

A PRODUCT
BY AND FOR
AUTISM



A PRODUCT BY AND FOR AUTISM

DPG49

Project proposer: G. R. Langereis

Theme: Heath Care

Client: de Berkenschutse AOT

Deliverables:

- A product (1) which can be assembled/made by autistic adolescents and (2) which has added value to autistic people at work.

- A 2-5min movie elaborating your concept and/or the perception of autistic people

June, 2011

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ABSTRACT

The focus of this project was on the surroundings of the person with ASD instead of on the person itself. There were two reasons for this; the first being that a person with ASD experiences most of their problems whilst communicating with the outside world, usually with the people at their school or work environment. The second reason is that it is simpler to change the behavior of someone who is not suffering from ASD, as people with ASD have a tough time dealing with change. There is a strong belief that if people are more aware of how it feels to have ASD that they will be more tolerant and understanding. This tolerance will eventually lead to less conflict between people with ASD and their direct surroundings.

In order to achieve this, a goal was set to create an awareness tool for people who live or work with people who have ASD. Currently, these people are informed of what autism is in very traditional ways, with flyers and powerpoint presentations, for example, but they do not get to feel the effects of having autism, and thus lack a true understanding. The final product gives the user this opportunity. It is a game, divided into six stages. Each of these stages highlights one aspect of autism. The game is designed so it can be played with groups of four people. The mini games symbolize the essential “building blocks” of autism. All the mini games are located within individual wooden blocks, and all the blocks fit together in a larger container. The complete collection symbolizes the autism experience.

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INTRODUCTION

The aim of the project A Product By and For Autism was to design a system that would improve the working environment of people with an autistic spectrum disorder (ASD). The final product should also be constructed by people with ASD in a community workplace. The client is the Berkenschutze AOT, an institute that specializes in helping people with ASD to find and keep a job. People with ASD often have trouble with their job, due to unexpected events, lack of understanding from coworkers, or the amount of independence they must have to be successful. This makes the job of the Berkenschutze especially hard. Designing for people with ASD is challenging. Autism is hard to fully understand by people who are not affected by it. Every person who is affected by ASD is different, in character but also in the combination of ASD symptoms they have.

“SOMEONE WITH AUTISM
REALLY IS LIKE YOU, JUST
MORE EXTREME.”

DR. WINNIE DUNN

RESEARCH

The following is an account of the research committed and
its conclusions

RESEARCH

AUTISM SPECTRUM DISORDER

Autism Spectrum Disorder, ASD, is a general term used to describe a group of complex developmental brain disorders.

People with ASD process information that comes through their five senses differently than people without ASD. They have difficulty perceiving and processing details into a coherent picture. Because of this, they have difficulties with communication, social interaction and imagination.

Autistic disorders are psychiatric disorders and classified according to the Diagnostic and Statistical Manual of Mental Disorders.

The three most common autistic disorders are classical autism, asperger's syndrome and PDD-NOS (Pervasive Developmental Disorder - Not Otherwise Specified).

CLASSICAL AUTISM

This is the most severe form of autism. People with classic autism have problems talking and relating to people. They can be hypersensitive to their environment. Certain sounds, colors and textures can upset them. They compulsively cling to rituals, such as eating the same foods or watching the same TV show every day at the same time. Changes in routine can upset them.

PPD-NOS

A condition in which some, but not all of the symptoms of classic autism and another pervasive developmental disorder are seen. In these cases, there can be social and speech problems, as well as unusual sensitivities in specific senses.

ASPERGER SYNDROME

A type of ASD that causes problems with social and communication skills, but does not trigger language delays. People with Asperger can be socially awkward, may not understand conventional social rules or may show a lack of empathy. They may make limited eye contact, seem to be unengaged in a conversation and not understand the use of gestures.

DIRECTION OF THE RESEARCH

These different disorders have a lot in common, but are not the same.

When mentioning autism, most people talk about classical autism. The other disorders do have a lot in common with classic autism and stem from this disorder. To give the research a specific orientation, the decision was made to focus the rest of the research on classical autism.

RESEARCH

GET TO KNOW AUTISM

Nobody in the team has first hand experience with autism, thus the research started at the beginning. Each member dove into the world of autism to learn more about it. What is autism? What are characteristics of autism and how does it influence a life?

Research was done by reading books, observing documentaries and watching films. A list of consulted sources can be found in the appendix. After two weeks the team came together and shared the results. Putting all the results together allowed for a good overview of the most important and common aspects in the life of an autistic person.

The list on the next page helped the team understand what to design for and gave possible directions for the project.

gevoeligheid voor prikkels = licht
geluid
geur

concentratie
Problemen

emoties herkennen

moeilijk
initiatief nemen

beschafte aan feiten, → geen levert
duidelijkheid
frustratie

oog contact

leren van immitatie

stress
↓
dicht klappen

geïsoleerd
↓
contact leggen.

oog voor
detail

moeite met
verandering

Plannen =
belangrijk!

geen overzicht ← hoofd & bijzaken
scheiden

Personal
Space

fascinatie
voor één ding : ding/taak/
hobby

onbegrepen
voelen

RESEARCH

Processing Research Findings

The results of the research in the first two weeks revealed that autism is a disorder that makes it harder for a person to function normally, and that their environments misunderstanding of autism makes it even more difficult. People without autism do not understand the consequences of this disorder, do not believe it or just ignore it.

The first direction of the project was exposed: to build a bridge between people with and people without autism.

The pictures on the next page show a visualization of this idea.

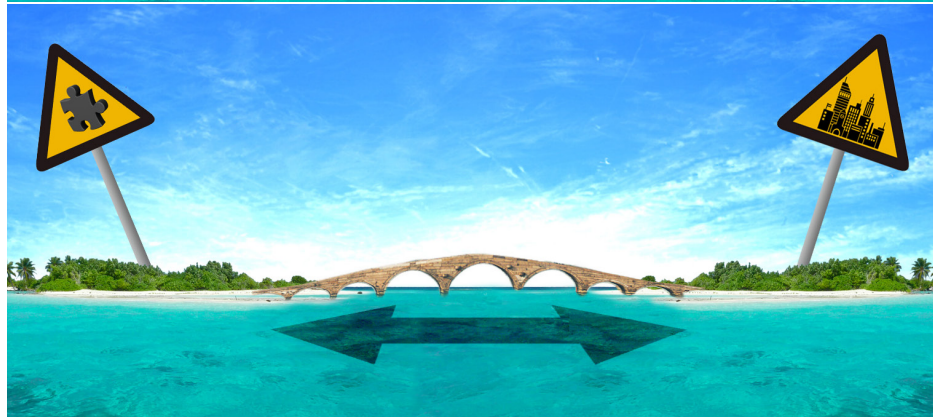
People with autism live in their own world. There is a lack of communication and understanding between them and the people without autism. Because of the lack of both, people without autism do not interact with autistic people because they behave differently.

The goal set was to build a bridge between the two separate islands; to create understanding between each world, allowing an ease of communication to develop.

Two separate islands.
One with autistic people,
the other without.



Two separate islands
connected by a bridge
of understanding.



RESEARCH

CLIENT BERKENSCHUTSE

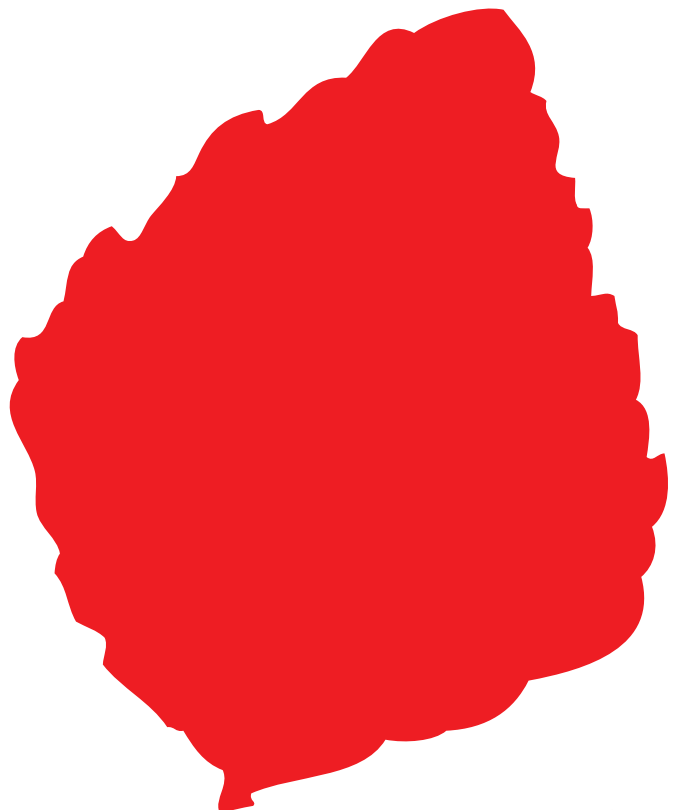
The client of this project is the Berkenschutse AOT, with Joke Haarman as liaison. Our client manages a center of expertise to assist autistic adolescents in the transition from school to work. The aim of the client is to place adolescents at risk on a career path where they can develop naturally.

The Visit

Two weeks into the project, the team was invited to the Berkenschutse AOT. The team got the opportunity to present their views on the project and their approach.

The client was enthusiastic about this direction, to build a bridge between the two worlds, but warned that it was an ambitious idea.

The team was then led on a guided tour of the facility, comprising of a workspace for the youth to work, a sewing room, and a computer room. The team worked with the autistic youth for three hours. A complete report on the excursion can be found in the appendix.



RESEARCH

USER PROFILE

The initial target group was the students of the client, the Berkenschutse AOT. These are all adolescents with autism, with ages ranging from 12 to 23. They had problems in the normal educational system so most of them are not very positive about learning. Because of their condition, almost all of them have had problems with performing in a regular work setting.

This has nothing to do with their intelligence. A lot of these autistic people are highly gifted. The fact that they do not fit in the regular educational system limits their development in key job skills.

Although they get training at the

Berkenschutse on how to deal with situations at work, they still have trouble expressing themselves.

It is not that they cannot learn, it is just that they need to learn in a special way. Since modern education does not have the time to teach these youngsters, it is left to specialist schools, which have recently received large budget cuts. As a result, there is more strain on the specialists. There is a need for simplification of training in some way, so that one specialist can work with more autistic children, without sacrificing the influence on them.



RESEARCH

SITUATIONAL ASPECTS

After visiting the client the team arrived at the conclusion that it is not possible to design one product that is useful to every single person with autism. Autism has a lot of different aspects that reveal themselves in different combinations with every person. The students at the Berksenschutse kept repeating that they are individuals and that it is not possible to generalize autism. It was decided to choose five different situations in which someone with autism could use help.

These five are:

- Entrepreneurship of people with autism
- Employers of employees with autism
- Handling unexpected situations
- Keeping autistic people's dignity
- Parents of children with autism

Each of these was worked out by a team member, with the exception of entrepreneurship, as this is a very small target group. The following pages highlight the results of this research.

KEEPING THEIR DIGNITY

When people talk about autism it is generally about the negative aspects or the obstacles they face in the interaction with autistic people. People with autism, on the other hand, often have the feeling that there is nothing wrong with them and that they are stigmatized into being a stereotypical person with autism. This is also the reason why people with autism are not keen on sharing their disorder with other people.

The question remained, how does one take away this mutual misunderstanding between autistic and non-autistic people and restore the dignity of people with autism?

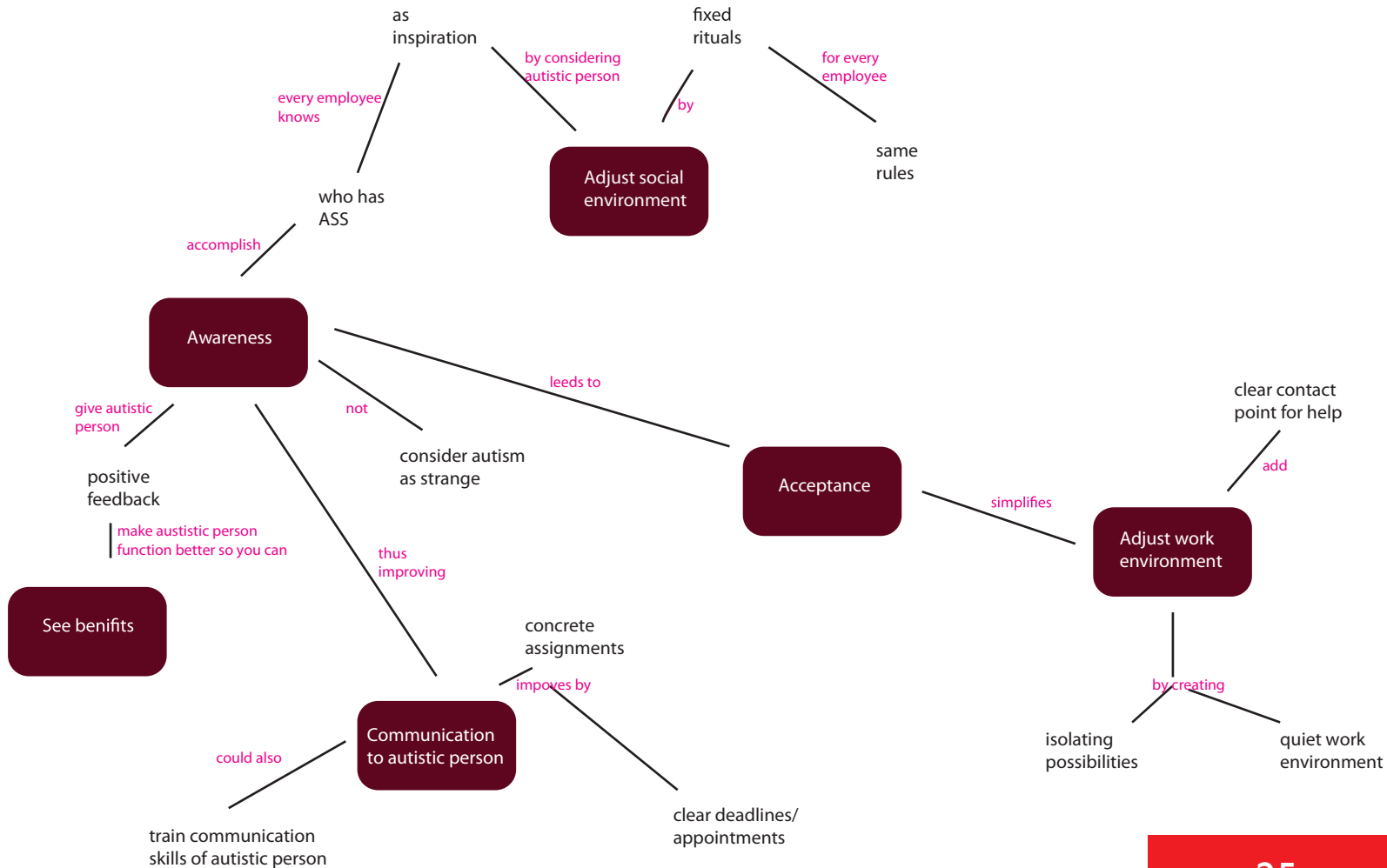
The research showed that all of these problems have their roots in a lack of knowledge of the general public about how it feels to have autism. If people learn to better understand this, most of the problems autistic people face could be resolved.

RESEARCH

EMPLOYERS OF AUTISTIC WORK-

Because the client is a school which teaches students with autism how to function in a work environment, further research was done on the relation and problems between employers and their employees with autism. Employers do not want to put much money or effort into employing a person with autism. In addition, when an employer searches for information about autism, they are likely to get negative information, and thus puts them off the idea. People with autism do, however, have some very strong features, such as dedication to their job. The conclusion of this research was that people with and without autism have

problems interacting with each other. Yet there are ways to improve these problems by educating people about the positive aspects of autism.

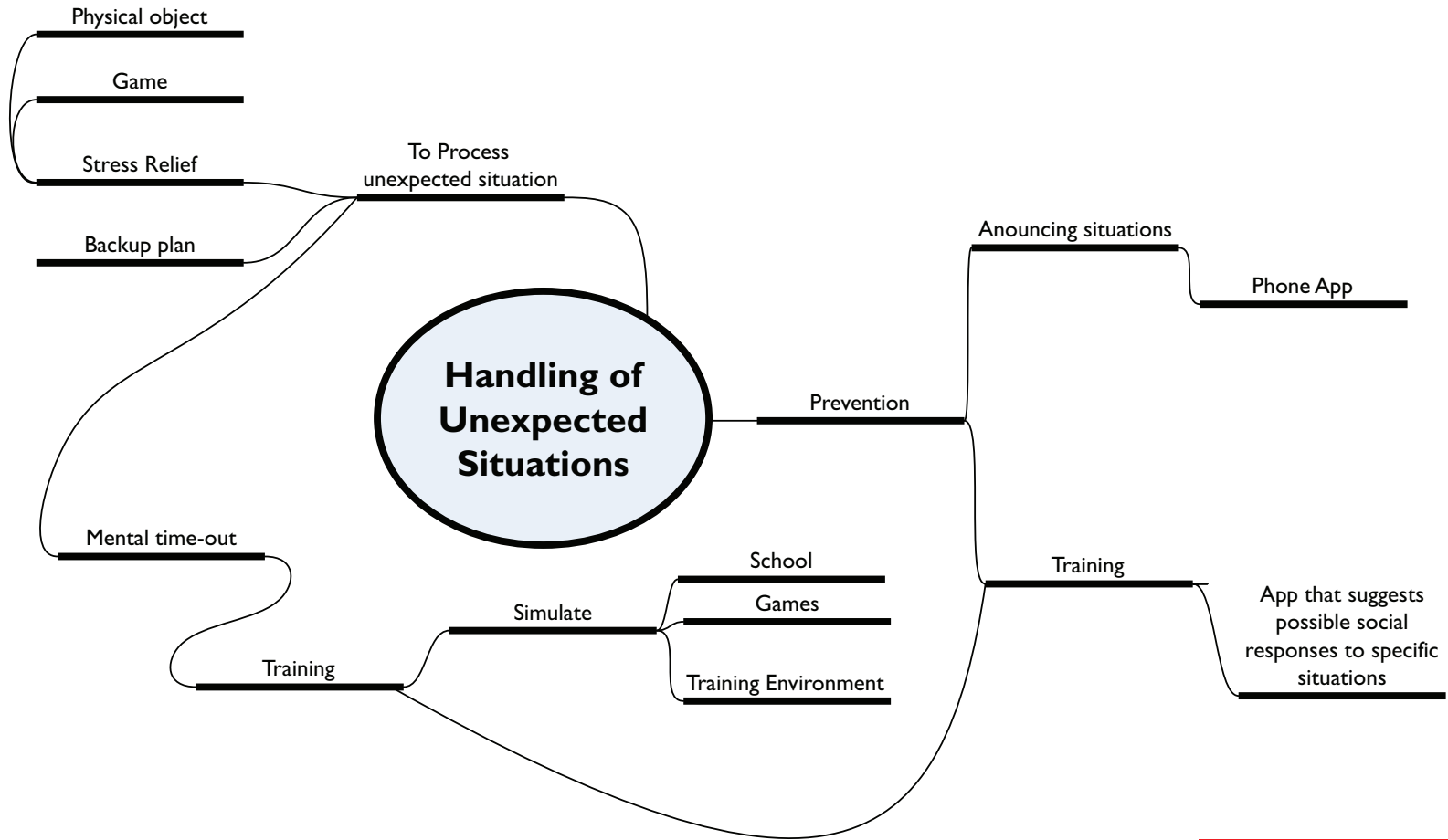


RESEARCH

UNEXPECTED SITUATIONS

Autistic people like consistency. They are most at ease if they are in a known environment or situation and are in some sort of control. However, this is not always the case. Sometimes they will run into situations where they do not know what to do. Such situations could be when someone speaks sarcastically or a question is asked and they do not know the answer. They will stress about getting the answer right, not realizing that they can just say they do not understand.

Schools that deal with autistic children train them to deal with these unexpected situations through simulation. Most older autistic people who have been helped when younger can handle these situations, but will not feel comfortable in them. The diagram shows the flow of situations and their possible solutions.



RESEARCH

PARENTS OF AUTISTIC CHILDREN

During the research process it was revealed that being a parent of an autistic child can be very challenging. A child with autism needs a lot more care. Stories about divorces as a result of a lot of stress because of the extra care for the child; broken friendships because parents have less time for their friends or the friends don't understand the problem of the parents. To find out more about these things Tove prepared a survey and had an interview with Wick (17 years old and autistic) and his parents to talk about these issues.

For this survey, three parents of students from the Berkenschutse answered questionnaires.

The results of these questionnaires show that parents with an autistic child love their child so much, that they will not admit the difficulty of having an autistic child. They admit the education for this child is hard, and that they have left everything for their child. A lot of special help and experts are needed, especially in the beginning with the diagnosis, but guidance is well organized.

During the visit with Wick and his parents it was clear the parents did not feel they needed a device that would help them with caring for Wick, but they wanted a device to help Wick in future life.

The conversation with this family was pleasant, a good way to experience how they interact with each other. Wick showed his drawing skills, which were excellent. The team asked Wick if he would like to design the front page of this report, which he accepted.

RESEARCH

Existing Products

Before moving further, market research was needed. It would be pointless to create a product that already exists. After looking through a few online catalogues, it became apparent that there were many products catered to autistic people, mostly children. What was even more apparent was that almost all were planning related products. This is understandable, considering that autistic people need structure and routine in their lives. An example of an existing product is the TimeBuddy, shown on the other page. This product helps children plan their activities and the time they can spend on it. This product also exists for older people, as

autistic people will need help with planning for the rest of their lives.

During the interview with several students of the Berkenschutse, the team came to the conclusion that these students were prepared to accept planning tools into their daily lives. Telling them that the product would then be a planning tool would have been an answer they would accept. However, just because they like planning tools, does not mean the final product should be a planning tool. "Think out of the box", were the instructions from our client, and from that moment on, the word "planningtool" was banned.

FROM THAT
MOMENT ON,
THE WORD
“PLANNING TOOL”
WAS BANNED



RESEARCH

Conclusion Research

A lot of research was done. A general knowledge of autism has been achieved. Further research into autism within certain contexts helped reveal that it is impossible to design for all autistic people, as there is no single aspect that all autistic people have. Planning tools were discarded as possible concepts, mainly because the market was already saturated with such products, even though it is something a large percentage of autistic people have a need for.

The most interesting conclusion was the lack of communication between people with and without autism. This is closely linked with the initial direction of the project of creating a bridge of communication and understanding between the two.



IDEAS & CONCEPTS

The following is an account of idea generation and concept development prior to the Midterm Exhibition.

GENERATING IDEAS

BRAINSTORMS ABOUT CONCLU-

The research led to four situations which were then brainstormed about: Employer of employees with autism, Handling unexpected situations, keeping autistic peoples dignity, and too ambitious parents. These brainstorms helped fathom the aspects of autism which were interesting from a design point of view. The topics led to nine problems that are experienced in relation to autism.

New individual brainstorms were held on each of these topics, which were then discussed with the rest of the group afterwards.

1. Connect the people with and without autism with each other
2. Tool for self-reflection
3. Communicate expectations
4. Change the physical workplace environment to benefit the person with autism
5. Making contact in a playfull manner
6. Expressing emotions througha device
7. Learning from the past tool/device
8. Interpreting communication
9. Taking initiative

After the brainstorm, six ideas were picked to develop further in theory. Each of these are explained on the following pages, with detailed accounts of what each concept is and the reasons why they were or were not developed further.

GENERATING IDEAS

Mood sphere



This sphere will sense by touch what state the person is in. This will help people with autism express their mood without the need for dialogue.

This concept was not developed further because it was technically too difficult due to the biofeedback systems required. The sphere would not be able to help the people with autism that much because many of them do not want to show others how they are feeling.

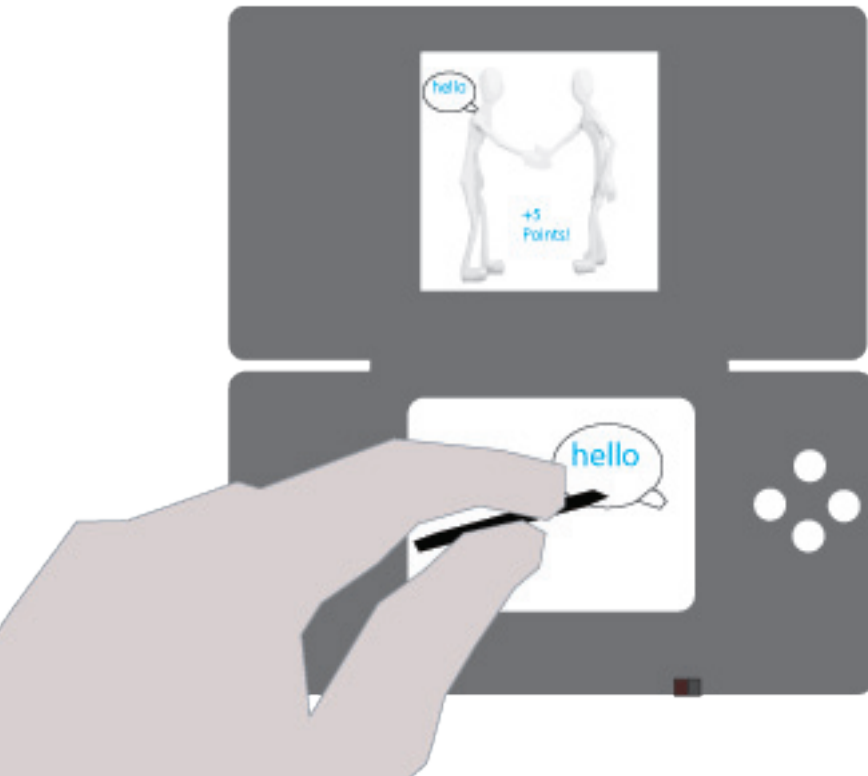
Frame for Recognition



An autistic person has difficulty reading other people's emotions. By pointing this frame at the person whose emotions they want to read, they will be able to. The device will read the emotions for them and clearly identify the emotional state through images or text. This concept did not get further than this phase because of the technical challenge and the fact that people with autism would probably have to have a lot of training on how to react to the emotions the device tells them. On top of that, if the device gives a wrong answer, they could make an error in the interaction which would only make them more insecure.

GENERATING IDEAS

Social Interaction



This is a game where people with autism can practice how to interact with other people. By playing games they will have an easier time interacting in real life.

This game was not the chosen concept because, although it might help people with autism, it could also mean they would just stick to the game instead of practicing the interactions in the real world.

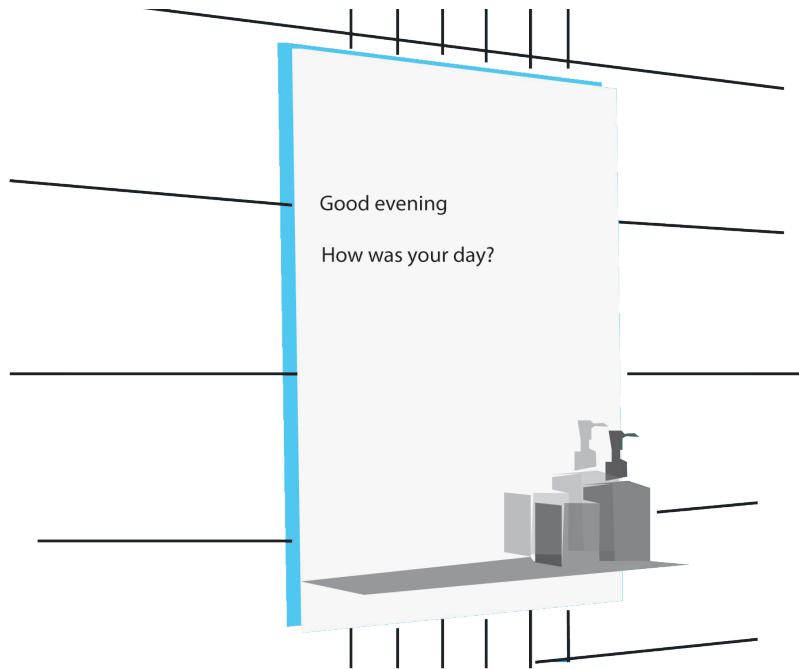
Modified Workspace



With non-flickering light screens around an autistic persons workspace, a clearly defined and relaxed space is created. The color of these semi-transparent light walls can be adjusted to what the user is comfortable with.

This concept was not developed further because it would cost the employer too much money and would not have enough effect. A possible negative side effect would be that autistic people shield themselves from others.

Self-reflection Mirror



A tool for people with autism. It consists of a bathroom-mirror which asks the person how their day was, thus initiating self-reflection.

This is one of the two concepts that were developed further.

Tove and Daniëlle tried to look further into the concept of the self-reflection mirror.

The mirror should be usable for every member of the family because self-reflection helps everyone. It should not have too many stimuli because this is not pleasant for people with autism.

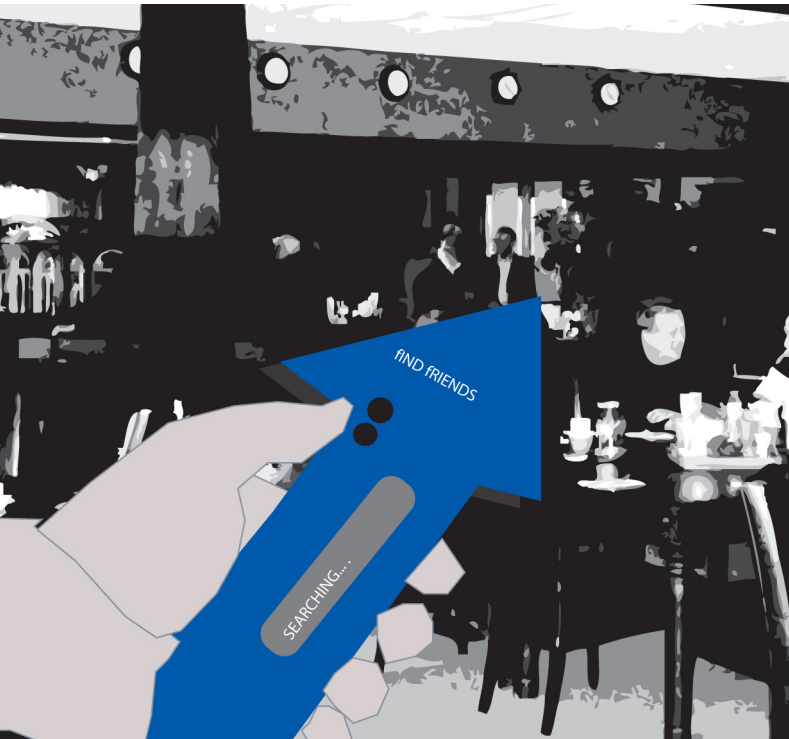
Research was done about how to make people self-reflect well and therefore what questions need to be asked by the mirror. It turned out this was a hard thing to find because of the many theories on this subject. Some even think self-reflection might not work although others such as the research, "Autism, employment, and the role of occupational therapy", by L.C. Caporaso, say it is very vital for people with autism.

The technical part was already done by a bathroom company so that could be copied although the aesthetics should be improved.

However, the midterm exhibition crept closer and the goal was to show one well rounded and finished product, so one product should be chosen. To find the right self-reflection questions and to verify if self-reflection would help would take too long, so this idea was put aside.

GENERATING IDEAS

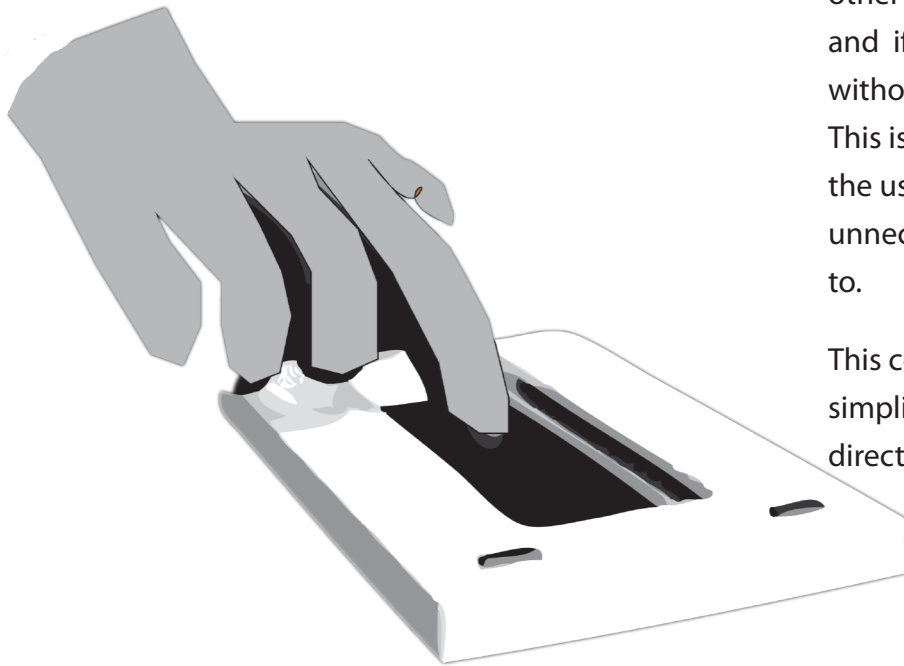
Common Interest Finder



Wick explained he would like to connect with more people and that it would be easier if there were more people like him when going to a bar. This device will tell the user if there are other people with the same interests in their direct environment, making it easier to start a conversation with them.

This concept was not chosen because it would mean that more people would have to have the device before it is usable. Perhaps only people with autism would buy it, but Wick explicitly said he also wanted to have non-autistic friends.

Emotion Communicator



With this device, autistic people can show other people what state of mind they are in, and if they want to be approached or not, without the use of verbal communication. This is meant to be used in situations where the user feels stressed and wants to avoid unnecessary dialogue, or wants to be talked to.

This concept was chosen because of its simplicity and the fact that it could make a direct difference.

PROTOTYPES

The following is an account of the Midterm Exhibition
prototype and the Autism Experience Center.

PROTOTYPE

After careful consideration, a choice was made to pursue the Emotion Communicator, as this was the most realistic idea to concretize.

Development

The idea originated in a brainstorm session about possible solutions to problems. The result was a tool for offline communication with regard to emotions. The idea was a 'moodring' to relay stress level into a visual cue. It was shortly afterwards that Pleinschoolhelder, a specialist school, revealed that they used a red card system with their autistic children. This allowed a child to put a red card on their table when they felt overloaded or stressed. The supervisor would keep an eye on the child and if they kept the card on the table too long, they would address the child about

it. Combining the two ideas resulted in a product that could be set to a color to communicate to the environment that the person does not want to be disturbed. This system would slowly change back to a neutral color, to motivate the user to distress. Furthermore it would be linked to a central system that keeps track of the amount of 'stress' time, acting as a reflection tool. The user would be able to see how often they were stressed and see if they are dealing with stress better than before.



PROTOTYPE

Design

The design process centered around familiarity and minimalism. A simple rectangle with rounded edges and a central interaction area was decided upon. The color would be white, a soft but still noticeable color. The light for stress would be red and for neutral state would be green, both internationally recognized colors for okay and not okay.

Expert Evaluation

The product was tested with its currently limited functionality by the team. Looking for errors or problems in the design, none were found. Although the only working function was the interaction to change the color, the underlying thought and list of functions that would eventually be in the final product made this prototype a success.

User evaluation

The opportunity arose to present the prototype to some autistic teenagers. They explained that they did not want an object associated with them and autism, and that

they did not want others to know they were autistic. They did not want a work environment to implement the product just because of one autistic person.

Conclusion

The results showed that the product was not catered to autistic people, and that autistic people do not want special products just because they are autistic.

EXPERIENCE

To get better feedback about the project at the midterm exhibition, an Autism Experience Center was to be built. This would let the visitors of the exhibition experience what it is like to have autism. Because this would explain autism much better than words, the visitors will be able to give better feedback. The purpose was to get receive a lot of sensory stimuli whilst trying to fulfill a task. This gives the visitor a stressed out feeling, a feeling of being out of control, just like someone with autism could feel.

To get people without autism to feel like this, the stimuli needed to be exaggerated. Another project group consisting of Jesse Meijers, Sebastiaan de Monte, Marjolein

Kors and Ilse Maessen already made a video highlighting annoying stimulants. A cooperation was created with this group and Daniëlle and Sebastiaan worked on designing this experience further.

The experience consisted of a little room where stimuli in the form of video are shown, highlighting details such as ticking feet, typing fingers, laughing and talking. These details are shown on one big screen in front of the user and two little ones at the side of the user to make the experience more enveloping.

The design of the Experience Center changed a few times, finally settling on one that was appealing yet functional. Financial

restrictions meant wood was not a viable building material. The framework was created out of pvc piping. Black fabric was wrapped over these pipes to make the walls look solid and restrict light from entering the inner area.

MIDTERM EXHIBITION

The exhibition presented an opportunity to display our prototype. Since autism is a topic few know about, an Autism Experience Center was built. The purpose of this center was to give visitors a peek into how it feels to have autism, before presenting them with our prototype. This would help them understand the purpose of the device better.

Autism Experience Center

The experience center consisted of three screens playing synchronized videos; one large screen in the center, and two smaller ones to the sides. The user would wear a headset for audio. The first half of the experience was a black screen with letters

popping up every so often. The purpose was to write these letters down, spelling the phrase **SOMETIMES MYSTERIOUS**.

The second half of the experience consisted of the same task, but the letters were hidden in between video shots, playing on different screens at different times, and continuously providing background noise. Spotting the letters was a much more difficult task, but those who succeeded found the phrase **ALWAYS UNIQUE**.



MIDTERM EXHIBITION

Emotion Communicator

The prototype generated quite a bit of interest, especially since it looked like a final product and worked. Visitors were impressed by the simplicity and quality of the prototype. They understood the purpose, and the only recurring problem was that green and red light does not work well for people who are colorblind.

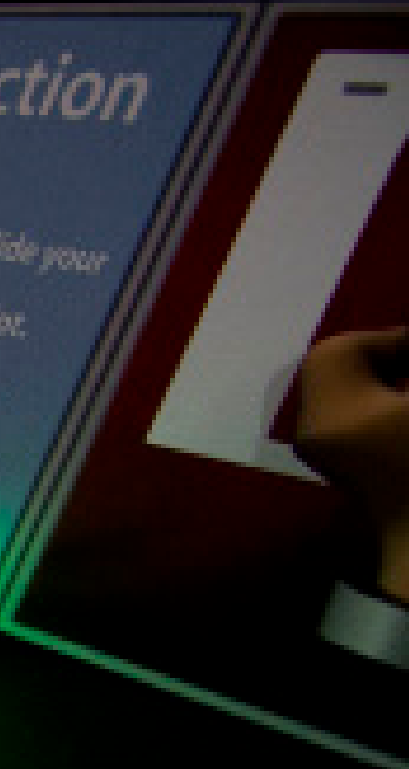
Feedback results

It was realized that, during the exhibition, there was more focus on the experience center than on the prototype. There was a lot of positive feedback on the experience center, and many suggested that it should be the new direction for the project.



Interaction

*To control the color, slide your
finger through the slot.
The more red, the less
approachable the person is.*



CHANGE OF DIRECTION

As a result from the feedback at the exhibition, the decision was made to take a new direction in the project, one that focused more on creating awareness about autism. The Autism Experience Center was a very powerful tool at the exhibition, but was not a truly interactive system and only stimulated two senses, sight and hearing. The system, in its current state, was not portable and only focused on one aspect of autism, the difficulty in handling an overload of sensory information.

Idea generation

A brainstorm was held to list possible variations on the Autism Experience Center. Ideas ranged from mobile trailers with a large experience center built in, to fine tuning the current video experience and distributing a DVD. One idea was to develop a game in the classical sense. Developing a game allows the users to interact with one another and elevates the power of the experience.



GAME DEVELOPMENT

Why a Game?

A game is something everyone is familiar with. It is generally fun and, if created in the right way, informative and powerful. Making it small and portable allows for easy distribution, and can be seen as a social activity, not taking more than forty-five minutes to complete. This allows it to be used in a work place, as it does not consume too much time. Instead of listening to a presentation about autism for an hour and only getting simple facts, the user can experience autism in forty-five minutes and gain much more understanding.

Development

The initial idea was to develop a general game with smaller sub-games, where the winner of each sub-game gets to move further towards the finish. After some contemplation, the decision was made to focus the game on experience alone, and not on winning, because in real life, there is no single winner. This game must be informative and have a strong experience level. Six sub-games were created, each highlighting an aspect of autism and bringing it out through an experience. As playing the games may leave some confusion, a voiceover will explain the

purpose of each game after it has been completed, highlighting direct connections with autism.

Construction

The decision was made to construct the game in wood, as this is classically attributed to well built toys. It is also strong and durable, allowing for a long lifespan of the product. A rectangular box was decided on for simplicity in construction and recognition that it is a game box. The initial idea was to coat it in varnish to bring out the Birchwood color. However, cost and supply limitations forced us to create it out of MDF, which is not an appealing wood. The decision was then made to paint the entire box in black and white, attributes commonly associated with minimalism, an autistic friendly design.

THE GAME

The following is an account of the Game development,
from start to finish.

MAIN BOX

Our gaming concept consists of several mini games that all try to let the user experience what it means to have autism. All the mini games are self contained and could be played separately. It is important, however, to see all the mini games together as a whole because together they symbolize autism. The mini games are like the building blocks of the experience we want to convey. That is why the decision was made to put all the mini games in small (building) blocks. When the boxes are put next to each other in the right order they form a bigger block that fits in the black carrying case.

The problem we found with the mini games is that they all require some form of instruction before they can be played. Reading instructions in between the mini games gets the user out of his flow in experiencing autism. That is why a more intuitive way of telling the user the instructions for the game was developed. The main box which contains the mini games should tell the user verbally what to do. A mechanism with switches in the bottom of the large container box was created, which can detect which mini game has been taken out of the container. When the user takes a specific box out of the container, a voice

starts telling the user the instructions of that particular game. When the box is put back into the container, the voice relates the game the user just played to the aspect of autism the game is about. This way the user can stay focused on the experience while still receiving instructions, and obtaining more information on autism.



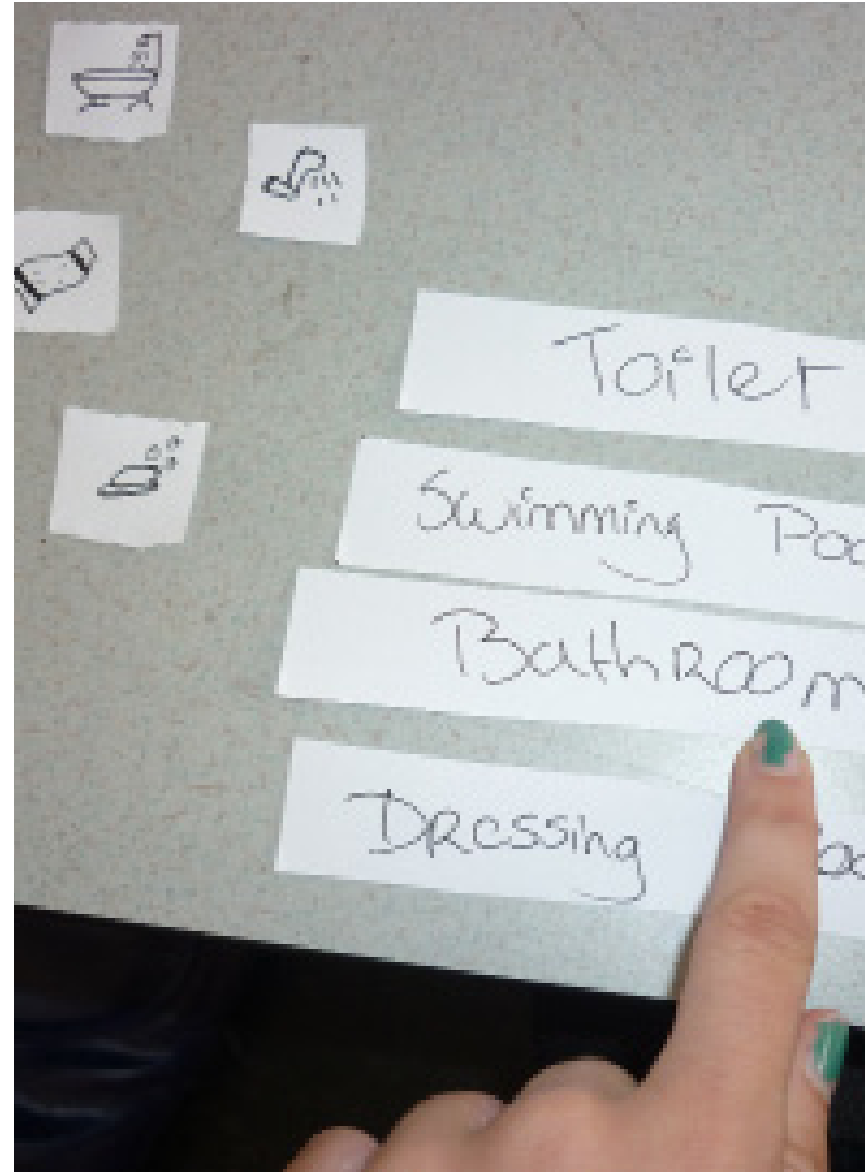
GAME OF DETAIL

One of the characteristics of autism is the fact that autistic people have a tendency to see details before seeing the big picture. For instance, they see: a stove, a refrigerator, knives and pans. Only then do they realize that it is a kitchen.

This mini-game has to replicate this experience. It will show details first, after which the players need to select the meaning of these details. The initial idea for the game was to let the players draw details on a puzzle piece, and while combining them into a fixed puzzle, the player to notice the big picture first wins.

However, actively drawing them is not close enough to the real experience. The players have to recognise immediately what they see. This is why the second design had icons on a board which are only visible when they light up. The shape of such a game was a challenge, as it need to be capable of having all four players play. To make room for the Arduino needed to operate the game, it was decided to create it in the form of a decagon.

The purpose of the game is to have the players work together and tell each other the icons they see so that they find out together what the solution is. This makes the game better because it eliminates competitiveness, allowing for all the focus to be on the experience itself.



GAME OF CHANGE

Having problems with sudden changes is also one of the characteristics of autism. This means this box had to contain a mini-game that will make the players experience unwanted changes during the game. The players have to have a certain goal which they want to achieve, but the game changes something all the time.

The game consists of a dozen half circles. Each of these has half of an illustration engraved on it. The players have to use their common sense to put the pieces together. They are told these pieces will stick together through the use of magnets, when the answer is right. Two of these combinations,

however, will not work, as the magnets are turned the wrong way. This is something the players will not anticipate, and therefore a sudden and unwanted change. The players will feel out of control and will question what they think is normal, just like people with autism do when something changes in their routine.

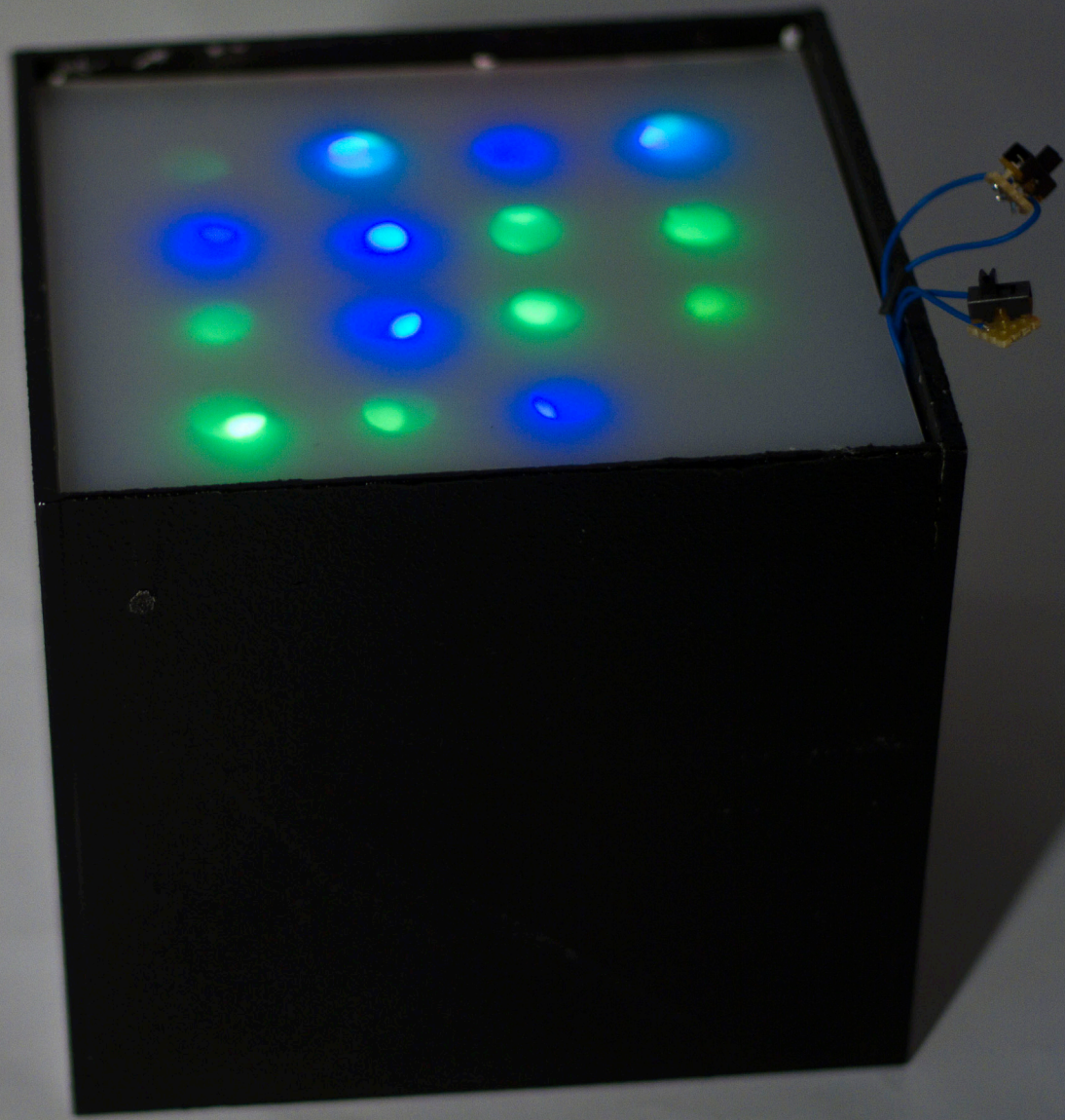


GAME OF CONCENTRATION

Having problems with concentration is a typical aspect for autism. They cannot filter sound around them, so all the noise in their environment is equally loud. Because of this, they cannot make a distinction between main and side issues. This concentration problem makes a study or getting a job really hard for some autistic people.

With this box, the players can experience how hard it can be to concentrate in a noisy environment. There are sixteen LEDs behind the plastic on the box. When the game starts, the LEDs will start blinking in different colors. One player gets the easy job of counting how many times they see a

red LED blinking between the other colors. The other players get the job to make as much noise as possible, distracting the counter. A user test showed that it is really hard to focus on the LEDs with screaming people around you. This way the player can experience how frustrating it is to have an overload of auditory input, whilst needing to concentrate. The other player do not experience the concentrating part of this game, but do experience the amount of noise there is, which is irritating enough. The most important in this game is that the players lose control and really go for it, making as much noise as possible.

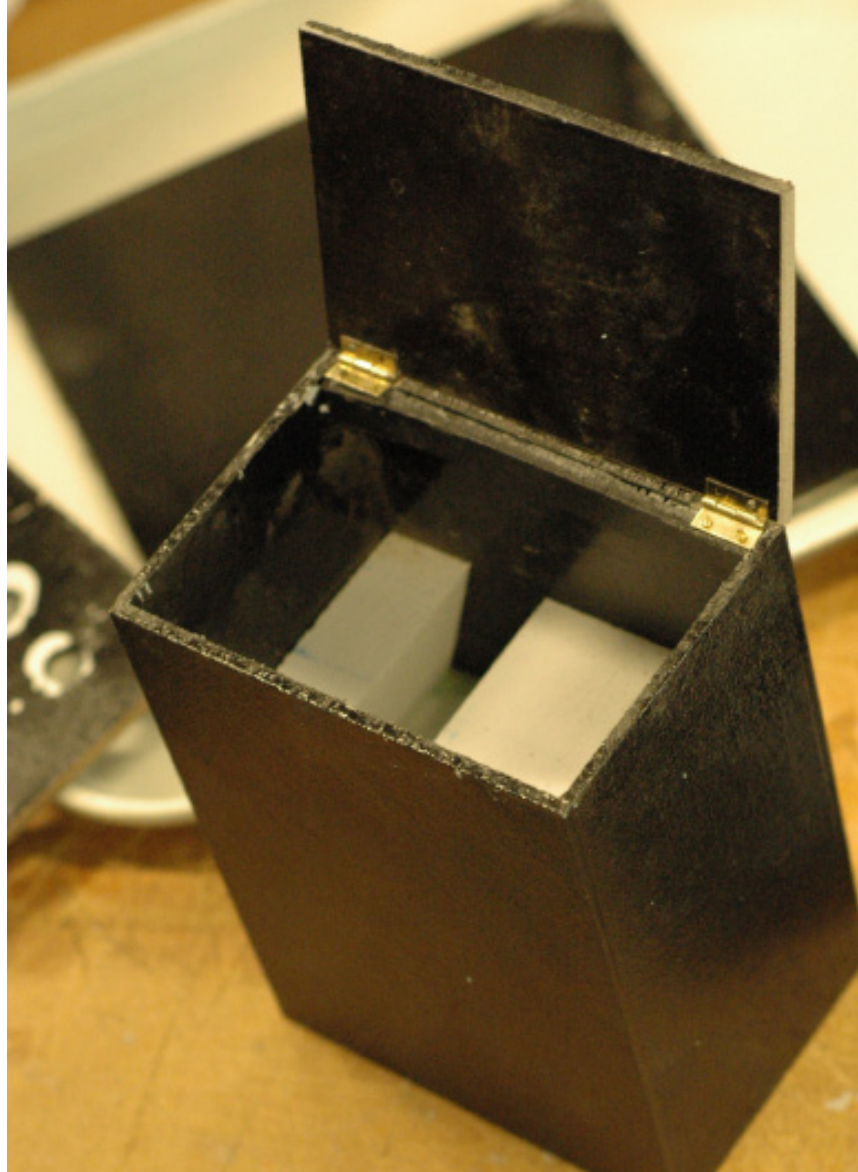


GAME OF COMMUNICATION

It is hard to recognize someone with autism at first sight, it is not as easy as identifying a blind man by his cane. You might not even notice autism during a first meeting, but you will notice that they are different from other people. Almost every autistic person has difficulties with communication. This can be communication in speech and body language, or his directness and brutality, but you will not know initially.

This game gives players the experience of communicating in ways people are normally not used to. There is a player card, on which a description of your communication behavior is written. This can be, "do not make eye-

contact with other players but take part normally in the conversation", or "answer every question with another question". The other card stack will be placed in the middle of the table. These are subjects and questions for the conversation. The goal of the game is to guess the communication behaviors of the other players. This way people will experience how difficult it is to deal with the communication problems autistic people face.



GAME OF PLANNING

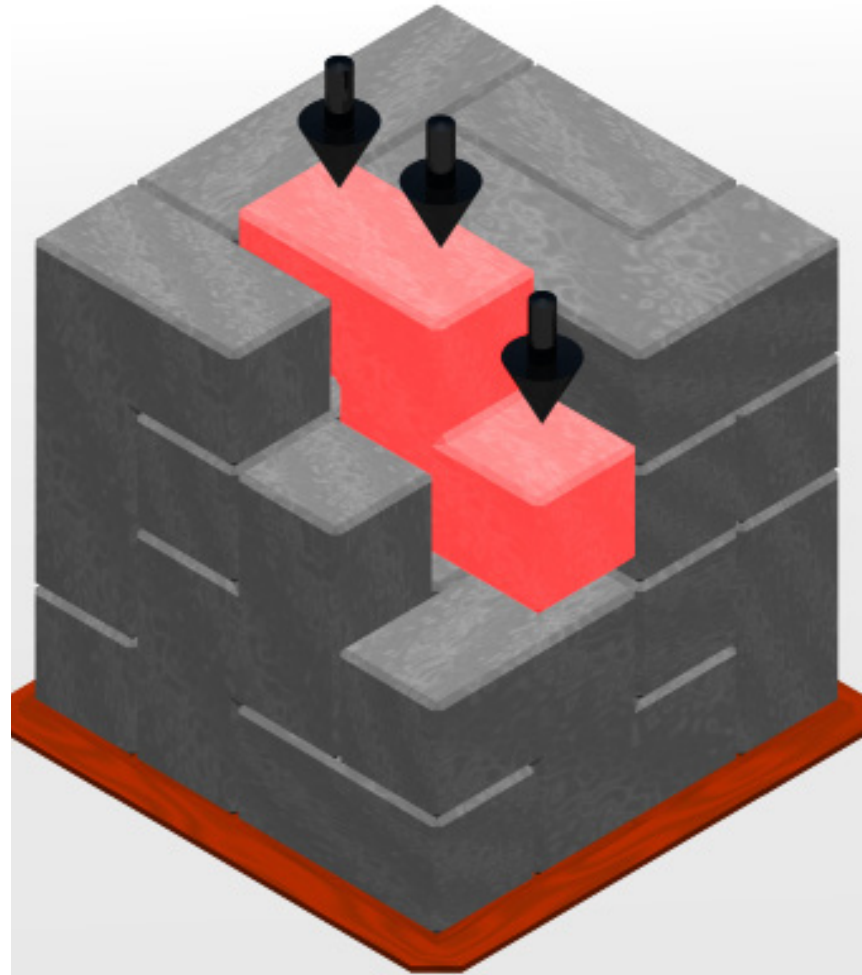
Purpose

The purpose of this game is to show the importance of planning. Although all people see planning as a useful tool, autistic people rely on it. If given a general task they will not know where to start. For example; "Please pack this suitcase" will not always work. Instead, they need direct steps, such as "Put the pants in first, then the shirts, and top off with shoes."

Development

The most important thing when showing the importance of planning is to show the contrast between having and not having it. Therefore it was decided to split the players into two groups and give them the same task. One team, however, will get step by step instructions whilst the other does not. After considering tasks from drawing to building towers, the task selected was to build a cube out of puzzle pieces. With three-dimensional 'Tetris' pieces and a 4x4x4 grid to complete, the task is very difficult to complete without instructions.

The size of the grid was chosen because of the difficulty level involved, but not being too big to fit inside the main game box. The pieces are composed of 25mm³ cubes, arranged into shapes of four blocks each. This size was chosen because any smaller would make it difficult for two people to create their cube, but any bigger would take up too much space in the main game box. Keeping the color scheme of the main box, one collection of pieces is painted black, and the other white.



GAME OF REACTION

Purpose

The purpose of this game is to show how autistic people may react in social situations. Autistic people are very sensitive to sensory input. Looking people in the eye can be a problem for them, as can crowded places or lots of sound. Most people can easily handle these things on a normal level. To understand the feeling of sensory overload, the level of input must be taken to extremes.

Development

The game centers around social interaction and the possible abnormalities experienced when communicating with an autistic person. Since all the games are developed for four people, there will be four sets of cards. Each set contains one main task, and three subtasks. The main task is dealt to one person, who is not allowed to see the subtask cards. They will then start their task. These tasks range from telling the group about their weekend to explaining the intricate details of their hobbies. As they are speaking, the other three people will perform their subtask. These tasks range from turning

their back on the speaker, simulating lack of eye contact, to moving as close as possible to the person and staring them in the eyes as they are speaking, which simulates what it feels like for an autistic person to look into a person's eyes.



FUTURE DEVELOPMENT

The following is an account of possible tasks and directions to pursue

USER TEST

There are some questions that need to be answered by user tests and surveys. These are the questions that need to be verified or answered:

Does the information given by the game stick better than a presentation about autism?

This can be answered by taking two groups. One of the groups get a presentation about autism and the other gets to play the game. Some days afterwards they have to fill in a questionnaire and thus by comparing the two groups you can see what sticks better.

Does the user know how to play the games?

Are the recorded explanations enough to be able to play the game or need to be changed? This can be tested while doing the test to answer the question if the information sticks better.

When playing the game, do the right experiences come across to the user?

Let 6 different groups of people play one of the mini-games. They will only hear the explanation how to use it. And not the explanation what kind of thing they experienced. Then you can see if the game itself really evokes the right feelings.

Are the businesses willing to play this game?

Threw the client, who is already busy with getting more businesses involved in taking employees with autism, we could by just asking businesses if they would participate.

Do the employers and employees take the employees with autism more into account than employers and employees who did not play the game before?

A person with autism has to have internships at different businesses. Half of these played the game and the other half did not. After this the person with autism has to fill in

a questionnaire about if he gets treated better by people who have played the game. Because if that changes for the better the game serves its goal.

After evaluating the outcomes of the tests some changes might have to be made to the game.

DESIGN CONSEQUENCES

Although the original design brief stated that the final product must be assembled by autistic people, permission was obtained from the project proposer and client to ignore this requirement, allowing the product to gain its full potential. As the final product includes electronic components, it became too complex for the Berkenschutse to assemble completely. However, if all the electronic components, puzzle pieces, and cards are assembled off-site and shipped to the school, the only thing the school needs to do is assemble the boxes into a complete product.

Other future developments include the possibility of material change. The current product is very heavy and bulky for a portable game. If mass produced, it would be viable to build the game out of plastic. This would reduce material costs and create a lightweight product that still maintains structural integrity.

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