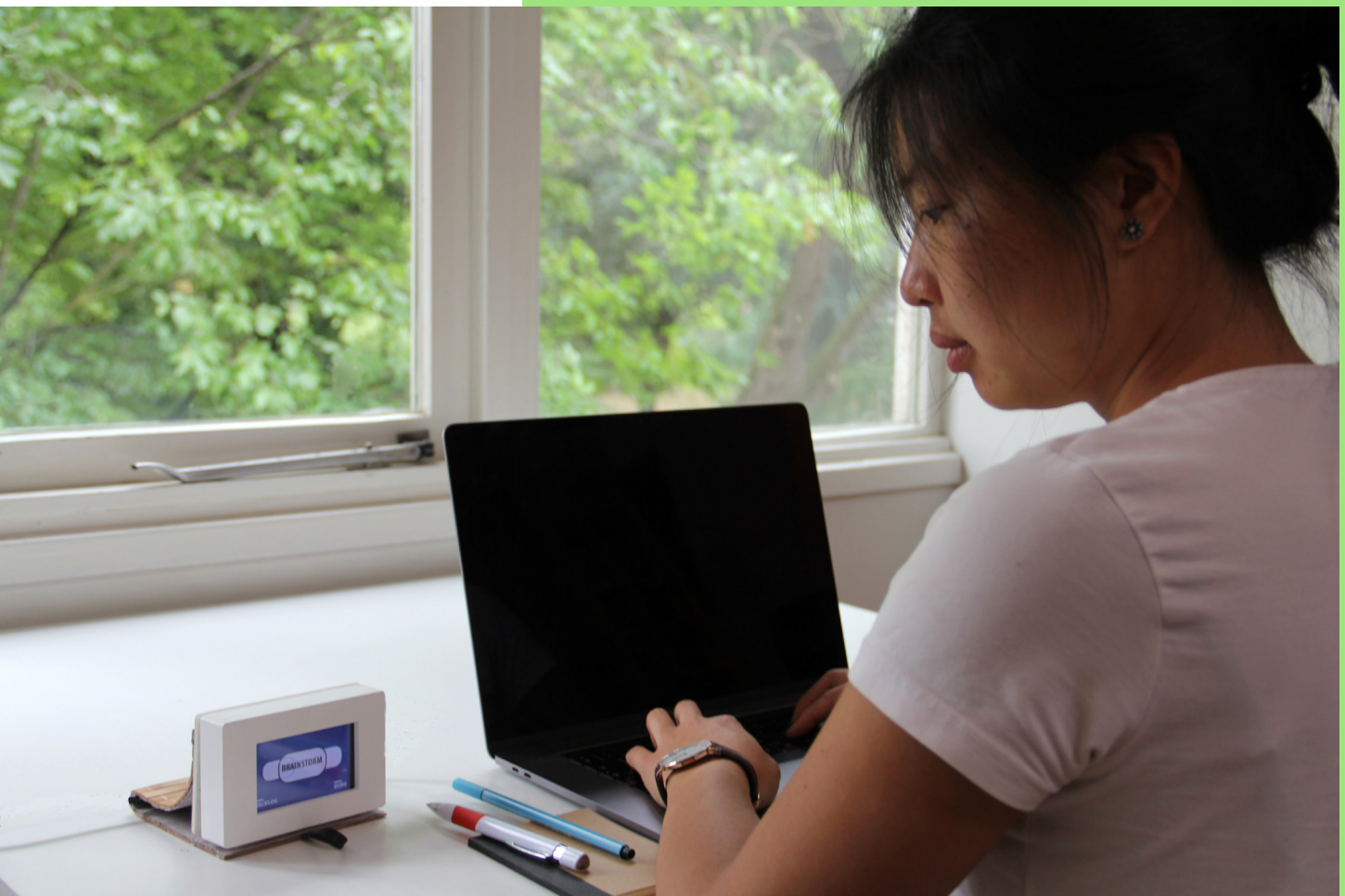


# RESHUFFLE



14.06.2018  
Final Bachelor Project by  
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Seamless Interaction Design for  
Everyday Life  
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# SUMMMARY

Stress is a serious problem that causes bad health outcomes. One cause of stress is inefficient time management. Difficulties with prioritizing tasks and willing to do too much in a day increase stress levels. Therefore, Reshuffle is designed. Reshuffle gives a dynamic representation of a planning instead of a fixed one. This allows the user to shift tasks. The system recalculates the schedule taking into account preferences and priorities. The concept is an outcome of multiple design iterations and tests. However, further research on dynamic planning related to stress is necessary draw conclusions related to efficient activity planning.

# PROLOGUE

During my Bachelor studies, I found that I like to focus on improving the Quality of Life of users. Exploring this direction has led to a vision in which I express that I think optimism is key. I believe new products and services should encourage people to become more accepting of their inner self and should inspire people to look at the positive side of problems. As an industrial designer, I like to focus on connecting the dots of all steps of the design process and on keeping the overall purpose of the design process in mind. I think it is important to involve the user in the design process to understand the needs of the user.

As a Final Bachelor Project, I did a design project in the Seamless Interaction Design for Everyday Life squad, because I wanted to design a product or service that matches the needs of the user. To affect the life of the user, I think it is important that a design influences the everyday routine of a user and that the design is integrated well into the user's environment. Therefore, I wanted to explore different possibilities of ways a user can interact with products. Hence, I wanted to learn more about the interaction-attention continuum.

The goals I set were focused on the competency areas 'Business & Entrepreneurship', 'Technology and Realization' and 'Math, DATA & Computing'. However, I also integrated the other competency areas in the project. To get a better understanding of how my concept would be implemented in the market, I wrote a brief business case. Also, I integrated steps of the Value in Product method I learned during the course Design Innovation Methods in my design process so I could get a better understanding of the user's needs. The squad focused on implementing Machine Learning algorithms. I found this a good opportunity to get an understanding of machine learning. When a product is used every day, I think it is important the product adapts to the user's behavior. Here, machine learning might be a great help.

I think it is important to derive insights from user tests. For this, I wanted to develop my skills in analyzing data by executing at least one qualitative and at least one quantitative test.

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# INTRODUCTION

There are only twenty-four hours in a day. Sometimes it feels like the hours are passing by too quickly. Doing all the activities one wants to do in these hours is problematic for many people. What to do with those precious hours comes down to time management.

## STRESS IN THE WORKSPACE

Stress is not a rare condition in the workspace. Employees are exposed to many stressors in their workspaces, such as time pressure, work overload and low sense control [18]. Likewise, students are exposed to a lot of stimuli they can perceive as stressful. For instance, high expectations about life at university, pressure from peers and pressure for high results not only directly influence the health status, bad habits such as smoking are also stimulated by stressors [10]. Stress can be described as 'any event in which environmental demands, internal demands, or both, exceed the adaptive resources of an individual or social system' [15]. Since stress is associated with negative health outcomes, it is important that the issue of stress is tackled [12].

## STRESS AND TIME MANAGEMENT

A study suggests that time management might be one solution to the problem [7]. Motivation therapy and time management interventions for students might improve emotional and cognitive reactions to stressful situations [10]. Effective time management might improve the control and might decrease the levels of stress [7]. A study among undergraduate students examined the effects of time management on stress. The study pointed out that after training about time management, the student's stress levels decreased. Also, the sense of control of time increased. Therefore, time management might help students to prevent stressful situations [9]. The sense of control of time rather than the actual planning is likely linked to stress levels. Study shows that college students who only had the sense of control over their time showed a reduction in stress levels [16].



## INEFFECTIVE PLANNING

Time robbers, such as an emergency meeting or an unexpected visitor might affect a planning. Such time robbers might affect a planning by keeping one distracted from their planned tasks. However, these time robbers might be important and necessary activities. Time management problems might occur when due to unawareness of responsibility for a task, there is not enough time to complete the tasks. The tasks are conflicting in time or last too long to complete them all in the given period. One fails to choose between tasks and therefore experiences lack of time to do the tasks. Here, prioritizing plays a big role. The impression one has failed because of uncompleted tasks might affect one's need for recognition and approval. This might cause the feeling of stress [19].

Because stress is such a problem, it is an important area to design solutions for. This design project explores different approaches to time management to reduce stress. First, factors that might influence stress caused by inefficient task management are looked at. Next, already available solutions will be reviewed. Furthermore, the design process is described. Tests and derived insights lead to the final design of Reshuffle.

# THEORETICAL BACKGROUND

## SENSE OF CONTROL

A stressor is an external stimulus that causes a stress response as output [15]. Since the response to a stressor highly depends on the perceived perception of control, a sense of control is an important matter in stressful situations. The work environment affects the individual's perception of control. It is influenced by the scheduling and pace of work. Flexible time schedules, for instance, balance work and private commitments which increases the sense of control. Also, decision making is a factor that might reduce stress [11]. A person able to control how and when they perform activities or tasks might as well increase the sense of control and therefore decrease stress [8].

## PROCRASTINATION

One can take control of their inner thoughts while pursuing a goal in a certain timeframe. Social norms influence self-regulation. Social norms are often based on a social comparison. When one fails to complete a task in time they might feel bad about it, and feel shame and guilt. Procrastination might increase the levels of stress. It links to negative self-evaluation such as difficulties to forgive oneself and a guilty feeling. Study suggests techniques for reducing stress related to procrastination would be beneficial [5].

## PRIORITIZING TASKS

While time itself cannot be changed, the way time is organized can be affected. External stimuli that cause a planning to change cannot be scheduled beforehand. Therefore it comes down to self-management. One should prioritize tasks since there is always time for the most important and urgent tasks [2]. For the heuristic approach to prioritizing tasks, different features play a role such as high costs when an activity is not finished in time. Negative outcomes when a deadline is not reached within time, give the task a certain extent of urgency. Also, the importance of the task determines whether the task should be executed first. Moreover, the duration of the task influences the priority of the task [6]. Not only those factors play a role in prioritizing, also associated feelings of a person play a role [24].

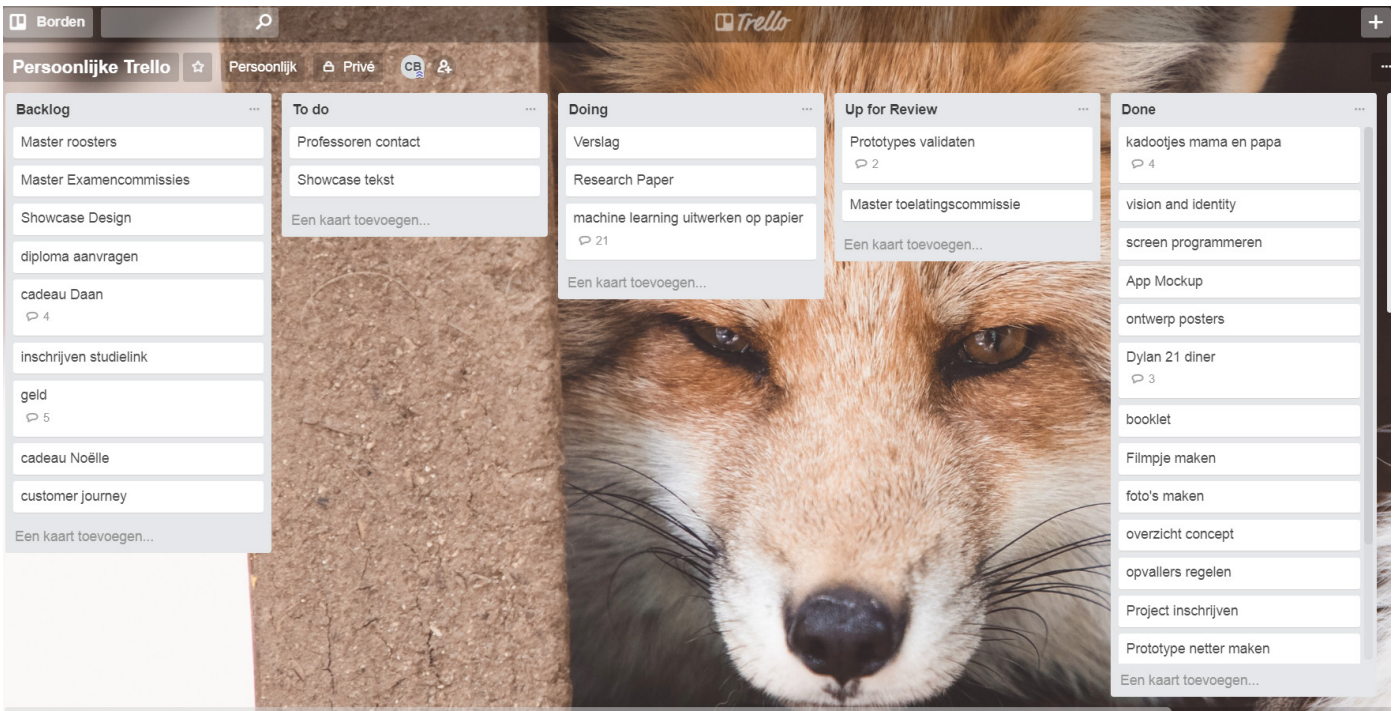
Task Matrix is a tool derived from Eisenhower's principle that importance and urgency indicate the priority of a task. The most urgent and important task has to be done first, followed by the most important but less urgent task, then the less important task but urgent task should be done and finally the task with low importance and urgency [13].



## **Interaction-Attention Continuum**

Since time is managed every day, consciously or unconsciously, it is necessary to focus on the implementation of time management in the everyday. For this, it is important to consider how the design can seamlessly fit into everyday routines. The interaction-attention continuum proposes a framework for shifting between focused interaction, implicit interaction and peripheral interaction. To seamlessly blend the design into every day, it is important to explore what type of interactions need detailed control and what type of interactions are completed as a routine task [1].

# BENCHMARKING



## SCRUM

Time management is already being explored by multiple methodologies and platform. One example is Scrum. Scrum is an agile method used to take better control of unpredictable events. Sprints form the basis for this method. Sprints are pre-set periods of time with a specific goal. For this, there is a sprint planning. For this planning, a goal is set and the ways how to achieve this goal. The sprint backlog keeps track of everything that needs to be done to fulfill the requirements of the final goal. The 'increment' lists all those items from the backlog that are considered done [20].

## TRELLO

An executive platform of the Scrum method is Trello. This is an online platform that helps to manage to do lists and projects. The system allows one to organize their tasks under the topics 'next, doing, delegating, waiting and done'. The platform gives a visual representation of all the tasks [3].

## TODOIST.COM

Another approach to keeping track of activities is Todoist.com. Todoist.com is an online platform that keeps track of all activities and tasks one has to do. It connects to all online devices so one can always add a new task to the list [22].

These platforms give the user the possibility to keep track of their activities. However, the possibility to help to reschedule can be explored further.

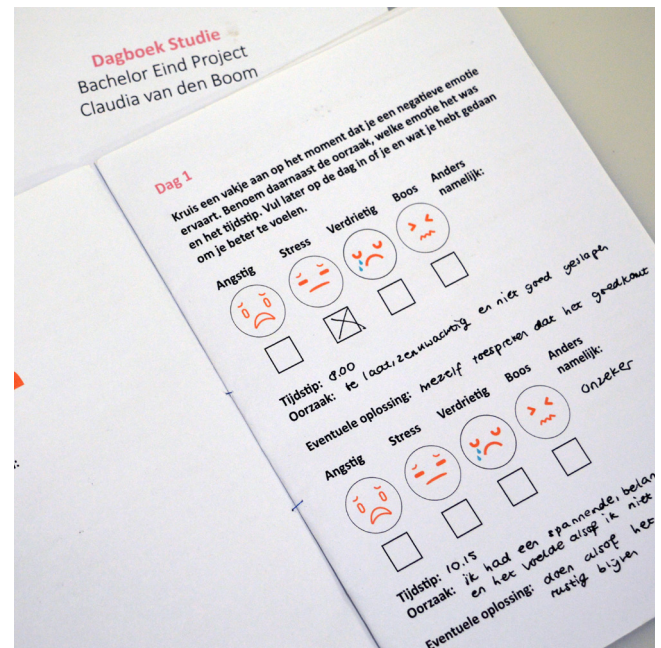
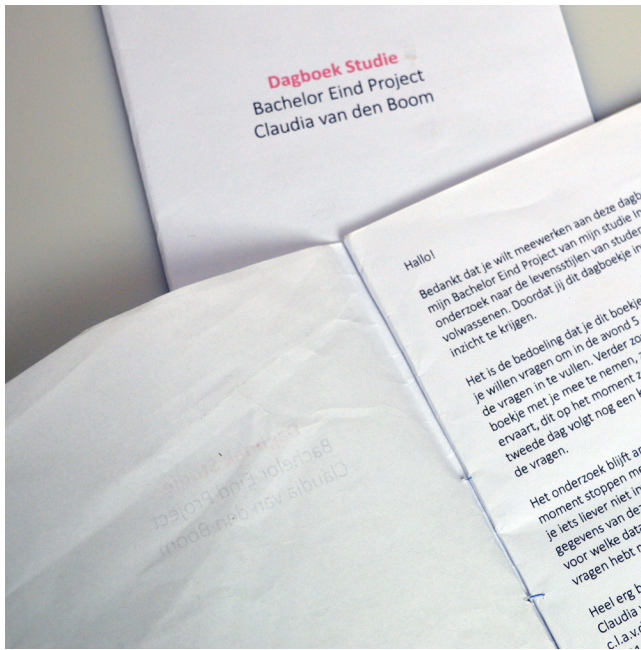


## DESIGN PROCESS

The project started by exploring seamless interaction for a better understanding of the scope of the project. Literature research has lead to a focus on the awareness of health. Next, more literature research has lead to a focus on the improvement of mental health.



# Diary Study



Next, a diary study was conducted. The aim of the test was to find out what influences the mental health of young employees and students during their everyday life. For this study, the research question was: when and why do young adults experience negative emotions?

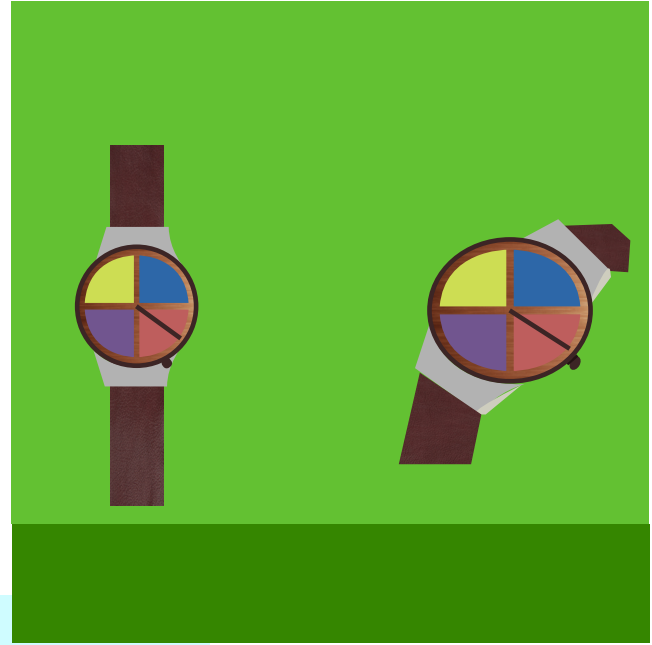
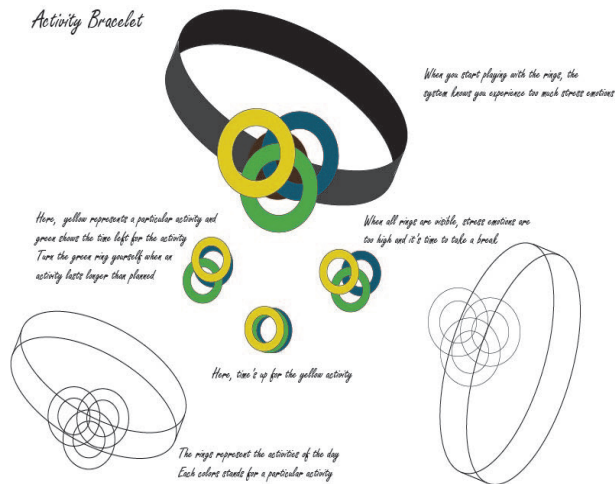
4 Participants were involved in the diary study. The participants were recruited via word-of-mouth. One young female employee, one young male employee and two female students participated. They were asked to fill in a diary for two days. In this diary, they could indicate when they experienced negative emotions, why they experienced these emotions and what they did to solve a problem. They also showed what activities they did on the days. The complete list of questions in the diary can be found in appendix A.

'Stress' was indicated as the most frequent experienced emotion during the day for all participants. Some expressed they ignored the feeling, others indicated they had trouble with dealing with the problem and therefore their complete day or part of the day was affected.

The results show that stress is a frequently experienced emotion and is caused by a stressor. A stressor might influence the mood of a person because the person struggles with their planning of the rest of the day.

The length and the size of this experiment were too small to draw credible conclusions. However, for the next step of the design process, the insights are taken into account.

# Brainstorm



The insights of the diary study were taken into account in a brainstorm to come up with a concept. Applying different brainstorming techniques lead to a first concept: a smartwatch that shows what task you should do when. It knows when you need to relax and then indicates you need to sport or rest. The smartwatch visualizes the tasks of your agenda. The smartwatch measures your stress levels and you can also indicate yourself when you feel stressed. More brainstorms lead to a smartwatch that visualizes your schedule with rings. The positions of the rings tell the duration of the task and the type of activity. The user can fiddle the rings to let the system know he or she is stressed. The system will come up with an activity that is likely to reduce the stress emotions.

# Brainstorm

## Form Exploration

In order to come up with a concept that fits in the market, it was important to look at consumer trends. The following trends were taken into account:

**Assisted Development:** adults will work in shared workspaces/live in the sharing economy and will ask for products that will help them with life skills such as realizing personal life goals.

**Virtual companions machine learning:** Makes it possible to have a realistic conversation with products and services, assistants are becoming companions.

**On the move:** people are willing to access their products anywhere and anytime they want [23].

Not only consumer trends were considered, also values were selected the final concept should entail. Such as self-actualization, saves time, simplifies, organizes, avoids hassles and informs.

To find a suitable form for the concept, multiple forms were explored using clay, sketches and paper. It was decided the form should be portable and have the ability to be moved around and to switch devices.

The concept had to be improved since informing the user he or she experiences stress, might lead stress emotions. Also, a choice had to be made between helping to reduce stress as a stress-ball-like interaction or as rescheduling assistant. Multiple brainstorms lead to two concepts:

-A device that is linked to your agenda and helps to reschedule activities

-A device that helps you to focus by visualizing a timer based on the Pomodoro Technique [4].





## Interview Psychologist

To get a better understanding of the exact problem students have with rescheduling, a student psychologist of the TU/e was interviewed. Questions were asked about how students feel about planning in general, how they plan their activities and why and how they experience stress. The interview can be found in Appendix B.

The psychologist explained most students have difficulties with saying 'no' to tasks. They do not accept when something goes wrong and want to do everything perfectly. They should accept a situation when something goes wrong and that will make them more relaxed. They should take a moment to plan their activities for the rest of the week. Also, they should accept a planning is a dynamic thing. Activities always shift.

The insights of this interview were taken into account and it was decided to combine the two concepts. The concept was now a tool that assisted in rescheduling. However, the user does need to take time to schedule the activities himself. Also, the concept involves a Pomodoro timer to help the user focus on their tasks.

# Survey

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For making a decision on the final form of the concept, it was important to know what a user prefers. For this, a survey was conducted among 69 participants. The participants were recruited via a Facebook message. The research question for this experiment was: Why do people prefer particular agenda tools over other agenda tools? The questions were about what objects the participants take with them when they go to work and why the participants use particular agenda tools. The complete list of questions can be found in AppendiceC.

The results of the survey show most participants had their laptop with them when they left their home (78.3%). Most participants (82.6%) indicated they use their phone to look at their schedule. 34% Of the participants use a paper agenda and 21.7% use Outlook.

Multiple participants (40) stated they preferred to have an overview of their tasks on multiple devices. 'I like to have a physical planning in front of me for the constant reminder' and 'When my laptop is in front of me I use outlook, but to take a quick look I use my phone' are examples of comments given.

The preference for using certain agenda tools varied. Some participants preferred their phone because they thought it is fast and easy and accessible. Others indicated they prefer a paper planner because it gives them a better overview. A lower amount of participants preferred to use their laptop/Outlook.

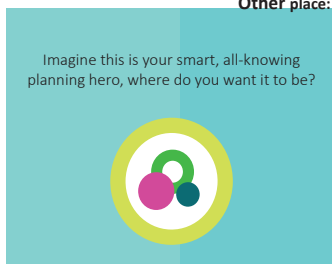
Some participants indicated they did not like to use a paper agenda because they think it is not up to date because they tend to lose paperwork. Some also state it gets messy real soon. The arguments given for not using an overview on a phone is unclear and difficult to use. Most participants state they do not like to use a smartwatch because they do not own one or they think it is difficult to use because it is too small.

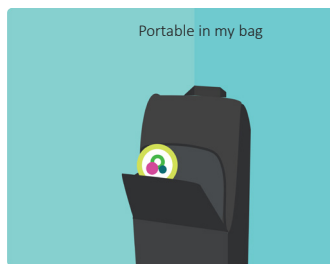
Furthermore, most participants indicated their planning changes throughout the day and they check their agenda multiple times.

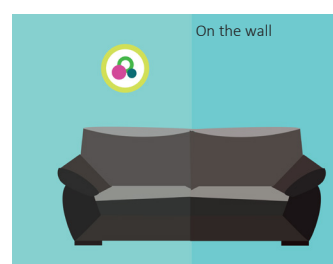
The results of this survey show that participants prefer particular agenda tools over others because, among others, it has a better overview, it is up to date and more accessible. Therefore, it is important for the final form it gives the user a clear accessible overview of their tasks which is up to date. This might be in a form that is connected to multiple devices since most participants indicated they like to use multiple agenda tools. Also, the results show a smartwatch is not the best option to choose as a form for a planning assistant.

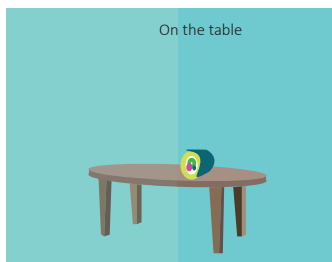


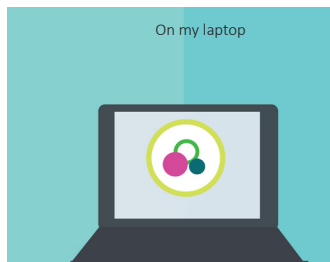
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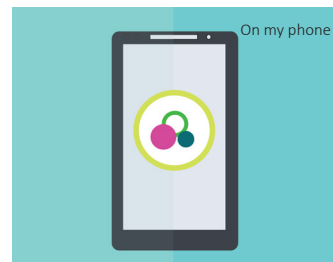













Why:



1 Participant wanted to have it on the wall, 4 participants preferred to have it on the table, 3 on their laptop and 6 on their phone

A wallet and a mirror were suggested as other options.

To get an even better understanding of what kind of form the user prefers for a planning assistant, an ABCDEF test was done. The research question for this test was: What is the ideal form for a planning assistant? 12 Participants were recruited via word-of-mouth and were asked to choose what form they would like to have their super smart planning. They were given six options and they could indicate it when they would like it to have another form. They could choose multiple boxes.

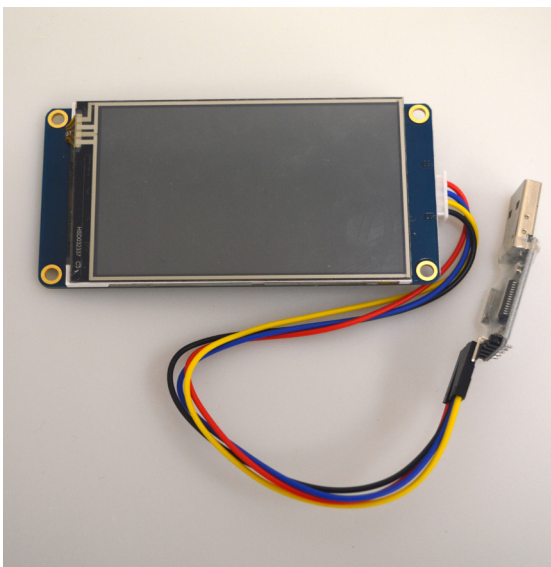
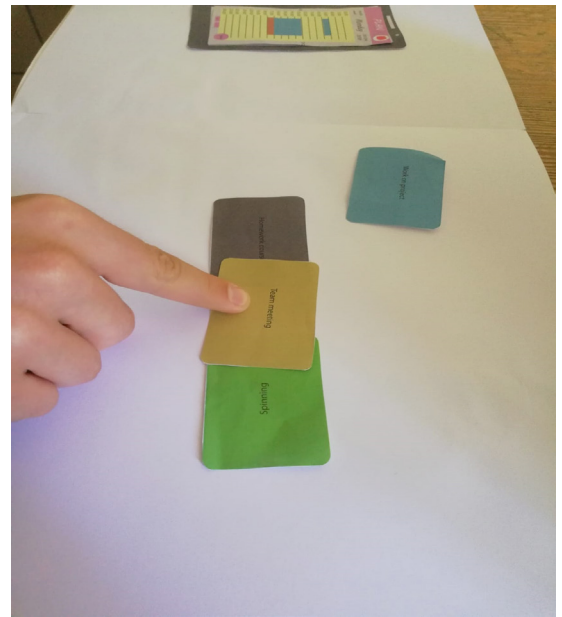
The test has to be conducted on a larger scale in order to draw credible conclusions.

Since the phone and the placement on the table were scored the highest, the results give an indication these would be the best places to program a smart planning assistant.

The next brainstormings gave the concept the form of a separate device that is connected to your agenda phone app.

# Prototyping

Now the concept was defined, it was time for prototyping. It was chosen to use a Nextion touchscreen. This touchscreen is programmed in the Nextion Editor program. This screen is relatively cheap so affordable for young employees and students. The tomato timer was programmed and the agenda visuals. Furthermore, a paper prototype of the app was made.



# Paper Prototype Test



In the paper prototype test, the interaction of the app was tested. The test was meant to look at what features still needed to be added in the app to make the concept more clear. It was also tested how the participants would treat a visual representation of a dynamic planning. Three participants were recruited via word-of-mouth. They were asked to complete the following tasks:

- Please go to the week overview
- Please go to the month overview of the next month
- Please add a new, green, fixed task with a high priority at Monday 10:00am in the office
- Please set the tomato timer for 25 minutes
- Please go to the day overview of Sunday
- Please zoom in at the task at 14:00 on Monday



The participants were all successful in completing all the tasks. However, their behavior suggested adding new types of interactions. For instance, all participants tried to add a task by double tapping, while they were meant to click on the '+' sign. Also, they tried to zoom in with their fingers instead of using the zoom button. Two participants suggested adding a contact option. Furthermore, the participants indicated they would like to read their activities from left to right. The left task being the previous activity and the right one the next activity seemed the most logical to all participants. They all indicated it would be more clear when the middle/current activity would be displayed bigger.

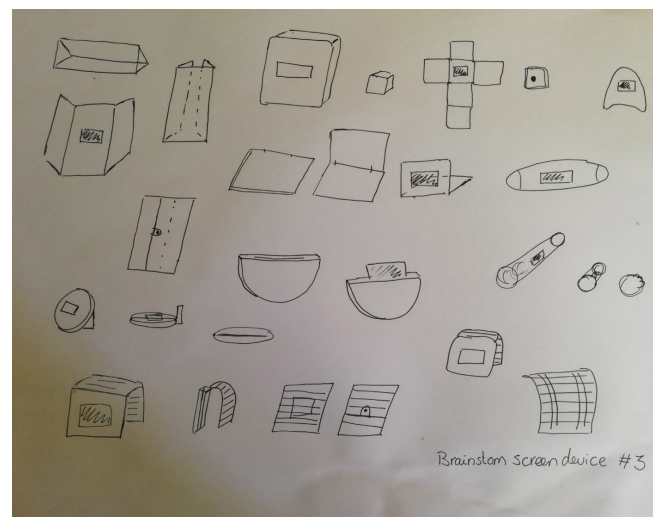
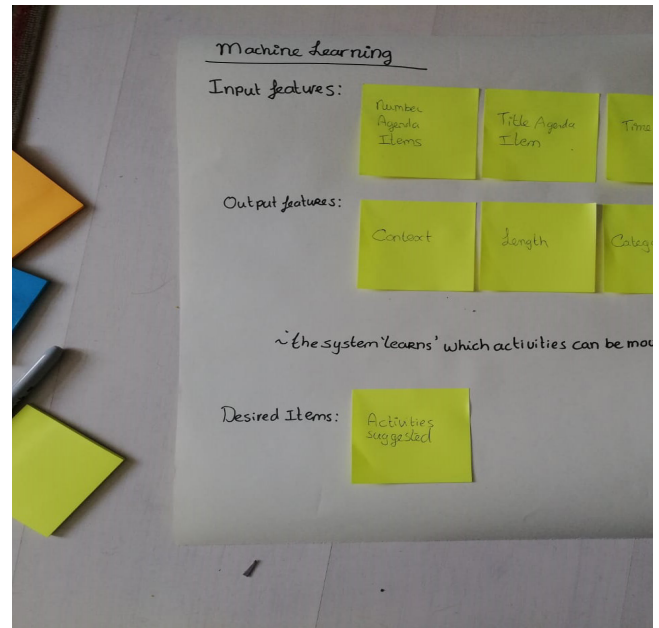
# Finalizing the Concept

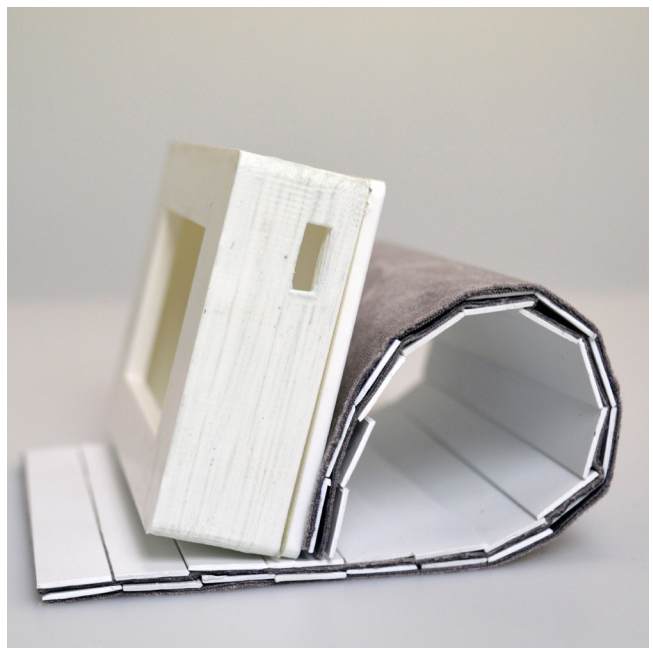
Next, the overall aim of the project was revised. Since the project aim is to reduce stress by helping people to reschedule and by helping people to say 'no' to tasks, the tomato timer was not considered relevant.

The concept of Reshuffle was finalized. For this, Machine Learning algorithms were explored by making drafts and reading literature. For Reshuffle, machine learning is needed to predict when a user wants to do what activity. This algorithm is explained further in the Machine Learning section.

The final form of Reshuffle was decided and prototyped by multiple iterations. The form represents a dynamic form. The form also represents a paper agenda. It is thin, light and portable.

The case of the device was first built with popsicle sticks to explore how the sticks would bend. Next, the case was built with laminate strips. Finally, the case was built with small bamboo slats. A 3D model was designed for the bezel of the Nextion screen. Furthermore, the Nextion screen program was finalized.

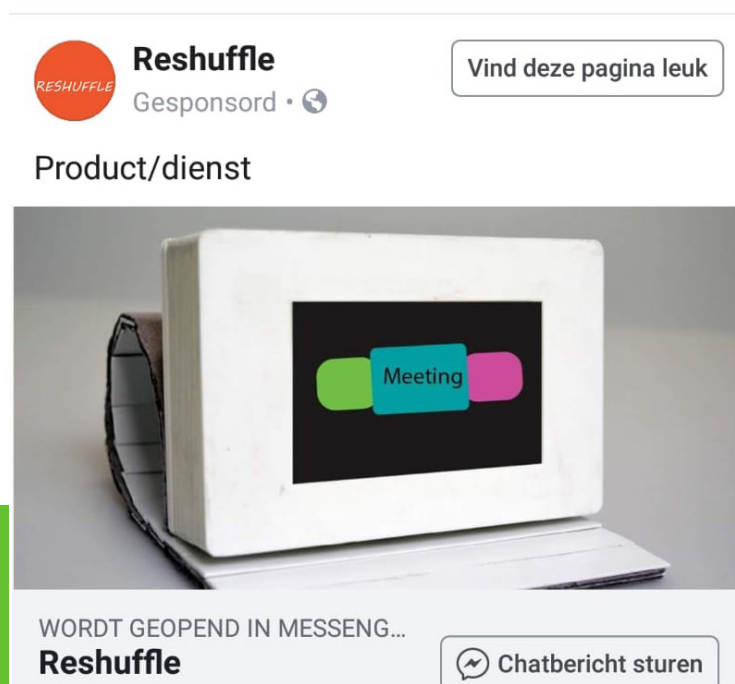




# Selling Reshuffle Online

To see if the concept is a product that customers would like to buy, a fake Facebook advertisement was made. The research question for this experiment was: are potential customers interested in the concept? The advertisement was linked to a landing page. This page explained the concept of Reshuffle. The advertisement was online on Facebook for two days.


The results of the fake advertisement test show that the advertisement reached 4057 people. Thirty people in total clicked on the advertisement. This is 0.74%. The average click-through rate for Facebook advertisements is 0.90%. So the advertisement for Reshuffle scored lower than the average. However, the advertisement of Reshuffle included a low-fi mockup photo. Therefore, an advertisement with a high-quality photo should be tested to see if this generates a higher percentage.



**Reshuffle**  
Gesponsord • 🌐

Vind deze pagina leuk

Product/dienst



WORDT GEOPEND IN MESSENG...

**Reshuffle**

Chatbericht sturen



As the last step, a validation test was done by asking questions, showing the prototype, asking what they think the prototype was and how they would use it. The main research question of this experiment was: is Reshuffle a concept the participants might want to use? The questions that were answered during this experiment were: Might Re-shuffle solve the problems the participants are facing with scheduling activities? What problems do participants experience with rescheduling? Do they understand the concept of Reshuffle? The interview questions can be found in AppendiceD.

Three participants were recruited by word-of-mouth. One participant was a male student, one was a female young employee and one was a female student. They were first asked general questions about rescheduling. Then they were asked if they understood the prototype and how and when they would use the prototype.

The answers of the participants are clustered in eight main clusters:

## **Planning shifts**

Yes of course my planning shifts sometimes  
Yes actually indeed, my planning shifts

## **Now rescheduling by memory**

Often that I think about it in my head  
In my head I am shifting them all  
My head plans my schedule the night before  
In my head I make a new planning  
Then I adjust it in my head  
I sometimes forget to do things

## **Feeling of guilt**

When it are tasks that I have to do with other people I feel guilty  
I always think that is stupid, mainly because other people also experience the consequences.

## **Irritated**

Otherwise I feel slightly irritated  
It depends on the situation, sometimes I feel really stressed

## **Need for overview importance**

But that depends on how high the pressure is of the activity I want to do next.  
I need structure

## **Visible overview**

It is visible  
I need to open Google Calender specifically to see what I have to do but I can just immediately see this in my house  
I think when you put it down you always get reminded of the tasks

## **Helping hand so no need to spend time thinking about rescheduling yourself**

It seems to be a helping hand  
So I think it is better that you do not have to adjust your planning all the time because it does the rescheduling for you  
I can keep it near me so I always know what the most important thing is what I am working on  
Then I don't have to think about anymore what shall I do

## **Easy access**

Pocket model is easy to carry with you.

# FINAL CONCEPT

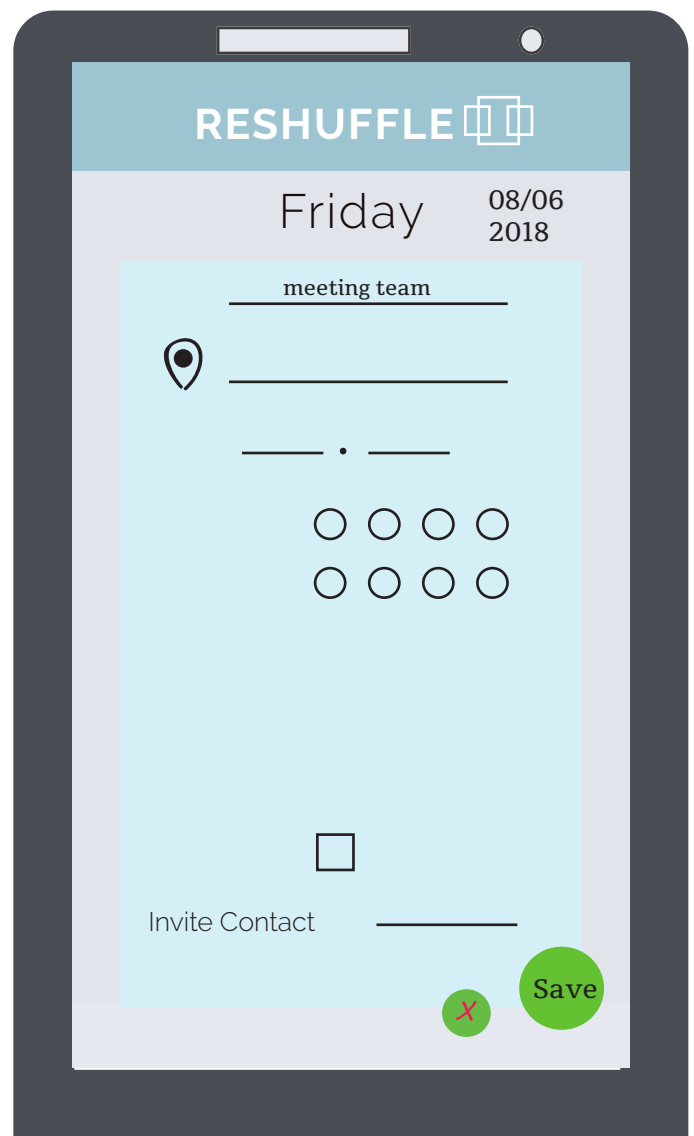
Reshuffle is a smart planner that gives you a dynamic instead of a fixed overview of your agenda. You can shift through your tasks when an activity lasts longer or shorter than planned. The system will automatically recalculate your schedule. The system will take your preferences and priorities into account.

Each task is shown in the pre-set time frame. When you finish an activity earlier than you expected, simply click on the next activity. Click on the previous activity when the activity lasts longer than planned. Your schedule will automatically be recalculated.

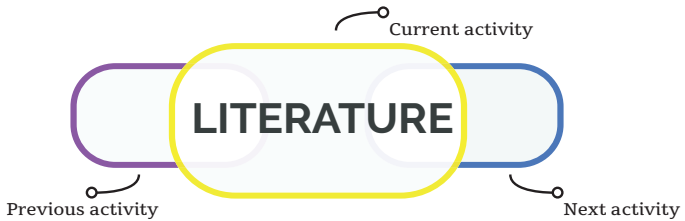
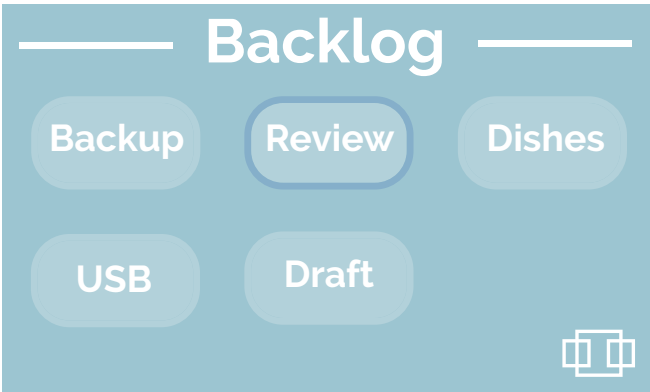
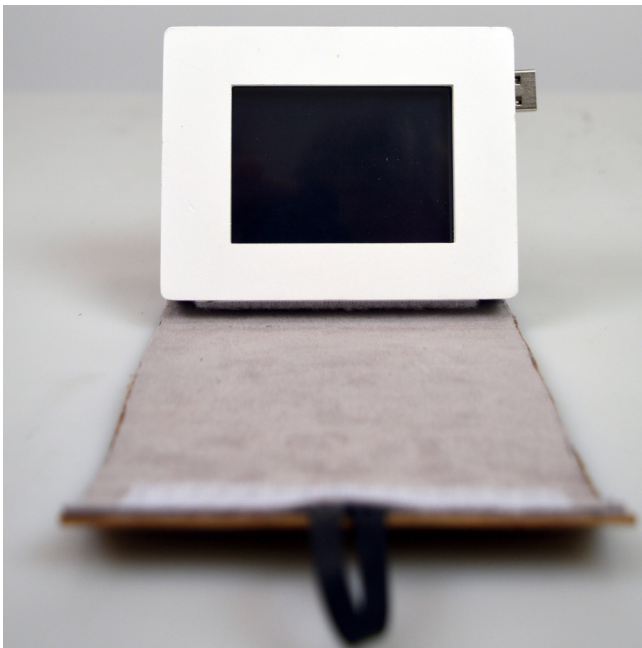
In the app, you plan your activities. Here you can indicate the importance and the urgency of the tasks. You can also set your time boundaries for each day.

The backlog keeps track of activities that you want to do, but you don't know when you want to do them. The system suggests doing these activities at a suitable time slot. Tasks that are rescheduled more than three times or tasks for which there is no time slot available are automatically moved to the backlog. You can also move or add tasks to the backlog yourself. The backlog is shown on the screen of Reshuffle as well. When there is time left in your planning because, for example, an activity lasted shorter than planned, the system makes a suggestion to do a particular task. You can now move the task to the backlog or move it to the 'done' page. You can get an overview of your backlog and done list by clicking on it.

Reshuffle is a portable digital device that is connected to the Reshuffle APP. The case of Reshuffle functions as both a case and a standard. The case is made of small and light bamboo slats and soft fabric. Gauze between the fabric allows the case to bend on one side and to reinforce the standard when bending to the other side. Reshuffle can be carried around and be put down on the table. The screen of Reshuffle is supported by a plastic bezel. Reshuffle has a touchscreen that can either be operated with a digital pen or by touch. The Reshuffle app is an agenda app with the backlog, done list, fixed activity (not able to shift in time), urgency and importance indication as extra features.







# ALGORITHM EXPLAINED

Since Reshuffle is not fully programmed yet, machine learning is not yet integrated into the prototype. However, an understanding of how the algorithm should work is explained. The system makes suggestions to do certain activities when there is not enough time to do all the tasks planned in the schedule or when there is time left to perform tasks. A recommender system is proposed.

For this, the system is first taking a look at the available data. This is the input for the algorithm. The system starts with a simple filter: what is the available timeslot for the tasks? The activities that have a longer duration than the available timeslot are automatically excluded. The tasks that have the same or shorter length are included. However, there is a margin of 5%. So the tasks that are 5% longer than the available timeslot, are considered. Next, the machine learning classification system is recommended, since the output is expected to be a category instead of a value. The proposed input features are the duration of tasks, the length of the available timeslot, the importance of tasks, the urgency of tasks and the day of the week and time of the day. The duration of tasks is given as a starting time and an end time. The day of the week, the time of the day and the time are all included as one date/time object. Since the class attributes year, day, time, month, duration can all be derived from this. The duration is calculated in minutes since a smaller time indication is out of the scope of the aim of the concept.

Content-based learning is executed with the use of a k-NN algorithm. The algorithm used is an instance-based algorithm. This means the algorithm develops a data list it compares new data to. A training set and a test set is prepared. This dataset is divided into a 80/20 distribution, to avoid the problem of overfitting when the data is not generalizable. The expected output features of the algorithm are day of the week, time of the day and category of activity. K is an even number,  $k=10$ , to avoid a tie. The duration, importance, urgency, and date are mapped on the edges of a 4D box, a graph with 4 axes. The Euclidean distance formula is used to measure the distance between K and its nearest neighbors. The neighbors of K are the 10 points plot on the 4 axes that are closest to K. When the 10 nearest neighbors of K are chosen, they are all compared to the user profile. The activity that comes closest to the user profile, is suggested as an activity. Once in ten times a random suggestion is made to avoid overspecialization. Also, the distance between Saturday and Sunday is bigger than the distance between Monday till Friday, since the activities done during the week are more similar than the activities done during the weekend [14][17][21].

# DISCUSSION

Reshuffle is a concept that might be able to partly reduce the symptoms of stress caused by a low sense of control on one's planning and worries about rescheduling. The results of the user evaluation test showed that the participants indeed experienced some problems with rescheduling, such as not writing it down that an activity shifted and then forgetting about it and a stressed or irritated feeling when something shifted in their planning. Also, for two participants the feeling of guilt played a role when other people were involved in their shifting activities. The results show participants valued a helping hand for rescheduling their tasks.

The backlog of Reshuffle might tackle the problem of saying 'no' to tasks because the user does not have to eliminate tasks for which there is not enough time. These tasks can be placed in the backlog or will be scheduled at another timeslot. The system does not calculate the complete schedule for the user. The planning of the activities is a focused interaction. The users have to plan their activities themselves at first which might give them a sense of control over their planning.

Also, the recalculation of the tasks takes into account the prioritizing of the tasks, which might reduce stress levels as well. Peripheral, focused and implicit interaction are all incorporated in the concept, therefore, the design has potential of fitting seamlessly in the user's environment. Looking at what activity to do on the screen and shifting between these activities is an interaction that shifts between peripheral and focused interaction. The automatic rescheduling of the tasks is an implicit interaction.

# DISCUSSION

Since only three participants were involved in the validation user test, further research using the concept is needed in order to find the effect of a dynamic planning on the levels of stress. Also the prototype of the concept used was a mockup. Therefore, a realistic interaction was not possible during the test. The visible cable to the screen, unclickable areas and low quality of a touchscreen might have influenced the results. Further research should use a prototype of higher quality in order to check whether the concept of Reshuffle might have an influence on stress levels. For this, it is important to research the effects of Reshuffle on stress levels for a longer period of time in order to draw relevant conclusions. Also, the levels of stress should be measured to see the effects of a dynamic planning. Next, it is important to research the influence of a dynamic approach on planning for other target groups. Other forms of a dynamic planning should be explored.

With better prototyping skills, programming skills and ability to pay high costs Reshuffle can be built as a high fidelity prototype. The Nextion screen should be connected with an Arduino to Android App Developer which would enable the Nextion screen and the Reshuffle app to exchange information. Reshuffle is not yet in its final form. The results of the validation test showed that a visible overview of a planning without having to open it particularly is valued. Further research should be done in order to define the most relevant form for Reshuffle. For now, taking into account the theoretical research and the results of the conducted experiments, Reshuffle's final form might be a visible screen that can be opened on any device without having to change programs. This screen can be thinner and lighter. Furthermore, taking into consideration consumer trends, the future form of Reshuffle might be a personal companion assistant that is able to empathize with the user. In this concept, Reshuffle might also be able to advice you on the length of tasks. For instance, when you misjudge the length of a certain activity multiple times, the system can make a suggestion to plan the tasks for a longer or shorter period of time. The form for this personal planning assistant might be an augmented reality doll or a video of a realistic person.

## BRIEF BUSINESS CASE

To be able to sell Reshuffle to real customers, a business plan should be made. Reshuffle would be a manufacturing business. The problem statement for Reshuffle is that young adults experience stress emotions caused by difficulties with saying 'no' to tasks and difficulties with rescheduling tasks. People might benefit from buying Reshuffle because the system will help them rescheduling tasks and will make suggestions to do tasks at suitable timeslots.

Reshuffle is a concept that might be sold as a product to young adults. The product is made of plastic and fabric which makes the product cheap in production costs. The bamboo slats are integrated in the product to give the product a robust and high-quality look.

For now, Reshuffle is a small portable device connected to the Reshuffle app. The costs of 10 Reshuffle devices is estimated to be €250,-. This costs will increase when a highquality touchscreen is integrated but will be lowered when a larger amount of products is sold. The app of Reshuffle can be bought for €2,- in the App and Android store. The device of Reshuffle is presented as a tool that gives you a better and accessible overview of your agenda. The customer can buy this tool for €40,-.

The next iteration of Reshuffle, the personal companion rescheduling assistant, can be another extra tool that can be purchased on the Reshuffle website. Reshuffle can expand its range of products by adding more products that relate to the general aim of Reshuffle: reducing stress symptoms in the workspace.

For realizing this business model, experts to realize the concept are needed such as an experienced programmer. Reshuffle can cooperate with the App store and Android store for selling the app, with a web host for selling the Reshuffle device, with Facebook, Instagram and TV programs for adverting the product and with a packet delivery company for delivering the bought products.

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# APPENDIX A - diary study

Hallo!

Bedankt dat je wilt meewerken aan deze dagboekstudie. Voor mijn Bachelor Eind Project van mijn studie Industrial Design doe ik onderzoek naar de levensstijlen van studenten en jong volwassenen. Doordat jij dit dagboekje invult, help je mij om hierin inzicht te krijgen.

Het is de bedoeling dat je dit boekje twee dagen lang invult. Ik zou je willen vragen om in de avond 5 minuutjes de tijd te pakken om de vragen in te vullen. Verder zou ik je willen vragen om het boekje met je mee te nemen, zodat je als je negatieve emoties ervaart, dit op het moment zelf kunt invullen. Aan het eind van de tweede dag volgt nog een kleine vragenlijst. Nadere uitleg volgt bij de vragen.

Het onderzoek blijft anoniem. Indien gewenst mag je op elk moment stoppen met het invullen door welke reden dan ook. Als je iets liever niet invult, laat de vraag dan gerust open. Ik zal de gegevens van deze studie gebruiken om een conclusie te trekken voor welke data ik wil verwerken in mijn concept. Als je verdere vragen hebt mag je dit altijd laten weten aan mij.

Heel erg bedankt!

Claudia van den Boom

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Door hier mijn handtekening te zetten, ga ik akkoord met bovenstaande,

# APPENDIX A - diary study

Geboortedatum:

Ik ben een:



Vrouw



Man

Studie/Baan/Dagelijkse bezigheid:

## Dag 1

Kruis een vakje aan op het moment dat je een negatieve emotie ervaart. Benoem daarnaast de oorzaak, welke emotie het was en het tijdstip. Vul later op de dag in of je en wat je hebt gedaan om je beter te voelen.

Angstig	Stress	Verdrietig	Boos	Anders namelijk:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Tijdstip:  
Oorzaak:

Eventuele oplossing:

Angstig	Stress	Verdrietig	Boos	Anders namelijk:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Tijdstip:  
Oorzaak:

Eventuele oplossing:

\* English version is available on request

**Algemene korte beschrijving activiteit in de ochtend:**

*Bijvoorbeeld: ik ben in de ochtend naar college gegaan*

**Algemene korte beschrijving activiteit in de middag:**

*Bijvoorbeeld: ik had een teammeeting om een project te bespreken*

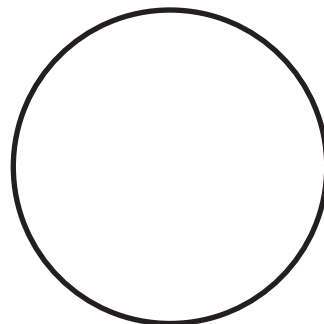
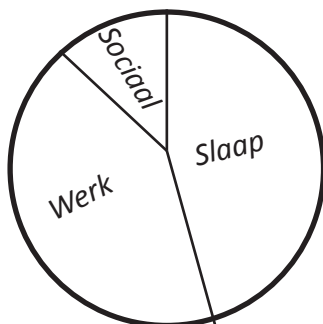
**Algemene korte beschrijving activiteit in de avond:**

*Bijvoorbeeld: ik heb afgesproken met een vriend om bij te kletsen*

**Mijn verdeling van sociaal-,werk-, slaap gerelateerde activiteit vandaag:**

*Hoe verdeel jij de percentages van de activiteiten die jij vandaag hebt gedaan. Hoelang had je gister nacht geslapen? Ben je vandaag sociaal bezig geweest? Heb je vooral veel gewerkt?*

*Voorbeeld*

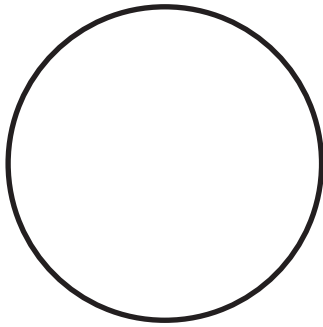


# APPENDIX A - diary study

## Vragenlijst

*Graag de volgende vragen nog beantwoorden*

**Hoe ziet jouw ideale verdeling van de dag eruit wat betreft sociale-, werk- en slaap- gerelateerde activiteiten?**



**Waarom ziet dit er zo uit voor jou?**

**Wat zijn voor jou sociaal gerelateerde activiteiten?**

**Wat doe jij meestal om je stressgevoelens te verminderen?**

**Waar ligt meestal het probleem voor je stressgevoelens of andere negatieve emoties denk je?**

**Indien je stress ervaart, wat zijn hier de gevolgen van voor jou?**

# APPENDIX B - interview psychologist

Stress is certainly a big problem. A lot of students (and actually everyone else) deals with it. Your concept makes sense. Think what thoughts of a person you have to convey in the system so the system knows what to do.

Actually is focus times memory automated. You have to focus in order to get something in your memory. Later on something automated doesn't cost any energy anymore and that reduces stress. For example planning. You put some effort in it in the beginning. Take a fixed time in the week to make your planning. That reduces the amount of work and thinking you have to put into it during the week.

Everything is priority: for example it's your dad's birthday, your best friend has a birthday party and you have a deadline the next weekend; everything needs to be done. People need to do a lot of themselves. They have learned to be critical. You are much nicer to your friends than you are for yourself with the same problem. You have to be more kind for yourself. It has to do with accepting your situation. Can I spend more time on that task? No? Then tomorrow is another day. Think already about how you want to deal with it.

A person can focus for 40 minutes maximum. That is not long at all. Nowadays the focus is much shorter due to many incentives. People have to do four times as much. New house, new social activities, taking care of your own money income, more choices and also social media, new social activities, that is the life of the student now. Often it is not possible to execute the planning the way it is planned; you have to have another view on planning. A planning is not fixed, they shift but meanwhile they do help you.

A lot of students come with stress complaints, fear of failure; you have to make the test very good for yourself.

A low level of stress is okay but the stress level really has to lower. The best rhythm is regularity.

# APPENDIX C - survey questions

What is your age?

What is your gender?

What is in your bag today?

- Laptop, Charger, Mobile Phone, Notebook, Paper Planner, Pencil Case, other

I look at my schedule on my

- Phone, Paper Planner, Smartwatch, Outlook, other

Checked multiple boxes? Why do you use multiple items?

What item do you prefer and why?

Which item's don't you use and why?

Generally speaking, how many times a day do you check your agenda?

Do you adjust your agenda during the day? Why or why not?

# APPENDIX D - user validation questions

What do you do when your time planning changes during the day?  
How do you feel about activities that last longer or shorter than originally planned?  
How much time do you normally spend on planning your activities?  
Is planning something you feel confident about or do you maybe have difficulties with planning?

## **show prototype**

What do you think this is?  
Where would you put it or take it?  
Where would you use it for?  
How would you use it?

## **Explanation**

In what ways is it different than making a planning in the way you are used to?  
Now you know what it is, how would you use it?



**BRAINSTORM**

BACKLOG

DONE





Final Bachelor Project by Claudia van den Boom  
Seamless Interaction Design for Everyday Life  
Coached by dr.ir.S.Bakker

