PeliPlan

Smart to Touch

Group 16A

Anne Bloem	1238059
Martijn ten Brinke	1241106
Stefan Groothedde	1253336
Ruben Hendrix	1236095

Eindhoven University of Technology, Bachelor
College Major Industrial Design
DPB100 Project 1 Design
Coaches: Erik Swaagstra, Jens Gijbels

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SUMMARY

Peliplan is a project about helping autistic children by doing their daily tasks, by splitting up large tasks into small subtasks. It is a physical device which provides a visual overview of a daily task in a playful way.
Children with autism find it difficult to do a large task, which consists of many subtasks. This is especially the case with tasks such as getting ready for school. This makes them very dependent on their parents, asking them every time again and again how to do it! This puts a lot of pressure on the parents..
PeliPlan will help the children with this problem. It provides a clear, timeless overview of the subtasks that belong to a main task. This is done by placing disks at the places where the subtask has to be fulfilled. Besides showing the place, the disks also show which tasks have to be done, by lighting up. The child can then do the task, hit the disk and the lights will disappear. Better than just a list or planboard, PeliPlan is an interactive, playful way of showing the tasks, which makes it fun and attractive to use. And this makes it really stand out from the alternative products.

ACKNOWLEDGEMENTS

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- Anna H. (for contributing to an expert interview)

TABLE OF CONTENTS

INTRODUCTION

PeliPlan is a project by Martijn ten Brinke, Ruben Hendrix, Stefan Groothedde and Anne Bloem for the 'Smart to touch' project squad guided by Erik Swaagstra and Jens Gijbels. PeliPlan is the result of the design process where physical interactions are key.

Our shared vision is one that sees a designer as someone with the responsibility, and the means, to help every member of society. Another element of our shared vision is the view on technology, and how it can be utilized to make life easier and quicker.
All members of our group had different experises they enjoy most; two people had more eye for the practical side of designing (prototyping, designing, etc.), while the other two knew more about users and society, the more sensitive and emotional sides to a design.
Children often struggle with doing their daily tasks without help from their parent, especially those with autism. They constantly have to ask for instructions so they do not lose track of what they have to do.

PeliPlan is an interactive planning device that helps children doing their daily tasks. It works by taking a large daily task and dividing it into smaller sub-tasks. This is combined with a playful element in the form of a 'treasure hunt'. PeliPlan will not only help the child in gaining more independence, but it also relieves strain on the parent. Parents can set up a task once, that can then be executed by PeliPlan indefinitely. PeliPlan is optimized for children with autism by researching colours, shapes and doing user testing. We decided to optimize our product for children with autism after we found out how many people have autism, but there are little developments in this area.

In this report there is a description of the process we as a group went through from start to finish. You can read about design choices we made, research we did and how we continuously thought about improving our concept using feedback and interviews to our advantage.

PROJECT GOAL

The goal of our project is to create a system that helps children with autism to perform better and more independent. The main focus will be the aspect of planning and executing daily activities, which is something children with autism often depend on parents or caregivers to do for them. We want to create a product that is portable enough to go where the child goes during the day, that provides a structured and clear description of the tasks that need to be completed. For example: when the child has to get ready for school in the morning, there are several steps that have to be done in a certain order. Showering, getting dressed and making lunch are three things that need to be done, we want to enable the child to do these things by himself, this will make them more self supporting and relieve strain on the parents.

PROCESS

Ideation

Focus on planning

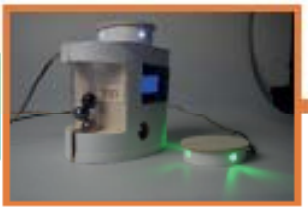
Concepts for Autistic children

Prototyping

User test

Final concept phase

Demo Day



Final prototype

Prototyping

Prototyping

3D-Modeling

Sketching

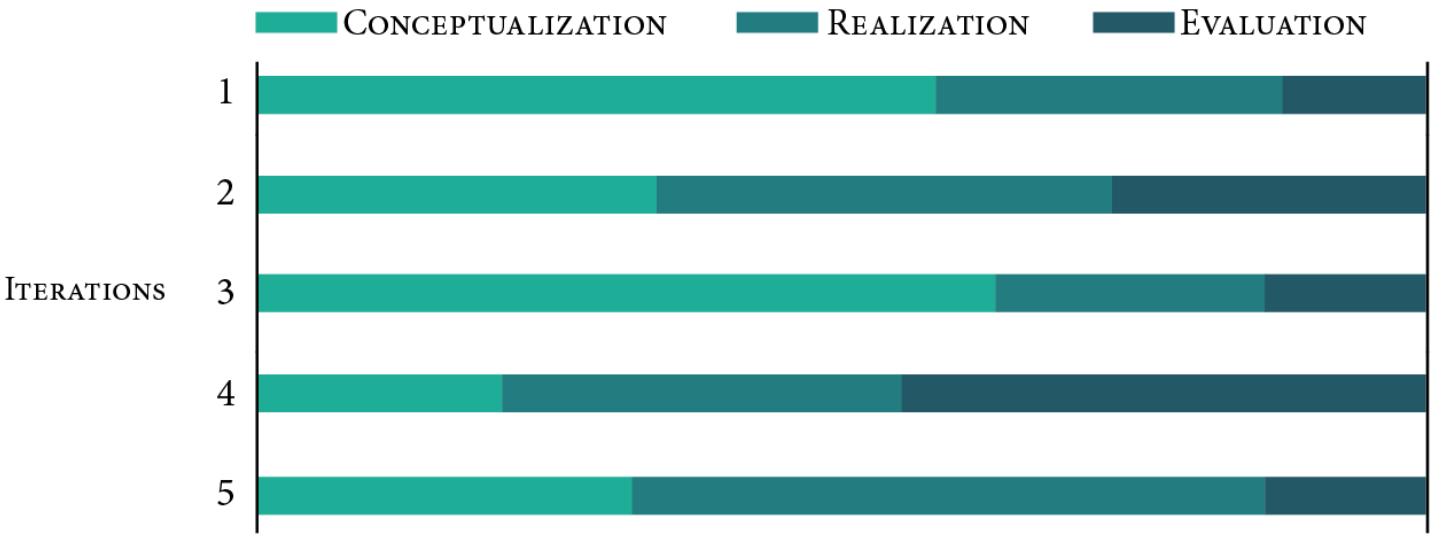
ITERATIONS

What is the real core of a design project? Is it the brainstorm session it all begins with? Is it the construction of that beautiful prototype? Is it the user which is designed for? All of these things are essential to the process, but on their own they don't mean anything. It is the relation between those parts which forms the core of each design project. This relation is integrated in a iteration: a continuous process consisting of three main steps: conceptualization, application, evaluation. In the conceptualization phase the idea is created, in the application phase the idea is realized and in the evaluation phase the idea is reflected upon. In this part of the report all the iterations we went through from the beginning until halfway this project are mentioned, and there will be elaborated on three parts of them: the goal, the methods we used and the outcome/results.

In the goal part we describe the goal as we formulated it before we went into an iteration. It is important to describe clearly what the goal, because working towards a vague finish line is not a very motivating. Therefore it is important to state this goal according to the S.M.A.R.T. method. This way it has to be formulated specific, which means it has to be clear, in order to let every team member have the same picture of this goal in mind. The goal has to have clear requirements and be measurable. After the iteration, everyone should be able to say if the goal is met or not, without discussion. So clear criteria have to be given to each goal. Last, the goal has to be realistic, in difficulty as well as in time it would take to achieve the goal. This is important, because working hard to reach a goal is only possible with the certainty in mind that all the work is not for nothing.

The second part we describe an iteration is the methods we used to reach the goal. These methods contain all the action we've taken, including physical prototyping, meetings, the making of decisions, everything. In the methods part the iterative design process will be involved, meaning that every step we took will be linked to one of the three design phases. When working in design team, it often occurs that tasks are split up. In that case it sometimes happens that tasks are not done in the right order. E.g. someone still has to finetune a prototype, when a teammate already starts testing it. This of course will lead to misleading results, which breaks up the design process. In order to prevent such miscommunication, it is important to state very clear in which design phase the team currently is. When that is clear among all the team members, there will be a lot less miscommunication, and the process will be going in the right order. So in all our iterations, we worked according to this iterative design process, which will be shown in every iteration.

The third part which will be discussed are the results/outcome of each iteration. This outcome does not necessarily have to be equal to the predetermined goal. It is even more likely that the final result after an iteration is way different that the estimated outcome on forehand. That is the reality of a design project, and that's also the reason why there are so many iterations needed in order to achieve a plausible result. When seeing that the actual outcome is very different than the desired outcome, the old goal will be adjusted into a new one and another iteration will start. So it's always the result of an iteration which provides the starting reason for a following iteration. This goes on until the result is perfectly equal to the goal (if the goal is having a finished product). In that case, the design project is finished and the final result can be presented.



ITERATION 1: PRESSURE COOKER

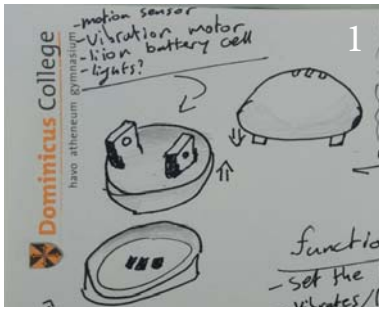
This iteration is done at the very start of the project. The main intention of this pressure cooker was to get a feeling what it is to go, together with a team, through the different design phases.

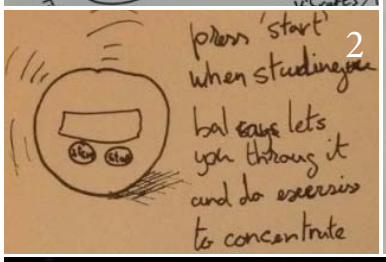
Goal

'Go through a design iteration and make a (low-fi) prototype'. The final goal in this iteration is very clear: making a prototype, which represents the outcome of one iteration. This goal will be achieved if the prototype forms a solution to the design problem and has potential to be the basis for the rest of the project.

Conceptualization

Everyone in a design team should be able to say what he/she likes, and therefore every teammember wrote down his/her favourite design problems. Out of these problems, two main concepts arose: connecting people (by a touchy device) and stress relief. Together with doing market research for inspiration, concepts sketches are made (1,2,3, appendix p. 25). Two different patterns could be distinquished from the sketches: the concept of sharing a touch in order to feel more safe via a pair of interactive gloves (Singhal et al, 2017) and the one of relieving stress by using an interactive, alarming exersize ball.





Realization

In order to simulate the interaction between the gloves, an arduino-based circuit is made with pushbottons at the fingers (5). When the hand is squeezed, an electric signal will light up a LED. For the end product, this current will cause a vibration in the other glove, sharing the touch. For the ball, a movement sensor was implemented which was connected to a LED. Lighting up after some time of non-movement, the ball will alarm and invite people to move more (4).

Evaluation

Looking at the market, the glove concept is more unique and has therefore more potential then the ball. Therefore, 'connecting people via touch to strengthen their emotional bond' will be the project theme.

Results

The results of the first iteration are two low-fi prototypes, one of whom is chosen to be further developed. Together with this prototype, a main theme sentence for the project is formulated. Looking back at the goal, the iteration can be called succesful: two nice-looking interactive prototypes are made, a clear design statement is defined and future design steps can be taken with the glove concept.

ITERATION 2: ELABORATION ON PRESSURE COOKER

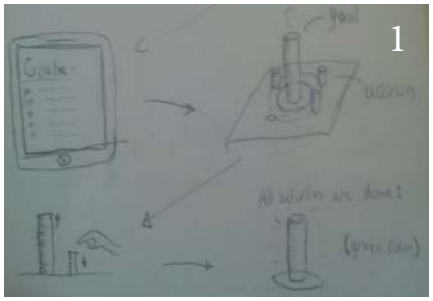
After the pressure cooker, the real project began. From that moment on, everything that was done could have influence on the rest of the project. Therefore it was important to start from a solid basis. That's what was done, by starting a new iteration. So using the theme (the result of the pressure cooker) as a guideline, new brainstorms are done and multiple new sketches are made in order to find the perfect concept.

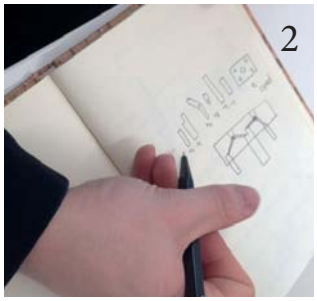
Goal

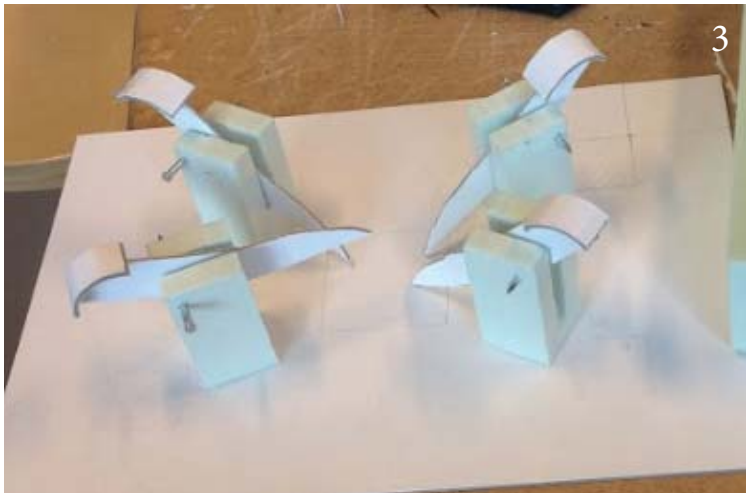
One aspect is still missing in the process: user evaluation. In order to achieve this aspect, a testable prototype has to be made. This prototype has to show the most important aspects of our concept. At the end of this iteration, a user test has to be completed.

Conceptualization

For the first time in the project, elaborate internet research is done. From this research, the concept of pin art seemed very interesting. These pins can perfectly be used for sharing movement over distance. However, during sketching one team member got the idea of using pins/bars to visualize different tasks in life. So the switch to the area of planning and organizing was made. A group in which planning problems are of frequent occurence are students, so this was chosen to be the target group. Because of the huge amount of existing products in this area, the focus would lie on the underying cause for procrastination: Why do we procrastinate? The main reason found was that not immediately seeing the relation between a small task and a bigger goal forms a great obstacle for doing that task (Kruse, 2016). So the design challenge is: How can this relation be made visi-







Realization

As answer on this question the following concept is realized. A bar stands for a single small activity/task that has to be done. When the task is finished, the bar is pressed into the device, which makes another bar to emerge. This bar represents the goal. So, even when doing a small task, one will be brought closer to his/her goal (the bar emerges). In this way, it feels like every single task is of great importance. This concept is realized by making a 5-bar device made of foam and cardboard. By giving the task-bars different heights, the goal-bar grows every time a task-bar is pressed (1,2,3,4).

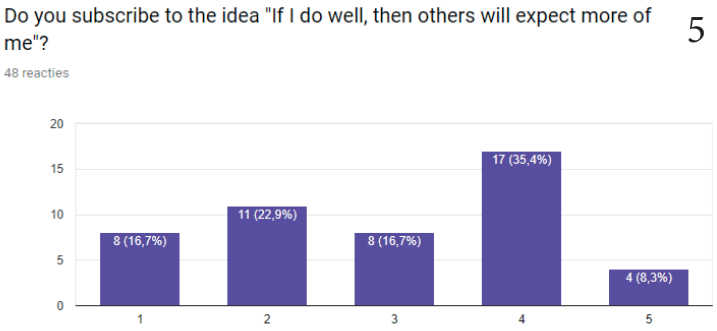
Evaluation

Before doing the user test with the prototype, having some general knowledge about the target group is useful. So an online questionaire was held, examining underlying reasons for procrastination. This questionaire however didn't show clear patterns (5, appendix p. 26). Besides general knowledge, feedback of the project coach implied that the interaction provided by the concept wasn't interesting enough. Be-

sides, for the target group 'students', lots of similair products existed already. So following up the coache's advice, a more specific user group was defined: autistic children, for which not many planning products exist yet (Heleentje, 2013).

Results

The iteration goal is not met: no user test has been done with our prototype. However, a new, with great potential user group has been defined: autistic children. The project will from now on be focussed on them.



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ITERATION 3: PELIPLAN

After having narrowed down to a specific user group, decisions have to be made on what aspect of this user group to focus on. This all has to be done with the midterm-demoday in mind, where a proper concept has to be presented

Goal

Due to the lack of time, presenting a nice looking, high-tech product wouldn't be realistic. Therefore, it would be better to present a well thought over and underpinned with research concept.

Conceptualization

In order to specify the design challenge, a mindmap was made (appendix p.27). In this mindmap, two different catergories were distinquished: planning within a family (dividing tasks) and planning for an autistic child (give visual structure in tasks). Out of this mindmap, the target group 'children with ASD' was chosen. After having done this, online research was done (scientific articles and parent fora) in order to find out what the main problems of this group were. From this the following problem statements about children with an ASD was formulated (Nieuwenhuis, 2015., Lincke, 2015) :

- They find it difficult to get started with a huge task, where they can't get an overview of
- They are often very chaotic → tend to forget multiple things
- They find it hard to deal with changes. Everything which is not in line with their daily routine is considered as 'dangerous'

Also, some problem statements about the parents of those children are formulated:

- They don't know how to deal with the problems of their child
- They don't have time to make a planning with their child each day

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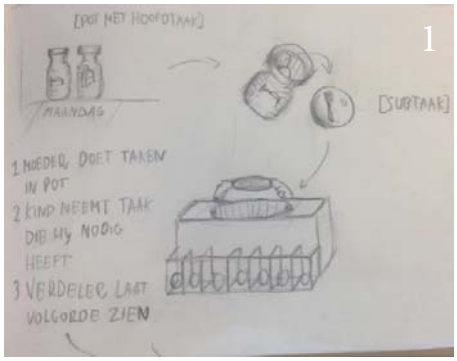

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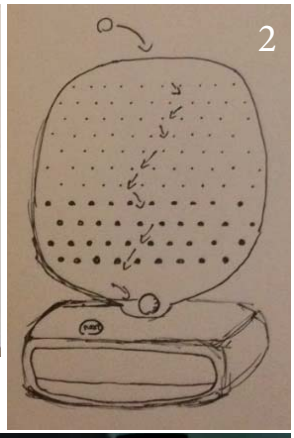
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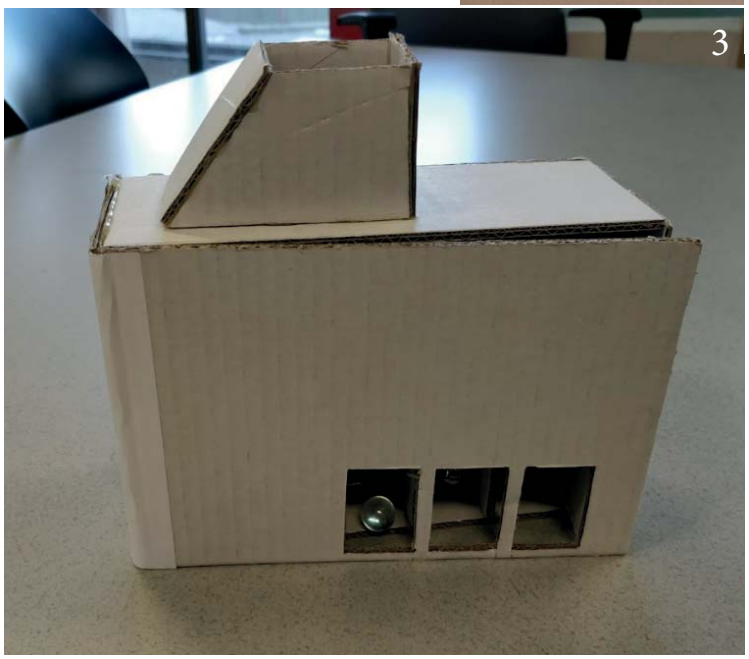
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Recognizing these problems, some concepts are defined. (1,2, appendix p.27) which form a possible solution to one of these problems. The main theme in these solutions is that the parent together with the child defines each small task a child has to do in a day. These tasks are then divided under main tasks, e.g. the subtasks 'brushing teeth' and 'packing bag' belong to the main task 'get ready for school'. The child can then, at the moment he/she has to do it, pick a main task and put it into the sorting machine, which visually sorts the subtasks into chronological order. In this way there is interaction between the parent and child, the child learns self-responsibility by choosing which (main)task to do, and he/she gets an overview of the tasks which strokes with his/her natural language: pictures rather than text.

Realization

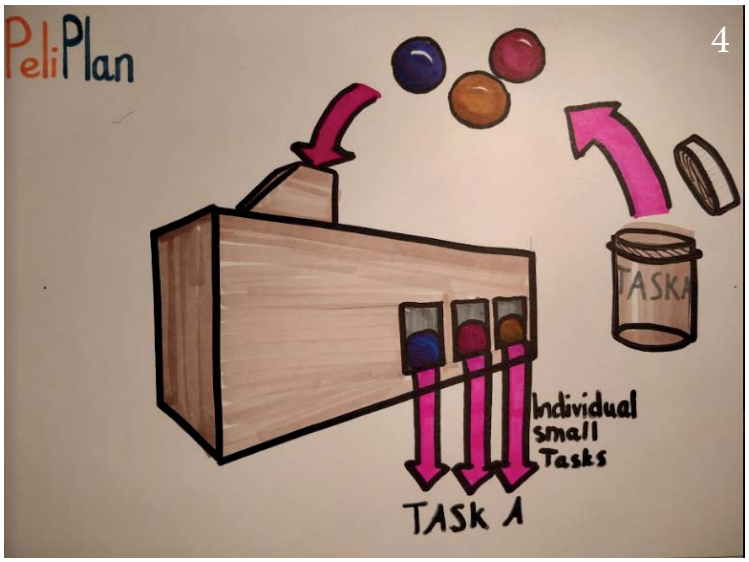
A prototype was made of the concept which had the most potential and had an interesting user interaction. This concept revolves around the sorting of subtasks via a bucket with balls. Each ball stands for a subtask, and has a different size. In this way, a cardboard box could be made which sorts the balls (3,4).

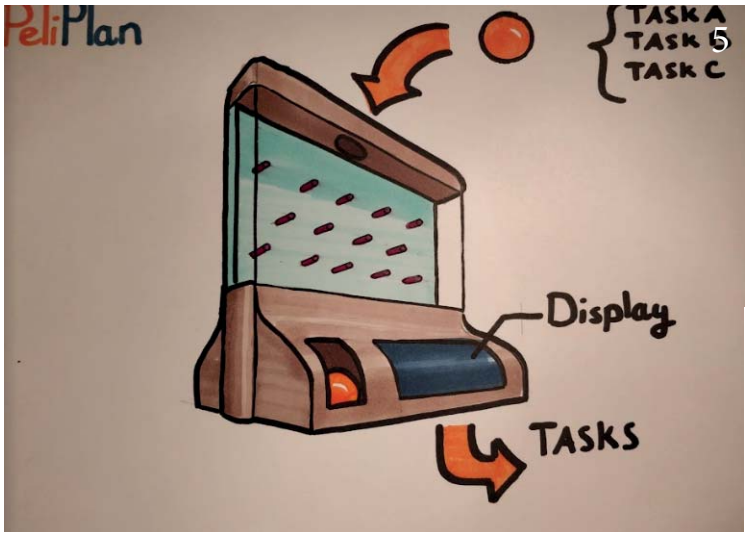
Evaluation

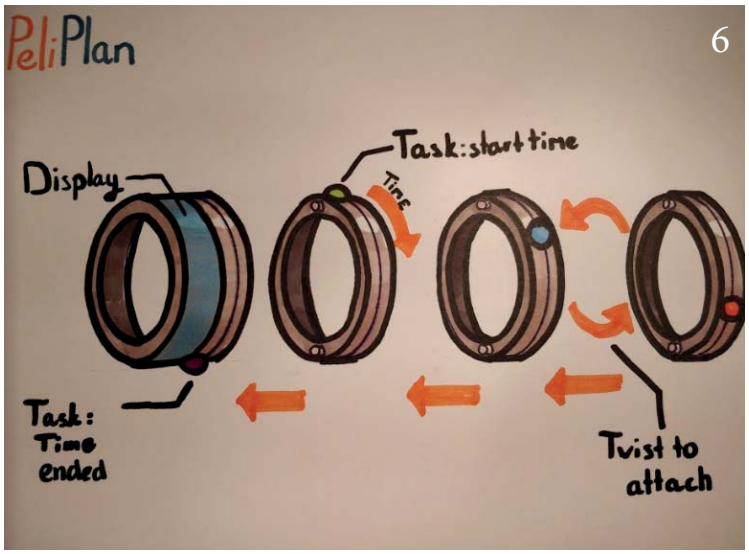
The feedback from the trial demoday implied that because of presenting the prototype, it looked like that was the one and only final product. However, this was not the case. So in order to present all the concepts at the same level, high quality marker sketches of them were made (4,5,6). Also, the feedback implied that it looked like the user group was neglected, because the focus layed to much on the product. In order to prevent this, a story board showing the life of an autistic child was drawn, to give the visitor at the midterm demoday an insight in the problems of the user group .

Other feedback was required from an interview with the mother of two autistic boys (appendix p.28). She gave a lot of insight in the parent-child relationship. Some concrete tips she provides were that the product should provide specific (so not vague) feedback to the child, that is has to be challenging, and it has to be custamizable, so that the child feels familiar with it.

The midterm demoday turned out to be very useful in terms of evaluation. Because there was no worked out prototype, only the problem and possible solutions in the form of sketches could be presented (7, appendix p.27). This led to the feedback that a choice has to be made very quickly, that a lot of work has still to be done. By stating for which goals and user group the concept should NOT be designed for, narrowing down on a specific concept will become possible.







Results

The result of this last iteration before the midterm demoday is promising: with lots of elaborate research and a first (mother of) user test, the foundation is laid for the rest of the project. In the next iterations, the best concept can be worked out into a physical prototype by which user tests can be executed.

7

ITERATION 4: WORKING OUT ONE CONCEPT

Halfway the project, it really is time to start working out a concept by means of a prototype and the corresponding user-test. Therefore an iteration is started where going into more depth considering a chosen concept will be central.

Goal

After the midterm, the time has come to start working out a concept, a thing other groups have long done already. The goal will then be to make a first finished-looking prototype. With this prototype a first real user test has to be done with an autistic child.

Conceptualization

Out of the three concepts existed at the demoday, one concept had to be chosen. They all three displayed the main idea: splitting up a large task into small subtasks. So in order to narrow down on the best one, the feedback of the midterm demoday can be used (state where NOT to design for). Doing this, it is stated that the concept should not help the autistic child in non-daily tasks, such as one-time occuring events (e.g. a wedding). This in order to prevent that the product will be next to splitting and visualizing big tasks also be a planning device. This would be too difficult to realize. Also, it will make the product too complex to use for the child. Therefore the decision was made to make the concept show only the subtasks when the child puts that specific daily task into into the product, so it doesn't show all the tasks a child has to do for the coming weeks.

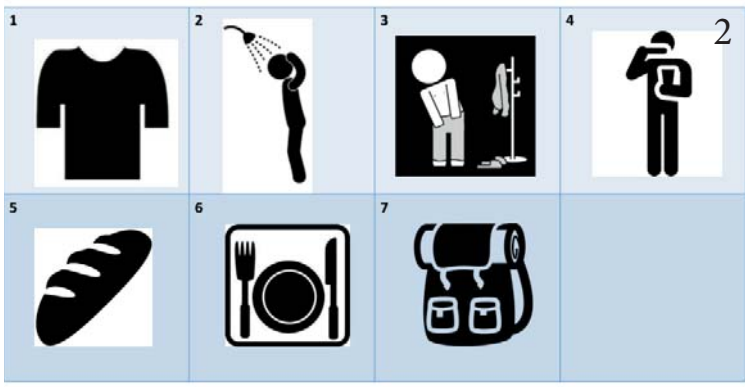
Therefore the easiest but yet most interesting interaction is chosen: the falling-between-the-spikes ball with a screen that shows the tasks concept. This because 1) it splits up the large daily task in a clear way 2) it is easy customizable since the use of a digital display 3) it is fun to use and 4) it can be made small thus portable.

Realization

Since the form of the concept was already defined by the sketches, the prototype could immediately been made.

In order to make it lightweight and portable, it is made out of balsa wood (1). This also gives a natural look to the device, ensuring that the child using it will not get overstimulated

(VeraWel, 2017). The prototype has no working electronica in it yet, but this can be simulated by a laptop screen with pictograms (2). Will the child be attracted by the falling ball, and will this stimulate him/her to do the tasks? Will the pictograms be understandable? Next to the testable prototype, some form explorations are done to test out what is the best portable form (4,5,6). The planning was that after the user test these shapes are further examined.



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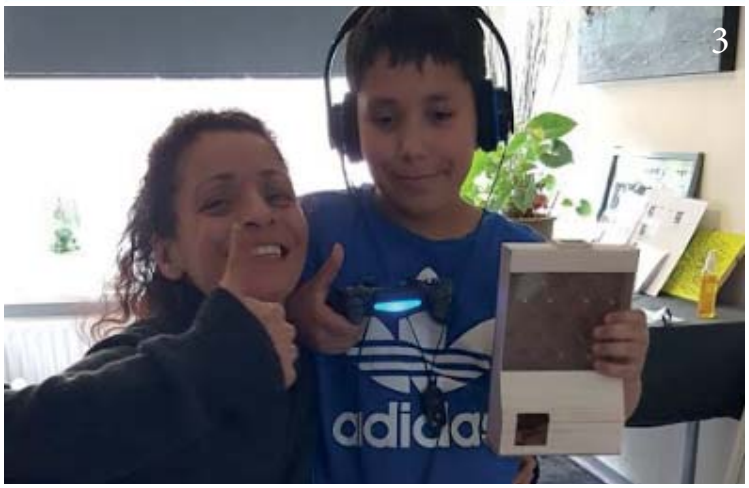
Evaluation

Finding an autistic child for doing a user test was a very difficult thing to do (appendix p.29). However, the user found provided convenient answers to the design questions (3). The child (who was constantly gaming, but yet got attracted by the prototype, (appendix p.31)) showed and said that he found it very nice to throw the ball in and watch it fall through the spikes. This was also confirmed by the mother, who explained that this works relaxing for the child, because he can then just sit back and watch. Holding this ball as a physical artifact of a task is also in line with his autistic mind, because those children are very physically focussed, she told.

She also told that the most critical moments on a day were coming out and going into bed (morning & evening) (appendix p.29)

So all the design questions could be answered with this user test. In order to get a clearer image of the different types of user (the two interviews), two personas were made (appendix p.31). The coaches however, were not convinced about the interaction of the falling ball: it was used too less. Also was the portability not useful, since the product would only be used in the home context for daily tasks. Because of this feedback, the focus in the project is zoomed out to the main idea: splitting up a large daily task into small subtasks. Because of this zooming out, elementary aspects of former and current concepts will be used for developing a new, final one.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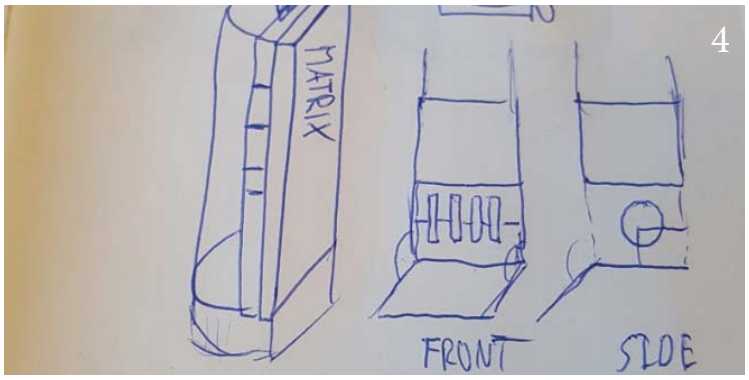

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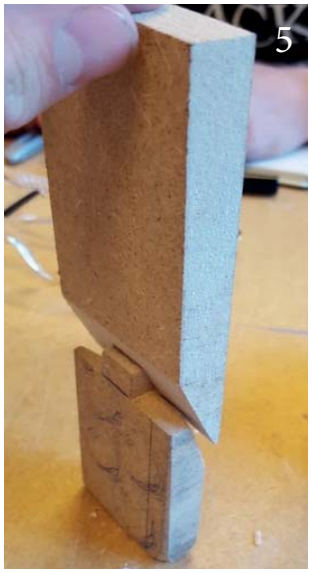
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Results

The results of this iteration are at the one hand quite positive and final: A nice looking prototype is made with which a user test is done which provided a solid underpinning of the design choices. However, the interaction aspect of the concept was not that interesting. So in the coming iteration will have to be made a new concept, whereby will be implemented as much information of the user tests and former concept as possible.

ITERATION 5: MAKING FINAL PRODUCT

This is the last iteration of the project. Because of the feedback of the last iteration, a partly new concept has to be developed. That makes this iteration really challanging: at the end there has to be a slicked presentation at the final demoday.

Goal

Because the time till the final demoday is running up, that's what the most important goal of this iteration is. So for the demoday, a technical working, aesthetically pleasing AND good underpinned prototype is needed. In addition, the full user context has to be presented, so that the viewers will immediately understand the concept.

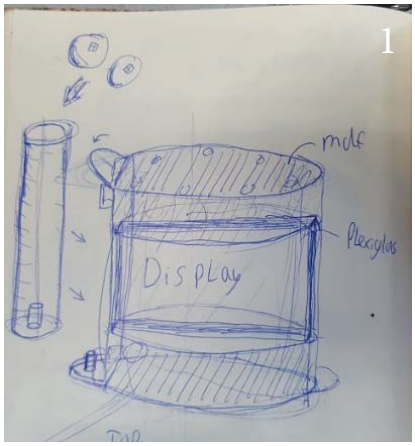
Conceptualization

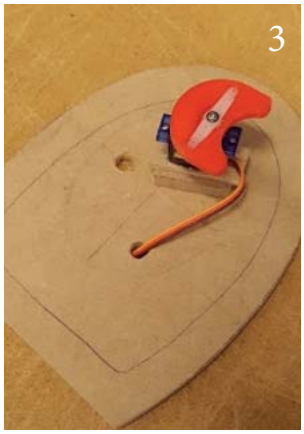
The product has to on the one hand provide a more attractive and logical interaction and on the other hand give the autistic child something it naturally finds very important: certainty (WikiHow, 2018). In order to do this, a hide-and-seek element is added to the concept, with small interactive disks at the place a task has to be done. In this way, the product is more scattered around the room, which stimulates the interaction. The disks will light up to show the order and location of tasks, and a screen on the main body will show the details of the task. The main tasks are mainly a morning and an evening task. This is done because from the user test it is retrieved that these are the most critical times of the day. From the former concepts, the aspect of the ball coming out of the device is still used, in the form of a reward for the child. This way of doing it is recommended by the mother of the autistic child where the user test was done.

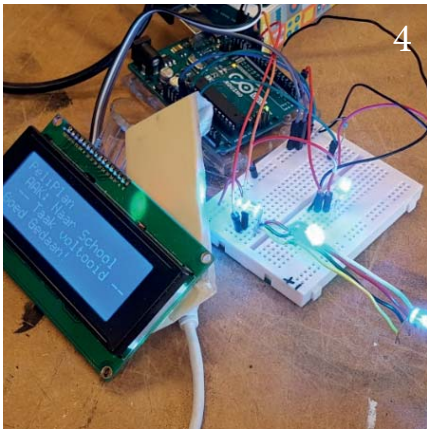
Realization

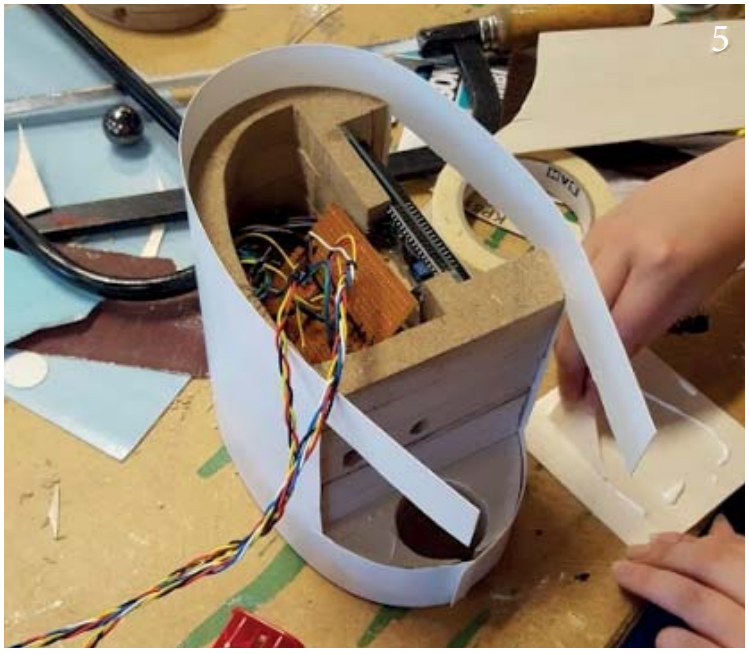
About the form of the concept was soon decided, because the oval shape seemed perfect for having a screen and allowing a reward displaying tube at one side (1). The body could be made of mdf plates with the electronics inside (2). For the functioning of the concept, a servo motor (ball-dispension), a lcd screen, a piezo-sensor (touch-sensitive disks) and LED's were needed (3,4). The outside layer is covered with white plastic, to give the model a calm, clinical appearance (5). As with the balse wood outward of the former concept, this is done to prevent the child from overstimulating.

For the things that can't be shown in real-life, e.g. the display in color, models can be made (appendix p.33). Also a display for the parent is made, where he/she can adjust the color and pictograms of the display (6, appendix p.33). Even images of the room can be added, all for making the device familiar to the child.









For presenting the concept in a right way at demoday, the user context has to be shown. This is done by showing the life of an autistic child, before and after using PeliPlan, in a storyboard (appendix p.32). Also, to give a preview of how the product is used, a video is made starring a child (appendix p.33)

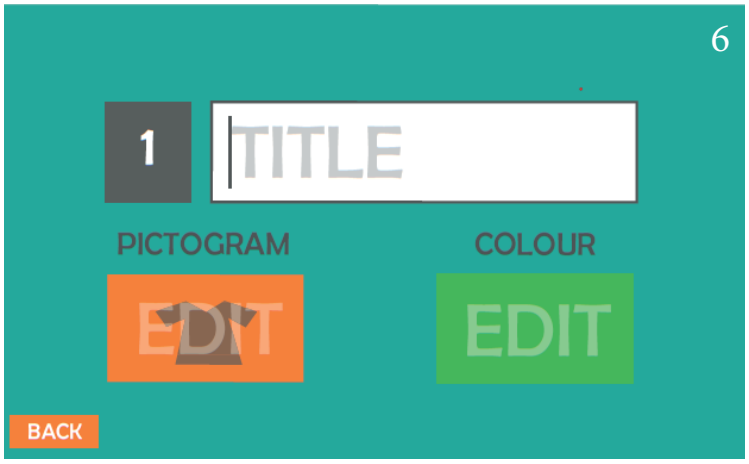
Evaluation

The main evaluation is obtained by the final demoday. Because of the fact that a bedroom will be the most occuring context of PeliPlan, the stand on demoday was also given shape like a childrens bedroom (7). In this bedroom, two tasks can be done (brushing teeth and dressing up), by which two disks were located. In this way, the viewers could walk in and experience the concept themselves. This led to positive reactions of the public and assesors.

There was no time to do a real user test with an autistic child with the final product. However, making a video of a 'normal' child can also be seen as a user test. A successful one, because the child immediately understood the interaction with the disks, wanted to hit them and loved putting a ball into the device. Of course not many conclusion can be drawn from one user test, but it can be said that PeliPlan might as well be useful for non-autistic children. This will make it more interesting for a larger target group.

Results

Since the result of the last iteration is also the final result, this result will be shown in more detail in the next session: overall results.

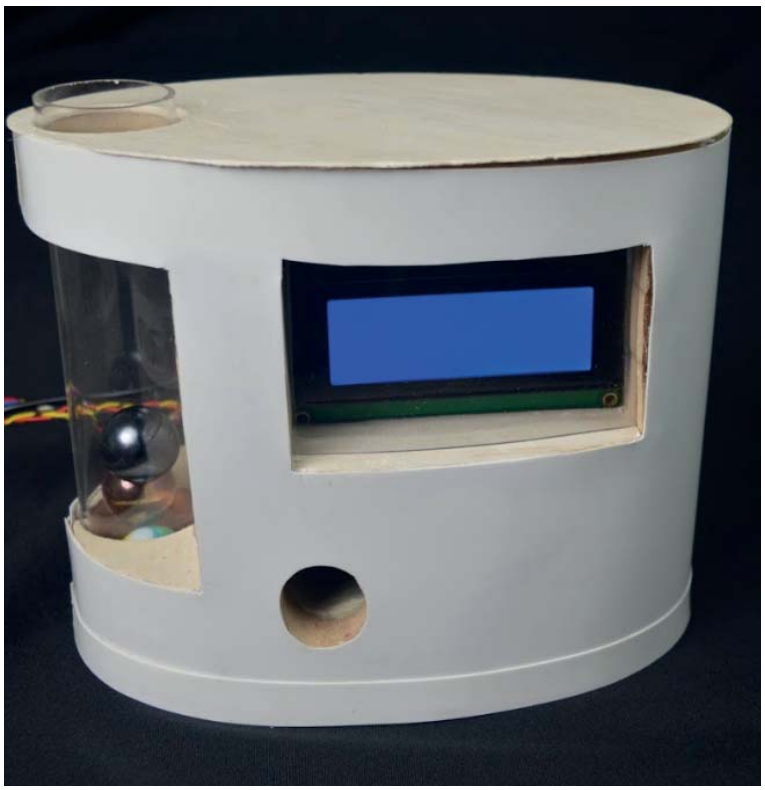


OVERALL RESULTS

Now when the project is finished, it is time to look at the final results. This will be done by giving a short summary of how PeliPlan works, showing some images of the final prototype (more are in appendix p.34), explaining the design choices on the basis of a rendered model and finally providing an overview of how the user context will look like.

Product

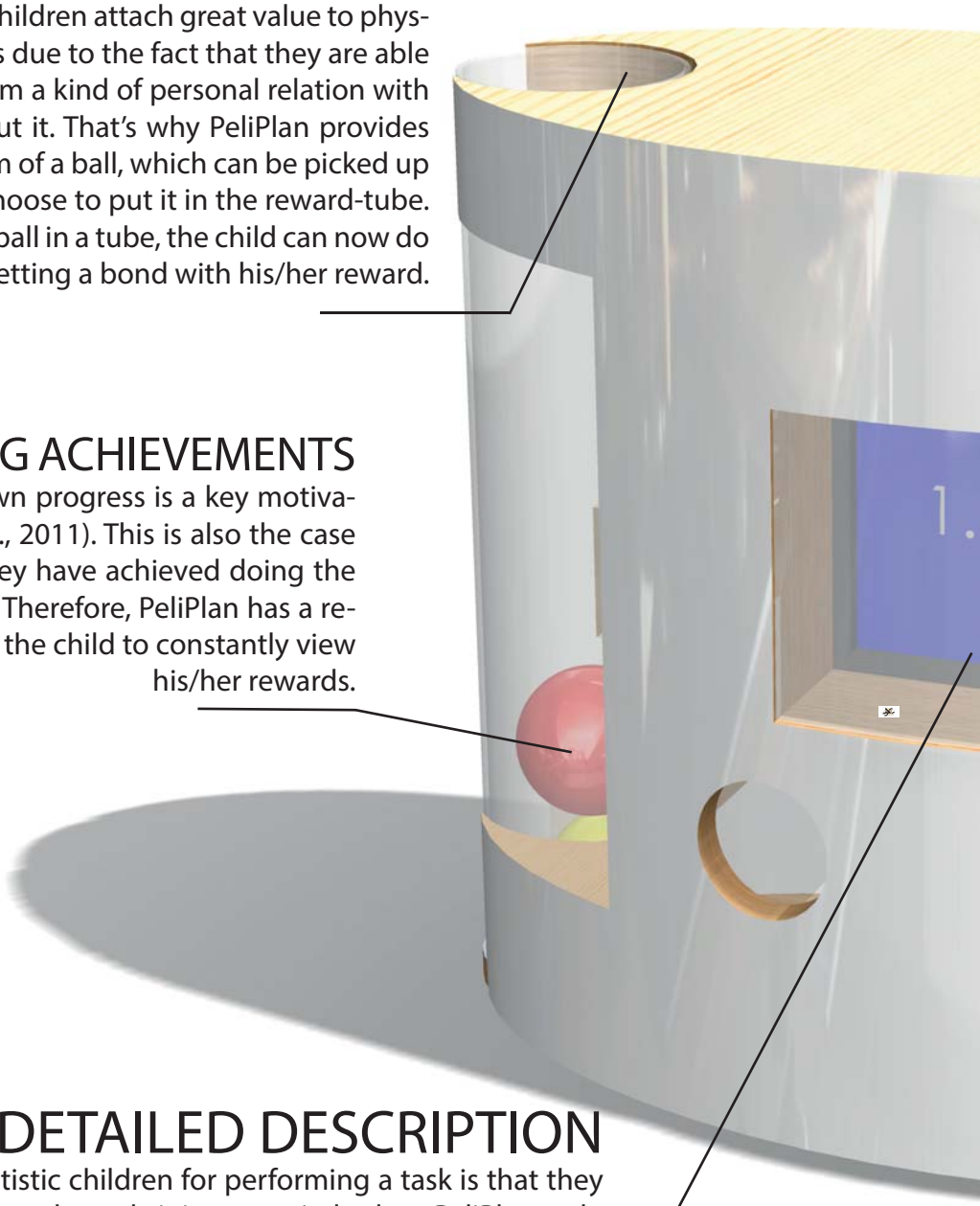
The final product is a solution to the problem autistic children and their parents meet everyday: doing a large daily task which consists of many subtasks (e.g. going to school). This problem is very time-consuming (the child has to wonder every day again what, where and in what order he/she has to do the tasks) and puts pressure on the parents (they are the ones who get asked every time). Peliplan is the solution to this problem. It is a physical device which splits up a large daily task and shows it in a clear and playful way. It consists of a main body and disks that are located at the places the tasks have to be done.
The screen on the main body (which is customizable) shows what the tasks are, while the disks show where and in what order the tasks have to be done. The device also dispenses a ball which serves as a reward for the child. This reward can be put int the transparent, removable tube.



PRODUCT

MANUALLY PICKING UP REWARD

Research has shown that autistic children attach great value to physical objects (appendix p.28). This is due to the fact that they are able to feel the object, which gives them a kind of personal relation with the object, feeling in control about it. That's why PeliPlan provides the rewards to the child in the form of a ball, which can be picked up by the child. This child can then choose to put it in the reward-tube. So instead of a machine putting a ball in a tube, the child can now do it himself, getting a bond with his/her reward.



CONSTANTLY SHOWING ACHIEVEMENTS

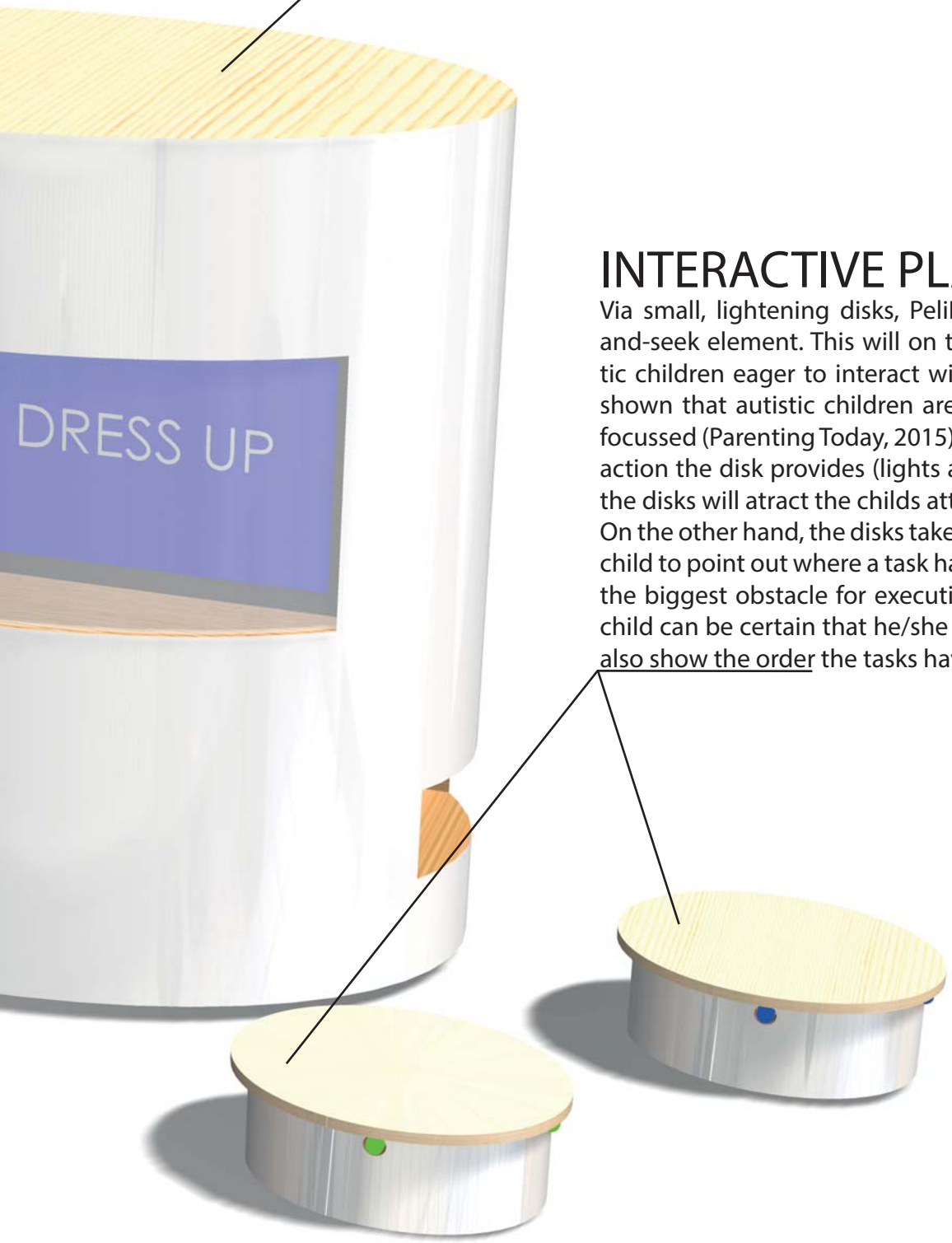
Research has shown that seeing own progress is a key motivation booster (Ambile, T. & Kramer, J., 2011). This is also the case for autistic children. Seeing that they have achieved doing the task before gives them confidence. Therefore, PeliPlan has a reward presenting tube which allows the child to constantly view his/her rewards.

PROVIDING DETAILED DESCRIPTION

One of the biggest obstacles for autistic children for performing a task is that they often have a lack of information about the task, it is not entirely clear. PeliPlan tackles this problem by showing a detailed description of a task both by text and pictograms. Research has shown that chidren from age 8 onwards are able to understand and applicate both the text and the pictograms used (appendix p.29).

NATURAL LOOKING BODY

The use of wood gives the product an organic, naturally appearance. Together with the use of white plastic (which gives the product a clinical appearance), this makes sure that the main body is not an intrusive object in the confident space of the child. Research has shown that using wood in the interior has a calming effect, which makes sure the child will not be overstimulated by the presence of the product (Ironica, 2016).



INTERACTIVE PLAY ELEMENT

Via small, lightening disks, PeliPlan provides a playful hide-and-seek element. This will on the one hand make the autistic children eager to interact with the product. Research has shown that autistic children are very visuallly and physically focussed (Parenting Today, 2015) which is in line with the interaction the disk provides (lights and 'touchy' disks). That's why the disks will atract the childs attention.

On the other hand, the disks take away the time and effort for a child to point out where a task has to be executed. This is often the biggest obstacle for executing a task. With the disks, the child can be certain that he/she is in the rigth place. The disks also show the order the tasks have to be executed.

USER CONTEXT

Before the child is able to use the device for their daily tasks the settings need to be put in. The parents with the child need to go to the PeliPlan website and customize the tasks for each day of the week. They can either choose some of the standard tasks that PeliPlan offers which they can then edit to their liking or create new fully customizable tasks. When the settings are done the device is ready for use. The device is set on a timer and will turn on when the task needs to be executed. For example, it is Monday morning and the child needs to get ready to go to school. The child will wake up and see the device in their room. The main screen shows that she will need to get dressed, then the device of the subtask of "getting dressed" will light up and turn blue. After performing this task she can hit or tik the device to let it know that the task is done. The light will turn green and the next subtask will light up and turn blue. She can either see where and what the next subtask is on the main device or if the next task is close enough she can see the task light up. Then the task will be performed and she can hit it when done and the next subtask will light up. This will go on until she has completed all of the subtasks of the main task. When the main task is finished she can go back to the main device. The device will give her a ball to put in the tube. This is to show her her progress and will motivate her to finish her tasks. Furthermore, the child can make an agreement with the parents on a reward system. For example, when she collected 5 balls she can pick out a sweet at the store or when the whole tube is full the parent and child will do something together. This will not only make it motivating but also more fun to do. And in time the child will get more independent.

CONCLUSION

PeliPlan was the result of our first project within the Industrial Design Bachelor. We all had a different theme in mind when starting, but we were still motivated to work with a different main goal. After a semester we had ended up with a concept and working prototype we were quite proud of.

The process from start to finish did not always go as planned, we lost a lot of time because we could not find an opportunity to conduct a user test. On top of that, making the final prototype cost us more time than we had initially thought it would.

Looking at our visions, we shared some common goals. Making life easier/smoother with efficient designs, helping weaker members of society and making designs that attract users' attention were some of the goals we shared among all of us.
These goals also helped us with finding a concept we could work on, because in the pressure cooker we did not come up with viable concepts we all liked.
We decided to make a planner for children, those with autism in particular after one of the group members mentioned how they struggle more than 'normal' children.

One of the things we would do differently next time is looking for users to test with; we initially were focused on school, even though they did not give us any opportunities. Instead, we should have turned to forums, facebook and our personal network earlier on. We did this eventually and everything worked out, but it cost us a lot of time. The time we lost is also the time we were lacking at the end to test our final prototype, we had validated our concept in a previous test, but we hadn't tested our final product.

The final prototype, together with the video we made, really conveyed the idea of what we wanted to create. The main functionality we wanted was present in the prototype and during our demo day presentation people were enthusiastic about our product. If we were to bring PeliPlan to market, we would have to still improve several things. Wireless communication between the main unit and the beacons is a major one, as well as creating a platform for the parent to customize, change and add tasks is a key feature. We would also have to come up with a business plan, materials to use, as well as creating a brand around the product.

The report contribution per group member is stated in the appendix p. 35.

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REFLECTION

Ruben Hendrix

After a semester of working on the B1 project in 'Smart to touch' I feel like I have learned a lot. Starting out I had chosen this squad with the goal of learning about different material properties and how to use them when designing. It turned out the project was more about designing a product that focuses on physical interaction. Knowing this, I had to change my goal, so I decided to spend the project on learning more about making a prototype that has all functions we would come up with. Next to that, I wanted to work with a more special user target, seeing as though before the only user target I had were 'people aged 40-60' with User centered design and 'people who drink coffee' in Introduction to business design.

As the project progressed, our group at first struggled to find a viable concept to work on; we first presented two ideas for the pressure cooker, these ideas were abandoned because those concepts were already quite developed. Later, we came up with our concept for helping children -focusing on those with autism- with planning and executing their daily tasks. Up to this point I had not done any research or designing, but I did learn a lot about different ways of coming up with concepts, making arguments for certain decisions we had to make and finding the middle road where each group member would be happy.

When we had a concept, and started iterating our design, I started with making sketches, designs and eventually a cardboard prototype we could test. This initially ticked off my goal of making prototypes, but after the mid-term demo day we found that we still had a lot of work to do with fleshing out the concept and realizing what we envisioned. We went back to the drawing board, meaning we kept our main goals of splitting up a large task and making the product playful. After going through the phase of researching, sketching and making once again I made a new prototype with Martijn, this time out of wood.

A running problem with our concept was finding parents with autistic children we could interview and conduct a user test with. At first, it really demotivated us, but my group members and I found new ways of contacting our target group; we started with calling schools, which gave us nothing. We posted an advert on Facebook, emailed people from forums, trying to get a reaction or even invitation. Finally, I got lucky with one of my customers from work: I deliver groceries to people's' homes, and one of those customers has a son with autism, so I decided to ask her if we could come by to do our tests and an interview. We got permission, and got all the results we needed to make concrete decisions for the design.

With the information we gained we started with our final concept: a main unit with beacons that point out different subtasks of a larger task. I focused on the electronics of the prototype and we eventually completed it, both the physical aspects and electronic functions we wanted to have were incorporated. This was the point where I completed my goal of making a working prototype.

What I learned in this semester is not limited to prototypes and user testing, but I also got better at leading meetings and making decisions, as well as learning a lot from our coaches about how things work in 'the real world'. If I were to do this project again, the only thing I would change is to make decisions quicker, this cost us a lot of time we could have spent otherwise.

Conceptualization – Realization – Evaluation.. That was, before the project started, the linear order I thought the process would take form. I now know that things are a little different, as I discovered with my other prejudices. This project learned me a lot about the design process, but also about who I am as designer (professional skills).

DESIGN PROCESS

First I will elaborate on my learnings considering the design process. I learned that this process is not called iterative for nothing: it really is. Going through the conceptualization phase more than once means that new concepts can be chosen, and this is what happened to us. Therefore I learned that being flexible is very important: don't cling too early to a certain specific concept. For me, this went often wrong. Especially in the end when we changed the concept a few weeks before the end, it felt like having done all the work on the prior concept for nothing. Eventually, I can see that it was worth it. Without having done all the work and research about the prior concepts, we would never have got to our final concept. The skill of being flexible allowed us to switch very quick and start working on concepts and prototypes.

PROFESSIONAL SKILLS

Besides learning about how a design process best works, I also worked on my professional skills during the project. I found out that almost half of the time is spent by getting aligned with my teammates. This was more difficult than I thought it would be. As my teammates confirmed, it felt like I was both physically and mentally more concerned with the project, making me spent more time and thus being at another level then my teammates. The main cause of this is the differences in motivation in the team. However, I can happily say that as the project went on these differences were leveled: we started to work as a whole, spending lots of time together working on it. In order to reach this state earlier, next time I want to make clearer appointments on forehand about how to work together.

This experience also learned me about my lack of co-operation skills. I found it very difficult to hand over work to others without wanting to do great parts of it myself. Again, this changed at the end of the project, when my team got more involved. This made me trust them more with doing their tasks. For a next project, I will sooner ask others to take over parts of my work load. This will relieve stress and keep me more focused on the parts I have to do.

Also in pitching I developed myself. The most important learning point is that being relaxed will take my pitches to higher ground. My first pitches I learned word by word, which resulted in me stressing out that I would forget some sentences during the pitch. After a while, I began to realize that once the pitch is seen as just a normal talk (which you never learn by head on forehand), it will make the way I present way more relaxed and pleasant to listen to.

FUTURE

However, the most important thing about this project is that it ensured my feeling that I am at the right place at Industrial Design. I really can use this study via projects to fulfill one of my greatest dreams: helping the society by a user-centered design approach. This project made me realize that I am really in charge of where I want to design for.

Besides, this project ensured my predilection with using design to make the life of both the physical and mental ill better, like we did with our product for autistic children. This is where I want to focus on in the rest of my study and hopefully design career, and I'm looking forward to do this in coming projects where I can use all the skills gained in project 1!

Martijn ten Brinke

At the start of this project my goal was to learn about different kinds of materials and what kind of effect they have on the users sensation they experience from the product. This quickly didn't appear to be the goal of the project, it was about creating interesting interactions with a product. This had nothing to do with my goal so I had to set up some new goals which resulted in becoming more skilled with group dynamics and improve my sketching skills and gain more experience in prototyping.

At the start of the project we endured lots of struggle because we couldn't find a good concept to continue with. Our first concepts didn't have enough potential. After we picked one with lots of potential we got stuck, which happened a few more times in later phases in the project.

Because we had a lot of struggle in the beginning of the project with picking a concept, we got over-attached to some parts of the newer concepts, like the marbles from our prototype. This over-attachment caused that we didn't make sufficient progress. From this experience I have learned that if you get stuck you should be flexible and not afraid to discard the old concept but be able to move on to a new phase/concept. This is not a waste of your invested time because later in the project you can still reuse interesting parts of the previous concept.

Another large threshold in our progress was the fact that we could not find any users that fitted our criteria in the beginning. Eventually we did find one but this was by pure luck. The struggle of not being able to find the right users to do user test with learned me that this is important but it shouldn't be your main focus. You can try to gain input from users who are similar to the desired users or that have the same way of thinking, in our case we also used regular children instead of autistic ones.

This project confirmed my identity for myself, I am a designer who finds it important to communicate with others, whether they are fellow designers or users. I also noticed I enjoy the visualisation of concepts and designing them. I learned from this project on the field of group dynamics that a proactive role will give you a good position in the group, everybody listens to you and you can really incorporate your opinion in the design instead of being overrun by the visions of others. This proactive role also helped with my postponing behaviour. I learned that it is way better for the design process. If you try to finish everything way before the deadline you have more time to prefer the lasts tweaks to the concept and you also have a buffer for if anything goes wrong.

I think that this project has contributed a lot to my overall view on me as a designer. It showed me the best attitude to have in a group and where my interests lay in the broad field of the Study Industrial Design.

Anne Bloem

At the start of the project, my expectations were different from what we ended up to do. As it was my first project I thought that it would be close to 'From idea to Design', which it was in a way. Before this project, I went through the design phases conceptualization, realization and evaluation as the way of what to do next. Thinking one logically followed the other.

In this project, I found out that this is not always the case. Starting with doing the pressure cooker we found that our results were not what we wanted them to be. Even though the team worked well together and I feel like we all tried to listen to one and other, we had a hard time making final decisions as a group. Because of this, we had to look at other ideas, taking the parts we felt worked well in our other concepts and trying to create something new.

However this did not stop, we encountered problems with lots of our concepts. I found it difficult that in the first half of the semester to do so many changes is our concept. I was afraid that because of this we might not have enough time. But I got to know to cope with these changes. I found out that as a group if you try to see the end goal(of the project) it is easier to make these switches. I learned that when making a switch it is very important to be as clear as possible and make sure the whole team knows what need to be done.

As we made so many switches, the last switch which was only two weeks before the final demo day was the easiest of them all. Having to have worked so hard these last couple of weeks the pressure was on.

I know from myself that in a very stressful situation I can have a lot of doubts and therefore find it hard to do the work I wanted to do. But I can say that for this project even with the stress level to the max, I stayed calm and did all that I wanted. The team and I worked well together and were more coherent, as was my goal for the team after the midterm.

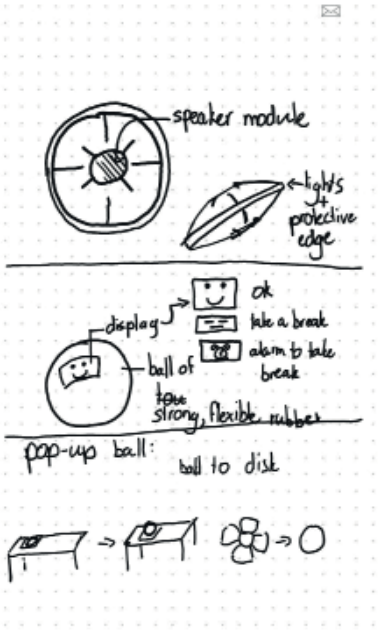
Furthermore, working on this project gave me lots of learning opportunities. As working on my creative skills such as my sketching. Even though this is not the level I would like to have been on, I have learned how to communicate with my sketching to my teammates and others. Which was my goal, and in the future, I would like to improve more in this area. Other creative skills I gained in working with Illustrator and InDesign. I had little experience in this and I wanted to better in this while working on the project. My teammates gave me the opportunity in this by letting me do most of the work on the posters and layout.

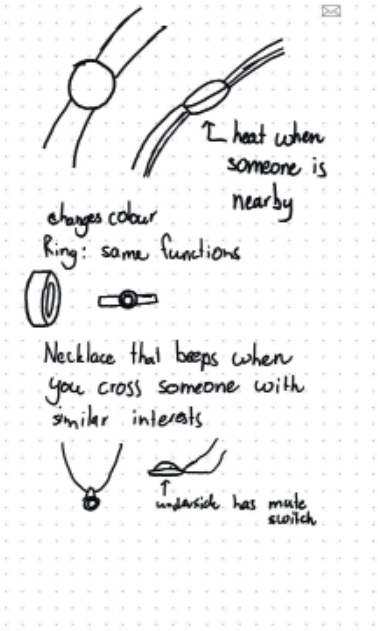
My role for this project was therefore mostly creative, guidance and including the user in the product. I feel like these skills have grown with the project, however, I regret not being involved more in the technical side of the project. This being my weakest area of expertise.

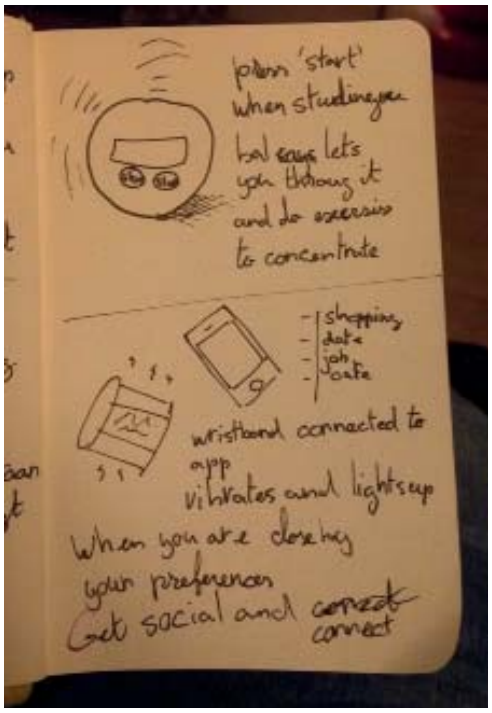
In conclusion, this project gave me a lot of knowledge about how to work in a team and project. Especially when not everything goes to plan, I feel that these ups and downs are a great learning experience for future projects, in Industrial Design and in a working environment after university. What I will do differently in future projects is trying to be more involved with every aspect of the design process, instead of being on the background for subjects I find hard. I think that being more involved in this will help me learn and be better.

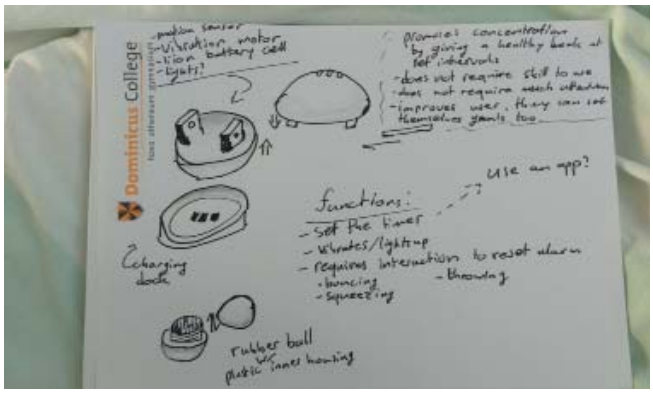
APPENDIX

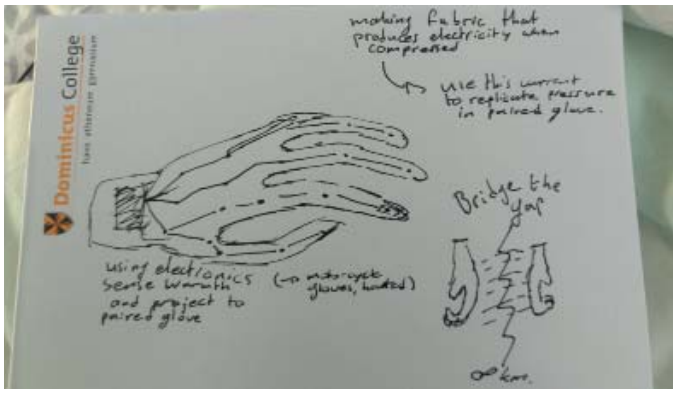
Iteration 1

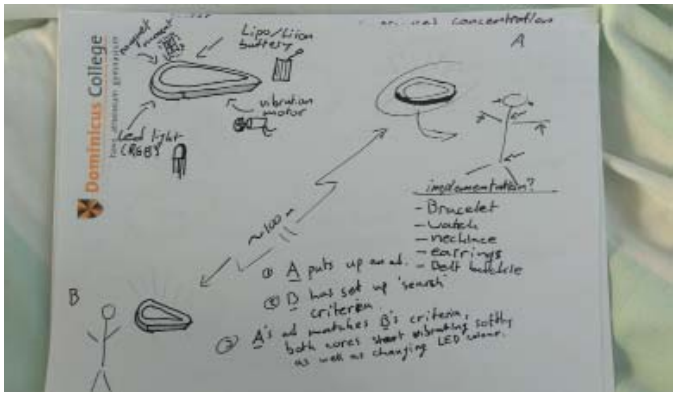








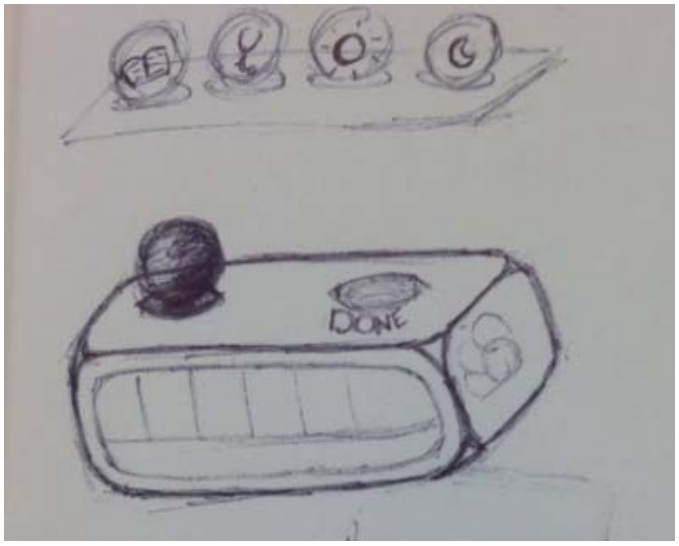


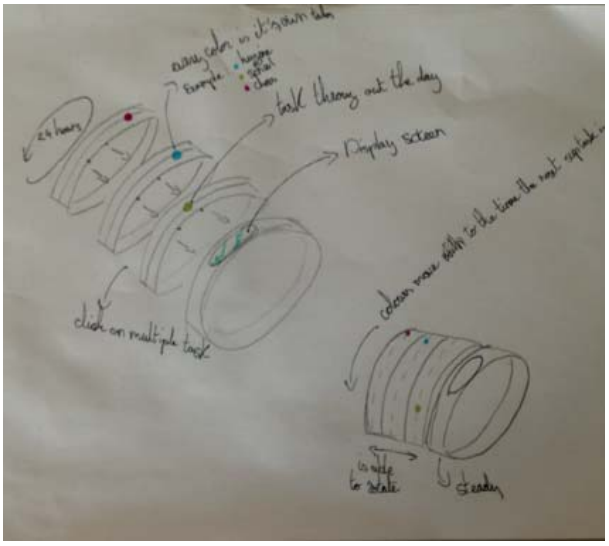


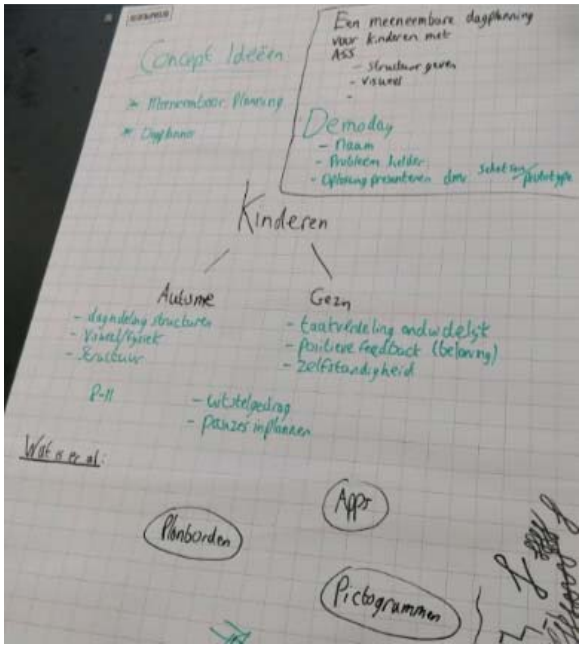
Iteration 2

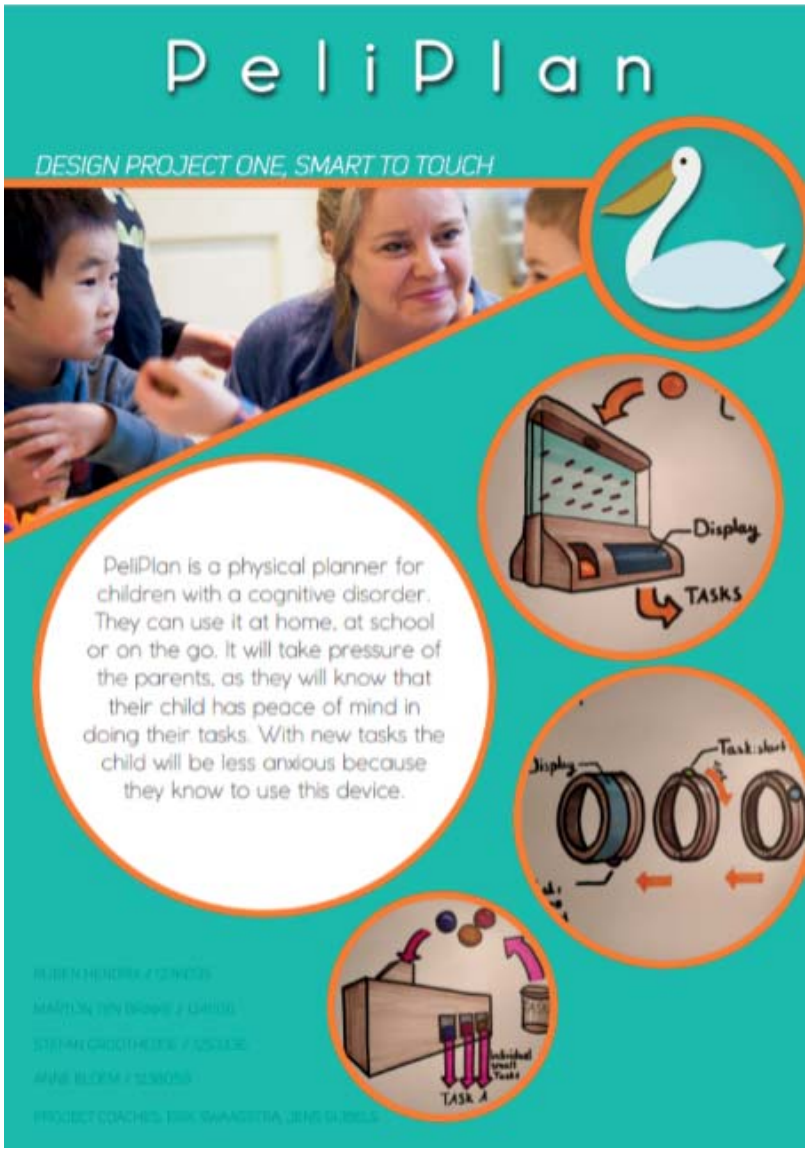
Link to questionnaire → https://docs.google.com/forms/d/1DHfgZwFBx-

Iteration 3


DONE


Display screen
click on multiple task
Ready


Concept Ideeën
Een meeneembare dagplanning voor kinderen met ASS
Demoday
Kinderen
Autisme
Gezin
Planborden
Apps
Pictogrammen


PeliPlan
DESIGN PROJECT ONE, SMART TO TOUCH
PeliPlan is a physical planner for children with a cognitive disorder. They can use it at home, at school or on the go. It will take pressure of the parents, as they will know that their child has peace of mind in doing their tasks. With new tasks the child will be less anxious because they know to use this device.
Display
TASKS

Interview

Q1. Do you have any children with an ASD?
Yes, 2 boys, 11 and 15 years old. The oldest one has Asperger, the youngest PDD-NOS. They are highly intelligent, verbal good developed. Their executive functions are badly developed, which means that they find it difficult to get to do things.
When they find a thing interesting, they find it easier to do it than when it is boring.

Q2. Do you have an ASD yourself?
No, but my husband has ADHD.

Q3. How is the relation between you and your children?
Good, they find it important that I'm with them. If I wouldn't drive them by telling what to do, they wouldn't function properly. It is important that I give clear instructions.

Q4. How do you help them as parent?
My children find it very important to know exactly what will on an event like taking a swim course. So I often go together with the children to the place where it will happen (e.g. swimming pool) so that they have a clear image in mind.
I sometimes have to deliver them when they get stuck in a situation.

Q5. What characteristics of ASD do your children have?
They really want to know exactly what will happen on a new event
Everytime again I have to tell them that they have to get ready for school, and how to do that
They want to know how long somethings will take
They find it really hard to start when a task is very big

Q6. What methods do you use to help your children?
Because of the fact that our children are highly intelligent, I used methods which relate to that. But those methods didn't help that good. I now use checklists (for daily tasks), structured timers (like an hourglass of 2 minutes, one of 10 minutes etc.), so that they have the overview of time.

Q7. What are the pros and cons of those methods?
Pros:
My oldest son is very visually focused, so I can easily use images to show him the things he has to do
The youngest wants to know when a task or event is finished, so he likes the hourglass method. Another example of this is the timed electrical toothbrush (with lights showing when ready). They really like this!

Cons:
There is often no possibility to adjust a methods to my children, to personalize it. Therefore, good methods don't work for my children only because one small thing doesn't appeal to them (e.g. a certain pictogram)

Q8. How do you deal with the difficulties of your children considering planning & organizing?
Every day I sit with the children, telling them everything that's going to happen. Together we look on websites (e.g. of a playground where they will go to for a schooltrip), and observe maps in order to get a clear overview of the place. This has to be very detailed (e.g. which locker do I have to use?). I also ask their teacher to tell and show as much as possible about such events.
At evening I ask them if they are certain things they still want to know, and often they ask this in the morning.

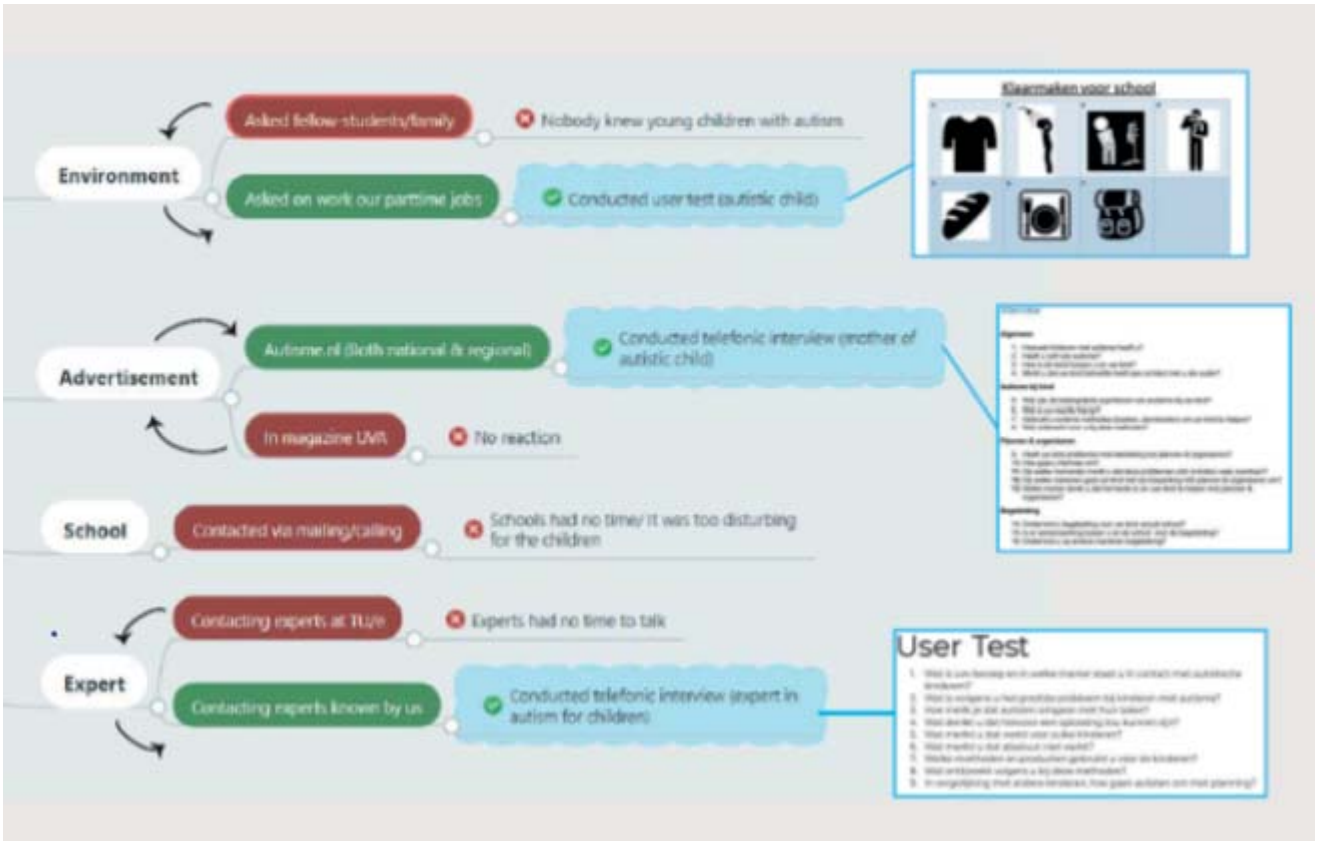
Q9. At what times does your children experience the least difficulty with his ASD?
At times when they find things really interesting, it doesn't matter how difficult or big a task is. Also when I give assurance (e.g. giving every possible coin so that one has to fit in the locker) gives them confidence.

Q10. How do your children deal with the disorder themselves?]
The oldest used a homework app, which divides large tasks into small ones. This was very helpful for him.
The youngest often takes a visual object with him to school, which will remind him at things he may not forget.

Q11. How is the co-operation between the school and you as parents, and how does the school help your children?
We often sit together talking about what would be the best way to deal with the problems of the children. This takes a lot of time. Our youngest son is at a special school for children with a high intelligence. At times when he is over-stimulated, he helps the concierge in the school garden to calm down.

Q12. Do you have any tips considering our concept?
Make sure it keeps stimulating the children, since they find it way easier to do things when they find it interesting. So integrate an aspect of discovery, or for example make an option to change certain things every month, so that it stays interesting.
Be specific, no vague instructions.
Make sure that it is personalizable, e.g. via a digital program where images can be added (so the child can SEE where to put certain things)
Add aspect of sound/narrative

Iteration 4



User Test Eindhoven 3 May 2018

First we asked some question to the mother
What kind of autism does your child have?
Classical autism.

What charactaristics of autism can you see on your son?
When he is with friends, they really have to listen to him, he wants to have the absolute control. Also, he is quite quick over- stimulated, e.g. when the caretakers come. He can get aggressive at times.

Does he get any extern treatment with for his autism?
No, I do everything myself. I don't use any material, just pure natural. He has to listen to me, I'm the boss at home.

What problems do you experience at home concerning your son?
Going out of bed really is dramatic. He stays daydreaming for an hour, and then it is too late to do all the morning tasks before going to school. So I have to call him 10 times and then finally he reacts. He also doesn't want to do the tasks which I want him to do, like tidying the plates. He is very lazy.

We see that you have a weekplanner, do you use it often?
No, almost never. It just doesn't work for him.

Then we conducted the user test with the son

Observations: He got really triggered by the ball going his way, and immediately took the ball again and threw it twice, although he could also pick up his joystick for playing on his playstation. So we can say he found our concept attractive. We also saw that he understood the pictograms, he could immediately tell what they all meant.

Questions to son

How do you like the form of the concept?
I think it is a nice form, I would use this concept

Do you think this concept will help you in doing your tasks (like getting ready for school)?
I don't think I will need such a concept, I can do it by myself.

Do you find it difficult to choose for example what kind of clothes you put on when you wake up?
No, I just decide at that moment what to put on.

Would you like it if your mother would show you via our concept the exact clothes you have to put on each day?
No, I want to decide myself!
[mother] Well.. You often ask things to me, and often we lay all the clothes together ready in the morning..

Do you understand the pictograms used? Can you tell of each of them what it means?
Yes, [explains each pictogram which task it implies, correctly].

Would you rather have images of your own stuff instead of pictograms?
No, these pictograms work fine for me.
[mother] We are soon moving to another house so images of stuff which is here won't work well.

When you do something special, like going on a school trip, do you want to know exactly what will happen on forehand?
I want to know where we are going and that kind of stuff, but for the rest I will see, just walking with my friends.
[mother] He is on a special school, so I they explain really well what happens on a special day, because they know that the kids need it.

At last we asked to the mother what she thinks of our concept

Do you think this concept would solve some of the problems you experience with your son?
Yes, definitely. It will relieve the pressure on me, because it takes over my task of having to attend my son several times what task he has to do. This concept will do that for me.

What do you think of the form of our concept?
I like the fact that it is simple but attractive. As you could see, my son really liked the playful element. I see that the playstation really works distracting for him, so I like that your concept is way less distracting.

What do you think of the ball falling through the sticks?
I really like that, because it has a positive effect on my son. He can just sit back and watch the ball going its way. This works relaxing for him. In this way he gets calm in his head. Also, the ball takes every time another road to fall, so it never gets boring.

Do you think adding some lights/colors will be good?
Yeah, maybe some lights, but not too much or it will get distracting. And my son will really like it when he may choose the colors of the concept himself will.

[to the son]
What colors would you choose the concept to be?
[gets very enthusiastic, throws his joystick away and names the colors.

What did we learn from this interview?
The form of our concept is fine, not too distracting. The playful element has a positive influence on the kid. Adding some lights will be nice.
The pictograms are really understandable.
The kid really wants to have control over everything himself.

X. Kegel

Xtensio

PDD-NOS | GIFTED | DEPENDANT

GOALS

- Get a clear overview of what a task entails
- Have a lot interaction with mother, feeling save
- Feel in control, know every single detail on forehand
- Have a physical, visual 'thing' that is linked to a certain task
- Be actively involved in planning

FRUSTRATIONS

- Mother is not always nearby to give instructions
- Can't identify task with regular used pictograms
- Existing plan-methods are often too boring

"Being in control of creating an overview gives clearity and peace"

Age: 11
Work: Elementary school student
Family: One older brother, mother and father
Location: Texel
Character: Smart, but with underdeveloped executive functions

PERSONALITY

Auditory — Visual
Thinking — Doing
Control — Freedom

BIO

X. is a very gifted boy, with a disharmonic intelligence profile This means that X.'s intelligence scores are very good, but his ability to really get doing something are underdeveloped. This implies that he wants to have a very clear image of what to do, else he can't do it. The one who gives X. this clearity, is his mother. She is very often busy with telling him what to do and how to do it. This makes X. very dependant on his mom.
When going on a school trip, his mom shows X. exactly where he will be going, visiting multiple websites and even looking it up on Google StreetView. Sometimes they even go together to the destination of the trip, to become familiar with the environment.
For daily routines, X. is not able to bring up all the subtasks a single daily task implies. Therefore X.'s mother has to explain every day again what X. has to do. E.g. when he has to get himself ready for going to school, his mother has to tell him which subtasks belong to this (brush teeth, dress up, pack bag) and in which order (first eat breakfast, then brush teeth). This makes the already busy life of X.'s mother even a lot more busy.
Because X. is very gifted, but with a disharmonic intelligence profile, he is on a special school. At this school, when he is overstimulated he may sometimes help the concierge in the schoolyard.

PREFERRED METHODS

Plan board
Smartphone application
Physical object
Instruction by mother
Todo-list
Planning by head

Classical autism | Quickly overstimulated | Strong willed

Jonas Smits

Goals

- Getting up in the morning and going to sleep at night faster and smoothly.
- Be independent.
- Has to fun and simple to use.

Frustrations

- Busy places or screens are overstimulating.
- Does not like to have a fully set planning, he need to be free to make his own decisions.

Age: 12
Work: Elementary school student
Family: single mom
Location: Eindhoven, Brabant
Character: Smart, a very visual thinker

Personality Trai

Thinking — Doing
Easily distracted — Focused
Control — Freedom

Bio

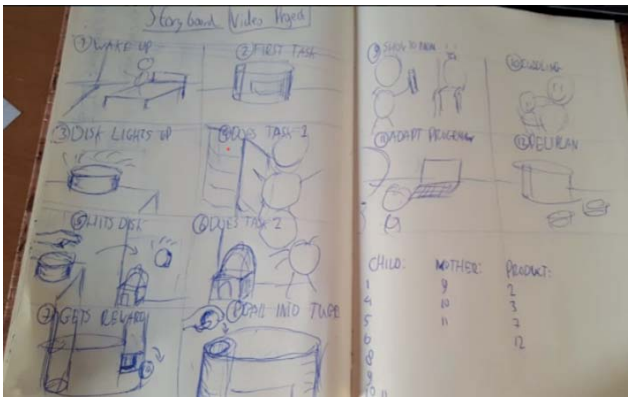
Jonas is smart and perceptive but still struggles with understanding basic things. For example time and why/when to do a task. However he likes to be independent and rather control others then let them be in control. Thats why he finds it hard to ask for help in the form of a plan board. He feels that if everything is planned he has no say in what he can do. Usually he still won't know what to do and asks his mom, she needs to explain the tasks often.
Jonas does not feel the need to know every detail, if he knows where, what and when he knows enough.
He needs help with the tasks but wants to be independent and his own say in the matter. Jonas can be lazy as well and therefore he needs something to make the tasks seem easier and still be fun.

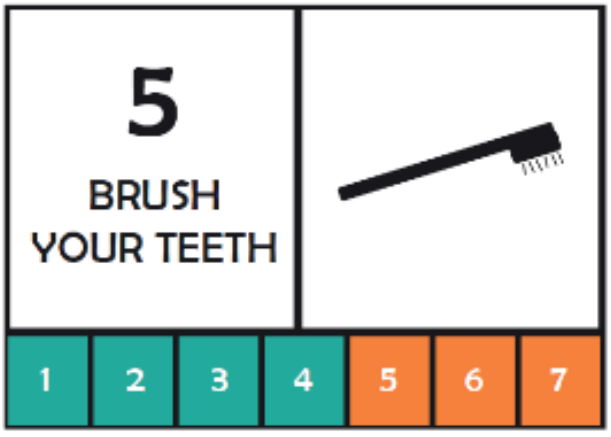
Preferred Methods

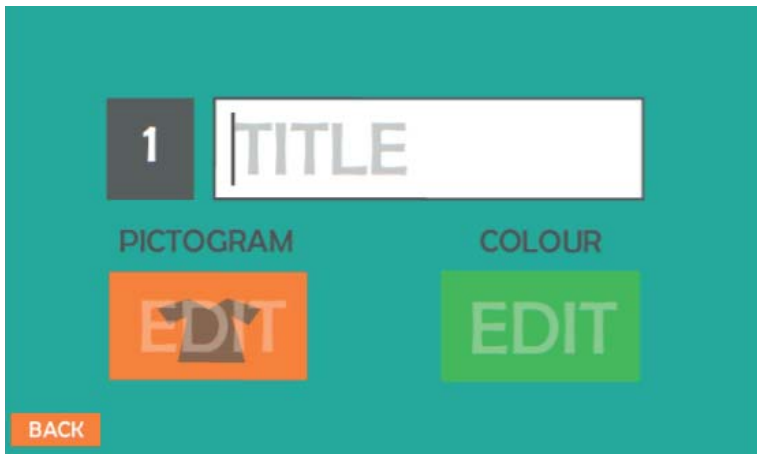
Plan Board
Smart phone applications
Physical object
Instructions by mother
To-do list
Planning by head

Iteration 5

Link to video: https://www.youtube.com/watch?v=XQqzsSAmOWo








PeliPlan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1
DRESS UP
5
BRUSH YOUR TEETH

Report contribution group members

Anne	Martijn	Ruben	Stefan
Summary	Process	Introduction	Acknowledgements
User context	References	Goal	Iterations
Report Assembly		Conclusion	Final product
			Appendix