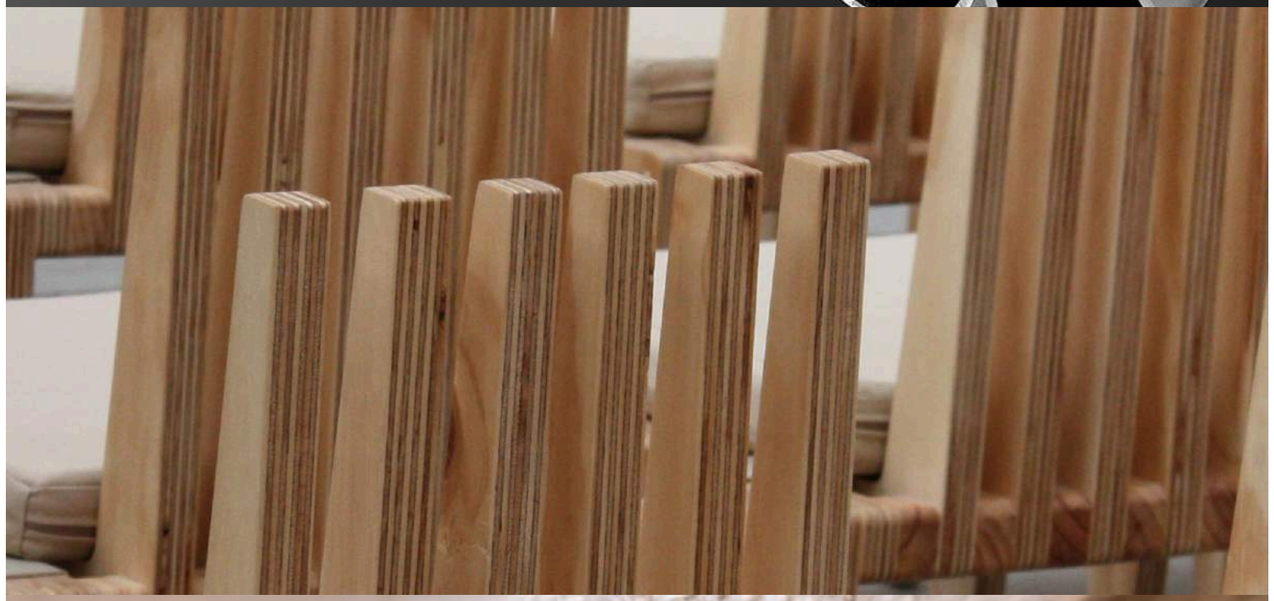
When both the laying down- and sitting inside side of the furniture were parted the continuous flow throughout the design was missing thereby a bent element joining the two seats were considered.

By involving more bent wood the cluttered and constructed impression transforms into an expression breathing intention, focus and smoothness. The intuitive use, highlighted affordance and easy function would also benefit from covering selected elements since they than appears standing out.



6.0 FINAL DESIGN

- CONSIDERATIONS
- TECH. DRAWING
- RESULT
- RESULT DETAILS
- RESULT CLEANING AND CMF
- RESULT FUNCTIONS
- RESULT MOVEMENT



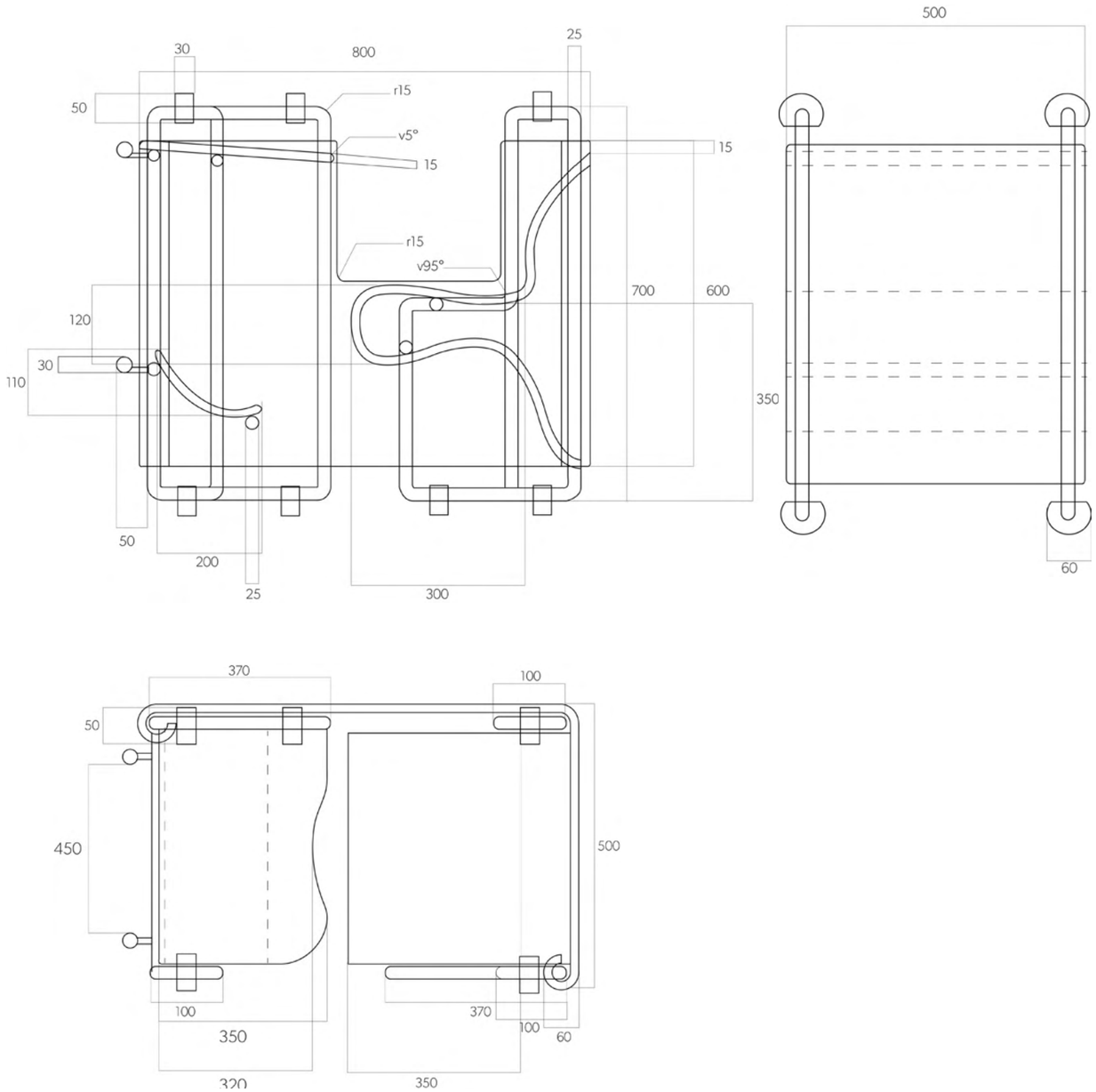
6.1 CONSIDERATIONS

While considering materials the functionality of lighter, durable and natural as well as honest materials were highlighted.

For the frame construction a light yet durable, commonly used and easily produced material was studied. The material in mind was aluminium extruded into pipes. This material is recyclable, easy assembly and disassembly. In addition to this the material in an extruded pipe provides a high level of sturdiness and solidity as well as lighter weight. The frame joins together either by welding or with screws.

The solid sides and elements of the furniture would also benefit from lighter weighted option that allows a smooth and continuous flow between elements. The material in mind was plywood, an affordable material with countless possibilities in thickness variations, bending- and surface treatment. This material is commonly used in e.g. IKEA furnitures in the children range due to the profitable weight and treatment possibilities. The plywood elements are joined with the overall construction by hidden screws for a less cluttered impression.

As often requested school furniture lacks cushioning for a comfortable experience. This were considered in this design as seat cushioning covered in a coarse fabric for durability yet a soft and welcoming expression. As this fabric acquire to endure scratches, dirt and moist without wearing out too quickly one of the best materials to consider would be thicker canvas. Canvas can be made from 100% of cotton and thereby made out of natural materials as a better option to e.g. polymers.



6.2 TECH. DRAWING

The technical drawing visualizes the designed furniture in measurements of millimetres.

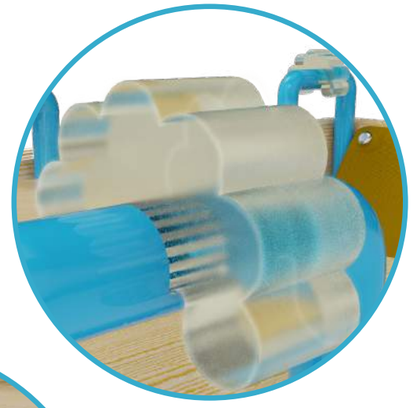
The aluminium pipe frame diameter is defined as 25mm as it is a common dimension for the part and allows movement and the ability to carry weight.

Dimension of the solid and bent elements of plywood measures to 15mm in thickness.

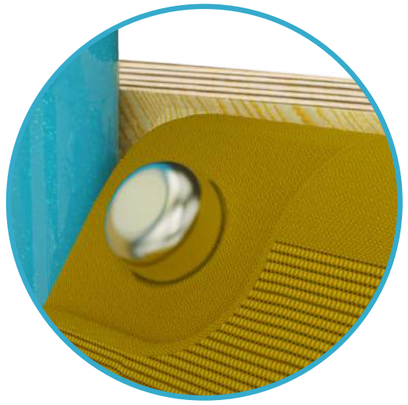
The curvature of the backrests providing a natural slug mimics the curvature of the office chair STANLEYS backrest, a product produced by Ajprodukter.

Through out the construction the dimensions and angles relates to the research of anthropometric data from Henry Drefuss and the IKEA children's range of furnitures. This to ensure an ergonomic and well suited furniture for school environment.

6.3 **RESULT**

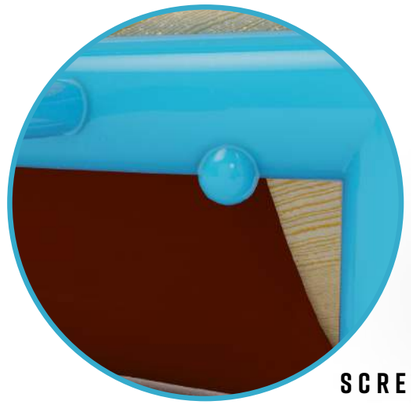


BUMPERS



BUTTONS

WHEELS



SCREWS

6.4 **RESULT**

DETAILS

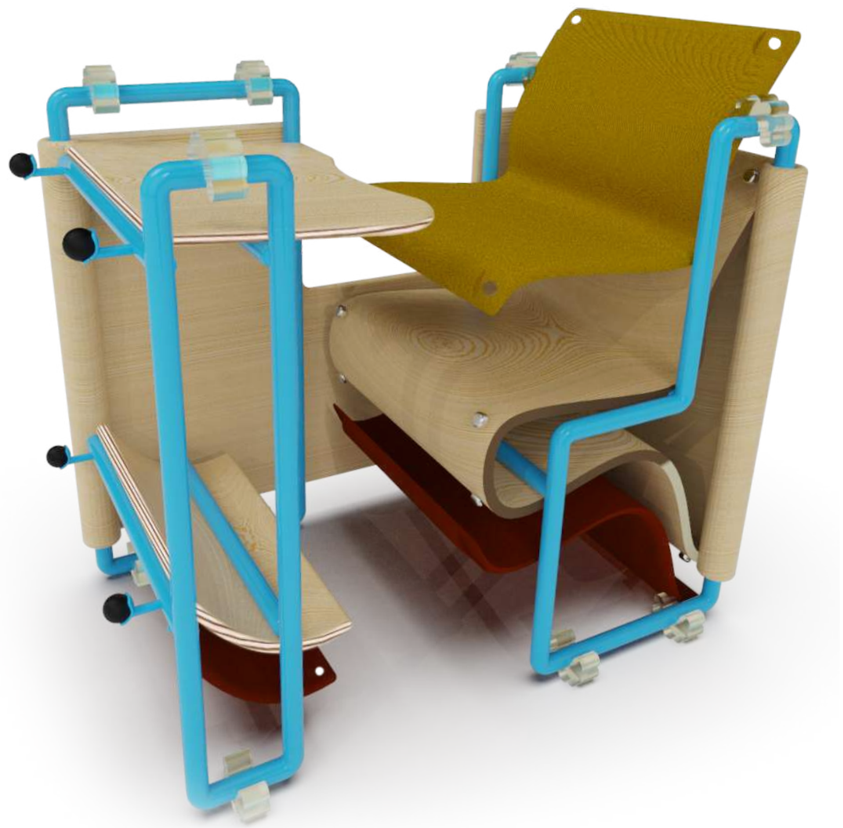
The furniture is built on an aluminium pipe frame that has been powdered colored. The construction and elements of the furniture is either welded together or joined with visible- invaluable screws.

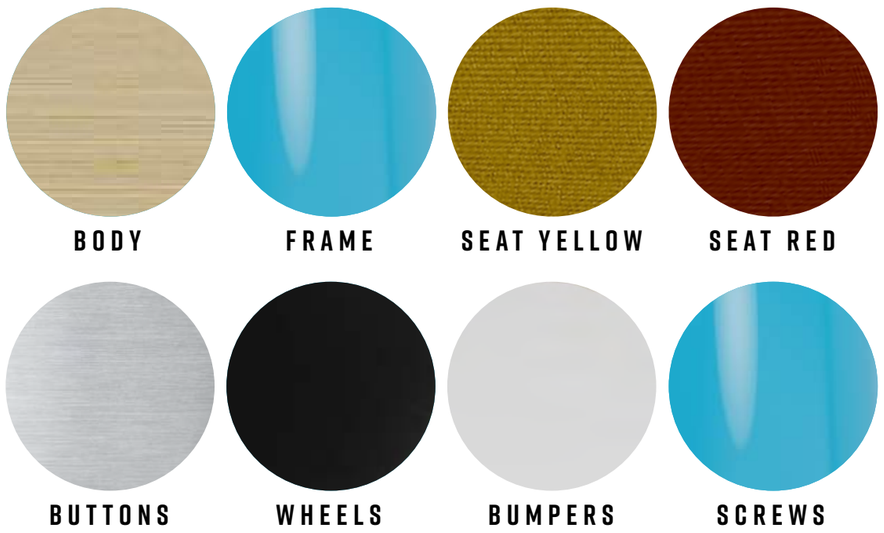
At one of the short sides, at the bottom of standing up straight position, four wheels are included to move in every direction for easy and fast flexibility.

The bent and straight solid body elements are plywood for a lighter yet durable and working furniture with an expression relating to cleanness and nature.

At top and bottom of the long sides of the aluminium frame rubber bumpers are included to protect both children an surfaces. The bumpers are designed to prevent injury in four directions which allowed fewer bumpers with the same safety measures ensured.

The color coded seat cushions that are made out of canvas fabric and are attached to the overall seat and construction by brushed aluminium buttons.





6.5 **RESULT**

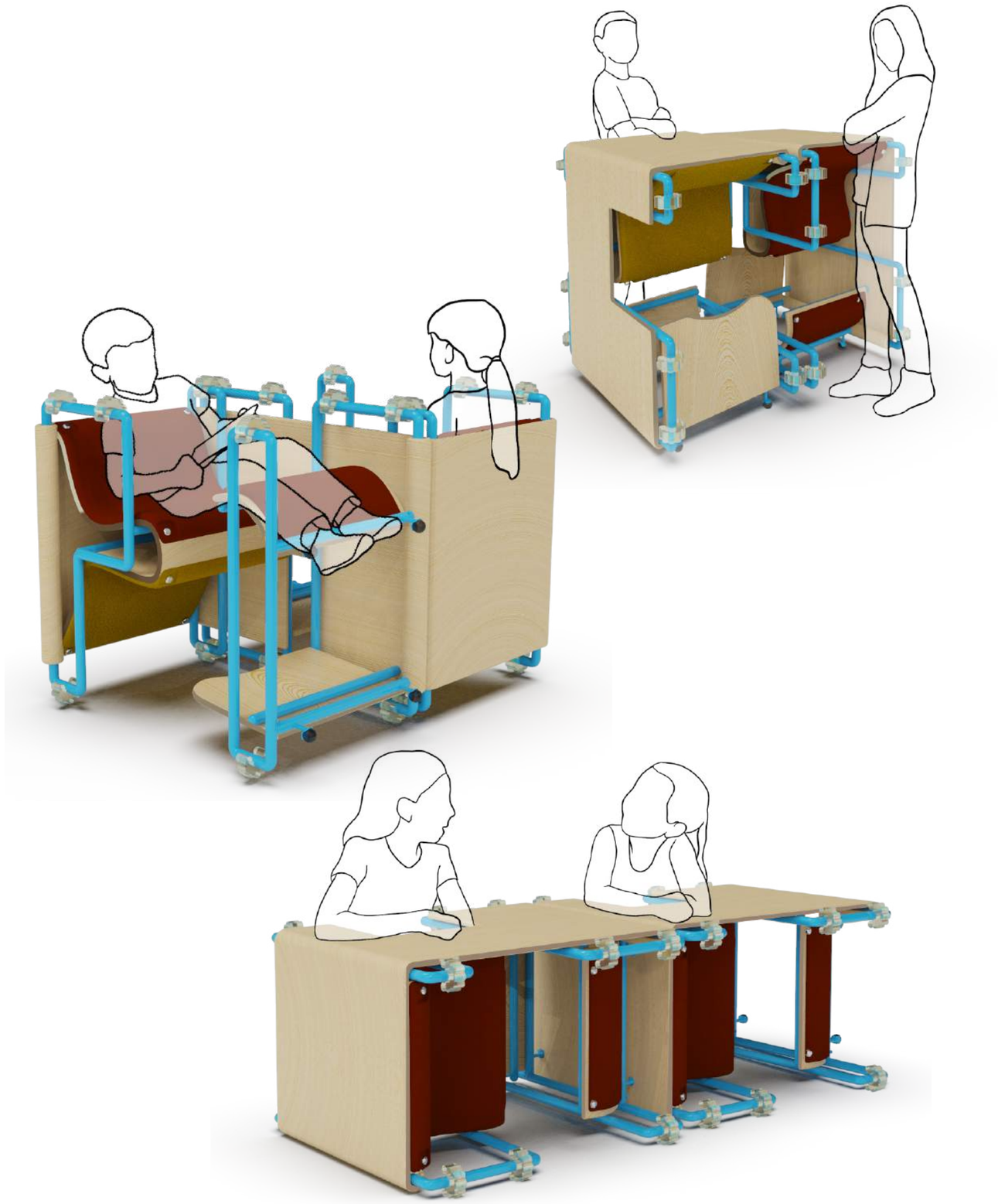
CLEANING AND CMF

To ensure clean and sanitary environments are vital in public areas. In school and especially amongst the target group of this project, ages of 6-9, this is highly important to prevent illnesses. Daily cleaning and maintenance are thereby central areas for the design.

By having bumpers with as little contact to the floor as possible, less dirt and dust will be collected. To ease cleaning, the up right standing position is equipped with wheels for fast and easy movement. The upright position is also the best way to store or transport the furniture since this position takes up the least floor space.

The cushion seats are exposed to a large range of, moist, dirt and scratches. To a larger extent avoiding worn out- or dirty cushion seats the seats are detachable for either washing or replacement.

The CMF of this project involves lighter and natural elements in combination with colorcoded elements highlighting affordance.



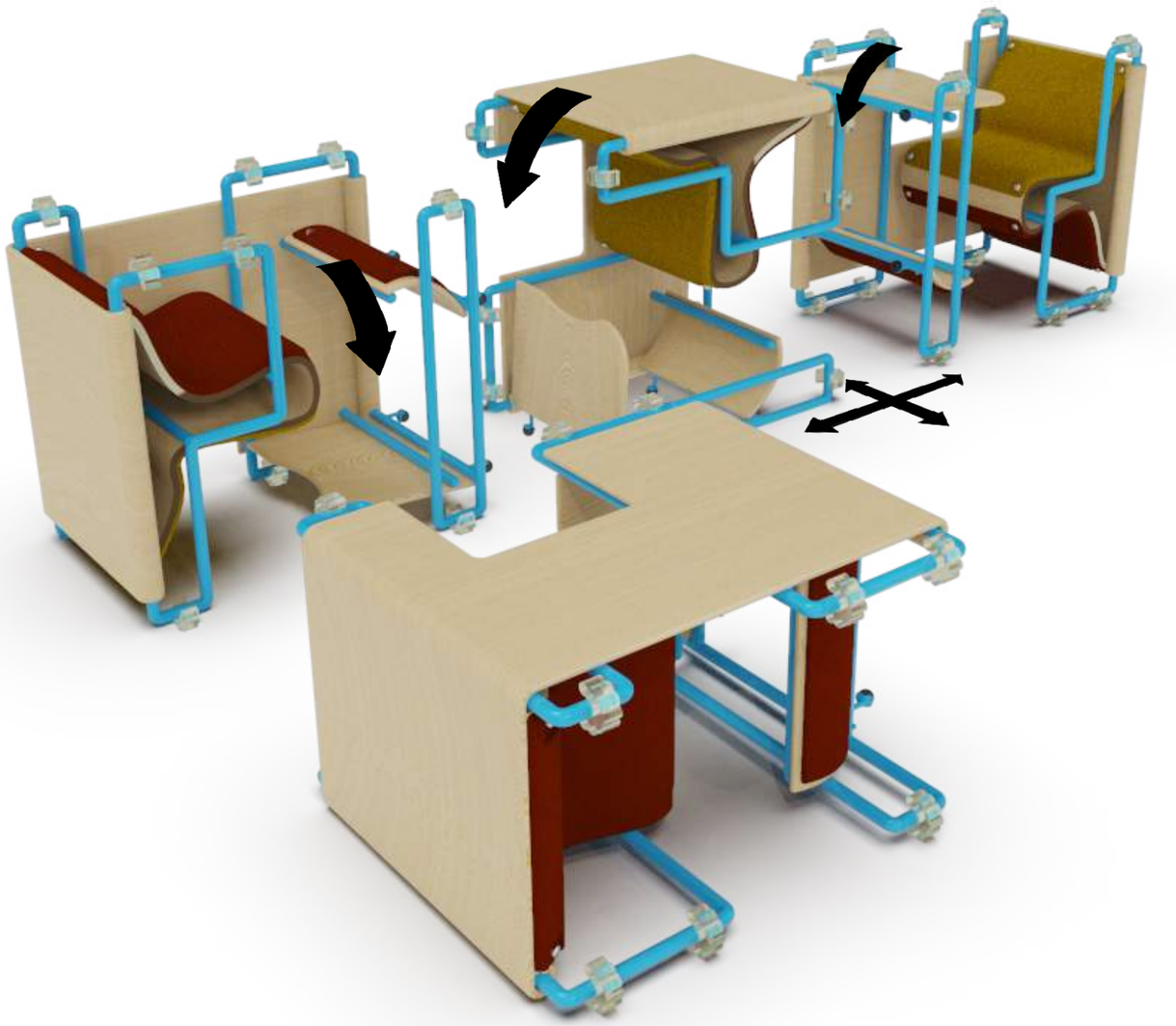
6.6 **RESULT**

FUNCTIONS

The furniture *Around the box* offers different variations in group constellations, from two and more furnitures docked together in the same positions.

The best positions for building groups with several furnitures docked together are standing up straight, laying down comfortably and sitting on the floor. The sitting inside position is not considered to be a great way to dock together two or more furnitures due to the position of the solid right side of the furniture, which in a docked layout decreases accessibility.

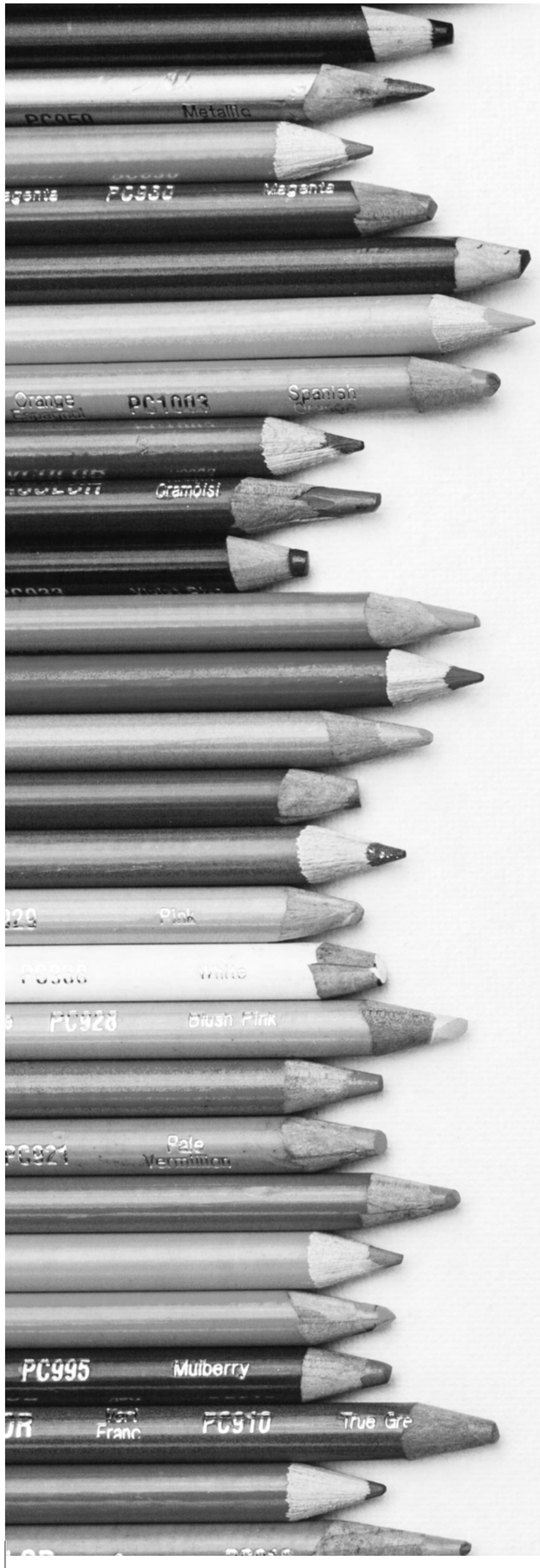
A docked together pair- or group constellation contributes to better possibility for the class and teacher to engage in more team exercises. This possibility generates better learning experiences and social interactions.



6.7 MOVEMENT

The movement or dance of the furniture is not only necessary for the dynamic and flexible nature of the furniture but also for the usage of several furnitures moving at the same time.

If the sitting inside position is predicted as the original position for the furniture the dance than require the furniture to be tilted upwards to a standing position. Than rolled by the wheels back into the initiated floor area and then tilted into the laying down position, to save space and chaos while in relation to the surroundings. Lastly the furniture can be tilted sideways into the sitting on floor position.



7.0 FURTHER WORK

- BEFORE PRODUCING
- PRODUCT IN THE FUTURE

7.1 BEFORE PRODUCING

Before considering producing this furniture and testing it amongst children, thorough solidity calculations, simulations and risk analysis have to be done.

As this furniture is meant for children to move around and use in different positions and in school, certain extra precautions are to be considered. The furniture can not by any means carry a risk for damage. Therefore by thorough solidity calculations and simulations are necessary for the design- and production of the construction.

Other health precautions such as allergies needs to be taken in to account. The school environment is a place welcoming everyone to feel comfortable and healthy.

All considering the previous stated, further risk analysis
accounting for risk of crushing, movements of the furniture and effect on the body as well as risk of furniture falling over.

Aspects such as sound when moving, sharp edges or small areas to get stuck are also factors to be included in a further risk analysis.

When the risk analysis has been reviewed the phase of prototype testing can be initiated.

The target users feel and intuitive habit of using and interacting with the furniture is vital for a successful design. Children are to be included in their work environment and their thoughts on colors, weight, comfort and impression are central for this design.

Aspects possibly requested by children can be variations of colors at the seating cushions to personalize the furnitures or an extra step to climb up in the laying down position. These are imaginative aspects, accurate once are riveted through discussions and testing with the intended target group.

7.2 PRODUCT
IN THE FUTURE

The furniture Around the box would be used in a section of classrooms all over to achieve a more dynamic classroom layout.

As this furniture is not meant to replace all furnitures in the classroom, spacial compromises between already existing furnitures in the classroom, such as desks, chairs and storage units, has to be considered.

If a class has 30 students approximately 10 Around the box furnitures would be included in the classroom. The students in the class would thereby have to take turns working at the designed furniture of this project.

While all schools and classrooms have different architectural layouts nor the best or exact position of the furniture Around the box can be determined. However the functionality of the classroom would benefit from a placement of the product which allows movement without be disturbing.

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Abstract (Children discussing book)
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1.1 Background and motivation (Dark classroom)
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5.2 Mood board (bent wood cuddle toys)
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5.2 Mood board (playfully shaped toys)
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6.1 Considerations materials (plywood)
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6.1 Considerations materials (fabric)
www.masterclass.com

THANK YOU FOR READING!

AROUND THE BOX

By Celine Adolfsson