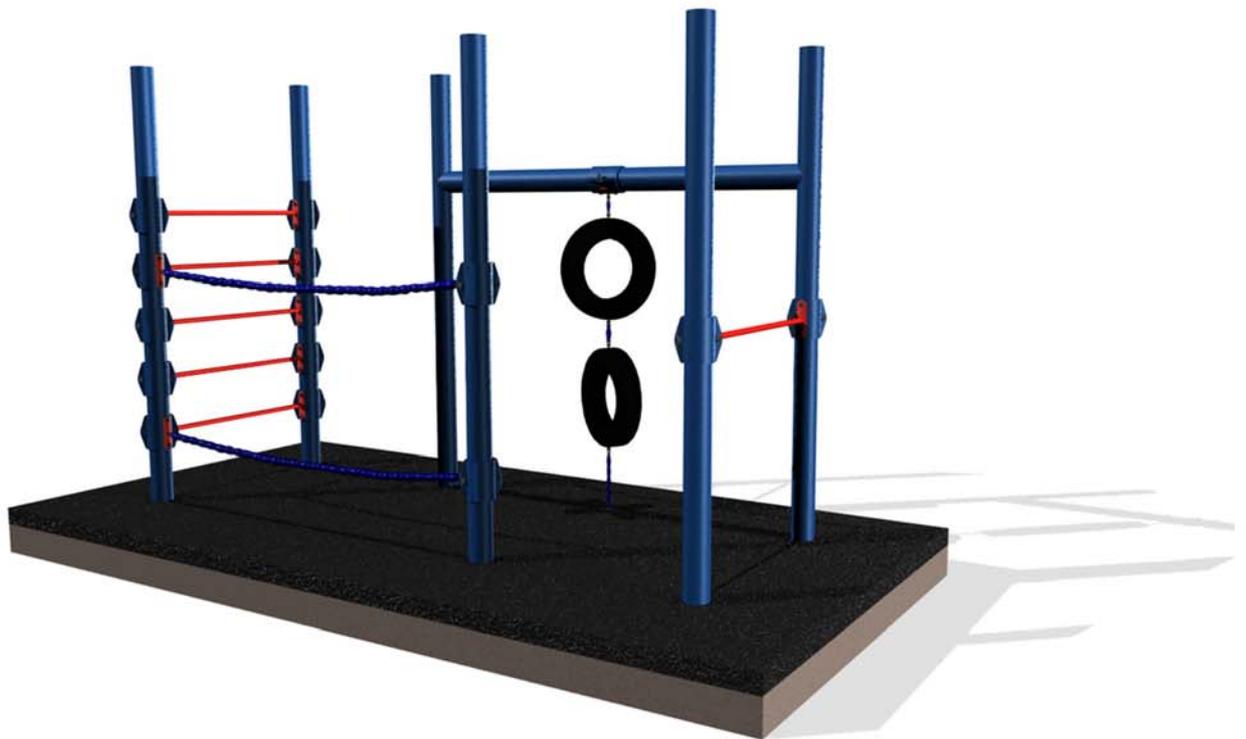


Future Playground



Design for Wellbeing

2005

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HAGS



Foreword

The purpose of this document is to illustrate our work process and our discussions so our coaches, people that have been involved in this project and people that are interested in the Design for Wellbeing organization can better understand what we learned throughout the year, what results we achieved, and how we worked. The document describes the project in detail so you can follow the workflow through the year.

We would like to thank everyone who has helped us and supported us throughout the project, those who answered our surveys, provided us with information, assisted us in the prototype building and helped us navigate through tough situations. There are so many people we want to thank we cannot list them all. Many of you are cited throughout this document. Most of all we want to thank our coaches, other teachers and staff at Luleå University of Technology.

Executive summary



At the beginning of September 2004 a group of students began this year's project called Design for Wellbeing, based on the theme of Future Playgrounds.

The main interest was captured in the words *active*, *creative* and *development*, while the team's mission statement was "*to construct something that will encourage children to be active and creative in a developing environment*". The name of the Team became AddACTIVE.

As society evolves through technological advances so do children. The integration of technology has led to a less active population and a changed social interaction. Children in Sweden spend 10 000 hours of their youth watching TV, equivalent to their time spent in grade school. Culture, lifestyle and eating habits have rendered obesity a serious problem in the USA, which has also begun in Scandinavia. We live in a part of the world where people are shortening their life expectancy by their eating. Through adequate physical activity, you can create a longer and healthier life.

The path began with the mission to investigate how the meeting place of the future might be designed to promote physical activity and social interaction in a safe and creative environment. Since this approach is extremely broad, the needs analysis and benchmarking phases of this project were extensive. These phases included several brainstorming sessions, interviews with children, teachers and architects, as well as numerous playground visits in Sweden, Argentina and the USA. In January, AddACTIVE went to the USA to get inspiration and had the opportunity to conduct several brainstorming sessions with both students at Stanford University and people with the knowledge and skills in creative product development. The gathering of information allowed the choosing of a narrower, more focused path, leading AddACTIVE to create a module playground.

Active play develops the physical attributes and social and cognitive development of children. Children need change to be active; hence, the construction of a module ground system. The system makes it possible to change the playground in terms of size and the combinations of features. Consisting of a ground plate, surface tile, poles and mountings, together these make a unit. The size of the playground depends on how many units you choose to combine.

A well-designed playground provides wide-ranging opportunities for exercising balance, strength and body control. It also develops the child's learning capabilities and provides a preparatory forum for school life. The playground is constructed for outdoor use since daylight and fresh air are ingredients in a long and healthy life.

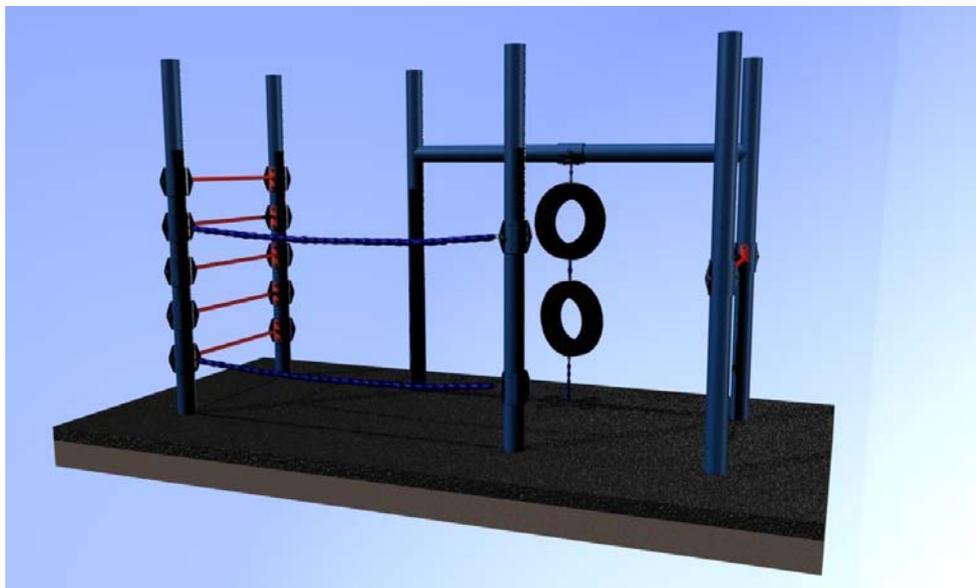


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Section 1: Introduction

SIRIUS is an eight-month product development project course given for final-year students at the Master of Science program at Luleå University of Technology. One of the projects in SIRIUS is called Design for Wellbeing and is a part of a global project with the same name. The main objective of the Design for Wellbeing initiative is to enhance the wellbeing of persons with motion, sensory and cognitive disabilities by using their descriptions of needs in relation to assistive devices as a starting point for product development. Design for Wellbeing redirects the focus of product development from technology-based development, via needs-based development, to participative product development. By adapting a multidisciplinary approach, involving both health sciences and engineering disciplines, the project covers the entire development cycle from an initial understanding of users needs to studies of finished products in use. The theme of this years project is Future Playgrounds and the name of the Team is AddACTIVE.

As society evolves through technological advances so do children. The integration of technology has led to a less active population and a changed social interaction. Children in Sweden spend 10 000 hours of their youth watching TV, equivalent to their time spent in grade school. Through adequate physical activity, your body will have more energy both physical and mental. You also create opportunities for a long and healthy life. Weighing too much can be a danger for your health. Culture, lifestyle and eating habits have rendered obesity a serious problem in the USA, which has also begun in Scandinavia. We live in a part of the world where people are shortening their life expectancy by their eating. In the year 1998-99, 48.8 percent of the male population in Sweden and 35.1 percent of the female population was overweight. The one as who belong to these groups seriously increase the risk for getting diabetes, high blood pressure, heart diseases and vascular disorder.

From investigations it is known that many children and teenagers for each year that passes, are getting both fatter, more immobile and the risk of getting the earlier mentioned “welfare diseases” already in the young years increase. You also expose yourself for great health hazards if you are physically inactive. Scientific results point to the relation between less physical activity and mortality to our big national diseases. People sitting still run a significantly greater risk of dying an early death compared to people that is physically active. If you are both sitting still and suffer from overweight you expose yourself for double health risks.

The human body is created for movement and physical activity. During approximately 4 million years, humans have developed different “habits” for surviving. When we for example had a surplus of food (power) we collected the fat and later used it as fuel (energy) when we were in movement or to survive when we did not have supply or enough with food. Our bodies’ system of enzyme has adjusted itself after what we have acquired during millions of years. When we eat too much we store the surplus of energy as fat on and in the body.

Three scientific reports shows that physical activity is an investment of your health (Borgström, Y (2000), Du blir vad du äter, (ISBN 91-534-2207-4)):

- Dr Steven Blair at Cooper Institute for Aerobics Research in Dallas, USA, have through his scientific studies shown that regular physical activity prevent origin of year related diabetes, high blood-pressure, cancer of the large intestine, heart disease and vascular disorder.
- In a report from USA Center for Disease Control and Prevention the following conclusion were made: “Regular physical activity is an important part of a healthy lifestyle. It obstructs origin of diseases and improves health and life quality”.
- According to chapter 11 in a Swedish report, ”Rapport 132/1997 statens beredning för utvärdering av medicinsk metodik”, there exist a significant relation between deficient physical activity and the origins of chronic diseases and conditions as year related diabetes, high blood pressure, cancer of the large intestine, obesity, heart disease and vascular disorder.

1.1 AddACTIVE

AddACTIVE consists of five students from the department of Mechanical engineering and two students from the department of Ergonomic Design engineering. The constitution of the group provides genuine competence to the project.

The AddACTIVE members have different background in life such as different age, work experience and childhood which all have contributed to the project. The AddACTIVE members are:

Aldgård, Thorbjörn

In the project Thorbjörn has been responsible for presentations and the welding-work. He did also contribute to the development of the ground structure, this includes IDEAS drawings and strength analyze.



Andersson, Karolina

In this project Karolina has been responsible for the visualizations of the project, containing animation, CAD, brochure and display case. She contributed mostly with here knowledge from prior classes in animation and graphical design.



Andersson, Per

Before Per started his education in Mechanical engineering he had some classes in economy, so it became natural that he took care about this part of the project. He also contributed with a lot of time in the mechanical workshop.



Back, Per-Emil

In this project, Per-Emil has contributed with CAD-skills to the upper mount and been a part of manufacturing the prototype. During the last part of the project he also had the post as project leader.



Johansson, David

In this project David has among other things been developing the upper mount. His major assignment has been to construct and manufacture the playground.



Sahlstedt, Johanna

In this project Johanna has been responsible for the report and its layout. Also contributed to the development of the ground structure, this included IDEAS drawings and strength analyze.



Svedberg, Jenny

In this project Jenny has been responsible for the visualizations of the project. She contributed mostly with here knowledge from prior classes in animation and graphical design.



Section 2: Design space exploration

This is an information-gathering phase. It is done to get enough background information to be able to design a product that is relevant and innovative. The phase consists of four sub-phases Needfinding, Benchmarking, Related technology and Brainstorming.

These four sub-phases will then be combined and analyzed. For example, the identified customer needs can be used to find gaps in the market. Combining existing and new solutions into a new product can then fill those gaps.

2.1 Needfinding

The sub-phase Needfinding focuses on identifying the human needs instead of finding solutions to problems, because the needs last longer than these solutions. A lot of work was done in this sub-phase. Information about customer needs and opinions were examined by doing surveys, interviews, observations and fieldtrips. This is to avoid making a product that the users do not need or want.

2.1.1 Questionnaire

To get a picture of what children and young people do and think about their spare time, interviews were made. Questions like what hobbies, training, and computer habits etc were asked. Interviews were also conducted with teachers and personnel working close to children and youths, to see what they think of children's and youths needs.

Teachers

The questionnaires (Appendix 1) were handed out to approximately 15 teachers and personnel in different parts of Sweden working close to children and youths in the age 6 to 16.

One common thought was that children and youths in all age groups liked ball-sports such as soccer. An opinion mentioned by several teachers was that they want the children to feel secure on their schoolyard and playground. One idea was to place, for example the climbing frame, closer to the classroom so the children often see the teacher and the classroom, which should make the children feel secure. Many of the teachers talked about that children needs to be activated, they often comes to school and talk about what videogames they have played and what movies they have watched, but more seldom about what physical activities they have participated in.

Climbing was an interest that seemed to be popular all over the country in the age group up to 12. The climbing frames were very popular and the sand around them was popular among younger children. The problem is during the winter, when the sand absorbs water, which gets frozen, and they then have no possibility to play with it. Before the snow arrives there are a lot of bruises as a result of falls from the climbing frame.

Older children are less activated than the younger. Above the age of twelve, it was more common to play pool or cards during the breaks than to be outside climbing or playing soccer. An activity that some times occurred was snowball or water fights, depending on the season.

Youths

These questionnaires (Appendix 2) were handed out to approximately 40 males and females in the age group stretching from 9 to 29 years. They were also handed out in different countries, Sweden (20 ea.), USA (10 ea.) and Argentina (10 ea.). After collecting all filled in forms these were closely compared.

Most (80%) of the people who were asked are performing a sport of some kind 2-3 times a week and of these almost everyone also do some other outdoor activity on their spare time. The outdoor activities are mostly done with one or more friends. Less physical activated children and youth had lots of different hobbies they were doing on their spare time.

The average use of television and computers is approximately 4-5 hours each day, this estimated on their free time after school and work. Those who had computer related jobs had a much higher use of this equipment. Different TV-consoles were not so very common among the asked group, not even those who had one seemed to play frequently.

The younger school children that spend time on playgrounds had different suggestions for making the playground more attractive. More swings in all different thinkable and unthinkable variations and they would also like to have more cableways, climbing frames and other challenging things. One child said:
- The playground was fun when I started school but now I'm tired on it.

In a comparison between the different countries some things stood out more than others. For example, in Argentina a computer is used mostly to write e-mails, chat and work with. The major reason for the less using of computers in Argentina is that it is not so common to have a computer at home because of the cost. They spend their computer hour at internet cafés and that cost money and therefore the short amount of hours behind the screen and more outside or hanging around with friends. This compared with USA and Sweden where it was more common to play games and watch movies.

2.1.2 Study visit

To come closer to the daily habits round the children and the opportunity to talk with them and their teachers, a study visit to the school Klöverträsk was made.

Klöverträsk

This school is a small public school for children between 6 and 12 years with 39 students. The school is famous for thinking outside the box and always introducing new ideas to their work. Also the parents have an active role in the

schoolwork. This is probably related to the fact that Klöverträsk is a small village with great solidarity.

The school is not built like a regular school, it consists of three big classrooms and a couple of smaller rooms and a big open area that is combined lunchroom and library. This is to get a more creative environment for the children. Inside the classroom the traditional benches have been replaced with tables along the windows and in front of the white board there are two couches.

The teachers work after the principle that children lose their attention if they are more than approximately 3 meter away from the teacher. All the children sit in a half circle to feel that they get the same attention as everyone else. In the classroom there is also a small attic in one of the corners. Up there the floor is covered with mattresses so that the children can lie down and rest or maybe play. In the middle of the classroom there are two racks with boxes where the children keep their books and papers. The idea with that solution is that they should be able to move between the table, the couches and the boxes. This way they get the blood to rotate and get more energy and willingness for their studies. One more remarkable thing at this school is the fact that they only have four traditional school desks.

During the break it was so cold that the teachers allowed the children to stay inside and play if they wanted. Even though it was below minus 20°C the children chose to go outside and play. The compost became a store and was frequently visited and the other children could buy different cookies, pizzas and cakes made by grass, snow, gravel and sand all depending on what they can get their hands on for the day. And it is all deliciously served on wooden plates.

The teacher informs that they sometimes sell feelings, and then you are able to buy for example laughter or crying. During the lunch break, two children decided to go out in the cold and play chess (Figure 2:1). One child said that:

- I like to play chess and be outside and I do not think it is that cold.



Figure 2:1

The teacher informed that the children had a chess club. After talking to some of the children they informed that twice a week they had a chess club at the school. They met at school and played chess, drank tea and bought cakes that they had made themselves (real cakes this time). After speaking more to them it came up that they had a tea club as well. This tea club met once a week at the school, and they discussed different issues from their ordinary life, problems with girl/boyfriends and other things; all this at the age of ten.

2.2 Benchmarking

In the sub-phase benchmarking AddACTIVE looked into already existing products and company on the market. This is to get inspiration, to avoid making already existing products and see possible insufficient on the market. Using internet, doing field trips and interviews, the information was gathered.

2.2.1 Architects

To get a better understanding why playgrounds look like they do today, architects that had a relation to playgrounds were contacted.

City architect of Luleå

The city architect of Luleå, Maria Andersson, was consulted. She explained what she thinks is most important on a playground, and what she puts efforts into when designing a new playground. She like different heights in the landscape, that invite to play games all year around. She also prefers to have some vegetation and benches in the playground area so it gets more comfortable for the older people. It is also nice if the area have a rivulet, which is perfect to play in with loose object, like a twig or a spade. But some one needs to look after a playground like that.

Manufactures of today offer fairly controlled playgrounds that do not give much space for the fantasy, which makes the game sooner much more boring. Kids are also sensitive for the design, for example if the swing looks too childlike. Maria also like playgrounds were the kids can both play and appear for each other, like a basket post. She does not like the concepts with computers at playgrounds, which mostly have been about memory games.

She recommended AddACTIVE to visit a new build playground at Hertsö School (Chapter 2.2.2). She explained about the costs of building a new playground such as the one at Hertsö School. The playground cost approximately 2 million Swedish crowns to build.

Mie Svennberg

From a TV program the idea to interview Mie Svennberg came up. She is the only architecture adviser with playgrounds as specialty that is hired in Sweden. Mie has designed a playground in Gothenburg, which has a hollow tree, a wishing star, a tunnel and some swings. When she designed the playground she visited children in the neighborhood and let them wish about how this playground should look like.

She thinks that it would be really boring if all the playgrounds in Europe had the same appearance. She also thinks that the cooperation has become good between people like her and the children.

Mie thinks that the thing that is missing now is the design of the things that the children play with. There are too few people that are working with designing the objects of a playground in a funnier and better way for the moment.

2.2.2 Playgrounds

Different playgrounds were studied in the neighbourhood of Luleå. Also playgrounds in Argentina and USA were studied to get a better understanding of how they are built and how they differ both between each other and from playgrounds in Sweden.

Sweden:

- ***Arcus – Luleå (Figure 2:2)***

Arcus is a spare time area and a camping, 20 minutes driving from Luleå. This playground was put up not too many years ago and is a very modern and inviting-looking playground. On this playground it is very obvious where each age group are meant to be playing, ground level structures for the smallest, 0-3 years old, and high spider web-looking nets for older children, 7-12 years old (Figure 2:2). Very close to these playgrounds there is an adventure-track in the woods with different stations such as tree and wall climbing, though this track is only open for play with a supervising adult present.



Figure 2:2

- ***Hertsö School – Luleå (Figure 2:3)***

This playground consists of new types of classical playground products. The products are scattered all over the schoolyard, not focused on one area as the traditional playgrounds. Also some new design ideas are represented. The swings are higher to increase speed and excitement and it also gives a better esthetic impression. An identical climbing net as the one at Arcus has been assembled in the end of a slope. A modern climbing frame is located in the sandbox next to



Figure 2:3

the swings; it features a climbing frame and is designed in the form of a bridge construction made in metal. Between two houses there is a climbing frame designed in the form of a ship. It is designed for younger children, in the age 5-7, and painted in clear and intense colors.

- ***Piteå Havsbåd*** (Figure 2:4)

This playground is very impressive and stretches at least 70 meters from one end to another. The construction of the playground is not something new, only the way they have built it and the size of it. From one end to another the different parts are chained together to form a span containing different nets, tube slides, aerial wires and so on.



Figure 2:4

- ***Porsön – Luleå*** (Figure 2:5)

The playground studied at Porsön, which was put up in the year of 2004, have different play-structures best suited for smaller children in the age 0-3, quite reasonable when there are a lot of families with children in this age here.



Figure 2:5

- ***Tuna – Luleå*** (Figure 2:6)

Tuna is a neighborhood probably built in the sixties. The playgrounds spotted around this area are not in the very best shape and some are even partly disassembled. Notable was that the playgrounds differ in degree of difficulty and in that way suited for a broader age group.



Figure 2:6

Argentina:

In *Buenos Aires* traditional outdoor playgrounds were found and all of these were located in public parks inside this huge city. You could tell by looking at the playgrounds that none of them were built newly. This could for example be seen on the slides that were made of wood. Most features were constructed with wood and iron as only materials, except the swings, with very simple standards. A common sight was just some bent iron bar sticking up from the ground, which the children for example could climb on.

The playgrounds found in *Puerto Madryn* and *Comodoro Rivadavia* was of the same simple construction as those spotted in *Buenos Aires*. In *Puerto Madryn* the playground was located on the beach and again there was those bent iron bars sticking up from the ground (Figure 2:7).



Figure 2:7

More hidden away was the playground in *Comodoro Rivadavia* where no playing kid was spotted. This playground was really worn out and most of the features did not work properly. Also here the well-tried concept of wood-steel was used.

USA:

- ***Christopher Playground – San Francisco (Figure 2:8)***

The playground's rich selection of after school activities is mostly sports-oriented, and gives the kids a place to feel comfortable in the afternoons. Amenities here include a playground, "the last of the good dangerous ones" and it has the really tall slides and monkey bars kids love. There is also a lit tennis court, basketball court and indoors play area.



Figure 2:8

- ***Julius Kahn – San Francisco (Figure 2:9)***

The playground consists of two separate sand surfaced play areas. They are both fenced and one are for babies and toddlers and the other one for school-aged children. Both have climbing structures, slides and swings. The tennis and basketball courts, soccer and baseball fields lying next to the playground made this place more than a little kid's park. Beautiful forest-like surroundings also make it a



Figure 2:9

great place to hike and picnic. The clubhouse have restrooms, a water fountain and picnic tables.

- ***West Sunset Playground – San Francisco (Figure 2:10)***

The equipment of this playground is ageing, but benches and gracious old trees make it a nice place to gather. A concrete court makes it suitable for scootering and rollerblading. Just behind it there are some big playing fields used mostly by the schools. This playground looks a lot like Julius Khan; they are from the same playground company.



Figure 2:10

- ***San José 1 (Figure 2:11)***

This playground is located in the middle of San José. It has 3 different sections; one for babies and toddlers, 0-3 years, one for children in school age, 7-12 years, and the third one is a train where anyone who would play can play. In the babies section there is sand on the ground, for the school aged children there are wooden chips and the train are standing on some kind of soft carpet. The section for babies only has swings and the sand to play with. The school-aged kids had a climbing stand with slides, tunnels and letters on one of the walls that they can rearrange. Where the train is located the children can play hide and seek or some similar games.



Figure 2:11

- ***San José 2 (Figure 2:12)***

This playground was located a little bit outside the absolute centre of San José and it had different sections.

In one part of the playground there was a stand with a hanging tire and one could swing in any direction. With the right tools one could also move the tire on the stand. Beside the tire stand and the climbing



Figure 2:12

stand there are swings on the playground. It is wooden chips on the ground in all the sections.

- ***San José 3 (Figure 2:13)***

This playground is located a little bit further from the centre of San José in a residential area. It has three major sections; one for smaller children in the age 0-3, one for a little bit older children in the age 3-12 and one for children that like practising sports.

The section for smaller children has letters and numbers on a big wall that the children can rearrange. The section for the older children have a “newer” climbing stand with a little climbing wall, bars and ropes that the children can hang on to.

It also have an almost frictionless ring, about a half meter above the ground, that can spin pretty much as fast as you want it to. You can be one person or more on it at the same time and try to find the balance or run until you cannot stay on the ring no more. On the side of this two sections there is courts were children could practise sports.



Figure 2:13

- ***Monterey Youth Centre (Figure 2:14)***

Monterey has a nice playground with a soft foundation of rubber and sand. There are two kinds of slides; the classic model and steel pipes. One leads under a footbridge in appearance of a sun. The steel pipes are placed across the ride direction, so the slide work like a conveyor. There is also a climbing frame, formed like a wave, with a small cave opening to a castle, which include a double slide, leaning climbing frame, sliding rail, a cableway, and some labyrinth games on the wall. There was a climbing scaffold, which are maid of curved steel pipes and tunnels of concrete tubes in a hill. It is also a suspension bridge at the park closed up. At the side of the park there are a steam engine and a skateboard area, which both are well attended by the children.



Figure 2:14

Summary

The playgrounds in Sweden were studied in the northern part of Sweden. There they are covered with snow at wintertime and it can be both positive and negative. The playgrounds can be slippery and if it is a cold day, and the playgrounds are made in metal, there is a risk for children to get stuck with their tongue if they lick on the metal. But on the other hand if it is lot of snow it is softer if you fall down and the playground can entice the children to new games and make them use their imagination even more. In some way you can say that they have a summer- and winter playground.

Those playgrounds which have a theme, for example the climbing frame with the form of a ship placed at Hertsö School, feels definitive but in the same time like a new design and a step in the right direction. The size of this boat is also a good idea. It becomes a natural boundary and children stay in that area and at the same time they can hide inside the ship if they want to. This ship had clear and intense colors and these probably draw children's attention. Though this is a modern playground and felt new and interesting a small tree house was discovered next to it. The fact that children had built a tree house next to a modern and new playground was very interesting. Obvious this playground did not fulfill children's needs to be creative, for a longer time. Could this depend on the fact that it has an already decided theme and does this lead to inhibit children's imagination?

In USA there are often green areas next to the playground where you can play sports or just hanging out. Instead of sand all over the playground they also often have a surface tile. This surface tile is soft and nice walking on. The negative about this surface tile is that it sometimes is easier to hurt yourself on it comparing with the sand.

On several playgrounds a big climbing net has been put up both in Sweden and in USA and when observing the children, they get it a lot of attention. It gives thrills and excitement combined with making the children active and provides training.

The playgrounds that were observed in Argentina were quite old and worn out. Slides were made of wood and most other features made of steel. For the most part they seemed to be built for smaller children where the parents could drop them off and just sit down and watch them play for a while. A difference between playgrounds in Sweden, Argentina and USA is that almost every playground in USA has a fence or enclosure with a warning sign

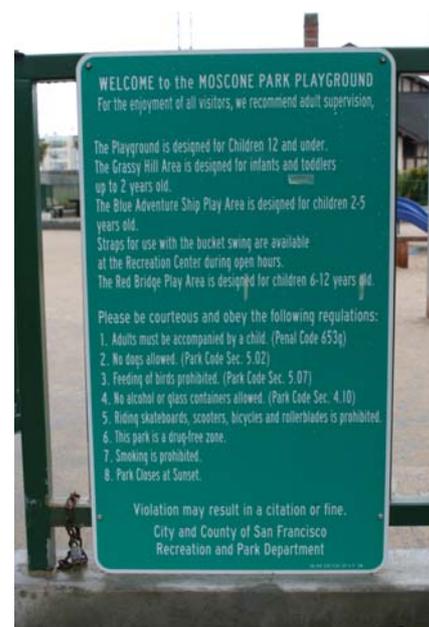


Figure 2:15

with rules and recommended age for the children who are going to play there including parent responsibility (Figure 2:15).

2.2.3 Playground manufacturers

To get more knowledge of the actors that today manufactures playgrounds; AddACTIVE looked into four big companies on the internet worldwide.

Corocord

Corocord make a product called Play-Spacenets and it is for all age groups. The products are constantly improved through the experiences collected during the maintenance of hundreds of spacenets carried out. Corocord develops the ropes and the rope surface consists of a high-quality polyamide yarn. Polyamide offers the advantage of high abrasion firmness in contrast to other synthetics. Corocord products can be found in more than 50 countries all over the world.

Hags Aneby AB

Hags Aneby AB is a Swedish company located in Aneby and Motala, in Sweden, and is one of the leading manufacturers of products for the outdoor environment. Hags Aneby AB playgrounds are very common in Sweden.

Hags Aneby AB develop and manufactures play equipment and street furniture and have one of the largest product ranges in Europe. Hags Play AB, which has approximately 270 employees. Subsidiary companies are situated in Germany, Great Britain and Spain. The products reflect the firm foundations upon which the business idea and success have been built; good design, function, safety and environmental concern.

There was a big interest about their new concept concerning activation of people in all ages. Their concept is basically an outdoor gym with fixed modules for performing of physical activation such as either training or stretching your muscles. This is interesting though one of our needs to fulfil is just physical activation to counteract obesity. Another interesting point is their fastening joints and ground anchors in order to develop such products that fulfil regulations and EU-standards.

Kompan

Kompan tries to make a difference of children's lives through the creation of unique play environments. Nearly 30 years of innovation and child development research are reflected in their playgrounds. They manage the playground development from conception through to completion with design, purchasing and installation. The playground matches the given budget and excites and inspires children while developing mental and physical ability.

Their Swedish product selection consist of; Kompan Moments that got more of traditional play tools as swings, slides etc, Kompan Galaxy have climbing

equipment, Kompan Elements have playgrounds equipment in steel and plastic and Kompan Freegame is for near sports-grounds.

Lappset Group Oy

Lappset Group Oy has playground equipment that is suitable for special needs children. Many components, such as sandboxes, rope swings and labyrinths are perfectly suitable for visually impaired children to use without assistance.

Lappset Group Oy also designs products for a sporting environment. The Sport range of sporting products and play equipment are simple and modern in design, and are suitable for children over three years old and adults.

Lappset Park products are for environments at open yard areas, parks and streets that are given an attractive and functional feeling. To the urban planner, the Lappset Park product range offers an extremely broad range of options for durable improvements to park and residential areas.

2.2.4 www.world-playground.com

When entering this link you can find a lot of useful information about playgrounds. It is not only vendors for playgrounds that you can find here, you also find everything else that has to do with a playground, like fencing, all kinds of sports equipment, playground consultants, safety, skate park equipment, recycled playgrounds and a lot more.

Many of the playground vendors sell parts of a playground or complete playgrounds, some playgrounds you could choose the size of the playground your self, like modules. Below (Figure 2:16, 2:17) follows some examples of playgrounds that were found at different links from www.world-playground.com.



Figure 2:16



Figure 2:17

2.3 Related technology

The sub-phase Related technology was done with research on the internet, by study visit and interviews about technology that can inspire to make new and creative solutions. Also to see what the society does for inspires children today.

2.3.1 Sweden

Fryshuset - Stockholm

Youth recreation center Fryshuset is an organization in Stockholm who started up the activity in a huge building, formerly used as cold store for meat products, of that reason the name Fryshuset (Fryshuset means cold store in Swedish). They work a lot to get solutions for teenagers who have problems, in subjects like racism, faith, sex, criminality or different political opinions. Different people and different needs have shaped Fryshuset into what it is today - a meeting place for everybody regardless of origins, beliefs, age or sex. It offers great variety of passionate interests, social project, successful educational programs, sports, culture and entertainment. But as young people began to shape and influence the place, social engagement started to grow as a reflection of needs and developments in the surrounding society.

It is today renowned for its social work besides education, skateboard, basket and music. Fryshuset have moved their activity to a bigger building, a concrete colossus of 22 000 square meters, located south of the city center. They have many projects, because they need to stimulate different needs for the teenagers, for example the projects Exit and The culture school.

- Exit helps young people to leave nazi- and racist movements. Few of us realize how hard it is to defect from these kinds of organizations. Deserters are exposed to violence, harassment and threats. They are persecuted by their former comrades and despised by ordinary citizens. At Exit they get help from people who have deserted nazi- and racist movements themselves.

The project helps deserters with everything from just listening to their stories, to helping them create a whole new life with a secret identity, psychotherapy etc. Due to its efficient, no-nonsense methods and realistic knowledge, Exit has reached amazing results. Since the start in 1998 the project has helped 180 young people to leave nazi- and racist movements.

Exit also educates communities, schools, authorities and parents in how to deal with nazism/racism, and has helped authorities in Germany to start a similar project.

- The Culture school works with young people involved in crime, drug abuse or other problems. They get to develop their self-confidence and creativity by working with music, painting, theater and other artistic expressions. But the Culture School also gives them regular school tuition. The purpose is to create a platform, which enables them and their families to change and develop.

Hälsanshus - Luleå (Figure 2:18)

Hälsanshus is a newly built exercise center for the upper secondary school of Luleå. It occupies an area of 4600 square meters and contains premises for

lectures, dance, ballgames and classic weight rooms. Outside it is connected with fields for soccer, basket and running possibilities. The vision with Hälsanshus is submitted in three points:

- Develop the physical, mental and social competence
- Make every individual aware of its lifestyle
- Increase the motivation for an active life

They also got “Äventyrshallen” (the hall of adventures). This is a unique creation and the first of its kind in Europe. In this hall they have a lot of different things to do, but they are mainly focused on climbing and balance in different ways. They have four traditional eleven meter climbing frame, from beginners to advance. They have assault courses in different types. An interesting construction in this hall is “Högaäventyret” (the high adventure). It is an assault course located in the ceiling. Up there you have regular ropes, logs hanging in ropes and climbing nets for example. It is like a playground for adults. While you move around up there you are always connected to a climbing rope if you might lose your grip and fall. The course is not only based on strength, you also need to work as a group and solve different problems.



Figure 2:18

Teknikens Hus - Luleå (Figure 2:19, 2:20)

Teknikens Hus is a world of technology and an exciting place for the curious of all ages. Visitors can make their own paper, navigate the remote controlled boats through the harbor or launch the rocket right out into space! In Teknikens Hus lots of exhibitions to experience and explore are held. These exhibitions are divided into permanent and traveling exhibitions. Permanent exhibitions are based upon the technology of the Norrbotten (the northern part of Sweden) region and everyday technology. Exciting exhibits include steel making, mining, papermaking, aerodynamics, household technology, space and more. Traveling exhibitions from other science centers and museums often make a stop at Teknikens Hus who also produce temporary exhibitions and tour them in Sweden and throughout the world.



Figure 2:19



Figure 2:20

The Swedish Missionary Society - Uppsala

The Swedish Missionary Society in Uppsala has different activities in purpose to give fellowship, moral support and happiness to those who taking part of the activities. The purposes of activities for the youth people are to give enjoyment in a drug free environment and to work with questions like integration and racism. Here follows some activities for children and youths:

- In the church's building there is a climbing frame, which is used of the 250 members of the climbing club. At Saturdays they have especial courses for people who have problem to work in groups, so they get use to teamwork.
- Music groups have halls for rehearse in the church, and a couple of churches are together running a music café down town. The café is open every evening and at the weekends it is some live music there. One of the happenings at the café is open stage; during the open stage twelve bands play for each half an hour. The church also has some choirs and a brass ensemble with mixed age.
- In the scout union there are different activities depending on the member's age. The children do more outdoor life while the youth's works with subjects like attitudes and racism for example.

The Swedish Sports Confederation

“Sports and spare time center in vicinity to inhabitants” is a project by the Swedish Sports Confederation, the idea originates from Norway. This project is interesting for Future Playgrounds though obesity and good health both are projects aim to fulfill.

The project of the Swedish Sports Confederation is built on small, flexible and durable sports facilities, open to the public in their neighborhood. This is the home ground of the future for sports and physical activity irrespective of level of ambition. In summertime the area is dominated by different ball games, but there are possibilities to test vigour, technique and rapidity. When the winter arrives, the ice is settled for ice hockey, bandy and skating. The snow invites to a great variety of other activities. The “Sports and spare time center in vicinity to inhabitants” stimulates the children's ability to perform sports spontaneously.

In September 2003 the first center in Sweden was inaugurated. This center is situated in the housing area called Öxnehaga in Jönköping. The center offers lots of activities for example: track & field, boule, table tennis, beach volleyball, soccer, basketball, handball and skateboarding. The construction is made in hardwearing materials to reduce the maintenance.

2.3.2 USA

Exploratorium – San Francisco (Figure 2:21)

Exploratorium is a museum of science, art and human perception. The Exploratorium is an experimental, hands-on museum designed to spark curiosity – regardless of your age or familiarity with science. With hundreds of exhibits to touch, look through, pick up, and tinker with. A lot of children appreciate the museum and even adults experience a lot at Exploratorium.



Figure 2:21

The Tech museum of Innovation – San José (Figure 2:22)

The Tech is a cosmopolitan museum singularly focused on technology; how it works and the way that it is changing every aspect of the way we work, live, play and learn. The museum is people- and technology-focused and the integration of advanced technologies into visitor experiences and infrastructure distinguishes. The museum remain among others four major theme galleries packed full of one-of-a-kind exhibits, IMAX DomeTheater, educational centre for workshops and labs. An estimated 650,000 visitors are expected to trek to The Tech each year. The museum is committed to life-long learning and providing educational experiences for children, families, and adults alike.



Figure 2:22

Zeum – San Francisco (Figure 2:23)

Zeum is an interactive arts centre that offers hands-on fun for children and families. You can experience everything from television production to the performing arts. A child can choose to become an animator, which involves first sketching a figure on a digital easel, then creating a 3D clay character, and then bringing it to life at one of Zeum's animation stations. You can even take your animation home with you in a print book or CD Rom. Children can play a director for example, which means collaborating with friends to produce a multimedia show



Figure 2:23

in Zeum's production lab, and creating special effects, acting out different characters, operating professional video equipment, and making a sound track. Children can also work with artists in Zeum's open studio, artist-in-residence program, to create prints, digital paintings, books and sculptures.

2.4 Brainstorming

During the Design space exploration phase several brainstorming sessions was made. The main point with brainstorming is to come up with good and sometimes crazy ideas. The brainstorming-session AddACTIVE used most was the one when everyone knows the topic of the session and then all session members sit down and draw or write down every idea they come up with on paper. This paper is then put up on the whiteboard so everyone can see it and add thoughts and further ideas to it. When the brainstorming is over the ideas is evaluated of the session members. AddACTIVE's evaluation of the brainstorming sessions resulted in a large number of different categories, such as; safety, adventure and varied ages.

Brainstorming sessions were made in Sweden with AddACTIVE members and AddACTIVE coaches and in the USA at Stanford University with two professors, Larry Leifer and Machiel van der Loos, and Stanford students John, Kinsey, Bryan and teacher Romain (Appendix 3:1, 3:3). Also one brainstorming-session with the design company, Onomylabs, was made (Appendix 3:2). (Figure 2:24, 2:25, 2:26)

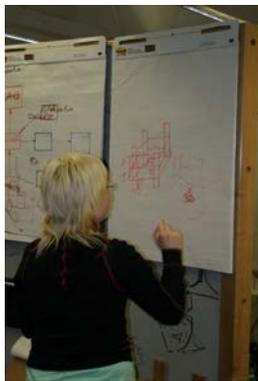


Figure 2:24



Figure 2:25

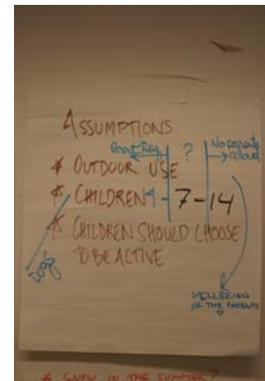


Figure 2:26

2.4.1 Ideas

During the Design space exploration phase a couple of ideas were generated from brainstorming sessions. For example (Appendix 4):

The bouncing-bridge (Figure A)

A bridge that feels insecure when you walk over it with the opportunity to bounce on it all the way over. Further reflections were to build it as a tube for example.

The entire ocean storms (Figure B)

A floor that is moveable with a fan in front so you get the feeling of a storm. Reflections were to make it into a track so you can jump from one floor to another for example.

Giant 3-D puzzle (Figure C)

The giant 3-D puzzle is a puzzle where the pieces are in a giant form. The children may need to be more than one to move a piece. Reflections were that the pieces can form a house or that the pieces can have pictures on them that form a painting.

Projected imagination-world (Figure D)

Big screens with different world motif projected. Here smells, light and sound can be added. The children can be characters in a movie for example.

2.5 Conclusion of Design space exploration

During the Design space exploration process a lot of various needs have been found, everything from small personal things, like a child who had the problem with where she should store her hamster at the playground, to larger social economical problem as the growing obesity of the population.

Today's playgrounds often get boring after a while and to keep children's interest it is necessary that the playground feels new and existing. A number of needs were found when looking in to the children, the adults and the society's requirements, and the needs that were found were:

| | | |
|-------------|---------------------|----------------------|
| Safety | Active play | Decreases harassment |
| Motion | Varied difficulty | Build self-esteem |
| Health | Season undependable | Decreased cost |
| Creativity | Decreased vandalism | Increased quality |
| Experience | Fellowship | Varied ages |
| Feel secure | Social interaction | Availability |
| Adventure | Individuality | Development |

Table 2:1

During the Design space exploration phase AddACTIVE went to USA were some of the benchmarking and brainstorming sessions took place. Also parts of the following phases, took place in USA (Appendix 3).

Section 3: Roadmap

The purpose of the Roadmap phase is to gather all of the information that was found out during the Design space exploration to get a straight description of the products function. It is important that the Roadmap phase is carefully done to avoid having to go back in the process to earlier steps. The key is to describe needs and functions without specifying them too much to avoid narrowing the product at this point of the project.

To obtain the right path for the project there are some design methods that can be used. The Ulrich & Eppinger book “Product Design and Development” describes some of these methods pedagogical and have therefore been a base in this Roadmap.

To gather the information a Mission statement and Product characteristics were established. In the Mission statement the needs (Table 2.1), found in the Design space exploration phase, were discussed and analysed to see which ones are considered most important. These customer/user needs are translated into the language of the engineer in Product characteristic, using a four-step method.

3.1 Mission statement

To get a general direction of the project some guiding principles are made. This Mission statement contains Product description, Key business, Primary market, Secondary market, Assumptions and Stakeholders.

The raw data from Design space exploration is here expressed in needs for the customer/user. For example if a customer statement for a bag is; I do not like when the contents of my bag get wet when it is raining. Then the need will be; the bag is keeping the contents dry.

When the data is expressed into needs there are some important guidelines to follow (Ulrich & Eppinger):

- To avoid focus on solutions it is important to express the need in terms of **what** the product has to do instead of **how** it might do it.
- When the need is described it can be expressed at different levels of detail. The need should be expressed at the same level of detail as the raw data.
- Phrasing should be positive, not negative because it is easier to translate a need into a product specification if the need is expressed as a positive statement.
- If the need is expressed as an attribute of the product it is easier to express product specifications later in the process.

-
- Avoid the words must and should to avoid establishing a level of importance.

The needs (Table 2.1) from Design space exploration were discussed and analysed on the basis of the surveys and interviews done in the Needfinding (Chapter 2.1) and Benchmarking (Chapter 2.2) phases (Appendix 5). The most interesting needs and the needs which were most suitable according to the surveys and interviews, were chosen; Active Play, Creativity and Development.

3.1.1 Product description

Earlier mentioned investigation's shows that today's children are less physical active and it is an advantage for children to stay outside to get fresh air, daylight and to activate their bodies to be healthy children. The goal is to create a part of a playground that makes children choose to be active, creative and outside.

After the Design space exploration phase was done one found 3 different needs:

- ***Active Play***
The children today are spending much time sitting in front of the computer or the TV and this can be one of the reasons why children are more overweight today. To avoid ill health it is necessary for children to be physical active.
- ***Creativity***
Children need the possibility to be creative. In the interviews done during the Needfinding process a lot of the children pointed out that they like to build snow castles and three houses etc. It is important that the playground encourage children's imagination instead of inhibit it.
- ***Development***
The environment we are surrounded by today has a high tempo and a high degree of development. These factors affect the children and the playgrounds today can feel boring after a while. It is necessary for the children that the playground feels new and exciting. If it feels old they have no interest in playing there any more.

AddACTIVE will construct something that will encourage children to be active and creative in an environment that is developing.

To delimit the project these three needs were made into three different matching themes. The themes were found after several brainstorming sessions and from these sessions the following themes were chosen.

- ***Air floor***
The main thing to achieve with this theme is the feeling of flying and freedom and something that is different from other already existing playgrounds. It can take many different forms by either use the "uplifting"

function in different spots on the floor or use it all over the floor by using sensors to activate it. To read more about Air floor see Appendix 6.

- ***Module playground***

This theme is based on a traditional playground, but instead of using the old technique of fixed montage, the playground will be adaptive and renewable. Different modules for different kinds of activities and seasons that are easy to replace whenever you like to. To read more about Module playground see Appendix 7.

- ***Multiswing***

As the previous theme this one is also a development of an old well-tried construction. The idea with this is to add more seats and some more axis of freedom, more directions of movement. To read more about Multiswing see Appendix 8.

3.1.2 Key business

The key business is:

- To construct a part of a playground that will be bought and produced by a company.

3.1.3 Primary market

Those who are interested in buying the final product are the primary market. Such as:

- Municipality
- Shopping centre
- Amusement park
- Hospital
- Hotel
- Residential company
- Kindergarten
- Schools
- Resort

3.1.4 Secondary market

Those who could have interests and benefit by the product without buying it are the secondary market. Such as:

- Children and youths
- The community

Children and youths are those who will have most interest in the product. The economy of the community can also benefit by this product since one of the products purpose is to make children active in a long-term perspective. If they keep being active even when they are older it can prevent some of the diseases and injuries that can come with gaining weight and worse condition.

3.1.5 Assumptions

The product will be constructed in a way that makes children chose the active alternative instead of an inactive and inspire children to be creative. Since daylight and fresh air are ingredients that are important for people's health and prosperous, the design of the product will be constructed for outdoor use.

A goal is that everyone will be welcome to this playground and in a long-term be a natural meeting place.

3.1.6 Stakeholders

- Tobias Larsson
Our primary financier
- AddACTIVE
Runs the project; they invest time and energy in the work.
- Andreas Larsson
Invest time and energy in the project.
- Mattias Bergström
Invest time and energy in the project.
- Lennart Karlsson, SIRIUS
- LTU
Finance the project and supervisors.

3.2 Product characteristics

Product characteristics are representing the expectations and the ambitions of AddACTIVE without telling how to do the product, just what the product has to do. Product characteristics are the result of transforming the language of the costumer/user needs to the language of the engineer.

The Product characteristics can be compared with one part of Ulrich & Eppinger concept development process that is called Establish Target Specifications. According to that phase AddACTIVE should set target specifications immediately after identifying the customer needs. To set the target specifications Ulrich & Eppinger request to use their four-step method:

1. Prepare the list of metrics.
2. Collect the competitive benchmarking information.
3. Set ideal and marginally acceptable target values for each metric.

4. Reflect on the results and the process.

When it is time to choose metrics it is useful to choose those who reflect the degree of the customer's satisfaction as directly as possible.

Ahead in time more defined specifications are going to be made and hence it is important to gather the competitive benchmarking information in order to support these decisions. The best result AddACTIVE could hope for is the ideal target value and the metric that would barely make the product commercially viable is the marginally acceptable target values.

When AddACTIVE was looking in to this four step method it was decided that the approach would be changed a little bit. This was because the present project is in many ways different from "usual" projects though this project doesn't have a specific concept at this point of the project. It was not possible to set a specific value of the metrics. Even though the project has competitors AddACTIVE's ideas are something that is very different and the project did not have any restrictions from the beginning.

3.2.1 Compiling Product characteristics

AddACTIVE decided to put together a metrics list by translating the most important needs to the language of engineers. The translation gave more than one function on each need (Appendix 5).

3.3 Conclusions of Roadmap

In this phase the customer/user needs found in the Design space exploration were analysed. The most significant needs were chosen and then translated to the language of the engineer.

To do this AddACTIVE based their method on a modified version of Ulrich & Eppinger's book "Product Design and Development" design methods. The modifications were done because the methods did not fit exactly to this project.

Translating customer/user needs into functions was difficult since Future playground is a very extensive and vague theme. Although AddACTIVE managed to find functions that felt good and that agreed with the three needs found in Mission statement: Active Play; physical, mental, change of activity, engage and social/conversation, Creativity; physical, stretch boundaries and mental, Development; material, colour, form and themes. It was difficult to translate these needs to useful metric values therefore AddACTIVE decided to write down metrics such that it is not possible to put any specific values on, but still gives an idea about what is wanted from the project.

In this phase also one of the three themes was chosen, the module playground, on the basis of the three needs. The theme was generated in brainstorming sessions. There was lot of discussion around these themes about which one would fit in the most according to the three needs. The three needs could mean

different things to different people and because of that fit in differently to the themes. For example Creativity meant for some people that children did something creative on the playground while some people meant that if the playground was changed it encouraged the children to be creative and still have an interest in the playground.

The Roadmap phase has narrowed the project a little bit further in what direction the project will go and the work done here will have big influence of how the result will be. Therefore lot of time has been spent on this phase to document it as well as possible, so there will be no problem to go back and check out the Product characteristic in the future if there are any problems with the design.

Section 4: Concept design

The Concept design phase is divided into three sub-phases:

- *Concept generation*
- *Concept evaluation*
- *Concept selection*

The first sub-phase, Concept generation, is a divergent phase where a lot of ideas around the theme are generated. These concepts are based on information from brainstorming sessions, expert consulting and benchmarking. It is important during this phase to suspend judgment, encourage new imagination and try to get a quantity and variety of ideas.

The Concept evaluation is the sub-phase where the ideas advantage and disadvantage from Concept generation is discussed. It is important to remember the needs in this sub-phase, that earlier were found.

The Concept selection phase is where the idea that satisfies the needs and Product characteristics is chosen. The selection is based on the results of the concept evaluation.

During this phase, a comparison was made between the three sub-phases; Concept generation, Concept evaluation and Concept selection, and Ulrich & Eppinger's five-step-methodology were similarities were found. The Ulrich & Eppinger's five-step-methodology:

1. Clarify the problem
2. Search externally
3. Search internally
4. Explore Systematically
5. Reflect on the solutions and process.

4.1 Concept generation

This phase started out with brainstorming that was based on the conclusions from the Roadmap phase. The concepts were divided into sub-groups for a better overview.

From the brainstorming sessions seven concept on a module playground were generated:

1. Modules like houses, cars, trees, etc, that are moveable on rails for example (Appendix 9, Figure A).
2. Modules like walls that are moveable on rails to build houses for example (Appendix 9, Figure B).
3. Modules that are located in the sealing and are moveable (Appendix 9, Figure C).

-
4. Children build things themselves with hammer and nails (Appendix 9, Figure D).
 5. A cylinder with tracks where boards can be moveable in different paths (Appendix 9, Figure E).
 6. Two walls with checked pattern where boards could be movable between them and build different tracks (Appendix 9, Figure F).
 7. Posts that are a base for changing features (Appendix 10).

4.2 Concept evaluation

From the earlier phases the users' needs and pre-defined Product characteristics were taken into consideration. The seven concepts advantage and disadvantage were discussed. Consideration to the Europe standard for play equipment EN 1176 – 1177 (www.hags.com/danyswe030911.pdf) was also made.

With 1 (Appendix 9, Figure A) different type of courses can be made. The disadvantage is that the modules can be very heavy for a child to move but on the other hand if the modules are too easy to move the risk of being pinched is higher etc. Things that are moveable can be difficult to get approved as a playground in consideration to the Europe standard.

With 2 (Appendix 9, Figure B) labyrinths can be built and the children can be very creative. The disadvantage is also here that the parts can be very big and ungainly for a child to move and the approval can also here be difficult to get.

3 (Appendix 9, Figure C) can be very attractive for children when you involve heights on the playground. Here prevention of injury's can be improved when the rails is in the sealing. The disadvantage is how to prevent the children from getting up on the top of the construction.

4 (Appendix 9, Figure D) is very creative and certainly appreciated of the children but from the Europe standards point of view it can be very hard to get approved as a playground.

5 (Appendix 9, Figure E) is flexible to install and can be both outside and inside but also this one can be difficult to get approved because the parts are moveable.

6 (Appendix 9, Figure F) have more possibilities but follow the same principle as concept 5, with the same conclusions.

Concept 7 (Appendix 10) generates the opportunity to change the playground more often and can be the ground for all of the other ideas, which makes it the broadest. This can lead to a unique product that fulfills the needs of the users.

4.3 Concept selection

After discussions AddACTIVE selected concept 7 because it generated more possibilities and some of the other concepts can be involved. The concept was developed furthermore and the module playground are going to consist of a module ground system which gives the possibility to change the playground both in terms of size and the combinations of features on it at any time. It consists of the ground plate, surface tile, poles and mounts, which together make a unit. The size on the playground depends on how many units you choose to have.

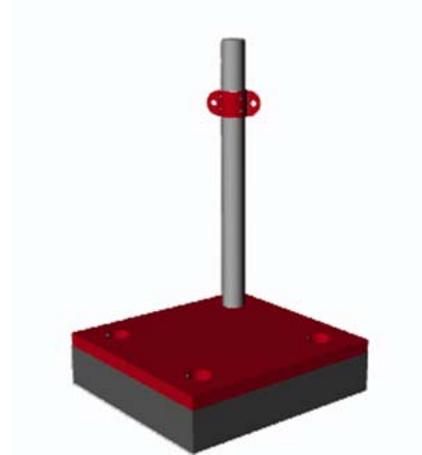


Figure 4:1

After a tip that there was a teacher, Sven-Gunnar Furmark, on the university that also had an idea about a module playground a meeting with him was booked.

4.3.1 Sven-Gunnar Furmark

Sven-Gunnar Furmark is a physical education teacher and a “special teacher”. For five years ago he started to work on his idée with module playground. The playground he developed is brought up at Strömsundshemmet, 50 km outside Luleå. The meeting with Sven-Gunnar was very interesting and he was very compliance.

He explained that today there is missing a lot of challenging on the playgrounds. Children learn fast how the playground is working and this is a problem because this is one reason why they get bored.

On the question, what his playground does to draw children and why they think it is so fun, his answer was that the children could imagine themselves swinging and climbing on the modules. It’s like a jungle theme. The playground is also very challenging. Children with the age 8-10 often manage 40 % of the modules and teenager often manages 70 %. This makes the playground attractive for a longer time.

When the playground was developed, the logs were mounted up in an indoor sport center to try out the best lengths and locations for the different ropes so that it would make a suitable challenge for the children, not too easy and not too hard.

When a playground is about to be construct there are lots of rules to follow. One Europe Standard-rule is that you are not allowed to build something that is inviting to high heights. Children like to climb high and do often accomplish this. To avoid this, Sven-Gunnar, has put a thin metallic strip on the beams. This

makes it unpleasant when they put their hands on it. If you want to put a beam on the diagonal it must be at least 90 degrees to the next beam. It is also very important to take in consideration risks regarding thumbs getting catch etc.

He has not modified the playground for use by a disabled person but had some ideas how to do it.

Strömsundshemmet - Råneå

The playground was built in a square form, 125 m² (10*10*3), and it endures of dozens modules with sand on the ground. It was more of a wilderness playground with ropes and logs and it offered a high degree of challenges. It was developed to fit children in different ages, or more accurate children of different lengths. A shorter child can find challenge in a certain part of the playground and a taller child can find his or hers challenge in a different part. It was all based on getting from one place to another and to do that you had to use ropes hanging in different ways from the top of the playground.



Figure 4:2

When AddACTIVE visited the playground there was a lot of joy and a degree of challenge even for people above the target age. The difference between AddACTIVE's idea of a module playground and the one at Strömsundshemmet is that the AddACTIVE playground is built in modules that are easy to change when you want a different playground. The one at Strömsundshemmet is built in different modules so that you can decide how you want it to be composed before you build it, but it is hard to change it when it already have been built.

4.4 Conclusions of Concept design

During this phase the module playground was chosen. The module playground consists of a ground plate, surface tile, poles and mounts which together make a unit. The size on the playground depends on how many units you choose to have. A meeting with Sven Gunnar that had built (what he called) a module playground and a visit to his playground was also done. Conclusions from that visit was that AddACTIVE's module playground and Sven-Gunnar's had almost none similarity.

Section 5: Detail design

In this phase AddACTIVE was divided into two groups for detail design, the ground construction and the feature-group. After two weeks work for the feature group AddACTIVE decided to let that go. The features (Appendix 11) were nothing new and without using any new technology, as AddACTIVE earlier decided were to expensive and sensitive equipment to work with, the feature group found it to hard to come up with something totally new. At this time a new group was created instead of the feature group, the mount-group. Cooperation with Hags Aneby AB (Chapter 2.2.2) and Teknikens Hus (Chapter 2.3.1) also started in this phase.

5.1 Cooperation

From an economic point of view AddACTIVE though cooperation's with different companies would help. During this phase cooperation with Teknikens Hus and Hags Aneby AB considered to be a good solution and possibility to get the opportunity to build the playground.

5.1.1 Teknikens Hus

A meeting at Teknikens Hus was held with Olle Nordberg, Malin Brändström and Britt-Marie Forslund. The AddACTIVE members started to introduce the project. The discussion was about a possible cooperation and they got very interested.

They thought the concept was very good and they saw possibilities in it. They were interested in placing the module playground in their park, either permanent or temporary. Cost according to fix the ground was going to be discussed later depending on if it was going to be there permanent or temporary. If it would be there permanent they might stand for the cost of that work. They showed a picture of their future park and thought it would be a good idea to place the playground in it.

Teknikens Hus offered AddACTIVE help if HAGS Aneby AB or any other company did not sponsor with features. Teknikens Hus themselves suggested a cooperation to build some kind of feature for demonstration of the playground.

5.1.2 Hags Aneby AB

Two members from AddACTIVE had a meeting with Vincent Lindström (Technical Director) and John Granström (Design and Development) that took place at Hags Aneby AB in Aneby. Vincent and John first introduced themselves and also told a little about Hags Aneby AB as a company and its history. Then the AddACTIVE members started to ask Vincent if he could sign a contract where he certified that the concept that the AddACTIVE members

presented was not allowed for them to take. He did not want to sign this paper. He informed that it was not the first time that he had gotten this question, but he wanted the AddACTIVE members to trust him that they would not steal the idea and the AddACTIVE members accepted his explanation.



Figure 5:1

The project, Design for Wellbeing, and the concept module playground were presented. They thought the concept was good and it was discussed. Vincent wanted a draw of the playground with the features AddACTIVE wanted them to sponsor with (Appendix 12). This gave him the possibility to see if it is going to work at all with the safety. Then he had to contact the CEO of Hags Aneby AB for an okay.

During the meeting discussions about safety on the playgrounds were discussed. Hags Aneby AB is very careful that the playgrounds are safe. It is not enough with calculations they also test their playground physical. They always follow the Europe standard for play equipment EN 1176 – 1177 and their playgrounds are tested and approved of TÜV (Technischer Überwachungs Verein). Because of this they sell a whole playground, with approved combinations, instead of loose modules. The module playground concept is that the customer, the municipality for example, has the opportunity to choose their own combination and they thought this could be a problem.

When you manufacture a playground there are lots of things you have to take into consideration; distance between a wall and a floor, tolerances, etc. But there are also some people that deliberately want to hurt children. They explained that they have had to change the slides. Before, the slide had a narrow opening on the sides. People placed razor blades there and children cut themselves when they went down. One other example is when people put nails in the side holes, which is for galvanization, of the slides looking like a tunnel. Before the holes were in a horizontal position and now they are vertical to prevent this.

The choice to always have a surface tile instead of sand they thought could limit oneself, since these surface tiles are very expensive. It is sometimes also easier to get hurt when you have these surface tiles. But on the other hand it is also a lot to consider when you have sand. You cannot have the same sand under swings and sandpits for example and animals use the sandpits for their excrement.

5.2 Detail design

To get the exact solution of AddACTIVE's concept the same steps as in Concept design (Section 4) was made; Concept generation, Concept evaluation and Concept selection was compared to Ulrich & Eppinger's five step-methodology.

5.2.2 Concept generation

The Concept generation phase could be compared with step 1-3 in Ulrich & Eppinger's five-step-methodology. A lot of ideas were generated. The ideas are based on information from brainstorming sessions, expert consulting and benchmarking.

Ground structure

Several different concepts for a ground structure plate were presented when AddACTIVE had a meeting where all members showed one or more ideas they had come up with. These ideas was the ground-groups starting point when trying to find out which way is the best to solve the problem. Solutions like the way a flagpole was mounted was discussed, and solutions where a fast locking was used.

The ground-structure group turned to people at the *Department of Civil and Environmental Engineering* at the university, because of their knowledge about concrete. From them the group got a lot of valuable information of concrete's strength, reinforcement etc.

Mount

A brainstorming about different types of mounts based on the product characteristics that was found in the Roadmap phase was made. During these brainstorming sessions a lot of ideas came up and sketches of them can be seen in Appendix 13.

Before the brainstorming sessions, everybody of AddACTIVE's members did some research of there own about what kind of mounts that could be found on the market today. One mount that all the group members had found were the slang pin. A meeting with Stefan Lagerkrans (*Department of Applied Physics and Mechanical Engineering*) was held:

- The meeting with Stefan Lagerkrans started with an introduction by the AddACTIVE members about the project. Stefan came up with some interesting ideas about how to do a mount. He thought that it would be possible to use some kind of wedge system between the two cylindrical surfaces. He also thought that one could pull these wedges together by hand force and it would still be strong enough to bear the pressure from the module. The idea with no holes in the pole was good for the poles strength and it was also a good sales trick according to Stefan. He also thought that some material other then wood would be nice to have since it is easier to deal with and can be used for a longer period of time.

During the Concept generation phase AddACTIVE members, looking for more information and ideas, visited a lot of companies in Luleå. To read more about the company visits see Appendix 14.

5.2.3 Concept evaluation

The Concept evaluation phase could be compared to step 4 in Ulrich & Eppinger's five-step-methodology. Further development of the concepts was also done in this phase, in forms of more benchmarking and continued working with the wanted "qualities".

Ground structure

Having lots of different solutions an evaluation had to be done. Looking on how AddACTIVE wanted the ground structure to work and look a sifting was made. One common thing with the different concepts was the function reminding of the way a volleyball-net pole is mounted in the gymnasium floor.

Consulting a construction company concerning different possibilities of putting all this on the ground without alignment troubles and difficulties when transporting these ground structures, some more important gaps were filled. The *Department of Civil and Environmental Engineering* was once again visited, to get more information about casting concrete. With the entire expert consulting the sifting of different ideas was easily made.

Mount

The ideas were merged together and three different concepts of mounts were constituted; Slang pin mount, Squeeze function mount and Memory metal mount, to read more about the three mounts see Appendix 15.

Stefan Lagerkrans thoughts of the best solution for a mount were taken in consideration. To be able to compare and evaluate these three concepts a list of wanted qualities of the mount were made (Appendix 16). A ranking were then made on each of the three mounts and qualities. The ranking went from 1 to 3 with 3 as very good and with 1 as poor. Since AddACTIVE had not decided any specific distances or modules, it was hard to anticipate a cost for the different mounts. Because of this all of the three mounts got the same ranking on the economical quality. After all the points from the ranking were counted number 2, Squeeze function mount (Appendix 15), was a winner. The ranking can be seen in Appendix 17.

5.2.4 Concept selection

In the concept selection phase the final concept was selected. The main focus in Concept selection phase is to select and bring the concept forward for further development and manufacturing.

Ground Structure

The choice of the final concept was made with easiness and economy as major guidelines. Having a few to choose among the big concrete block was chosen. This was a 2x2 meter block with a thickness of 0,15 meter, consisting of four mounting holes and three lifters (Appendix 18). In this way no alignment problems would appear and it would easily fit on a standard truck bed. The poles size was chosen after Hags Aneby AB features because of a proposed

cooperation (Appendix 19). After consulting the *Department of Civil and Environmental Engineering* this concrete block would be enough to the pressure it will be exposed to. But would it be enough with 0,15 meters of the 2,75 meter high pole to hold the construction?

A strength analyze with some assistance from Peter Åström (*Division of Computer Aided Design, LTU*) was made on the pole which ought to be connected to the ground, this to see how much the total deformation of the pole would be. A worst case was approximated when a group of children produced a radial force of 10000 N on the very top of the pole. Result from analyze showed that the height of the ground was enough for the pressure. A deformation of 0.0015 meter was noted which was very good (Appendix 20).

Mount

The three mounts were determined and ranked. Further benchmarking and research were made on these, in forms of manufacturing costs, choosing materials and distances. After deeper investigation in these three concepts AddACTIVE realized that the winning concept would be really expensive to make. Therefore the ranking was remade with other inputs on the economical quality. The remade ranking (Appendix 21) ended up with number 1, Slang pin mount, as a winner.



Figure 5:2

The mount that was elected (Figure 5:2) can easy be removed and after consulting Stefan Lagerkrans it should be enough for the pressure the mount will be exposed to.

Section 6: Manufacturing

In the Manufacturing phase AddACTIVE looked into the economy. What was possible to manufacture? After the trip to the USA AddACTIVE's budget had been spent, so the only solution for AddACTIVE was to get sponsored to manufacture the module playground.

6.1 Result of cooperation

The ones that showed interest in AddACTIVE's module playground were the earlier started cooperation with Hags Aneby AB and Teknikens Hus.

6.1.1 Hags Aneby AB

AddACTIVE earlier sent a picture (Appendix 12) for an approval to Vincent Lindström at Hags Aneby AB. He accepted the suggestion and the CEO of Hags Aneby AB approved sponsorship of the features. Hags Aneby AB also gave AddACTIVE a discount on the tile.

6.1.2 Teknikens Hus

A second meeting was held at Teknikens Hus with Olle Nordberg, Malin Brändström and Britt-Marie Forslund. The meeting started with presentation from AddACTIVE's members of the construction in detail and the picture that was sent to Hags Aneby AB (Appendix 12) was showed. The AddACTIVE members explained the economic situation and wanted Teknikens Hus to buy the tile and do the ground work. They still were really interested of the playground and showed a place in their backyard were they wanted it to be (Figure 6:1). They thought this deal was okay.



Figure 6:1

6.1.3 LTU

A meeting with Tobias Larson (coach) was held and the situation with the sponsors to AddACTIVE and what was left out in these deals were explained. AddACTIVE wanted to buy material to build the two concrete blocks, and material for the mounts and poles. This would be a cost of approximately 10 000 Swedish crowns for Design for Wellbeing. He approved these expenses and wanted AddACTIVE to build the playground.

6.1.4 Conclusions of Result of cooperation

Hags Aneby AB sponsors with the features, Teknikens Hus stands for the costs of the tile and the groundwork and the project, Design for Wellbeing, stands for the costs of the ground structure, poles and mounts. The AddACTIVE coaches thought this was a great deal so the orders and manufacturing started.

6.2 Manufacturing

The Manufacturing phase includes detail description of the manufacturing of the ground structure, pole, mount and assembly.

6.2.1 Ground structure

AddACTIVE started with doing calculations of how much material that were needed to the ground structure. Materials to manufacture the two concrete blocks were ordered.

To manufacture the concrete blocks, two forms were made. Inside the forms arrangement was done with two layers of reinforcement carpet, lifting device and fixtures for the pipe part in the bottom of the form (Figure 6:3). The pipe part includes a pipe and a collar. The collar to the pipe part needed to be ordered from an external company (Erlandssons Verkstad AB). The collars were screw thread (Figure 6:2) and weld on the pipe part. When the two forms were ready for casting the concrete was ordered. The concrete came with a truck and was pored up in the forms. With a concrete vibrator that was borrowed from the *Department of Civil and Environmental Engineering* the concrete were equalized (Figure 6:4). The two concrete blocks needed to incinerate for two to three days.



Figure 6:2



Figure 6:3



Figure 6:4

6.2.2 Pole

Six poles were ordered from Tibnor where AddACTIVE got a discount of 52%. The six poles shall have a collar in the lower part that fits to the collar at the pipe part in the concrete block however with a smaller inner diameter. The collar was ordered at the same time and from the same company as the collars to the concrete block. These were welded on the poles (Figure 6:5). The poles were also painted with varnish in a blue color, this to protect the poles from corrosion and also get a nice color on the poles (Figure 6:6).



Figure 6:5



Figure 6:6

6.2.3 Mount

To get a refreshment of the mount see Appendix 15 and look at Figure 5:2. The material to the “body” to the mounts was ordered from the same company and at the same time as the poles. Also here the external company that made the collars (Erlandssons Verkstad AB) made the “ears” at the same time. For the playground 14 mounts was needed, which meant that 56 ears needed to be ordered. The “ears” were welded to the “body” and painted with the same color as the poles.

6.2.4 Assembly

When the ground structure, poles, mounts, tiles and features were arranged everything needed to be assembled at Teknikens Hus (Figure 6:1). The work started with putting the ground structure in the land, putting the poles on their places, the mounts to the features were brought up with the features and the final thing to do was to put the tail in its place. (Figure 6:7)



Figure 6:7

6.3 Economy

A calculation over the costs was made (Appendix 22); the calculation included the study visit to USA, manufacturing costs, presentation costs, sponsorship, etc.

Earlier during the project AddACTIVE applied for different scholarship, but with no result. To read more about the applied scholarship see Appendix 23.

Section 7: Product Launch

7.1 Product description

At the beginning of September 2004 AddACTIVE started the project with only two words; Future Playgrounds. Based on these two words, extensive Benchmarking and Needfinding was done and AddACTIVE captured the main interest in the words *active*, *creative* and *development*. This led to a unique product, which fulfils the needs of the users; “*to construct something that will encourage children to be active and creative in a developing environment*” (Figure 6:7).

The module playground is designed to promote physical activity and social interaction in a safe and creative environment. Active play develops the physical attributes and social and cognitive development of children. Children need change to be active. One child said that she easy got bored on the playground on her schoolyard; hence, the construction of a module ground system. The system makes it possible to change the playground in terms of size and the combinations of features.

The module playground consists of a ground plate, surface tile, poles and mountings; together these make a unit (Figure 4:1). The size of the playground depends on how many units you choose to combine.

A well-designed playground provides wide-ranging opportunities for exercising balance, strength and body control. It also develops the child's learning capabilities and provides a preparatory forum for school life. The playground is constructed for outdoor use since daylight and fresh air are ingredients in a long and healthy life.

7.2 Product display and presentation

With 15 minutes to present the project of a year's work from the seven members in AddACTIVE, to people who have no idea of what has been done during the past year, AddACTIVE put a lot of work in the product launch on the 20:th of May 2005. The product launch consisted of five main parts: an oral presentation, an animation of the product, a big poster of the product, brochure that presents the entire SIRIUS project in text and a physically product build at Teknikens Hus.

AddACTIVE decided that the center of gravity should be on selling the product module playground. But also highlight that the project just started with the two words; Future Playgrounds, and today a physically playground at Teknikens Hus is brought up. With an animation AddACTIVE illustrated how the playground is built and how it looks like. The animation was also shown in the display case. The display case was built really big so it would be able to attract

people to it. The display case had a similarly look like the presentation in the brochure; a red ball that starts to roll and finally end the path and the project has reached its goal.

7.2.1 Presentation at Teknikens Hus

An inauguration on Teknikens Hus was made on the 28:th of May with a short presentation of the project, module playground, and distribution off candies to the children was made (Figure 7:1).

AddACTIVE's members were around to answer any questions the audience had. Teknikens Hus had brought up a wall chart next to the playground that also explained the project and the module playground.



Figure 7:1

Section 8: Project reflection

8.1 Team Work

The AddACTIVE group has been a mix of students with different backgrounds and knowledge, different ways of seeing issues and solving problems. Meetings and consultations have been held in a rather informal manner, with the project coaches making sure everything is headed in the right general direction. This method has worked well and has been reflecting the general spirit of the project. Since AddACTIVE is a rather small group with seven members almost everyone have been involved in each discussion and decision. It's a small group but to many if everyone is supposed to be involved in every decision. When everyone is responsible it is easy that no one takes responsibility or just a few. This method has worked okay for the group but AddACTIVE did not have a group leader until the end of the project and afterwards it would have been better since it probably would have led to better communication and better check on the different responsibility areas between the group members. Communication and responsibility is key words in a project like this. Sometimes it has worked well, and sometimes not.

8.2 Project goals

In the beginning of the project, a mission statement was created. The mission statement was made on the basis of an initial Design space exploration. At this stage, the project was still very broad, which in turn made the mission statement equally broad. In the end the goals were reached, but some were fulfilled to a greater degree than other. Since the core of this project is about exploring and inviting, it is very hard to have an idea of where the project is going to end up at an early stage, and new insights might make previous goals outdated, or even wrong. Goals serve as a way of keeping the project focused, and as a way to make everyone work in the same direction. This was well achieved with our goal, even though it was rather broad in the beginning.

8.3 The master plan

To help keep the project in the right direction The master plan (Appendix 24) was created by the group's coaches to give an outline of the project. Since none of us had previous experience with planning a project of this size, predefined milestones saved us a lot of time. As AddACTIVE progressed through the project, The master plan became more and more utilized. The master plan acted as the blueprint to the planning for our project. We followed the suggested roadmap and were able to accomplish our goals. The master plan did not tell us how to meet the deadline; it just gave us the deadline and what was expected. The rest of the planning was up to us. We have learned how important it is to have a master plan as a foundation for the project. Since it only gives "the big

picture”, and doesn’t interfere with how the work is done, it is not constraining the project. The master plan is also a way to keep everyone informed on how far the project has developed. This is something that could have been emphasized more throughout the project.

8.4 Coaching

The coaching was quite unique in this project. We had very little interference by the coaching staff. The project and its outcome were basically in our hands and our coaches’ wallets. In the beginning of the project the coaching was more frequent to help us keep the track but in the end of the project we were very independent. This has made us feel that it is our project and that the things that have been accomplished are a product of our own competence and knowledge. The coaches did give us pointers at each phase, but their main function has been to be there as a resource and a place to bounce ideas on. The fact that most decisions were made by us led to a stronger self-confidence in decisions making.

8.5 Project planning

The project planning was based on The master plan. The ways to approach the deadlines were developed by the project coaches and then agreed upon by the project members. Tasks were split up and checked at each meeting. This planning method worked okay for AddACTIVE. We have learned that planning and taking responsibility for the tasks you get is really important in a project. It is also important to get a balance between group decisions and independent work.

8.6 Resources

Our coaches started to give us an amount of money that we were allowed to use. This money we had spent in the beginning of February, since we went to the USA. Our coaches did not provide us with a new set amount of money. This meant that we needed approval for every investment. The negative side with this approach was that it was hard to know how much we could spend on the different parts of the project, such as the manufacturing, and it was hard to know what we needed until we were done with the design since we got sponsored from Hags Aneby AB with features and from Teknikens Hus with the tile and the ground work.

8.7 Conclusions

Overall this project has provided a unique learning opportunity for us. We learned to depend on one another and to trust each other to fulfill the commitment to the project and the members. The project coaches were

important in keeping the project on track but it was really up to us as individuals to do our share and make us accomplish the project goals.

Everybody in the project is unanimous in feeling that this project was an excellent tool to provide our team working skills, our communication skills, and learning about the design process through a distributed team.

We are really proud of what we have accomplished; a physical product that Teknikens Hus wanted for their exhibition.

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Appendix 1

Interview guide teachers

What do you work with?

Which age group are the children you are responsible over?

What are the children doing on their breaks?

What do you see that the children like to do?

What do you see that they don't like to do?

What does the children that are physical training (not physical education)?

What do you think a schoolyard would need?

Remaining thoughts about children and their habits?

Appendix 2

Interview guide youths

Age:.....

Gender: Male: Female:

Training:

What kind of training do you perform?

How often do you train?

Leisure activities:

How do you activate yourself during your spare time?

How often do you activate yourself?

Computer habits:

How often and how long does the computer activate you (hours/day)?

What are you doing with your computer?

TV habits:

How many hours per week do you watch TV?

What do you watch?

TV-game:

Do you play TV-games?

Hobbies:

Are you doing anything else in addition to previous questions?

How often and how long do you perform your hobbies per week?

Friends:

How often do you spend time with your friends when you are not in school/day-care/at work or doing any of the activities that you have already mentioned?

What do you play with your friends?

What does a perfect evening with your friends look like?

Meeting places:

What is most important with the place where you are playing/spending time with your friends?

Which things should exist on these places?

Playgrounds:

Which things should exist on a playground?

What is most important on a playground?

How often do you visit a playground?

What is good with this playground?

What is the funniest thing you have done on a playground?

Why was this so fun?

Environment:

What do you find missing in the environment for you and your friends?

What do you want the municipality to stake on?

Appendix 3

USA trip

Zeum 22/1

Stanford 24/1

At Stanford AddACTIVE met two professors *Larry Leifer* and *Machiel van der Loos*, here follows a short presentation of their work:

Professor Leifer's research interests include rehabilitation engineering, design methodology, and programmable electromechanical systems, among others. He has published in the areas of diagnostic electro physiology, functional assessment of voluntary movement, human operator information processing, rehabilitation robotics, design team protocol analysis, design knowledge capture and concurrent engineering.

Machiel van der Loos's research interests include robotics and design Ethics, human service and rehabilitation robotics, mechatronics, human-computer interface, real-time data collection techniques and www-based technical support and user training for complex equipment.

AddACTIVE had the opportunity to discuss the theme module playground with them:

Discussions issue:

- Target:
 - o Children between 4-14
 - Children under 5 years old can not be alone on the playground
 - Children between 6-12 can play mixed
 - Children over 12 years old do not want parents involved
- Parents:
 - o If the parents must be with the children, the playground should be attractive to the parents as well so they want to take the children there.
- How can a construction look like to be attractive for different age groups?

Alternative:

- Playground you can grow in
- Different sections for different ages
- Mixing age groups
- Do you have to wear shoes or certain type of clothing
- Themes; different kind of worlds
- Kids on stage (amphitheatre)
- Adaptive weather
-

- Design for all seasons (different kind of weather)
 - Sunny in winter, snow in summer
- How to give people something that they not expecting
- Play pattern for boys, girls, mix
- Social conventions

Module playground

- Playground of the month
- Rotation system
- A company sales the concept to the municipality and are in charge of reparation etc.

Stanford 25/1

An easy model, of the theme module playground, was made in the loft at Stanford. The model was build with one fixed pole with two modules that had different appearance. It should have had four poles, but it became one because of short supply.

Onomylabs 25/1

AddACTIVE visited the company Onomylabs; here follows a short presentation of the company:

Onomylabs designs and creates evocative interactive systems that enable audiences to experience the future. They work with the most advanced technologies, as they emerge fresh from the lab bench. Onomylabs creates signature exhibits and their work can provide an interactive centrepiece for a lobby, gallery, university, or research project. They get you the attention of the press and they give you a platform to help you tell your story. They use four major creative disciplines of art to develop their products; science, design, and engineering to create robust and easy-to-use, interactive that engage, educate and entertain.

AddACTIVE had the opportunity to discuss our themes, airfloor, multiswing and module playground, with them. After short brainstorming-sessions around the three needs; active play, creativity and development, discussions issues came up such as:

- Since children often see the playground from far away the playground should look attractive
- That playgrounds of today are age based
- Multiple use
- Children like competition
- Sounds when you touch things

Brainstorming around the theme Airfloor:

After a short discussion it came up that a cheer with the feeling of flying already exists at The Tech museum of Innovation in San José.

Brainstorming around the theme Multiswing:

Thoughts about this one were that it didn't entertain children above 6 years old.

Brainstorming around the theme Module playground:

- Have houses and trees that the children could move around and shape the landscape. The trees and houses could stand on railways for example.
- Have different walls on railways so the children can build a house for example.
- You cannot build too high if the children are going to drag the modules around.
- Modules with different themes.
- To get it safe advanced technique may be needed.
- Change the playground after different themes like Easter, Christmas, Midsummer (Swedish tradition).

Presentation in Sweden 25/1

A presentation was made with a videoconference in Sweden, from Stanford, with Karolina and Thorbjörn

Exploratorium in San Francisco 26/1

The Tech museum of Innovation in San José 26/1

7 playground visits 26/1

- *Julius Kahn*
- *Christopher Playground*
- *West Sunset Playground*
- *San José 1*
- *San José 2*
- *San José 3*
- *Monterey Youth Centre*

Stanford 27/1

Brainstorming-session

A brainstorming-session was held with three first year Stanford students John, Kinsey and Bryan, professor Michael van der Loos and teacher Romain, around the theme module playground.

Discussion issues:

- Add electronic because of the changing culture.
- Laser tags, but without killing each other.
- How can you push things around without hurting yourself?
- You can make just one part movable so the children get the feeling of moveable things.
- Something that makes you moves.
- Harry Potter – make the same play for children.
- Different levels that you can choose on your own.
- Choose a toy you want and fill it with air.
- If you want a tube, for example, you push on a button and then it pops out a tube.
- In cities you got a lot of heater (waist heat) in the ground so you could heat the playground so you could play with it all year around.
- You could get points for doing things. A timer and instructions of different plays.
- Have to interact to play.
- Children like things that move on playgrounds.
- Safety, entertainment and learning.
- Website to vote witch playground it should be next month or season.
- Parents need to be able to come there and like it.
- Have places for the parents to interact with each other. It would be great to interact them with the children's play.
- How are parents having fun now days?
- Comfortable music.
- Present the playground for adults to.
- Quotation from John; you do not need a playground to play, just a ball.

Group meting – Schick

AddACTIVE visited Kinsey's group meting. The name of their group was Schick and they investigated how to sense human feelings when the razor is sharp or not sharp. Which sharpness is most comfortable and how to know that without doing a customer research every time, so you can test it on a computerised human skin instead.

They had a 45 minutes group meeting with their three coaches each week. Their assignment is sponsored from the company Schick that makes razors.

Suds - Me 310

A presentation with Thorbjörn and David was held about AddACTIVE's project and they showed the model for the Me 310 students. After the presentation it was mingle on the Me 310 loft.

Fuseproject 28/1

AddACTIVE visited the company Fuseproject and here follows a short presentation of the company:

Yves Behar, which is the company founder, has won many awards and unlike some of the nominees he is a true industrial designer having produced packaging, electronics and

furniture. Fuseproject is currently working on a new line of furniture that is breaking new ground from a material and manufacturing context; "To build a strong brand today, a company needs products with personality, products that evoke a point of view and communicate through the desired message". Fuseproject is known for its expressive approach to design and for products and brand identities that establish strong emotional connections with users.

Conclusions-USA

With the study trip behind us we have gained experience in all forms, both good and bad.

AddACTIVE's first visit at Stanford University did not fall out as we had expected, letting *Larry* and *Machiel* take command over the meeting we had with them. With a plan to briefly describe our three themes it all ended up with just discussing the module playground theme. Although we discussed a lot concerning the process thinking, both what we already knew and also a lot of other useful thoughts came up. This was a good thing when it is important to now and then look back and see what things we have based older decisions along our path.

We already knew Americans would be very energetic and maybe take a little too much command but despite our knowledge the start was a little chock. Though, this never became a problem when we adapted ourselves very fast.

During the visit we came to a decision to concentrate on the module playground theme and furthermore put more energy to it in following workshops.

All different sessions that have taken place, both on Stanford and Onomylabs, have given us lots of new ideas concerning our module playground. Safety and different way of approaches on our problems was also discussed during these meetings.

One thing we brought home in our baggage from the Stanford visit was the importance of having a physical model. We got the chance to make one during the visit to easily explain our module thinking.

If a summary of all short project introductions we made on places visited, one could say they often were a little bit fuzzy and unclear to understand. The difficult part for us was to make a presentation that did not tell too much just because we did not want to "lead the way", thinking this could lead to new ideas from their side. Telling too much could also have led to too much concept thinking instead of developing our different themes.

Totally we visited three places reminding of *Teknikens Hus* back home. These visits gave us the understanding of what exciting and interesting stuff you could do interacting new technology with old traditional.

Seven traditional playgrounds in the surrounding area were investigated to see if they were any different from the ones in Sweden. One big difference was the big warning signs that were put up on every playground telling that it was dangerous to play there and that you played on your own risk.

The trip was interesting and gave us new energy to continue the work in Sweden.

Appendix 4

Generated ideas through brainstorming

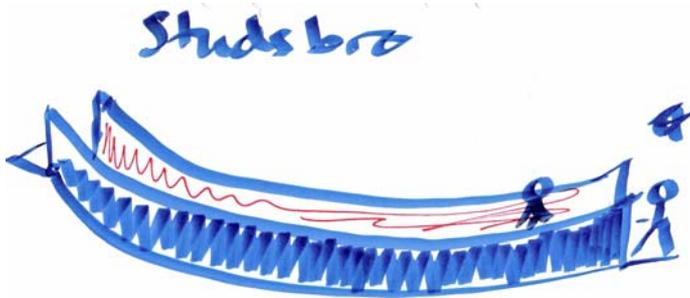


Figure A



Figure B

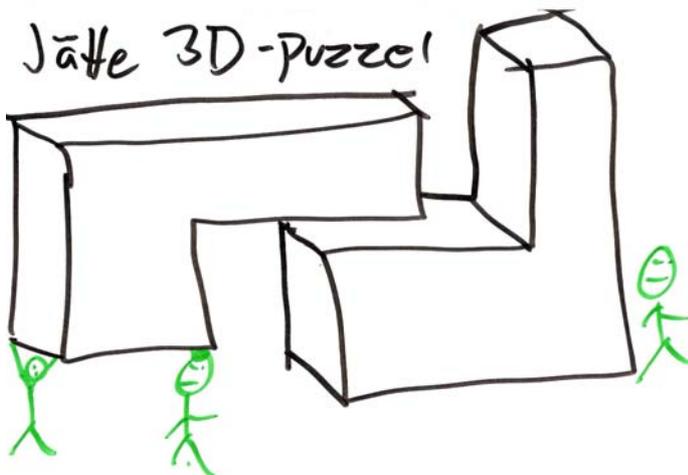


Figure C

PROJICERAD FANTASIVÄRLD

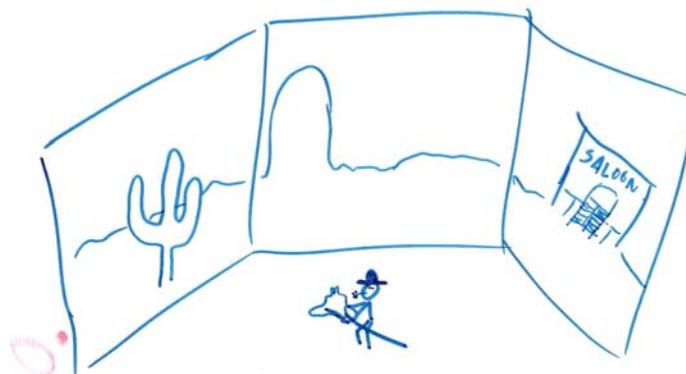
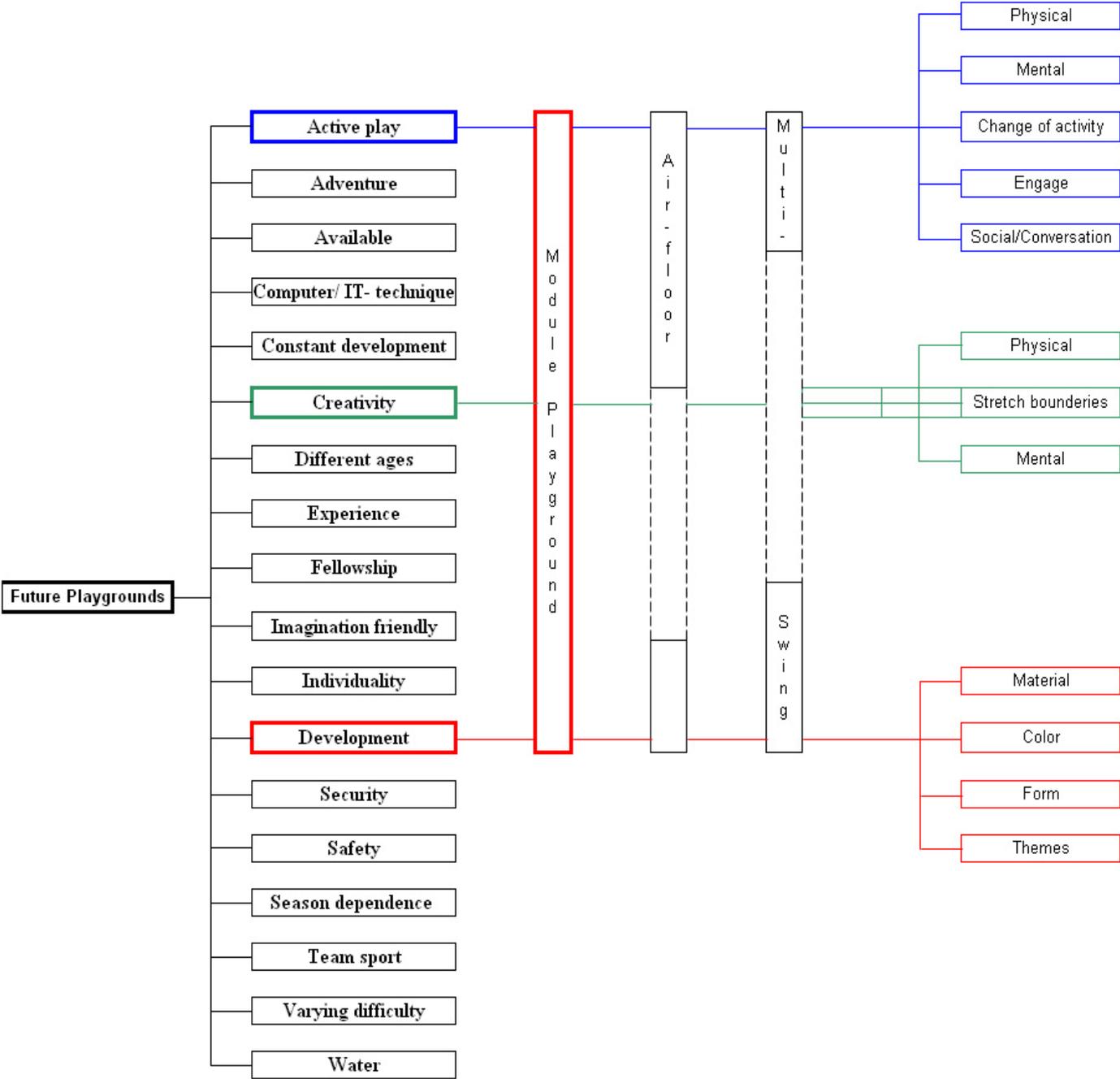


Figure D

Appendix 5

Analyze of the needs



Appendix 6

Air Floor

The main things to accomplish with this theme are the feeling of flying and freedom and make something that is different from other already existing playgrounds. To achieve this feeling one can use air-pressured floor, magnetic field, gravity pump, non-sticking gel or other functions. It can take many different forms by either use the “uplifting” function in different spots on the floor or use it all over the floor by using sensors to activate it.



Six thoughts were discussed, all including the “uplifting” function in some way:

1. Projection

This idea builds on the ability to project different playgrounds or games on the floor and the walls. It is also doable to use some kind of spot lightening to make light change on the floor. Different sport courts, some kind of dance etc, is example of things that could be projected.

2. Air bumps

This idea builds on different levels on the “uplifting” function to create jumps and other fun traveling ways. One idea could be to do an assault court.

3. Touch and light sensor

This idea is more like two solutions to make this concept work better;

The touch sensor consist of constrains to provide safety that make the “uplifting” function stop when the child lies down on the floor.

The light sensor consist of constrains that make the “uplifting” function to start when shadow are thrown up on it. This function also offers a safer environment.

4. Bogie board

This idea builds on the ability to “fly” above the floor on a board. It is also possible to combine this idea with other ideas as the projection idea.

5. Human bumper cars

This idea is supposed to work something like bumper cars. The only difference is that you take away the cars and only glide over the field with your own force.

6. Dry water slide

This idea is based on a water slide with tunnels and turns, but instead of water the “uplifting” function should be used.

Questions

How are the technique viable and which restrictions are there?

How can we apply this technology to a playground?

Examples: ad spotlights, different games, skating park, etc.

Appendix 7

Module Playground

The idea with this theme is that you are able to change different parts in your playground during the years. It gives a lot of advantages this way, for example you will be able to change broken parts easily, which leads to easier maintenance. This way you can reduce cost, especially if the need for specialists is minimized. With this system you will also be able to renew the playground more often. Which leads to that the children enjoy it during a longer period of time without getting bored. A more frequently used playground is more likely to be a natural meeting point in the local community.

Furthermore the idea is that the children themselves should be able to build and rebuild parts of the playground. That gives them an outlet for their creativity and the possibility to shape the playground after their own ideas.

The playground should consist of a basic platform. From this platform a varied selection of modules can together be composed to the playground, best suited to fit the needs of the target group.

Ideas and possibilities:

- Subscription on parts. You can change a various numbers of parts each week, month, year, etc. If you have a subscription on new parts some one comes and changes the parts. That results in a new type of playground.

Ideas for section:

- Slides
- Climbing nets
- Climbing frames
- Waterfalls
- Art pieces
- Spider net
- Bounce mat/net
- Fire poles
- Bounce bridge
- Glass platforms

Ideas for assembly:

- From the basic platform a number of poles are placed vertically. The other sections are connected in these poles.
- Electromagnetism; the contact surfaces is in metal and all the part is locked by a magnetic force.
- Vacuum; the modules are locked together by a vacuum force.
- Expanding building blocks; uses the same principle as earplugs, you can squeeze them together and then put them in their place and there they expand and grows into their place.

- LEGO principal; Building blocks that can be built on each other like LEGO blocks.
- Movable walls or structures on a railway.

Different assembly methods are suitable for the parts that children can build and the ones that adults are supposed to change.

Design Ideas:

- Small signs of animals, cities, countries etc carved on different places. Mainly to get the child's interests to explore more of the playground and learn more about the things they discover.
- Walls like blackboard where children could paint.

Questions

How is it possible for children to build their own playground?

How can a module playground with loose parts be created without risking them disappearing?

How is it possible for children to build their own playground without hurting themselves?

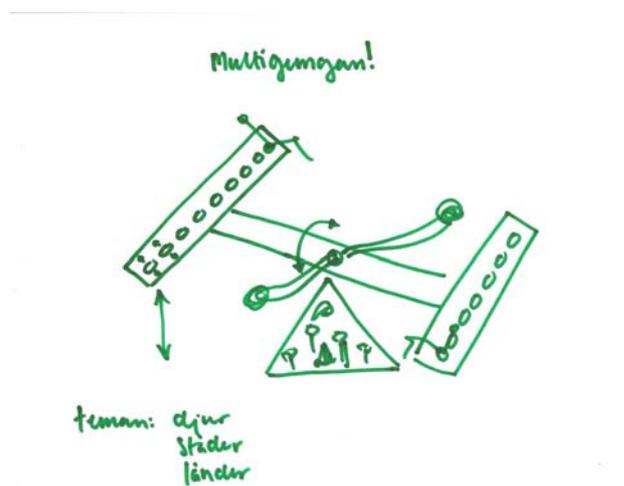
How can a module playground be easily replaced by least possible effort without being forced to modify existing structure?

Appendix 8

Multiswing

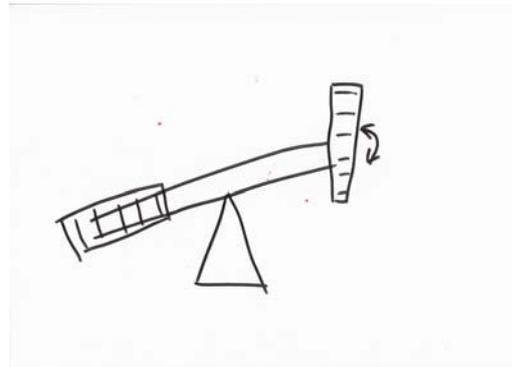
Version 1

Multiswing is a product meant for several people who can swing up and down, and ride to the sides. Each person is sitting on a simple seat that can move both backwards and forward in the direction the person sits. The stand are designed with different pattern, like animals, townscapes etc.



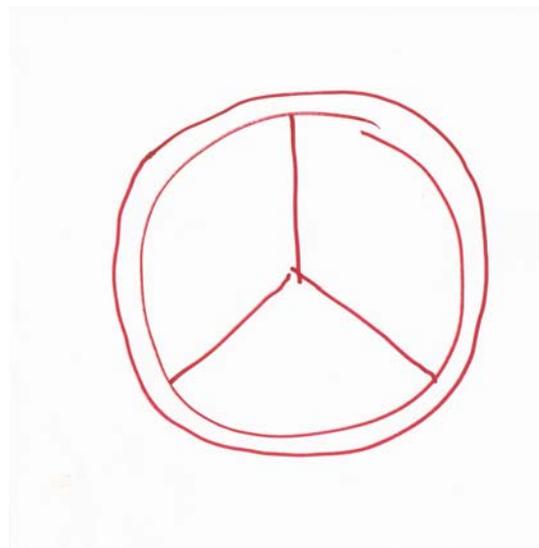
Version 2

Ball limb to the stand, turn able seat boards with two handles for each person to hold on to. The arms to the turn able boards are curved to avoid injury caused by squeezing.



Version 3

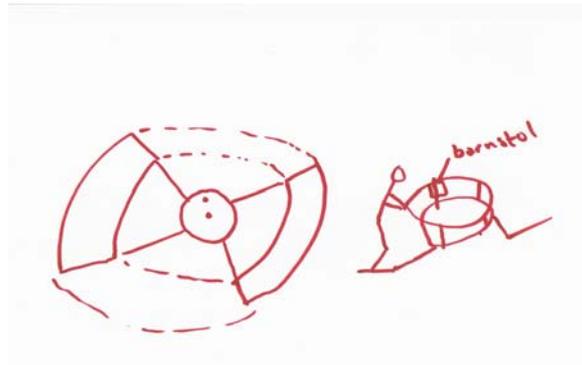
Ball limb to the stand, seat boards with two handles for each person.



Version 4

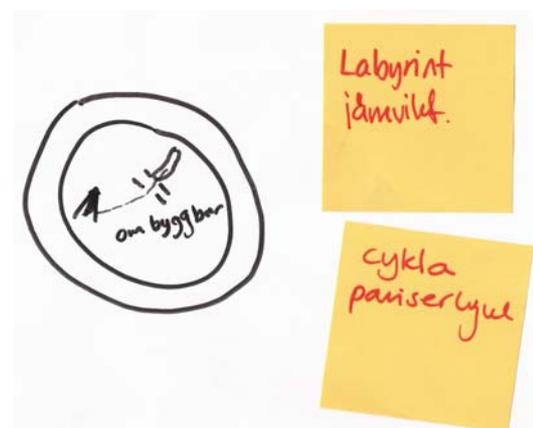
Ball limb to the stand curved standing places. Railings were baby-sits are affix and to hold on to, then propel stand in the swing.

A labyrinth with a ball located on the top of the stand, the ball moves by the movement of the swing.



Version 5

Like version 4 but with exchangeable games. One idée that also came up is a big wheel to cycle in.



Question

Which functions can be added to the multiswing?

How can you activate a child while swinging?

What kind of function should be used to make the swing move?

Appendix 9

Concepts

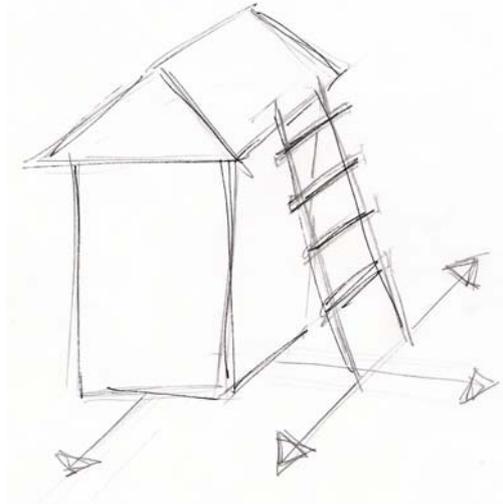


Figure A

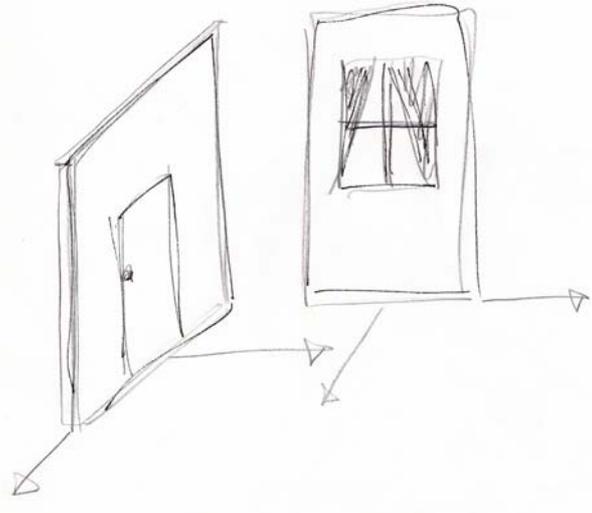


Figure B

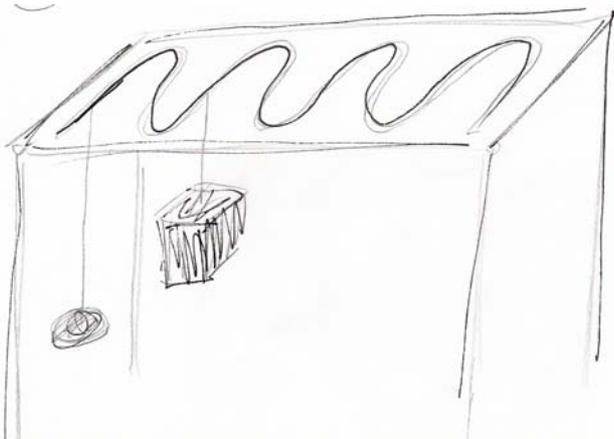


Figure C

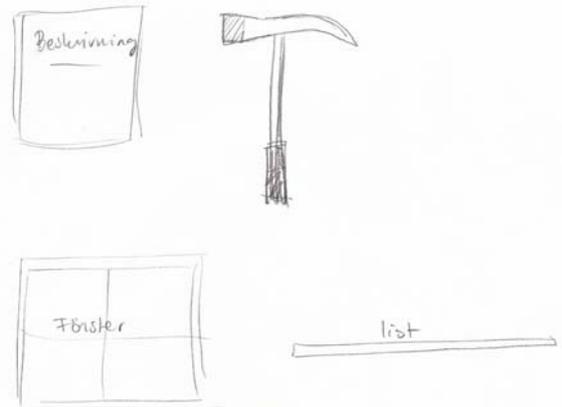


Figure D

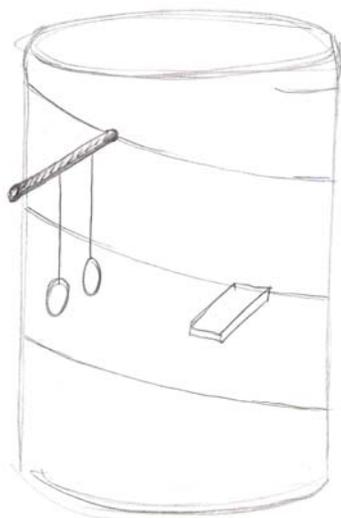


Figure E

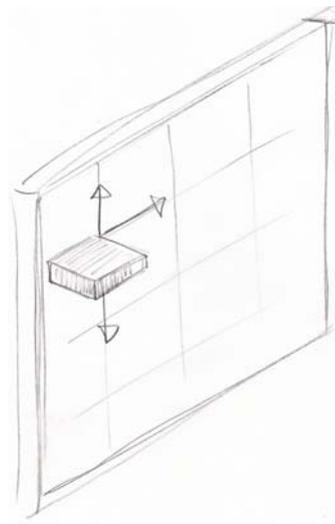
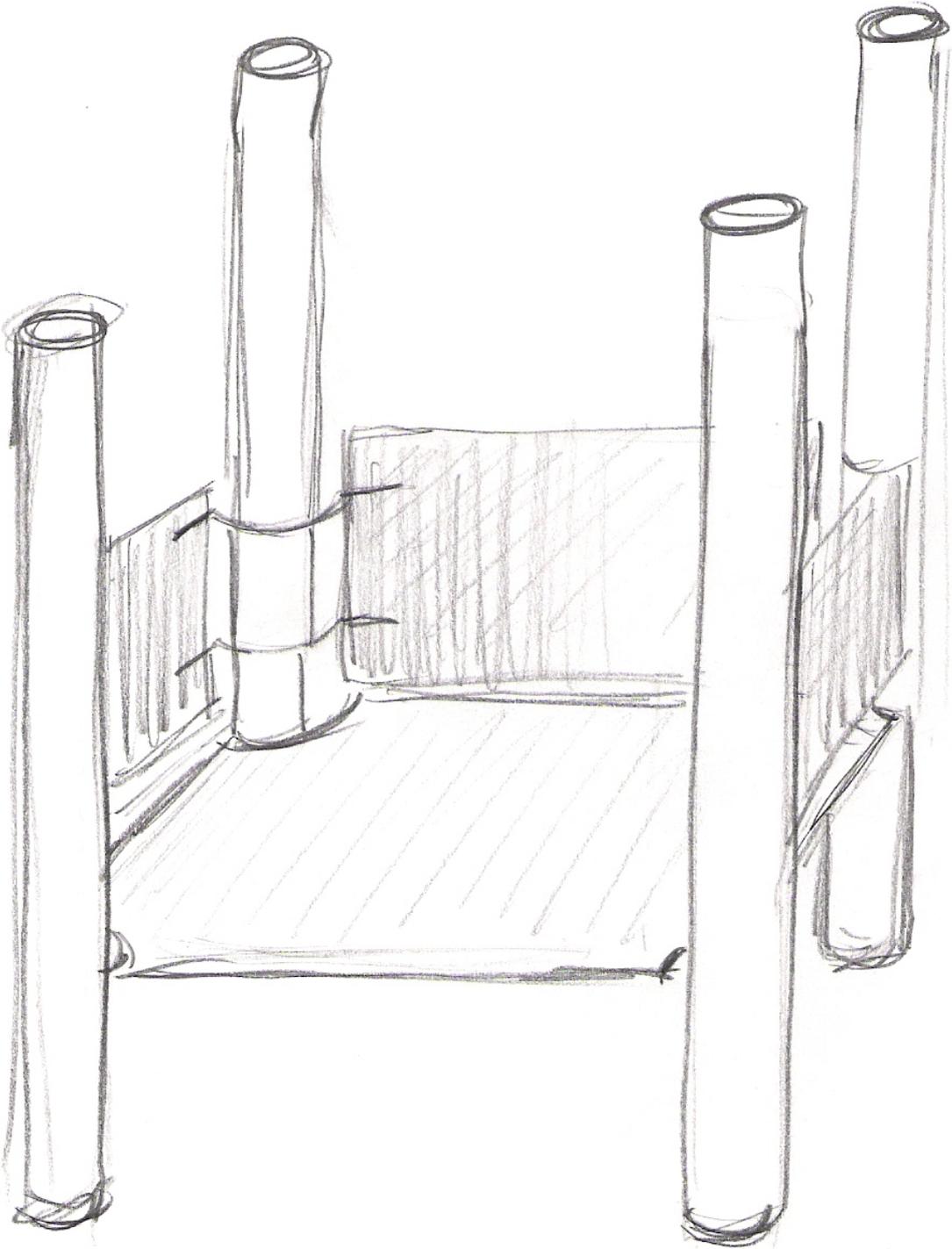


Figure F

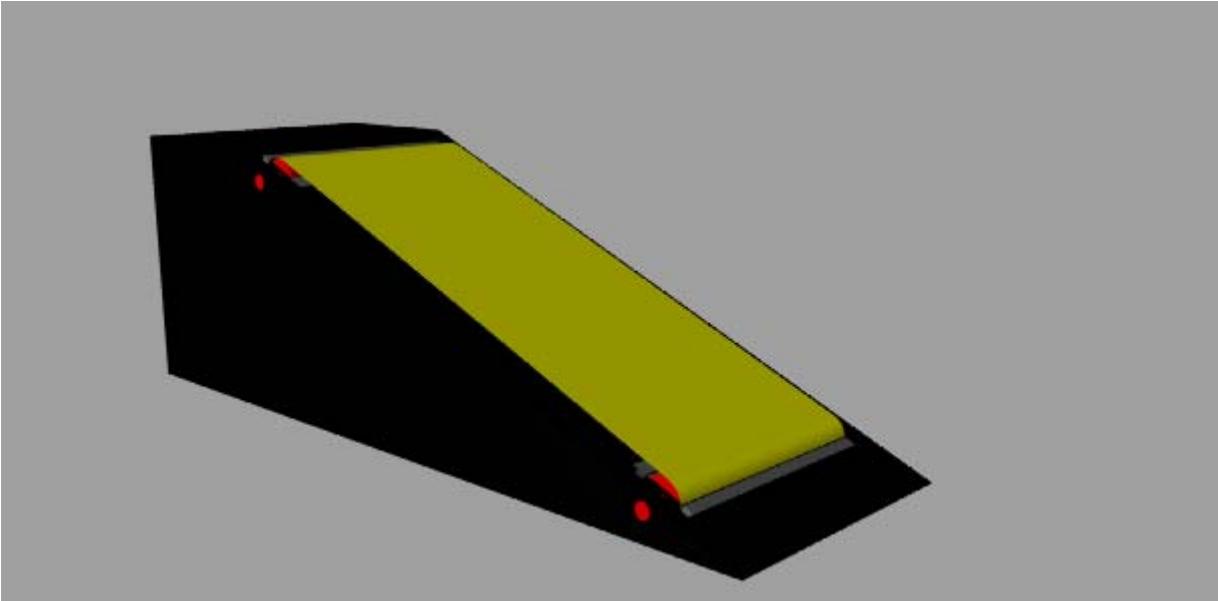
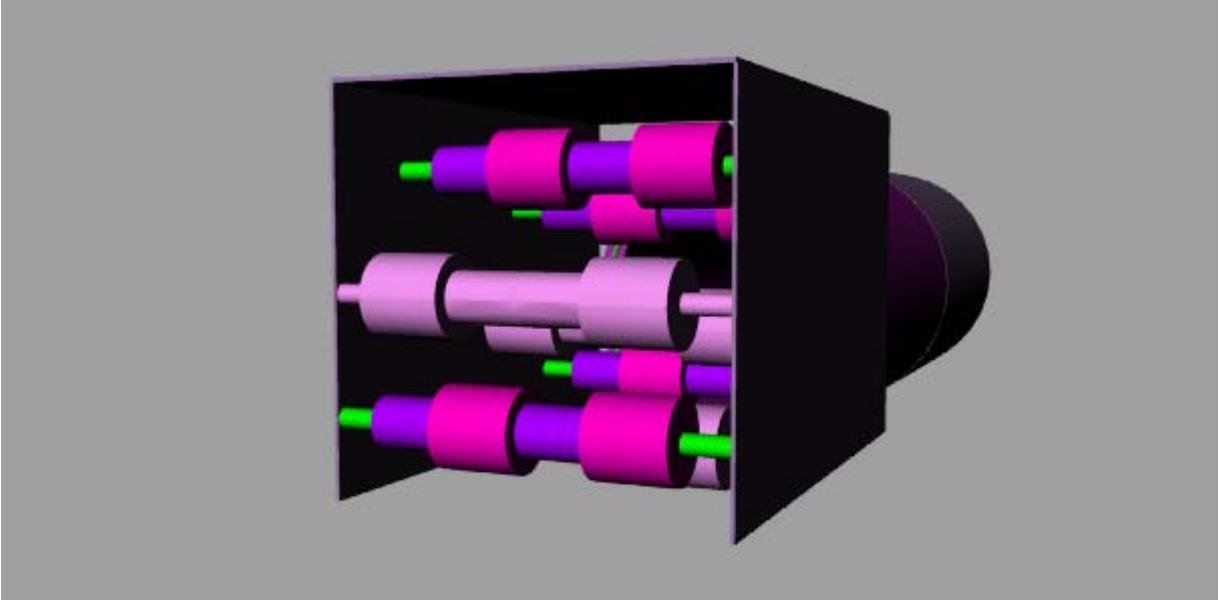
Appendix 10

Concept



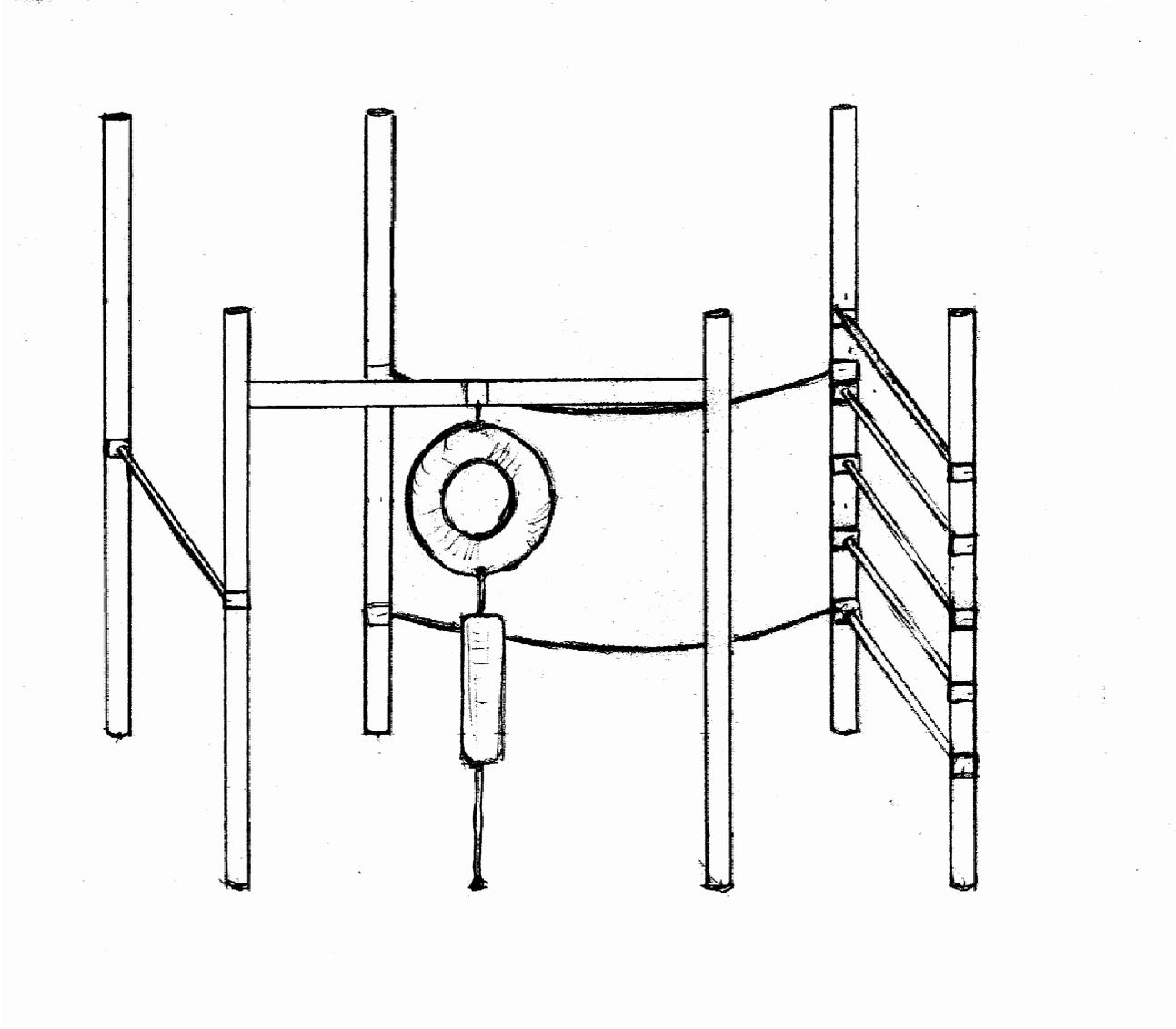
Appendix 11

Different kind of features



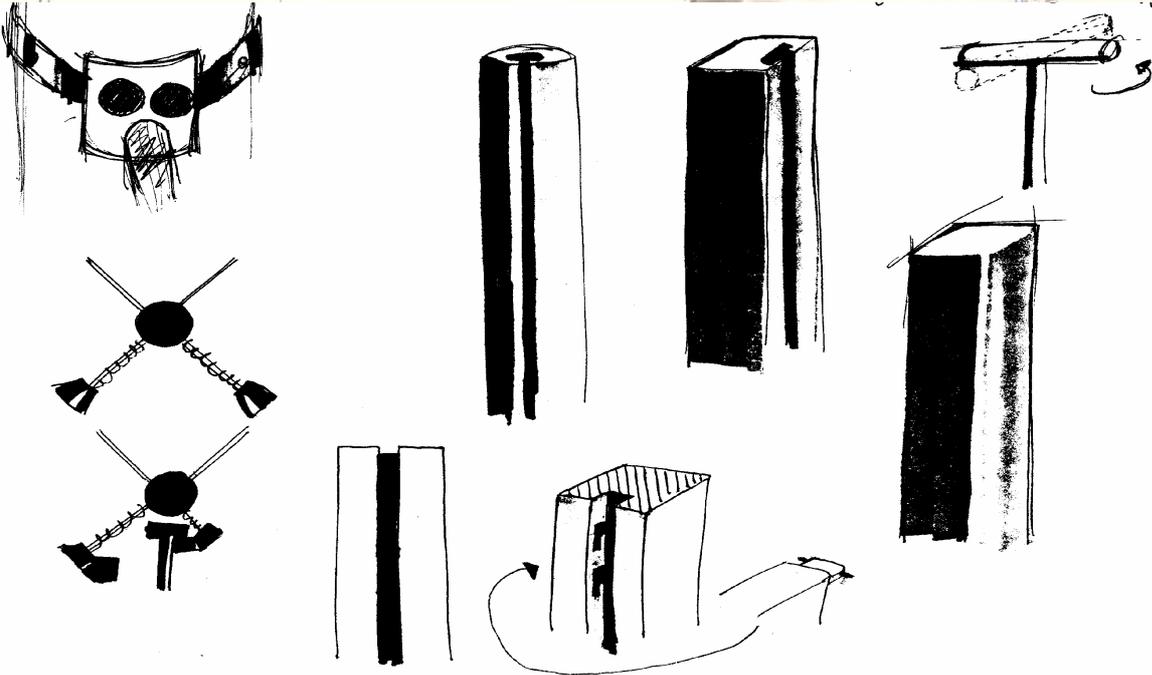
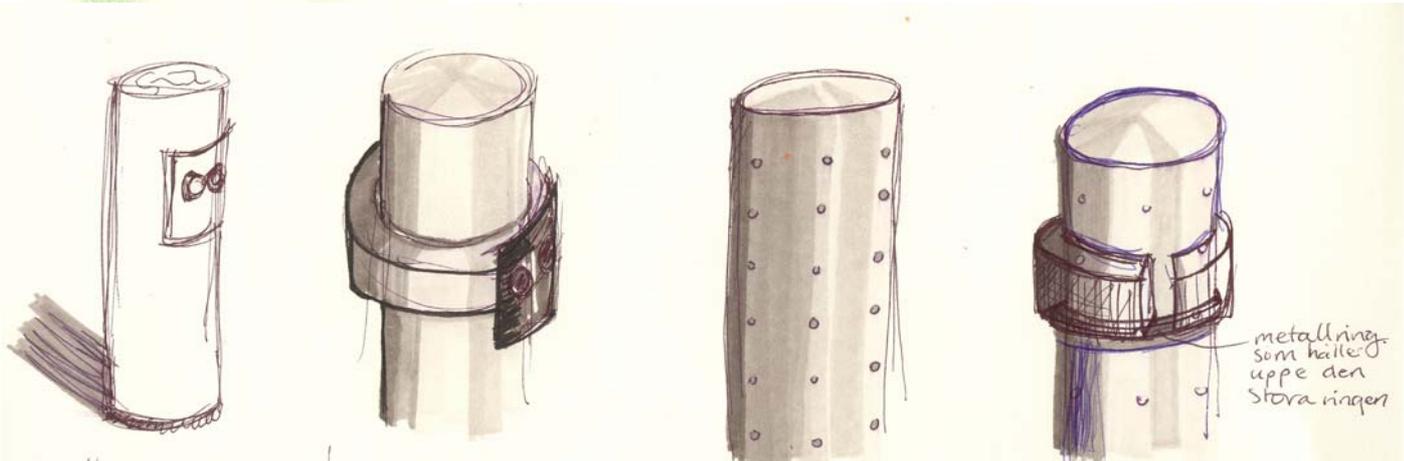
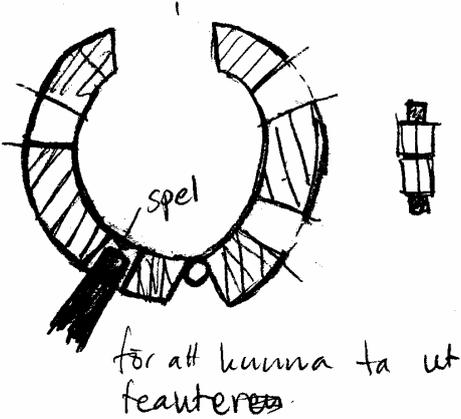
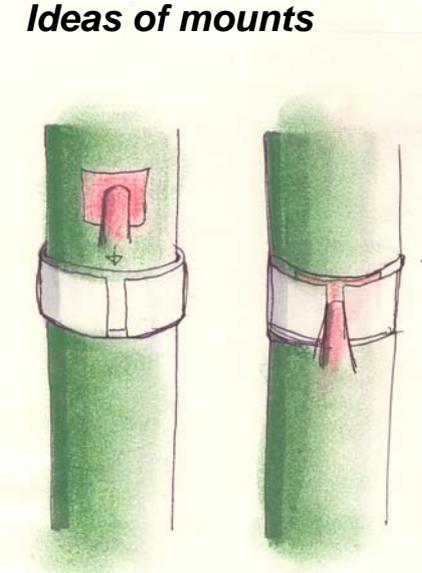
Appendix 12

The proposal to HAGS



Appendix 13

Ideas of mounts



Appendix 14

Benchmarking

The 24 of mars Jenny and Karolina visited some stores to look for different mounts. The interest was especially in some kind of pin band, but it was not too easy to find. The stores visited were: Jula, Järnia, K-Rauta, Laitis, a photo store in Smedjan and Beijers.

Most of the stores did not have the mounts that were in interest, but in all of the stores they had slang pins in different sizes and designs. Interesting mounts were only found in two of the stores, Järnia and the photo store.

In Järnia a cleaning device was found, that had an interesting mount (see picture nr.1). It worked like a screw and it had four pegs that grabbed the “pole” when the screw was at its farthest position. At the top of this cleaning device there was a construction that might help the ground group with some ideas about what mount they should use.

Another interesting mount was found at the photo store at Smedjan (see picture nr.2). It had like a handle that one could twist back and forward that made the mount open and close.



Picture nr.1.1



Picture nr.2.1



Picture nr.1.2



Picture nr.2.2

Appendix 15

Concept

1. Slang pin mount

This concept work like a slang pin and includes six parts. Two of the parts forming a circle, “the body”, and the other four parts, “the ears”, need to be weld on to “the body” parts.

The good thing about this mount is that you can have four features, 90 degrees in relation to each other, on the same height. It is also pretty easy to change feature.

2. Squeeze function mount

This concept is build up of two cylindrical parallel surfaces that are welded together in one of the ends with some distance in between. This makes it work a little bit like a pocket. When the module is put down in this pocket one should tie it up so the children cannot lift it out. This mount is really easy to change and just like the first alternative you can fasten four modules at the same height.

3. Memory metal mount.

This concept is build up of metal with memory. To use this as a mount one would like it to swell into place and it has to shrink to be removed. To make this happen one has to change the temperature in the metal. It is possible to program the metal to change characteristics with a certain temperature. If one is supposed to use this function outside and all year around the changing temperature could not be in between – 50 degrees and + 50 degrees. A problem with this in a playground is that you have to bring some special equipment to be able to change the temperature. These metals have only been used in biochemical purposes before, but they are starting to become more and more usual in other areas as well.

Appendix 16

List of wanted qualities

- 1. Easy and quick to change**
- 2. Possibility to have four features**
- 3. Design**
- 4. Production/praiseworthy**
- 5. Hags**

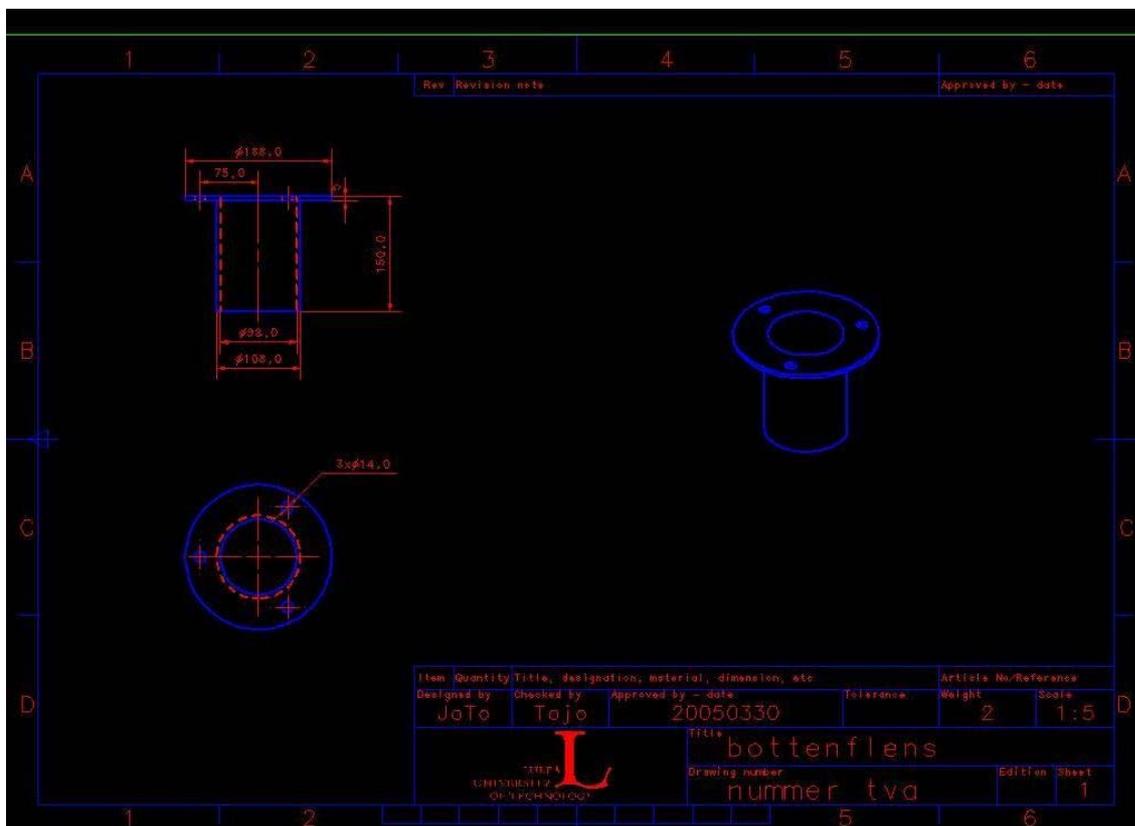
Appendix 17

Ranking of concepts

| | Concept 1- Slang pin mount | Concept 2- Squeeze function mount | Concept 3- Memory metal mount |
|---|-------------------------------|---|-------------------------------------|
| 1. Easy and quick to change | 2 | 2 | 1 |
| 2. Possibility to have four features | 3 | 3 | 3 |
| 3.Design | 2 | 3 | 2 |
| 4. Production/praiseworthy | 2 | 2 | 2 |
| 5. Hags | 2 | 2 | 2 |
| | 11 | 12 | 10 |

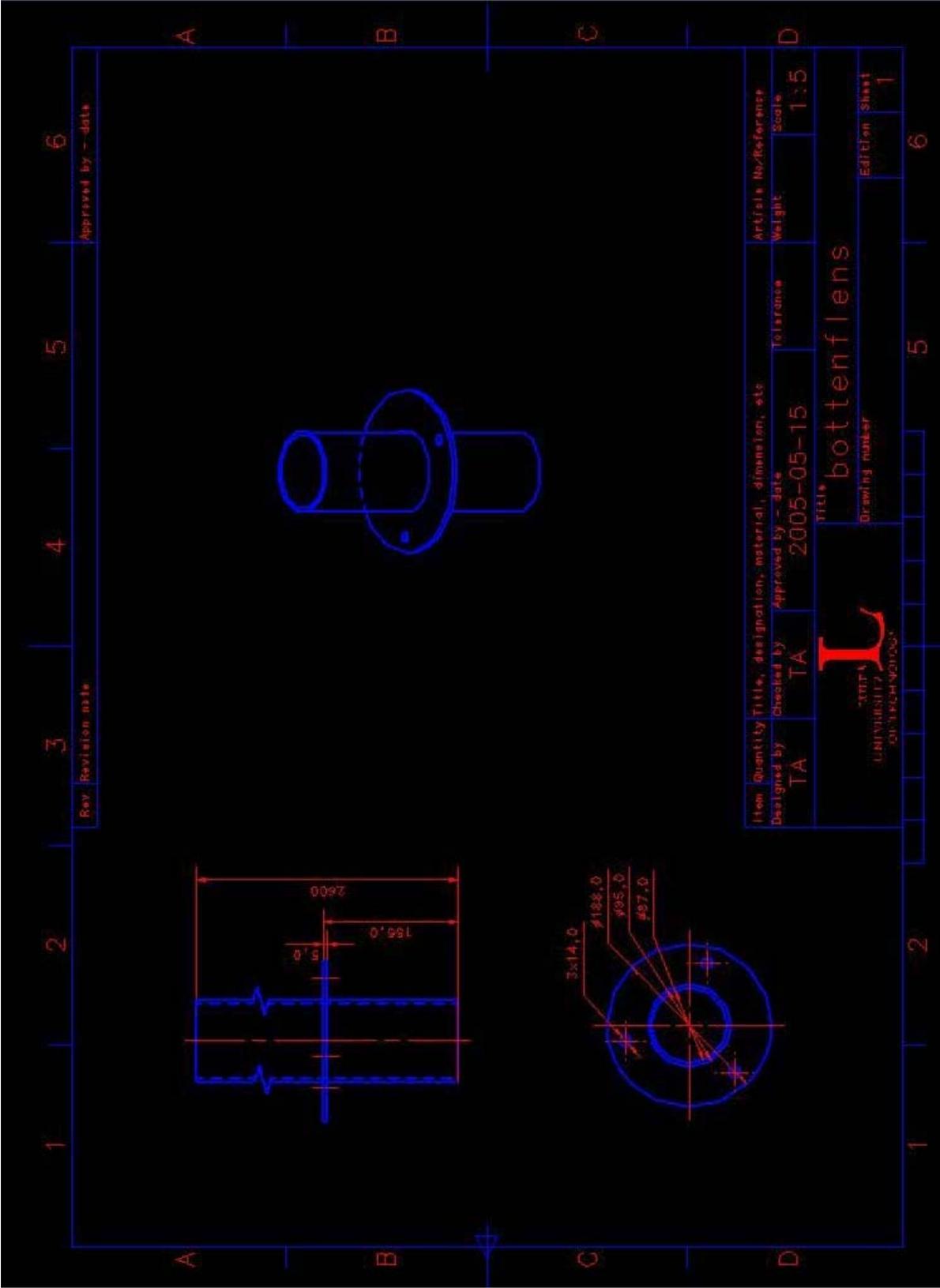
Appendix 18

Drawings of the concrete block



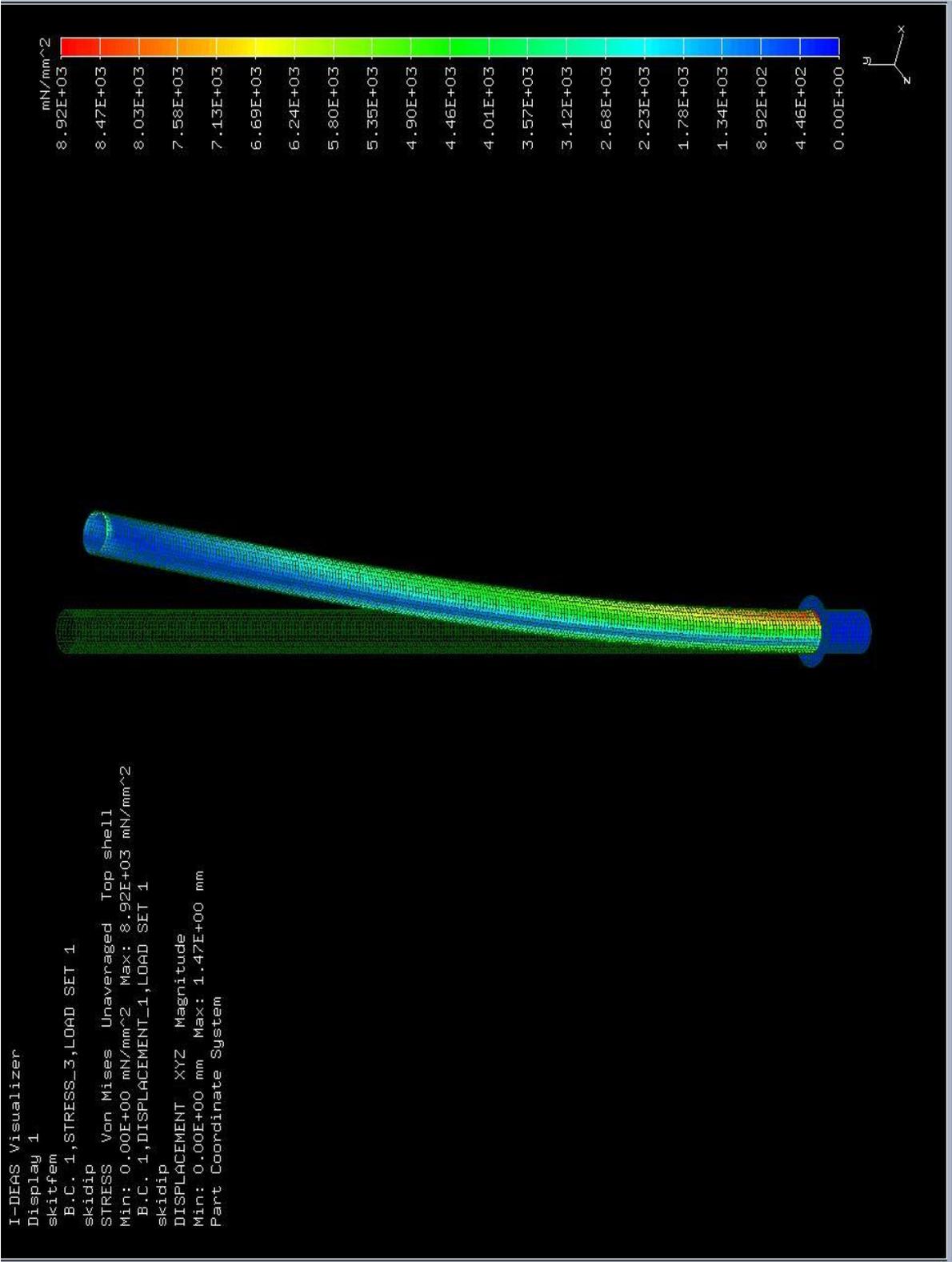
Appendix 19

Drawings of the pole



Appendix 20

The strength analysis of the pole



Appendix 21

Ranking of the concepts

| | Concept 1- Slang pin mount | Concept 2- Squeeze function mount | Concept 3- Memory metal mount |
|---|---------------------------------------|--|--|
| 1. Easy and quick to change | 2 | 2 | 1 |
| 2. Possibility to have four features | 3 | 3 | 3 |
| 3.Design | 2 | 3 | 2 |
| 4. Production/praiseworthy | 3 | 1 | 1 |
| 5. Hags | 2 | 2 | 2 |
| | 12 | 11 | 9 |

Appendix 22

Economy

| Item of expenditure | Teknikens | | |
|---------------------|------------------|------------------|-------------------|
| | Hus | Hags | LTU |
| Building | | | 17 545 kr |
| Construction work | 25 500 kr | 4 375 kr | |
| Feature | | 7 415 kr | |
| USA trip | | | 69 042 kr |
| Remaining | | | 16 535 kr |
| Sum | 25 500 kr | 11 790 kr | 103 122 kr |

Sum total

140 412 kr

| Item of expenditure | Teknikens | | |
|----------------------------------|------------------|-----------------|------------------|
| | Hus | Hags | LTU |
| <u>Building</u> | | | |
| Mould for the concrete | | | 6 127 kr |
| Tools | | | 227 kr |
| Frame to the rubber floor | | | 1 087 kr |
| Concrete | | | 2 550 kr |
| Film wrap | | | 182 kr |
| Sum | - kr | - kr | 10 173 kr |
| <u>Steel construction</u> | | | |
| Steel tube | | | 3 475 kr |
| Tools and screw bolt | | | 272 kr |
| Rent of saw | | | 600 kr |
| Paint to the tubes | | | 1 190 kr |
| Laser cutting | | | 1 835 kr |
| Sum | - kr | - kr | 7 372 kr |
| Building sum | | | 17 545 kr |
| <u>Construction work</u> | | | |
| Construction work | 4 000 kr | | |
| Rubber floor | 19 500 kr | 4 375 kr | |
| Freight charge | 2 000 kr | | |
| Sum | 25 500 kr | 4 375 kr | - kr |
| Construction work sum | | | 29 875 kr |
| <u>Feature</u> | | | |
| Feature | | 7 415 kr | |
| Sum | - kr | 7 415 kr | - kr |
| Feature sum | | | 7 415 kr |
| <u>USA trip</u> | | | |
| Airplane tickets | | | 34 454 kr |
| Hotel | | | 24 538 kr |
| Car | | | 9 636 kr |
| Admission ticket | | | 414 kr |
| Sum | - kr | - kr | 69 042 kr |
| USA trip sum | | | 69 042 kr |

Remaining

| | | | | |
|-----------------------------------|------|------|-----------|------------------|
| Car allowance | | | 1 975 kr | |
| Travel cost for the trip to Hags | | | 3 934 kr | |
| Office supplies | | | 1 225 kr | |
| Kick off | | | 4 551 kr | |
| Screen to the presentation | | | 1 137 kr | |
| Wall chart to the screen | | | 1 200 kr | |
| Clothes to the inaugural ceremony | | | 2 513 kr | |
| Sum | - kr | - kr | 16 535 kr | |
| Remaining sum | | | | 16 535 kr |

Appendix 23

Applied scholarships

- **Stiftelsen Lisebergs Kulturfond**
- **Första majblommans riksförbund**
Annotation: Första majblommans riksförbund contributes individual children and youths to an age of 18 that lives in Sweden and has difficulties because of disease, disability or social situation.
- **Anders Zorns Stipendiefond**
- **The Scandinavia-Japan Sasakawa foundation**
Annotation: Board of Scandinavia-Japan Foundation could not find an economical space to support our project for which we supplied subvention.
- **Stiftelsen Kooperativa förbundets stipendiefond**
- **Stipendier för studier och forskning i Japan**
- **Erik och Göran Ennerfelts fond för svensk ungdoms internationella studier**
- **Stiftelsen till Hjalmar Brantings minne**
Annotation: The foundation is established with the purpose to honor prominent leadership in The Swedish Democratic Party.
- **Ragnar Berfenstams stipendiefond**
- **Stiftelsen J Sigfrid Edströms stipendiefond**
- **LKAB:s stiftelse för främjande av forskning och utbildning vid Luleå tekniska universitet**
- **Sverige-Amerika stiftelsen**
Annotation: Sverige-Amerika foundation only gives scholarship for masters-, researchers- and doctoral degree studies in USA or Canada.

Appendix 24

The master plan

