Foster Individual Productivity at the Workplace

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Ab stract

This project began with an interest in the productivity of the individual. How does the definition of productivity change when altering the perspective from a team to the individual?

The context of this project is very intentionally limited to the individual workplace of an employee. The opportunities of an understanding of individual working techniques and personal strategies that employees develop to cope with mood changes throughout their working day can offer great insights and possibilities to guide and help the individual in accomplishing their personal work goals. The shift of perspective from designing for an entire working environment to the focus of individual productivity is one of the goals in this graduation project.

Ack now ledge ments

Many thanks go first and foremost to the excellent graduation team that helped me tackle the significant challenges of this thesis. Both Gert Pasman and Haian Xue were an exceptional team, providing the insightful and critical feedback necessary to push this project forward continually.

Additionally, I would like to thank both Lacoste Germany GmbH and Aiderly GmbH for their continued involvement in the project. All employees involved in the process of testing and giving insightful glimpses into their daily working life made this project possible.

Lastly, I would like to express my most profound appreciation for Adeline, who was consistently supportive throughout this entire process.

1

Approach

Introduction

Work is constantly changing and evolving. To approach the current status of the working environment, a look back is necessary to understand those changes. Two significant developments are crucial factors to consider for the research phase of this project.

The change from manual to knowledge work brought with it important changes to the way of working today.

The introduction of the personal computer and later the smartphone were essential milestones for the tools of today's workforce. How smartphones started to blend work, and personal life is also an essential factor in the overall productivity of the knowledge worker.

The research phase of this thesis project is divided into two parts. Literature research will examine the changes and consequences of the shift from manual to knowledge work and how this change influences the perception and measurability of productivity.

Furthermore, will the literature research include a closer look in the influences of the smartphone and its effects on the work-life balance and consequences towards individual productivity.

Mood is an essential factor, especially in the shifting workforce of knowledge workers. As will be later discussed, a definition of productivity for knowledge workers is closely tied to the individual, unlike the output which can easily be measured for manual labor.

To understand individual productivity, we have to follow the individual. To do so, we have to grasp an essential influence on productivity, which cannot be ignored in the fundamental equation of productivity maximization: Mood states.

The second part of the research phase is field research. With knowledge about individual productivity at hand we will be interviewing knowledge workers within their context. Closely examining their individual workspaces and effects as well as consequences on their productivity are central questions to be answered. Furthermore are individual working routines and habits

Research Question

The project assignment was broken down into a single research question as follows.

How can knowledge workers enhance their individual productivity at the workplace?

This question can further be split into three distinct subquestions:

How can the productivity of knowledge workers be measured?

What are the relations between mood and productivity?

What are vital influences in the workplace that affect productivity?

As can be seen in Visualization 2, each sub-research question uses a specific research method within this early phase.

The initial question of measurement of productivity is essential to the later design process. In order to design an intervention that can enhance the worker's productivity, it is critical to be able to measure the influence of those intervening concepts. As the output of workers has drastically changed from the manual to knowledge work, it is beneficial to understand what changes have brought about the knowledge worker who is central to this thesis project.

The correlation between productivity and an individual's wellbeing or mood state are closely tied together. Positive mood states result in more creative problem solving (Vosburg, 1998) according to Vosburg. Even earlier to Vosburg's thesis, Weisberg already found positive correlations between productivity and mood (Weisberg, 1994).
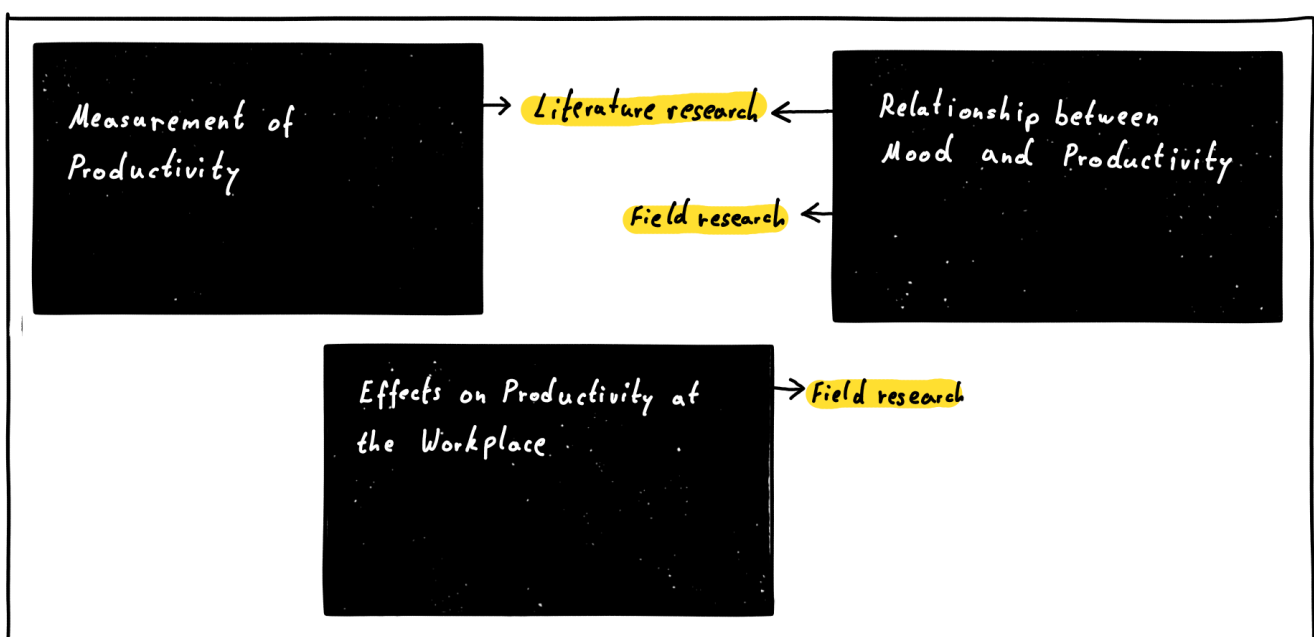
Both field research and literature research are proper methods to answer this question. In terms of field research, the technique of interviewing help uncover further qualitative insights with the quantitative basis from literature reviews.

The last research question regarding effects and influences on individual productivity is a perfect candidate for further field research. Both observation and in-context interviews help unfold qualitative insights.

Process

The process of the overall project can be broken down into three distinct categories. Research, Design, and Validation.

Initial literature research regarding the above-mentioned research questions will already provide new answers and the necessary quantitative backing to explore the topic of individual productivity in context further.

Field research will be conducted in context with two participating companies. The full immersion and direct contact with knowledge workers allow for observation. Furthermore, interviews are also prepared with employees at the two respective companies.

In total, six interviews and observation sessions help to gather necessary qualitative insights for the relationship between mood and productivity and the overall effects on productivity that exist within the workplace.

With the necessary knowledge and insights at hand, the iterative design process will commence. Iterative testing and prototyping of ideas ensure a constant and validated design process. Testing will also be conducted in context. The learnings and problems uncovered during this iterative process will help to perform a final more extended product test to validate the final design.

Literature Research
Field Research
Design Concepts
Testing in Context
Validate
Deliver
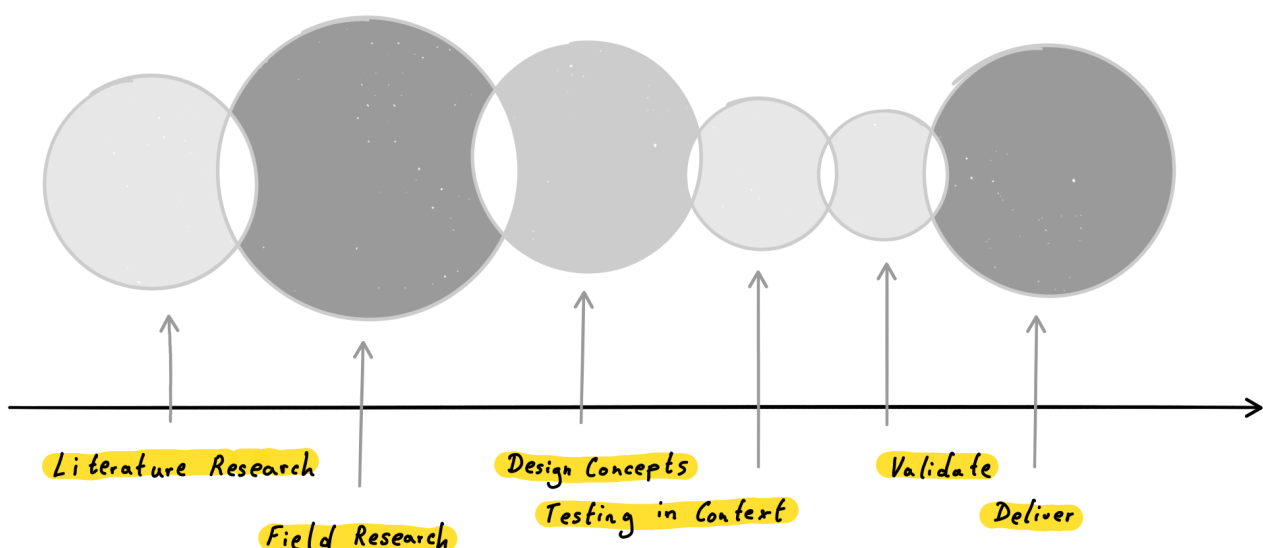
2

Literature Research

To approach the diverse field of individual productivity, gaining a general understanding of productivity at the workplace is critical.

Knowledge Worker

In to understand the influences on and gain a definition of individual productivity, it is paramount to go into the changes within the workplace throughout the last century.

Although the 20th century with influences of the industrial revolution resulted in an immense increase in productivity for the manual worker, the 21st century marked the rise of productivity for the knowledge worker.

Manual Worker Productivity

Frederick Winslow Taylor was one of the first economists to analyze and study manual labor. In his analysis, Taylor showed that there was no such thing as 'Skill' for the manual worker. By observing the motions, a manual worker would perform, he understood that manual labor consisted of simple repetitive motions. Taylor would then develop an understanding of essential movements a worker would need to complete and increase productivity, which he would define as the output a worker would produce. By removing

excessive motions and undesirable behavior that does not directly contribute to the workers' production Taylor directly contributed to more productive manual labor.

The knowledge Taylor developed is strictly applicable to manufacturing work and measures productivity by the output produced. Taylor's methods work with very defined processes that can easily be labeled. In contrast to the very defined environment of the manual worker, the knowledge worker is a territory which is still very underdeveloped in its analysis it deals with even more undefined, individual and subjective influences that directly result in productivity.

Knowledge Worker Productivity

Drucker explains how crucial the group of knowledge workers is becoming for developed countries. More and more manual labor in developed countries is shifting toward knowledge work, which makes it essential to create a language and understanding of its productivity (Drucker, 1999).

The productivity of a knowledge worker cannot merely be measured in quantitative output; quality of work is an essential component.

Drucker lays out six distinct factors which determine knowledge work productivity.

Six Productivity Factors

According to Drucker

1. **Definition**

The task at hand needs to be understood and defined.

2. **Autonomy**

Knowledge workers need to take responsibility for their productivity and need enough freedom to make decisions for the task at hand.

3. **Continuous Innovation**

Innovation and continuous openness for change is an important factor for the resulting productivity.

4. **Learning**

Knowledge work requires constant learning.

5. **Quality**

The productivity of a knowledge worker cannot simply be measure in quantitative output; quality of work is an essential component.

6. **Asset**

Unlike the manual worker, who is easily replaceable and seen as 'Cost' for an enterprise, knowledge workers need to be treated and valued as an asset of the company.

Task Definition

Unlike manual labor, where tasks are dictated and delegated, an essential part of productivity is not the measurable execution, but the definition of the task at hand. Deciding what to do next is a crucial daily question for knowledge workers.

Furthermore, as stated in the six requirements by Drucker, quality is a more crucial and vital element of judging knowledge work. Drucker says that the definition of the task, of what to execute, dramatically influences the outcome and its quality. In the end, the definition of quality ultimately comes down to the definition of the task.

Capital Asset

As already stated earlier, the relationship dynamic between company and employee dramatically changes when observing the transformation from manual labor towards knowledge work.

Manual workers are overall seen as a cost to an enterprise, and the objective with costs for a company, is to reduce them as much as possible and in turn, promote profit. Manual labor is extraordinarily controlled and replaceable. The means of production, frequently machines, and other tools are in the hands of the enterprise and not the workers.

In stark contrast to manual labor, knowledge work seems to turn positions. Workers are seen as an essential asset, taken care of and nurtured by companies. The means of production, working habits, strategies, and most important of all, knowledge itself are in the worker's possession and easily portable to other companies. This fluidity of capital assets forces companies to the other side of the table and makes their relationship with workers both symbiotic and dependable.

Stress

The working environment can have a stressful impact on employees. Karasek's Job Strain Model (Karasek, 1979) tries to lay out a formula that represents the leading causes of stress at the workplace.

$$Strain = JobDemands + DecisionLatitude$$

Stress or mental strain is a result of the job demands that are projected on an employee and the distinctive capabilities that a worker has. Karasek argues that high job demands and low abilities of decision making result in high mental strain.

As we already discovered in Drucker's depiction of the knowledge worker, individual decision making is more critical than ever. In combination with Karasek's Job Strain Model, decision latitude becomes a fascinating and invaluable asset for further research.

Karasek continues an analysis on working environment influences that directly influence the overall well being and mood state of employees.

Involuntary Attention

The concept of involuntary attention uses the example of natural environments within workplaces as an example. Karasek describes the therapeutic capabilities of those natural scenes. They require close to no efforts from the individual involved but provide an opportunity for mental recovery. Thayer's model on mood regulation, which will be later discussed can be connected to Karasek's concept of involuntary attention. High tension arousal levels can be regulated by involuntary attention. The influences of the natural environment provide opportunities to lower tension levels and in turn recovery from mental strain.

Mood Regulation

As already mentioned before, the mood regulation model by Thayer provides essential guidelines that can successfully decrease Job Strain and in turn, boost productivity for employees at the workplace.

Not everyone does practice mood regulation tactics or even pays attention to their current mood states. It is, therefore, from profound interest to investigate and understand the mood regulation process and principles to changing mood states.

According to Thayer, tension and energy levels are the most significant influences on mood states. As tension and energy represent the foundational ingredients for mood generation, changing their respective levels does result in mood regulation and alteration. Increasing energy by going for a walk and reducing tension by taking a hot bath, are promising strategies for dealing with negative mood states.

Energy and tensions levels both increase in relation up to a certain level that Thayer describes as high tension-energy. This relation falls apart in both extreme energy and tension levels, resulting in tense-tiredness and moderate energy levels. The latter, as pointed out by Thayer are desired mood states for its low tension levels. Contrastingly, tense-tiredness is summarized as a depressed mood state.
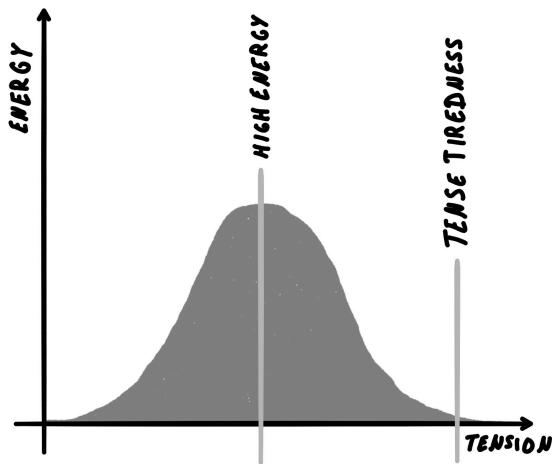
As can be seen in the relation model above, as tension increases, to a certain point along the x-axis, energy steadily increases. After the high energy point shown in the graph above, energy starts to fall as tension still increases, leading to a depression state described by Thayer.

Once we flip the axis, and energy is plotted for tension levels, we get the same graph, only now we end up in the positive mood state of calm energy, which releases tension in high energy levels.

Thayer provides a biopsychological model of mood changes. As already laid out before, both energy and tension arousal are responsible factors in mood states. This two-dimensional model is central to human behavior and affects individuals daily, especially while working. As the two arousal levels are responsible for mood changes, manipulating them can result in beneficial mood regulation. Thayer found interventions ranging from physiological to psychological to be successful in changing both tension and energy levels. Social engagement, cognitive and physical exercise are all beneficial for mood regulation.

An important aspect when looking into mood regulation is gender differences. Both men and women respectively respond differently and prefer other mood regulation strategies. Social support, in low energy, high tension mood states is distinctly more preferable with women. Alcohol and drug use are likely mood regulators for men in weak energy mood states.

According to Thayer's mood theory, moods are associated with two arousal components. The range of both high energy and tiredness as well as tension and calmness are the essential two arousal dimensions that culminate in mood perception.

According to Thayer, optimal mood states are associated with reduced tension, but higher energy, so-called calm energy states. On the other hand, the more negatively connotated mood states are on the different spectrum with lower energy and higher tension levels.

Finally, we can take into account two general mood regulation strategies that Thayer lays out in his paper. The evident approach of reducing negative mood states, but a tremendous neutral mood-enhancing regulation are direct energy and tension affecting actions by the user. Of course, negative mood states are an undesirable condition and can be altered by either influencing energy or tension level through activities. Interestingly Thayer concludes that already neutral mood states have the potential for enhancement, by, for example, drinking a glass of wine in the evening to alter neutral tensions levels for an even better mood state. Thayer's strategies are incredibly eye-opening and provide a theoretical basis for further research activities.

Individual Productivity

Based on the readings during the research phase, a preliminary definition of an individual productivity can be translated.

The proper scope set for this project allows the neglect of the influence of the overall office space. Although external factors of the office environment do directly contribute to the productivity and mental wellbeing of the employee as laid out by Karasek and his example of natural scenes within the office and the positive effect of sunlight penetration, those influences are effecting the overall mood state of the entire office.

To understand individual productivity, the direct influences, and factors, which are individually addressable need to be observed and followed. The desk of employees is an excellent example of a source of individual, external factors that affect and directly contribute to productivity.

Furthermore, the current mood state, which is another source that can be defined as an internal factor on productivity, is directly manipulatable and individually accessible.

For a definition of individual productivity, the scope of the knowledge worker is critical. As already laid out by Karasek's Job Strain model, decision latitude is not only affecting employee stress level's, but their productive ability. Especially knowledge workers are the part of the work force that takes on more significant responsibilities in autonomous and self-managing ways. Knowledge work is both operational and strategical, which makes it such a valuable asset for companies. This nature of knowledge work also scopes its

definition of productivity heavily on the worker's capability and willingness to make decisions.

The hypothesis of achieving higher productivity through the alteration of both internal and direct external factors at the workplace needs evidence, utilizing a design intervention that manipulates both external and internal factors to foster individual productivity.

3

Field Research

The initial intervention scope limited the thesis project to the desk at the workplace. Naturally, to further broaden the research, in context research was necessary to surface possible design opportunities within that scope. The focus was especially being shifted to the worker as an individual within the working environment and the unique behavior that characterizes individual productivity. Furthermore, the desk itself as a workplace was to be understood and analyzed. Existing objects at the desk and their effect on individual productivity as well as functionality and value for employees is another critical aspect of the research.

The criteria for the selection of companies that would participate in the research was intentionally limited to open space environments. Open spaces are prone to distraction and frequent communications between colleagues and employees. The already existing interruptions caused by the open office environment itself can surface more instances of so-called productive disruptions for employees and in turn, offer better insights into problem spaces for individual productivity than traditional office spaces.

Furthermore, the type of enterprise was also a criterion for selection. To ensure broad applicability of insights that would result from

the research, both small and large scale enterprises had to participate.

The two companies that resulted in participating in the research were Lacoste Germany GmbH located in Munich and Aiderly GmbH located in Berlin.

Lacoste is a fashion brand, and the German subsidiary in Munich mostly handled logistics and operations within the country. The size of the company as a large enterprise and the fact that its offices were indeed open spaces resulted in its selection. Furthermore, work at the company is purely knowledge work and therefore ideally applicable to the premise of the thesis project.

Aiderly is a very young startup that was just founded a little more than a year ago. The company develops management tools for nursing homes and is located in Berlin. Aiderly perfectly presents the opposite pole to Lacoste in terms of size and stage of the company itself. The team also works together in an open space and the constellation as a startup helps to compare working processes towards a larger organization.

Furthermore, the choice of individual participants was also carefully selected for overall representative results. Three female employees at Lacoste and three male employees at Aiderly would be participating in the research and later on usability tests for the project. Additionally, the positions of those participants were equally important for the insight outcomes of the investigation.

Two employees with primarily operational tasks at Lacoste could correctly layout their processes and productivity techniques. The third employee was working at the director level and responsible for the entire marketing team at Lacoste Germany. This level of responsibility and oversight would not benefit to insights regarding personal productivity, as tasks are more related to strategy and management than individual productivity. The director would instead present a perspective from the opposite side and contribute insights in that regard.

The participant selection for Aiderly was equally distributed. One intern with less strategic decision making and a lot of operational workloads was taking part in the research. Two participants were founders and saw themselves as more managerial than functional, although the team's situation as a startup would instead show the opposite. The small group of six people at the time would instead distribute tasks equally. There was strategical decision making for the two, but their knowledge as a software developer and finance manager would reflect day to day workload primarily.

Interview Preparation

The initial interviews would be conducted at the employee's respective workplace, not only to gain a glimpse into their work but to also do the research directly at their individual desks and to conduct an in-depth analysis of tools and products that are already manifested at their workplace. Further points of interest for the interview were the ability of decision making throughout the day and self-organization methods. A significant benefit was the self-reflection of employees to what extent influences on decision making do already exist. Thayer's mood theory of the energy tension model and the existing influences at the workplace that directly affect energy and tension levels provide a solid foundation to also research employee's recollection of mood changes throughout the day and their connection to focused productivity sessions. An initial approach to research the link between mood and productivity was the use of the experience sampling method. Due to the limited availability of employee's and the intrusive nature of the technique, the ESM was unsuitable for the project.

Every interview would follow the following talking points. Initially, the topic of research would be broadly presented and laid out. Furthermore, the essential elements and focus on individual productivity would be displayed. The importance of decision making, based on the transformation from manual labor to knowledge work would be briefly explained to give participants the necessary context on its importance. Then the decision-making process on assigned tasks and overall workload would be discussed and which tasks are delegated

and how much decision making power is left to the employee. How does an employe prioritize, and how is this prioritization process influenced? How are decisions directly influenced? All those questions regarding decision making are central to an understanding of productivity. As already discussed in the paper by Drucker, the importance of decision making for productivity is crucial.

Following a deep dive into decision making is a detailed description of a typical workday. How does the day start? When are breaks? Lunch breaks? These questions give the participant the feeling of security and the ability to talk about a topic the participant thoroughly knows. Furthermore, it provides the research with an opportunity for insight from areas previously not included.

Finally, the interview ends with a walkthrough of all objects currently on the employee's desk, talking about their use and functionality as well as their possible influences on decision making.

Anna

The first interview took place at Lacoste with Anna (fictional name) who is mainly responsible for affairs regarding customer relationship. Anna's primary tool for tasks is her inbox. The first thing she looks at to prioritize, is the title of an email. She will check the headers from emails that arrived from the evening before until the morning.

> ❝ *The first thing I check is my mailbox!*

Anna mainly uses her work inbox as an organizer for the day. Although she uses the timeline of the arriving emails as an initial way to sort through them, she mentions that the originator of the email is just as important. In case some of her managers are the originator, she will prioritize those first.

When asking Anna about her mood states throughout the week in regards to her work, she reports that there are two different types of days for her. One of those, is a day where Anna has a clear understanding of her tasks ahead and goals to achieve for that day. This type of workday is commonly met with extreme motivation and joy.

> ❝ *Because I know I have a kind of purpose for the day.*

Interestingly, Anna justifies her mood states with the argument of purpose. She knows that she is needed and has responsibilities and essential tasks to be worked on.

The other type of workday that Anna mentioned is one where nothing 'Important' is happening and all deadlines have been met. She describes it as a 'kind of chill day' where she doesn't have to stress herself, but at the same time feels bored. When further asking about the organization and origins of those different days, Anna also talks about how she in advance already plans specific tasks for different days. She describes how urgent emails evolve into more prioritized emails which have to be dealt with as soon as possible, whereas some emails such as customer care are less relevant and can be postponed to less busy workdays.

> ❝ *I know if I don't complete those tasks, that I am the only one that is impacted by that.*

When further asked about deadlines, which do result in productive work days for Anna, she does admit that giving herself deadlines is not

something she does and that she indeed needs someone to do that for her.

Furthermore, when asked whether those less busy days can also involve stressful mood changes, Anna responds by elaborating on the fact that those less prioritized tasks mostly impact her work and the dampened stress level usually results in less productivity for that type of workday. She further elaborates in detail, the impact of the tasks on the overall business and people involved. Anna has a three category prioritization system divided into high, medium, and low impact. Every email and resulting tasks are categorized into one of those three priorities.

> **To be completely honest , I think I am a little bit lazy and that's why I don't give myself deadlines.**

What is hugely insightful about Anna's remarks about deadlines is that when she does have a day packed with tasks full of deadlines and stressful situations, she does feel more valued as an employee and in turn motivated in her mood state.

The remaining day, Anna tries to focus on the tasks at hand but quickly gets distracted by incoming emails and new tasks, which makes her work very balkanized. She ends up working on multiple projects and many things at once. When asked to reflect on it, she reports that she would be bored to work on a single task and that days where only one unique project needs work, she feels bored and less valued as a member of the organization.

Additionally, when talking about breaks through the day, Anna elaborates on the fact that she doesn't take enough 'regular breaks,' but does have many moments through the day where she loses herself in thoughts, which is often triggered by her phone. She quickly glances at her work phone, which is always lying with the screen facing up on her desk.

> **My phone is always near me.**

The glance is frequently at the current time and an opportunity for Anna to disconnect from her work life thinking about personal affairs.

> **I will push the home button and look at the hour.**

When further talking about tools and task-management, Anna mentions that the process of writing things down as an essential part of her workflow. She will look at tasks on her computer and write them down on a piece of paper, but rather than keeping those to-do lists, Anna throws them away and doesn't continue to use them anymore. For her, the act of writing is an important part. She explains how it is helping her memorize specific tasks.

> **When I write it down, I press print.**

The last part of the interview involved an overview of Anna's desk and her remarks on the individual objects and its functionalities and uses. Workplaces at Lacoste have a clean desk policy, so the company provides most products that are already on the workplace. Products such as the computer monitor and the stationary telephone are company provided. Anna's iPhone was directly positioned next to her computer with her keys. Furthermore, her physical notebook, which she mainly uses to write down tasks to memorize, serves no other archival purposes as previously discussed. Other than that Anna doesn't have different objects of interest directly located on her desk.

Amelie

The second interview was with the e-commerce manager of Lacoste. Amelie (fictional name) is responsible for all online product sales and third-party vendors that sell Lacoste products online. When asked about her daily routines and organizing her day, Amelie describes how reports are an essential element in her workday. As she is dealing with sales figures and numbers, managers above her and the headquarters in France are continually asking for sales reports. She has to prioritize other reports from her managers and talks about how there is little time to focus on her own sales figures from the e-commerce market.

When further going into detail about her prioritization process, she explains that if an incoming task comes from a 'Head,' it has to be dealt with as soon as possible. In case it is affecting other people in the business, such as customers, it will be prioritized as well. Her work, on the other hand, the work that directly impacts e-commerce, is kept at the lowest priority. Amelie continues to explain how she often continues her work at home, and the low priority for her work comes from a feeling of 'No stress.' She can take her time at home to finish work that only directly relates to her own field.

> 66 *So I keep myself, I think at the bottom of the list.*

The exciting insight from Amelie's remarks is that the missing stress turns out to hurt Amelie's ability to finish her work at the office. As her reports do not directly impact or require

any other person at work, she can take her time at home and slowly finish her tasks there.

In the interview, Amelie further explains how the involvement of other people in tasks affects her mood states. She describes how the participation of others make the task itself more stressful because deadlines are involved.

> 66 *If I'm preparing something for another person, it's more stressful, because there is a deadline. So I have to be quick and good with the content.*

Amelie also uses her mail inbox as a tool to manage tasks. Unlike Anna's simple prioritization method, Amelie uses different topics, such as marketing or sales, to assign different emails to. Interestingly, in case a person above Amelie is involved, she will create

a separate folder for the person to assign the task to. In case a task has been completed, Amelie moves it to the archive.

Just as her colleagues, Amelie also uses a physical notebook to write down notes for tasks. She describes how she uses those notebooks across companies. She keeps all her old journals from previous companies, which gives her the ability to look back into older notes for reference.

> **I go back and take a look at my notes.**

She considers her notebook as very private, something that is just for her. She sometimes even writes down notes in her mother-tongue, Turkish.

Amelie, when asked about her phone interestingly enough, reports that it is always located directly on her desk. She uses it as both a work and personal phone and wants to be in the loop in case there is an emergency with her son.

> **As I have a son, it is always in front of me, because I want to see if there is an emergency from the Kita (Kindergarden).**

When talking about the office environment, Amelie discusses how the open space does promote communication and collaboration, but it also hinders productivity in terms of individual work.

> **Throughout the day, because it is an open office, it is not so efficient all the time.**

Another interesting insight that Amelie reported during her interview is the social pressure that she experiences while colleagues interrupt her during working hours. Amelie doesn't want to be rude towards her co-workers, so an inner conflict between continuing her individual work, which piles up and talking to her colleague arises.

> **I don't want to be rude, but inside I feel stressed.**
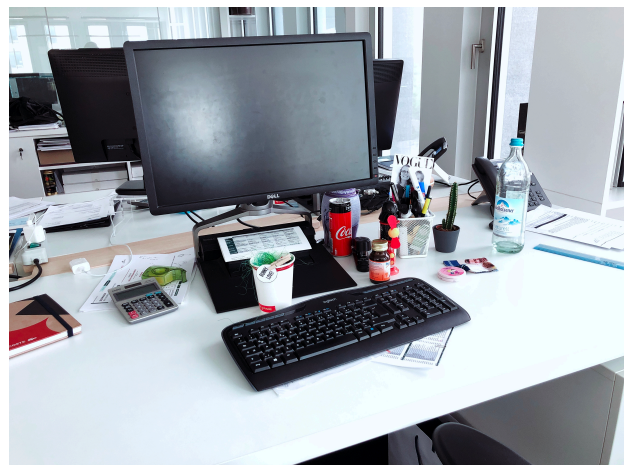
Francine

The last interview at Lacoste was with the marketing director Francine (fictional name), who is overseeing the entire marketing team of seven people. Francine is in charge of all marketing operations within the German market. Just as Anna earlier reported, Francine is also primarily using her inbox as her primary source for organizing her day.

> **" When I come to the office in the morning, the very first thing is to look at my emails.**

Interestingly, Francine does not even initially sort her inbox by date, but directly by the sender. She uses a list of people she reports to and goes through them to see whether new communication came in since the day before. After going through the emails by sender, Francine changes the filter to sort by date to go through the remaining mails.

As a manager of an entire team, Francine reports how she selectively chooses, where to engage in ongoing communications. Ongoing projects and deadlines have priority, and other issues that arrive in her inbox can easily wait.
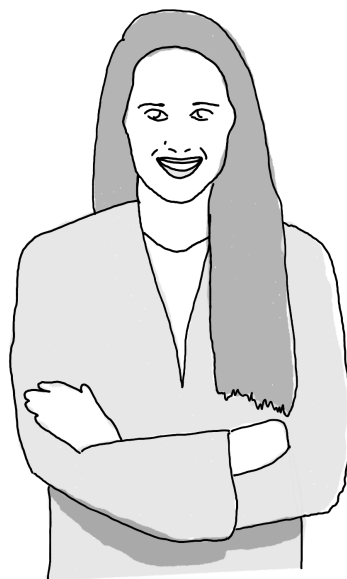
Early on in the interview, Francine goes into detail about how she has to distinguish proactive and reactive management behavior. Her morning routine of going through her email is reactive behavior, which is followed by quick notes and to-do's written down in her physical notebook. Francine describes her email as being operative and her physical notebook as a strategical guideline to her management.

Francine's further day is usually packed with meetings. Intentionally, she leaves an hour in the morning free to be able to go through emails and work on her strategic notebook. In case there are no meetings, she is mostly involved with her team. She further elaborates how her role does not include many operative tasks but rather management and strategy work.

> **Throughout the day, I am extremely packed with meetings.**

When further going into detail about the value of physically writing down int the book, Francine stresses the personal significance it has. It's her book, with her unique history. She also goes into length about her own unique way to strike through finished to-do's.

> **I love to have my notebook with me, containing my very own history.**

When asked about how much focused desk work Francine does through the week, she explains that as her work is mostly strategical, little time is spent doing operational work, and she would estimate that around 20 percent of her time is spent that way.

Francine also reports that the open space promotes communication, which she encourages as she wants to be there for her team in case projects need help.

Mood states were also discussed during the interview, and Francine says how stress is usually perceived as a very positive emotion for her. It helps her to get things done and results in very productive sessions.

> **Most of the time it is positive stress, it really gives me this boost to be motivated, productive and effective.**
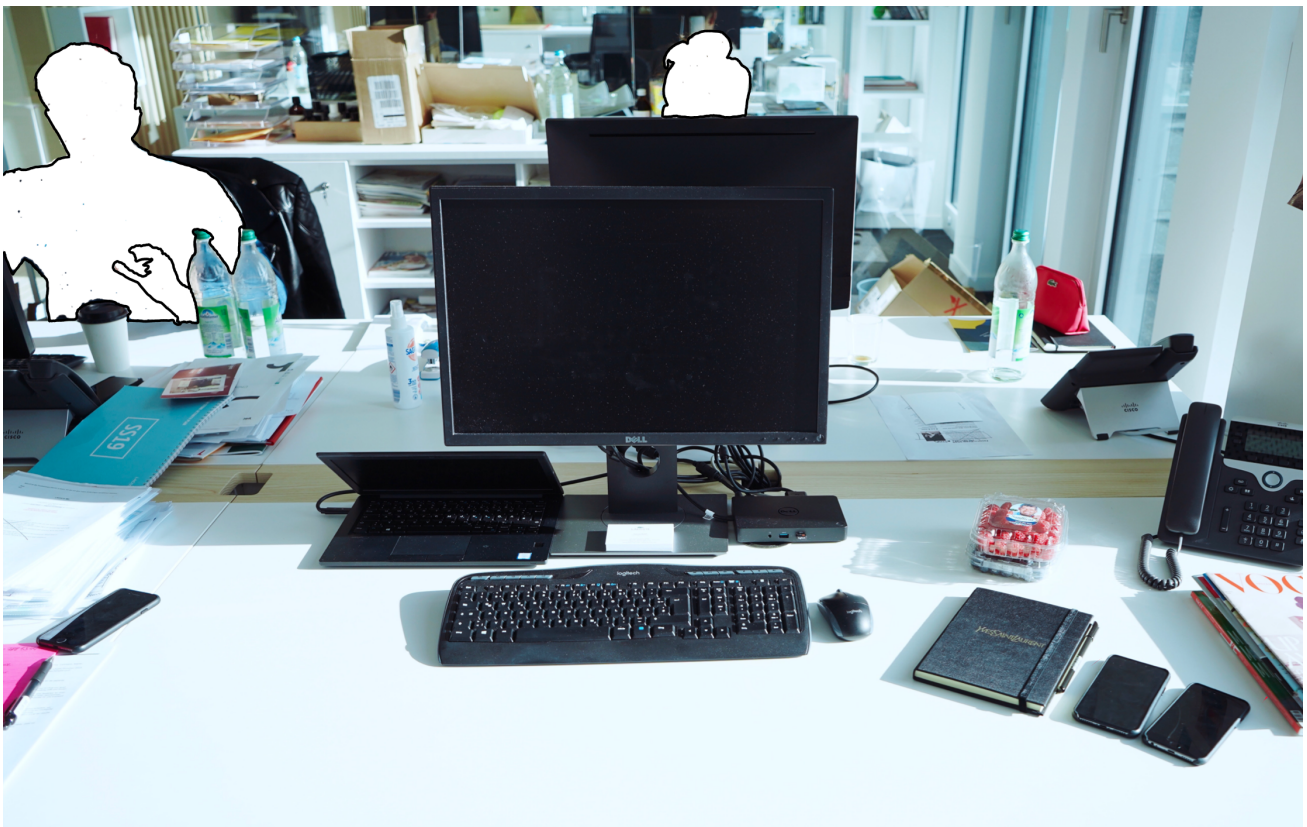
Markus

Markus is one of the founders of Aiderly and mostly responsible for technology. Even though Markus has a managerial role within the company, he has to work on a lot of operative tasks throughout the day. The very young team usually self manages itself, and communication between individuals happens on a communication tool called Slack.
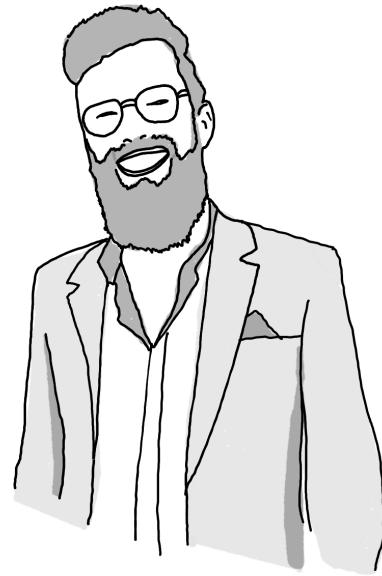
Markus usually checks while still being at home where to go. Quickly checking his calendar and emails, he decides whether to go to a meeting or the office directly.

Three primary tools are in use for Markus to decide which tasks to tackle once in office. He uses posit's on his desk to note down urgent tasks directly concerning him. Furthermore, he uses a tool with the team called Asana. This task management software visually displays tasks as a scrum board, which is directly shared through the team. Lastly, as Markus is mainly working on technology-related tasks, he uses another service called GitHub, which is a tool for managing Aiderly's software products.

Markus explains that the many distractions at work make it very hard to focus. He usually wants to be home by six in the evening to continue some of the work.

> ❝ *I make sure to be home by 6PM, so I can continue to work without distractions.*

When further talking in detail about the distractions at work, Markus explains that peer pressure to, for example go for a quick cigarette or have lunch forces him to pause his work and get out of his focus mode.

> ❝ *Oftentimes I say that I need five minutes to finish, while in reality I still need around half an hour.*

Prioritization is usually based on urgency for Markus. In case contracts need to be signed or approved, those tasks are completed right away. On the other hand, if Markus needs to work on some coding-related task, he usually chooses the personally more exciting tasks for him to complete. On the other hand, in case Markus isn't feeling energetic, he would instead do more manageable tasks.

While talking about deadlines and self-management as well as mood states, Markus elaborates that he has so-called phases of productivity. As an example, he brings up his last weeks work. During the first three days of

the week, he accomplished all his goals for the entire week which halted productivity for the rest of the week.

> 66 *It was more of an excuse to do less.*

Lastly, while talking about Markus' workplace, one thing that directly stood out, was the phone visibly placed, screen up right next to the laptop. When asked about the phone, Markus says that while coding during the day, he usually turns it around, so he doesn't easily get distracted. He even places it on books or magazines, so the vibration of incoming notifications won't be heard as much.
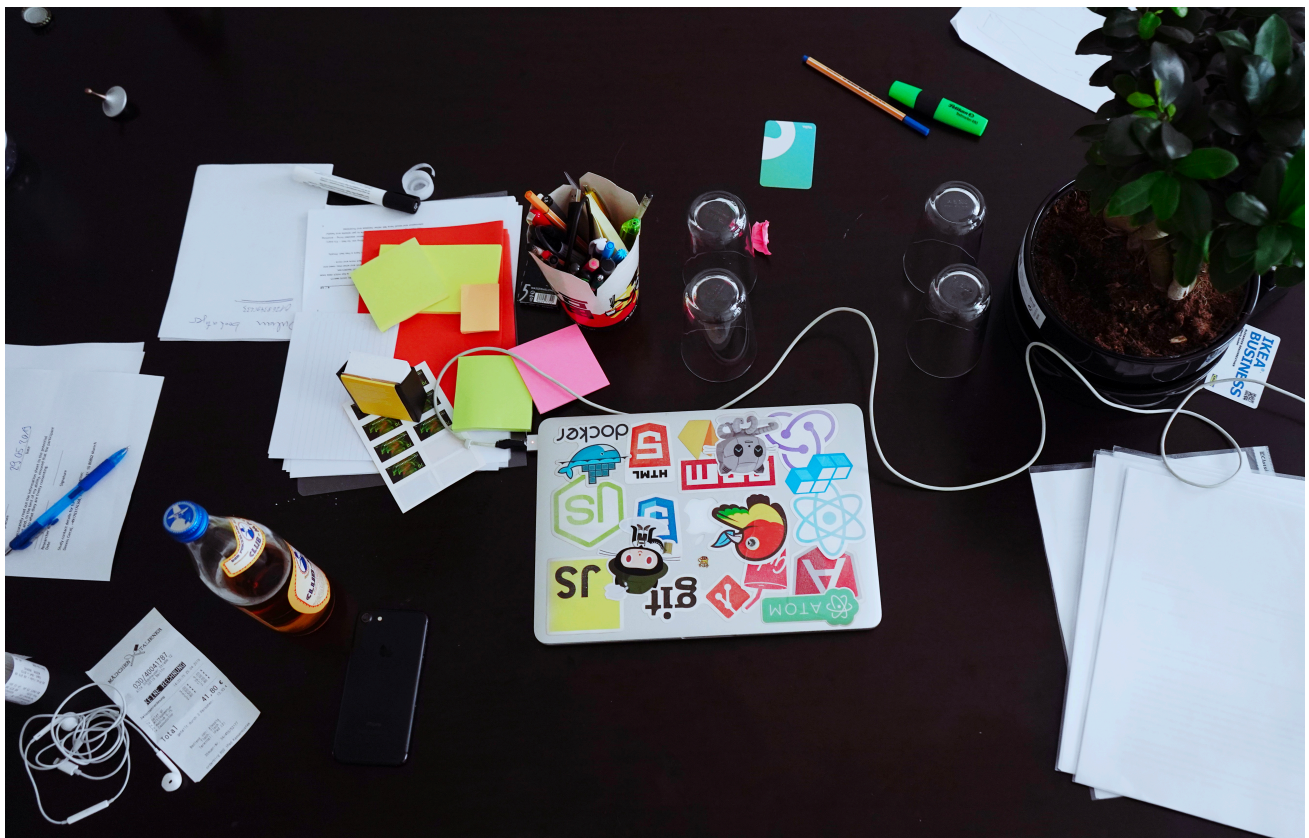
Leopold

The second founder of Aiderly GmbH is Leopold (fictional name). He is responsible for all aspects regarding financials. When talking about the daily structure of his work, Leopold immediately turns to his to-do list. This list, which is more of a ripped sheet of paper, contains bullet points on both sides. Those points are clearly defined to-dos for Leopold, which are stroked through once completed.

Regarding the sequence of those tasks, Leopold mainly prefers currently urgent tasks and a clear defined arrangement doesn't exist. When talking about the source for those tasks, Leopold reports that external communication represents the most significant source for tasks. Furthermore, as founder, no one directly delegates tasks to him, but he rather chooses and prioritizes his next steps, which directly arise from strategical decision making.

> *I write down some keywords of what I need to do on a simple sheet of paper and strike those point through once they are completed.*

When further going into detail why Leopold chose the format of a physical list, he immediately points out the benefits of a single source of truth. The list is a constant reminder of what needs to be done next and cannot be lost in the digital nirvana of the computer. The physical qualities of the format also help Leopold to get things done.

> *This way, I always have everything at a glance. On my phone, I need to to open another app.*

Interestingly when further discussing the to-do list, Leopold says that he doesn't just note down company-related points, but also personal things.
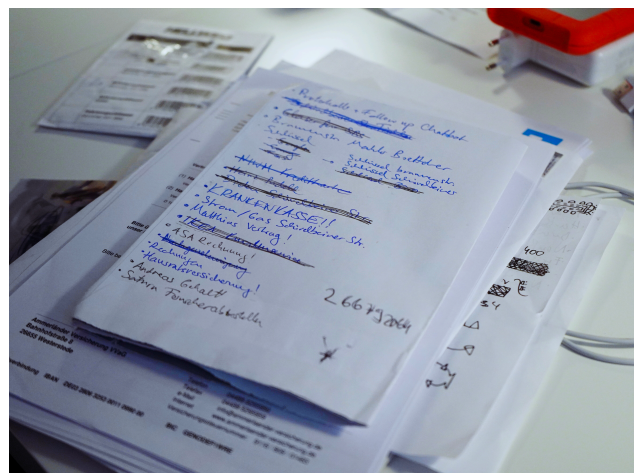
> ❝ *The list has everything on it. Not only things related to the company, but also personal things.*

When asked about a single period in a day where Leopold would structure and plan his work, he responds that as there is a constant flow of incoming communication, he cannot merely point to a single period. Those decisions are continually being made.

The next point that was discussed was the negative influences that directly impact individual productivity. Leopold remarks how their old office had huge street-facing windows which would directly affect not only his but other employee's attention. Their new office is facing the back yard, which makes it a lot easier to focus.

Breaks were also a point which was discussed, and Leopold admits that apart from regular breaks during lunchtime, he does play around with his phone a few times throughout the day.

> ❝ *It's not like I work full three hours and then take a break for half an hour. There are constant breaks in between.*

While interviewing Leopold and talking about these mini-breaks, his phone was directly on his workplace with the screen facing up.
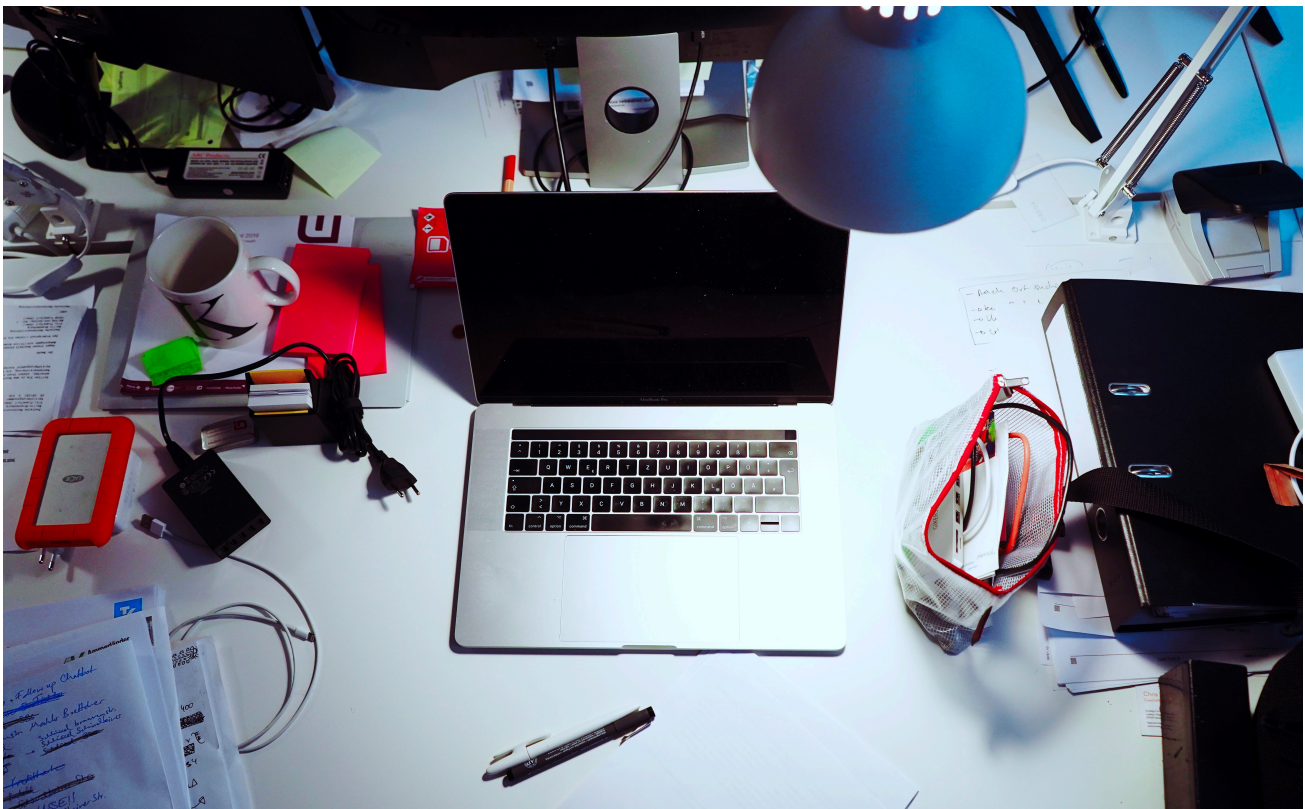
Kevin

The last interview was with Kevin, the intern. As an intern, Kevin is usually all over the place regarding his responsibilities. From researching current news in the nursing home industry to making quick presentations for the founders, Kevin works on a broad array of tasks.

Once Kevin gets into the office, the first thing he works on is the so-called 'Pressespiegel,' which is a news rundown specifically for the nursing home industry.

For the source of tasks, Kevin mentions how both founders personally communicate assignments directly, and a tool called Asana also digitally manages tasks.

Some tasks are also clearly more difficult than others, and Kevin elaborates how he feels the lack of progress. At a specific point when he gets stuck, Kevin oftentimes chooses more manageable tasks which he quickly completes to then continue working on the harder ones.

> *" I get this feeling of frustration, because I don't know how to continue. [...] Then I continue to do something easy, finish it, and have this kind of feeling of success.*

Kevin also works on longer projects, where he is somewhat independent to work at his own pace. When comparing tasks where others are directly involved and waiting for completion, he prefers deadlines as it gives him a sort of

schedule and estimation of how long that specific task should take.

> *" With a target in mind and a deadline, I can better work through the tasks at hand.*

When going through different influences that directly affect productivity, Kevin says that with tasks that are not as important he can more comfortably make decisions and work

independently, but with assignments that have significant influences on the core business, Kevin double and triple checks the quality of his work.

Lastly, Kevin went through the products on his desk. The Rubik's cube was one of the prominent objects located on Kevin's desk. When talking about it, Kevin reports that he sometimes quickly solves an entire cube within minutes. In case he has the feeling that he needs a quick break, he takes the cube, solves it, and has that feeling of accomplishment, which boosts him to continue to work on his current task.

> **"** *In case I need a quick distraction, I take my Rubik's cube solve it and quickly and feel a bit better afterwards.*

What's exceptionally insightful for Kevin's need to solve a Rubik's cube is the feeling of accomplishment he has afterwards. Similarly, Kevin reported that he sometimes gets stuck

with a more difficult task and does something more comfortable to receive that same feeling of accomplishment, which helps him to continue his work on more complicated tasks.

Just as with all other interviewee's working at Aiderly, Kevin also had his phone on the desk with the screen facing up.

Discussion

One of the major takeaways of the interviews and analysis of individual workplaces at open offices are mobile phones. They are almost always prominently positioned at the employee's desks. Five out of six interviewees had their phone directly on their desks and also reported using them throughout the day. Furthermore, some of the employee's at Lacoste said that the phone was both personal and working phones, which were the main reason for their prominent presence on the desk.

Leopold from Aiderly went into detail in his interview how he uses his phone throughout the day for non-business related activities such as Instagram or games. The phone is the most prominent external physical distraction within the personal working space of employee's.

Furthermore, the interview with Francine and Anna surfaced the fact that stress can actually be a big motivator and positively influence productivity. Anna reported how a day where she has a lot of tasks that are linked to deadlines makes her feel needed and valuable for the company, which in turn boosts her motivation and productive output.

Lastly, we found out how open offices are especially prone to small talk. Although already known and one of the main reasons of choice for conducting the interviews at companies that were operating out of open spaces, the existence of social pressure which forces other colleagues into taking a break is a new insight.

The reported insights are a strong basis to go into conceptualization for possible design interventions that directly address the problems of phone overuse at the workplace and stress as a motivator as well as the existing social pressure for break taking by co-workers.

Even the phone of the co-worker was on the desk

Two phones constantly on the desk

Phone
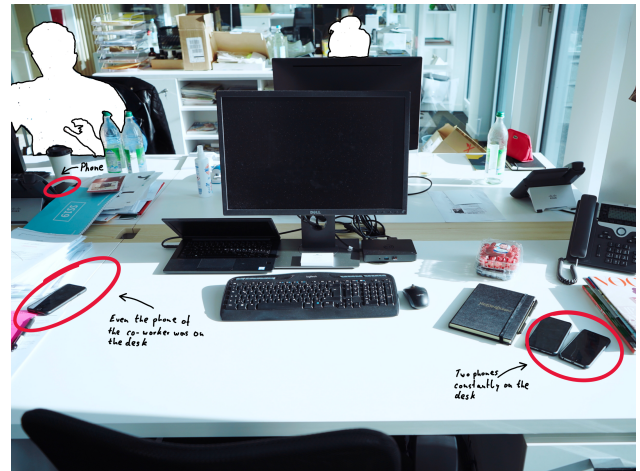
4

Concepts

Insights

The interview sessions and desk research resulted in very profound insights in regards to individual productivity within open space offices. The most significant outcome of the study that all participants shared was the immediate presence of mobile phones. Almost all participants had either their work or personal phone in direct close range on their desks. This proximity frequently results in short breaks and distractions, which have an immense consequence in the overall productive output of an employee.

The interesting phenomena regarding the phones position and characteristics are the low barrier of transition between experiences. Switching between a focused, productive session to one of low productivity and distraction by the smartphone is incredibly low. In almost all cases, participants had their phones on the desk. Some users had the screen turned upside down or placed on top of magazines to reduce vibration sounds. The interplay of work tools and personal tools become intertwined and lose their boundaries. The vast functionalities contained in a smartphone are so diverse and ranging from entertainment to productivity tools. An excuse to quickly check some work-related email can

easily lead to a social media session on Facebook. This fade of boundaries makes the smartphone incredibly dangerous, in terms of its harm to productivity.

Compared to other insights gained during the interview sessions, phone distraction presents one of the most promising intervention possibilities. Its significant impact on individual productivity and its presence with almost all participants, makes it a promising foundation for following concepts.

Phones are a huge distraction and always lie face up on desks of employees.

Additionally, the perception that stress could only have negative consequences on productivity turns out to be untrue. As the interview with both Anna and Francine as well as Kevin showed, more stress and deadlines can have a positive effect on productivity. Estimation of task difficulty is easier understood with deadlines and personal planning, as shown in Kevin's interview are easier to handle. Interestingly, most participants, when talking about setting their deadlines, reported they wouldn't do it.

External stress factors, such as deadlines set by superiors, are an effective measure to increase productivity. This insight can undoubtedly be useful when designing a concept that could incorporate motivational or stress resulting features.

Stress can be a big motivator and positive influence for better

productive output at the workplace.

Open offices are known for their communication promoting characteristics. More exchange between teams and even within teams can encourage productivity and does so as Francine from Lacoste mentioned during her interview. On the other hand can those frequent communications be very distracting for focused workers. Amelie even reported feeling social pressure from her colleagues to engage in chats, although she was busy working on tasks at the time.

Quietly sitting at a desk and working in front of a monitor is not a strong enough indicator for co-workers to do not disturb. This presents an excellent opportunity for a design intervention that can communicate to others whether someone is busy working or open to discussion.

Open offices are prone for small talk and social pressure forces from colleagues break focused working periods.

Small breaks throughout the day are frequent among knowledge-workers. Quickly looking outside the window and gazing at the streetcars passing by, or looking at the trees outside are healthy ways for mental recovery after long working hours. Karasek's model of involuntary attention perfectly describes this phenomenon with nature. Mobile phones can also have the same effect as Anna reported during her interview. The problem, as previously mentioned, involves the length of such a mini-break. Even though glancing at the

time of the phone can reduce tension, by wandering in thoughts, the following distraction by social media can have the exact opposite effect.

Involuntary attention (mini-breaks) can have a positive effect, by reducing tension levels.

Lastly, Thayer's two-dimensional mood model is an excellent basis for understanding mood generation. The vital insight with Thayer's model is a clear way to influence both tension and energy level to provide a solid foundation for employee's to be productive. Furthermore, can Thayer's model have an educational purpose for users to understand their mood states in correlation to their productivity.

Thayer's two dimensional energy-tension model provides clear actionability to influence mood states for productive work sessions.

Vault

The digital device of the smartphone presents an escape world from the real one. As already mentioned earlier, the placement of the phone right on the desk of employees presents the lowest barrier of transition from focused sessions to unproductive work. Picking up the phone to check the time, can turn into an hour-long Instagram session.

Especially the barrier of transition from a focused working mode of productivity to quick distraction to the phone is incredibly low while the phone is lying right on the desk. Most of the participants for the interviews had their phones on the desk with the screen facing up.

There are multiple factors which contribute to the low barrier of the transition of mobile phones on the desk.

1. Notifications

Incoming notifications light up the screen and draw attention to the phone.

2. Vibrations

Vibrations are especially loud as most desks are made from reasonably hardened material such as plastic, which make vibrations especially audible.

3. Distractions

As most mobile phones are smartphones, excuses such as the phone primarily being used for work can quickly turn into other activities of use such as games or social media.

A solution that would make it harder for employees to get distracted while still being able to use essential and important functionalities of the smartphones could stop distractions and help improve individual productivity at the workplace.

Interaction Vision

Initial interviews showed that the phone laying on desks was more of a personal way to escape work throughout the day. The interaction vision for the vault is one where it locks this escape away. A safe and secure piggy bank that mainly protects the user from himself.

The portrayed interaction vision is a user putting away some money in a piggy bank. The piggy bank acts both as a protector for the user as well as the money. As already mentioned above, the transition between states is fundamental. In the case of the piggy bank, the product hinders the ability to use the money. If the coins it contains were on the kitchen table, the friction for the user's action would be extremely low, and the money would be spent quickly. The high friction a piggy bank creates, ensures lower user actionability to use the money.
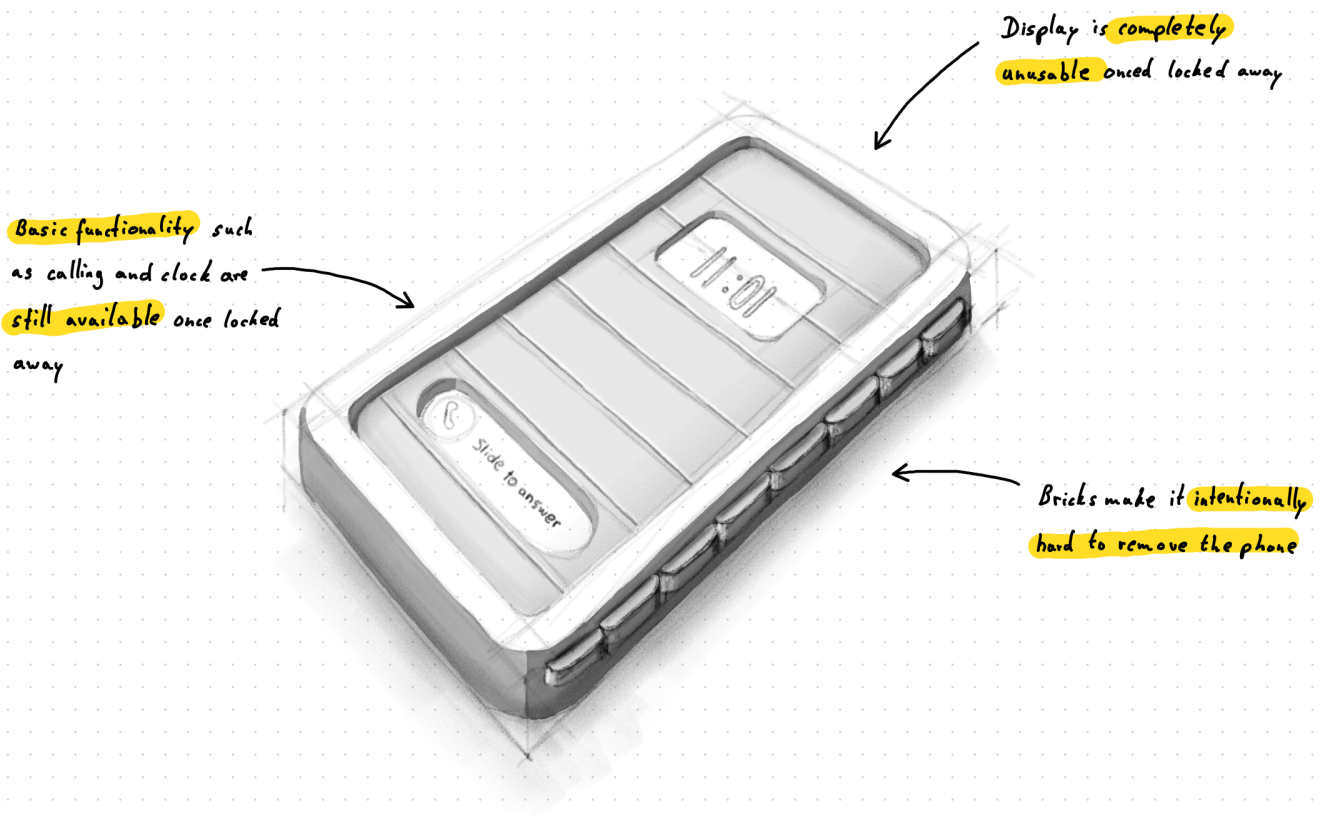
This interaction quality of a piggy bank is beneficial for the design intervention of the vault. The concept increases the barrier of usability, so employees use their phone less for non-work related activities.

Features

Vault is a phone case designed, so you use it less. The case itself has horizontal bricks which slide in after you put your phone inside. Designed to make it extremely hard and inefficient to be removed, the case keeps your daily productivity in check. Two small cutouts still enable basic functionality. The bottom opening allows answering phone calls and the top cutout can both display time and caller-id

The goal of the case is to make the barrier from focus to distraction as hard as possible. Once users in a working environment pick up their phone, the transition is almost seamless and goes unnoticed — designing this transition to be as noticeable as possible will, in turn, prevent pickups and improve productivity.

Display is completely unusable onced locked away

Basic functionality such as calling and clock are still available once locked away

Slide to answer

Bricks make it intentionally hard to remove the phone

in case of a phone call. Besides those basic functionalities of checking the time and phone calls, all other capabilities are entirely blocked.

Mood Disc

Another significant insight was the characteristic of open spaces to be especially prone to conversations with both positive and negative consequences. Although this type of office environment does foster collaboration, it also easily distracts focused and productive employees from working.

Although co-workers can be a great source of productivity, they can also foster distraction, especially in an open space environment. Furthermore, the root of the problem is that disturbing co-workers are not informed about productive focus sessions of their colleagues. Quietly sitting at a desk does not convey whether you are busy being productive or open for discussion. The resulting social pressure of telling co-workers not to be disturbed can be perceived as rude behavior, which in turn has the consequence of stopping a focus session from discussing with colleagues.

Also, the direct indication of being busy can have the same effect of 'rude behavior.' In case a design intervention could have another use that would further benefit the user, the use of the product has a further justification than only keeping co-workers at a distance.

As already discussed, Thayer's mood model provides direct actionability on negative mood states. The connection between productive work sessions and mood states can offer insightful reflections to users. Mood Disc offers the functionality for mood logging while serving the usability of an indicator of productive work for colleagues.
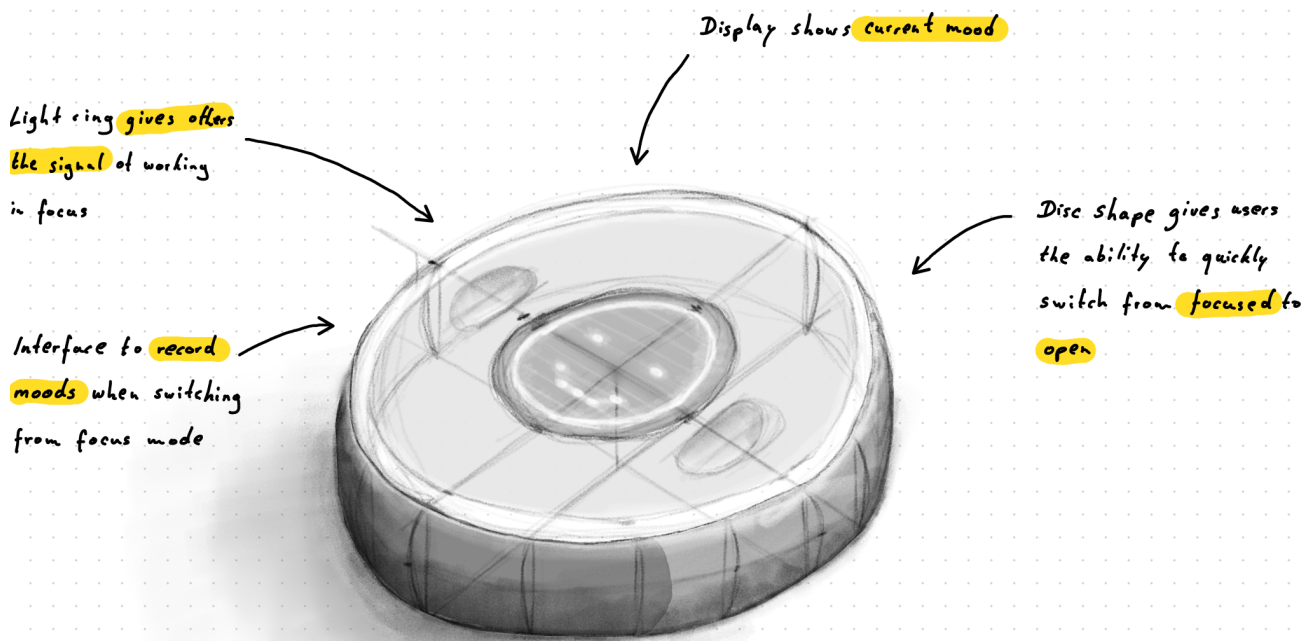

Interaction Vision

The interaction vision for Mood Disc portrays an annoying alarm clock with the user frustratingly hammering the off switch. The interaction quality of hitting on the clock reflects the annoyance of employees unable to voice their frustration about constant distraction. The interaction with the alarm clock can communicate that frustration to third parties at the workplace.
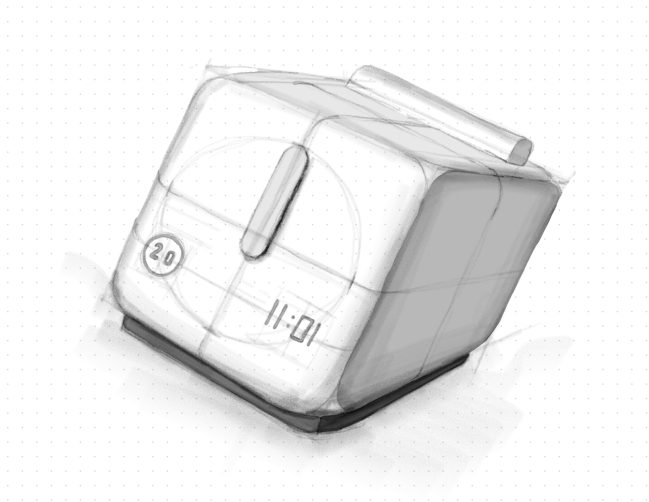
Features

Mood Disc is a device that indicates to colleagues whether an employee is currently focused or open for collaboration. The simple disc shape can be turned either way to display the open or concentrated state. A red ring light then indicates the availability of collaboration to others. Furthermore, a small display and control interface gives the user the ability to record the current mood state. A separate phone application lets the user pre-define those moods and use them when turning the disc into focus mode.

Display shows current mood

Light ring gives others the signal of working in focus

Interface to record moods when switching from focus mode

Disc shape gives users the ability to quickly switch from focused to open

Focuscube

The first concept already built on one of the main insights that phones on employees desks are one of the leading causes of distraction at the workplace.

Furthermore, Francine's interview showed that stress could have a positive influence on productivity. So-called positive pressure could result in more focus and productivity. Vault presented one possible design intervention to cope with the problem. Increasing the barrier of usability can be achieved using other methods than a barricading phone case. The boundary between focused work sessions and distractions can be clarified, by distinctively highlighting the transition.

Interaction Vision

Highlighting the transition between spaces is a useful interaction quality for the problem of smartphone overuse at the workplace. The interaction vision shows a passenger at an airport handing over her boarding pass for check-in. Traveling with an airplane between locations marks a clear transition between spaces. If you could pinpoint the distinct point where that transition occurs, it would be the airport and the act of boarding the plane. The quality of handing over boarding passes is its gesture and incorporated meaning. The boarding pass serves as a gateway to the new location; without it, there is no way of boarding the plane. Handing it over to airport personnel gives you access to the airplane and distinctly marks the decision and commitment to traveling to another place.
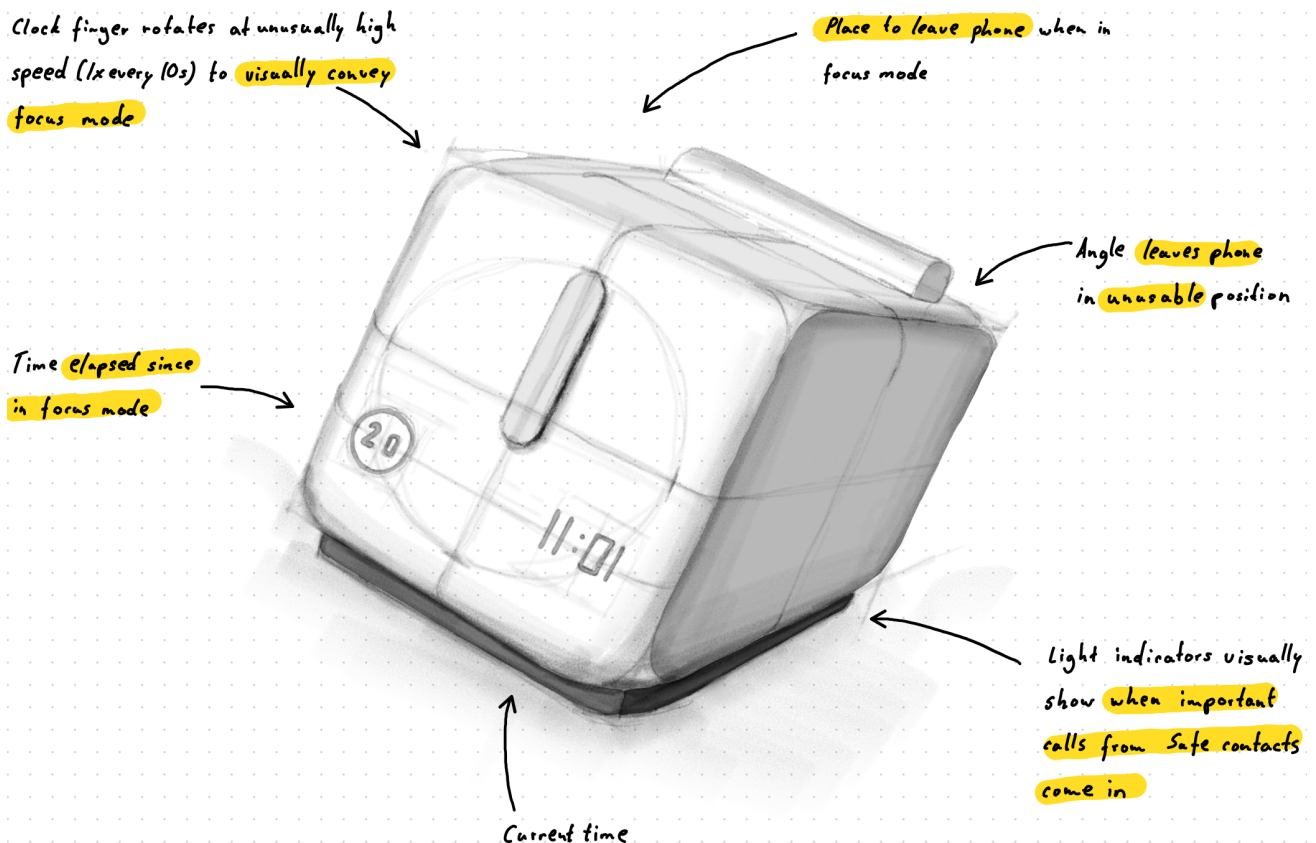
Features

Focuscube is a simple desk clock that acts as a focus timer. Once a user decides to focus and has the intent to be productive, he places the phone on the flat lightly angled surface of the clock. This interaction is a direct result of the interaction vision of handing over airplane tickets. The phone represents access to distraction-free working and handing it over to Focuscube, marks the transition between barriers. This interaction also clarifies the boundary of usability.

The middle clock finger on Focuscube acts as an indicator for being in focus, continually reminding the user that focus mode is running and slightly increasing 'positive stress' levels to increase productivity. Karasek's model of involuntary attention is the basis for the design decision of the clock finger. Quickly glancing at the finger allows employees to have a 'mini-break' without getting distracted. Once the phone is taken off the base, the clock stops running, making the barrier of usability even more apparent. Additionally, to simply indicating focus mode using the clock finger, a separate application on the users' phone logs focus times throughout the day.

Clock finger rotates at unusually high speed (1x every 10s) to visually convey focus mode

Place to leave phone when in focus mode

Angle leaves phone in unusable position

Time elapsed since in focus mode

Light indicators visually show when important calls from safe contacts come in

Current time

5

Design

Concepts

The result of the intense research for the thesis project were three concepts addressing problem spaces that directly influence individual productivity at the workplace. Although all three ideas had strong foundations, one concept would have to be further worked on for later testing and prototyping. Merely choosing one concept seemed to be premature, as all three incorporated valuable insights and capabilities to foster productivity.

Combining various elements of all three concepts is a valid approach to come up with a meaningful prototype that addresses most insights from the research phase. In terms of interaction qualities, the last idea, Focuscube, was an elegant solution to emphasize the transition between productivity states. Merely putting your phone on top of the base was an easy way to indicate the intent to focus. Furthermore, the clock finger was a meaningful result of Karasek's involuntary attention model.

The aspect of merely limiting phone use in the design of Focuscube leaving all its capabilities unused, seemed to be a lost opportunity. Achieving a reduction of distractions should still be the paramount objective of the design, but all that screen real estate and functionality of the smartphone could always be an opportunity in terms of the design of the Focuscube.

Vault's most robust feature is the durable protection it offers to limit the use of the smartphone. Not being able to see any notifications or use third-party applications is a strong characteristic of the concept. Being able to offer this level of protection is essential for the culminated idea that will further be worked on.

Lastly, Mood Disc introduced the ability to log mood states. Thayer's two-dimensional mood model presents clear actionability to influence mood and an easy path for mood self-reflection. The concept of Mood Disc incorporated a few of those aspects and left a significant enough opportunity to further work on the element of mood self-reflection and control.

All mentioned features from previous concepts should culminate into a single version. The basis, as already discussed, should be the interaction vision of the boarding ticket.

Focusstand

The foundational idea of using the phone as the main design intervention space is promising, but the execution of this idea needs refinement. The next iteration focuses on the direct incorporation of the entire device into the product itself. Using the functionalities of the smartphone to benefit the product qualities further enhances usability.

The new form offers more than only leaving the phone on top. It resembles the characteristic of a charging stand. A single form with a horizontal slit, easily lets users slide their phones into the stand. The charging connector on the bottom of the stand ensures correct placements of the device, as well as charging capability. The unusually deep slit hides most of the screen, for less usability during working hours. It's from closely works together with the software of an application, which is installed on the users' phone.

Focusstand perfectly fits within the context of an employee's workplace. The initially defined scope of an employee's desk is as a result of this respected. Furthermore, does the simple intervention of the stand provide an elegant solution by combining and using the existing functionalities of the smartphone

Application

As already quickly mentioned earlier, Focusbase uses an accompanying application. Both hardware and software work closely together to enable a seamless user experience. The app uses a tab bar for navigation, which has three distinct sections.

Sessions display the focus calendar, which enables the user to go through past focus sessions. The main interface is a card displaying a selected date from the calendar, which shows the corresponding session that was logged on that particular day.

The next section is called Focus and shows an easy to understand instruction on how to start a session. To start a session, the user will have to place the device into the physical stand. Once connected to power, the application will automatically start a session. The display presents the already physically present clock finger from an earlier concept. The critical changes made to the feature will be discused in a later section. To stop a session, the user will have to remove the device. Once removed, the mood log screen is presented.

The last section is basic settings, which enable the user to see and change the current focus goal, which will also be discussed in a following part of this paper. Three primary date inputs let the user further customize planning for his day. Start, lunchtime, and leaving work are all editable times that help the application to be able to send the user notifications at appropriate times without disturbing current focus sessions.

In addition to navigational screens, the application has so-called contextual screens as well. As already mentioned, the session

screen that will be presented once the phone is connected to the stand shows current progress and essential information about the session.

The daily focus goal screen is another contextually based screen. It gets to be displayed every time a user opens up the application for the first time on any given day. The interface of the daily focus goal helps the user to set a defined goal for the day.

Lastly, the suggestions screen gives the user actionability to manipulate his mood by changing energy and tension levels directly. This screen is triggered based on the last known session and its mood state.

Daily Focus Goal

Another significant insight that resulted in the clock finger implementation for the third concept in the initial concept phase was stress, having positive effects on the productivity of knowledge workers. Focus Goals try to intensify the motivational and positive impact on the daily work processes. Each day a user would define their desired focus goal. This process will happen as soon as a user would open the application. As the research shows, most employees organize their tasks in the morning and at the beginning of the week. The
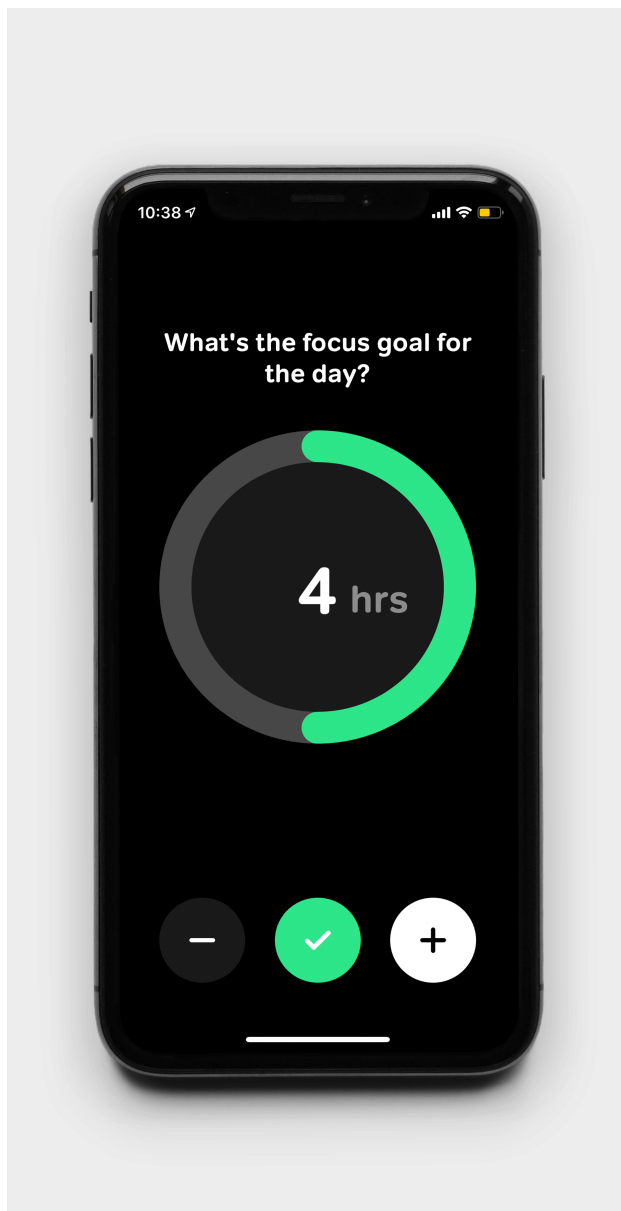
fact that the app asks for the desired goal in the morning perfectly fits into the existing routine of knowledge workers. Furthermore, are all achievements in terms of focus time being measured against that goal. Indicators while working in focus mode or reviewing the focus calendar all show similar focus levels based on that daily focus goal.
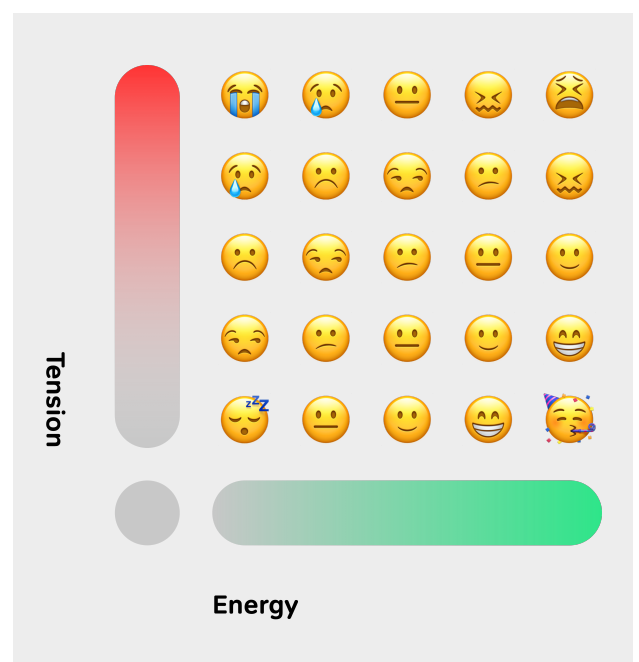
Mood Visualization

One of the primary goals of Focusbase is an understanding of mood states and their relation toward productivity. This helps employees to reflect on their mood states and create a proper understanding which is currently rather challenging. To create this opportunity for users of Focusbase, intuitive, and clear visualizations of mood needs to be developed.

Thayer's mood model provided an excellent foundation for this endeavor. Using two visually connected shapes for both energy and tension levels would give the necessary depiction of mood. Those two elements are connected by sharing the form of a circle, which would represent the connectedness and mood itself. The essential use of color is not enough to intuitively communicate mood levels. Emoji are a commonly used tool in the messaging space to convey moods and emotions. They have high familiarity and an intuitive feel for smartphone users. While the use of a divided circle will teach employees about the essential principles of moods, emoji will provide a familiar tool to understanding them.Energy Spectrum

The choice of colors that represent respective scales of energy, tension, and focus goal, was based on the natural occurrence of the light spectrum. Light, when described as a wave has a specific wavelength which determined its energy levels. Shorter wavelengths result in higher energy levels and longer wavelengths in lower energy levels. Using the analogy of moderate to high energy levels of light waves to describe scales of energy, tension, and focus goal seemed over to be an appropriate approach. The visible spectrum of color has corresponding color codes to energy levels of its wavelength. Ultraviolet (purple) light has higher energy than infrared (red) waves. The result was a range of vibrant colors that made up the user interface of the application. Except for the analogy to the physical properties, this visual representation had no familiarity with existing visualization of energy scales. It was clear that educating the user about the meaning of the corresponding colors would be essential for its success.

Mood Matrix

A matrix is a proper tool to visualize all facets that correspond to moods resulting from energy and tension levels. A five by five matrix plots energy levels along with its x-axis and tension levels along its y-axis. Every segment has the resulting mood state, described as an emoticon. In total, 25 different mood states are mapped in the matrix. Those states serve as an algorithm which will be used in the Focusbase application to offer users the ability to proper mood logging.

Mood Sliders

As previously mentioned, part of the application would include the ability to log mood states after a focus session. This screen consists of the mood visualization with its representation of energy and tension levels, as well as an indication of the achieved focus goal. Many current mood logging applications only use simple emoticons for users to report their current mood. This visualization is very limiting and conveys a wrong understanding of mood. They are very diverse in their appearances and cannot only be represented by a three-segment scale of emoticons. Thayer's model offers the ability to dissect a mood state into its elemental parts and in turn, provide a strong understanding for reflection and actionability.

Two sliders with corresponding dependencies to energy and mood offer a natural and almost playful interaction to finding the current mood state. Furthermore, do the slider elements introduce users to Thayer's mood model and understanding of mood. As soon as a user would manipulate one slider, the output in the form of a mood visualization is directly presented on top of the screen. This try and error interaction leads to an exploration of the relationship between mood, energy, and tension and in turn results in a more precise mood log.
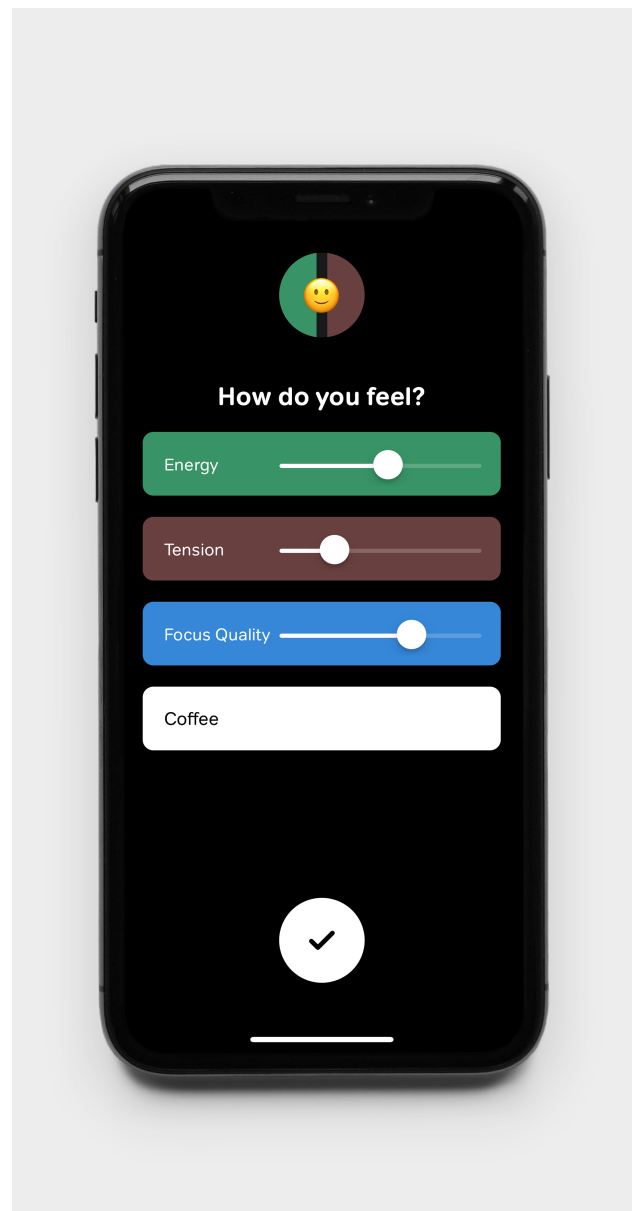
Co-Creation Session

Although a very first working prototype had been developed, this first iteration still needed **user** feedback. Many open questions regarding the experience and design remained before a proper long term test within the context and without interference could be conducted. To get closer to a testable prototype, a day of use would serve for proper sensitizing for users to perform a co-creation session.

Participants were employees of the Berlin-based startup Aiderly. Markus and Leopold from previous interview sessions would be testing the device on two separate days. The open office layout proved to be an issue for interference prevention, as both employees would frequently exchange insights about the Focusstand's use and features.

After two days of initial testing and an opportunity for the employees to familiarize themselves with the product, a short half an hour session was reserved for product feedback, insights, and discussion.

Session

The session started with an introduction of the goals and went right into feedback from both employees. The elapsed time indicator was a distracting element for Markus. He describes how the urge to know the current status of the session forced him to look onto the Focusstand repeatedly. Furthermore, he also compares it to a challenge. His suggestion is to remove session statistics, such as time and progress.

> 66 *An interesting part was that I often had a look on my phone to check how many minutes I was in focus mode. It was like challenge.*

Another significant insight from Markus was the vibrations the stand would produce while a notification would be reaching the phone. The hard plastic of the stand would directly conflict with the hard materials for the table. The resulting loud noises directly impacted the user's ability to work distraction-free. Furthermore, as the device stand was oriented vertically, any incoming notification would be directly perceived by the user and result in the same levels of distraction as the phone merely laying on the desk.

> 66 *Every time I get a push notification, it was extreme vibration and the table was vibrating as well.*
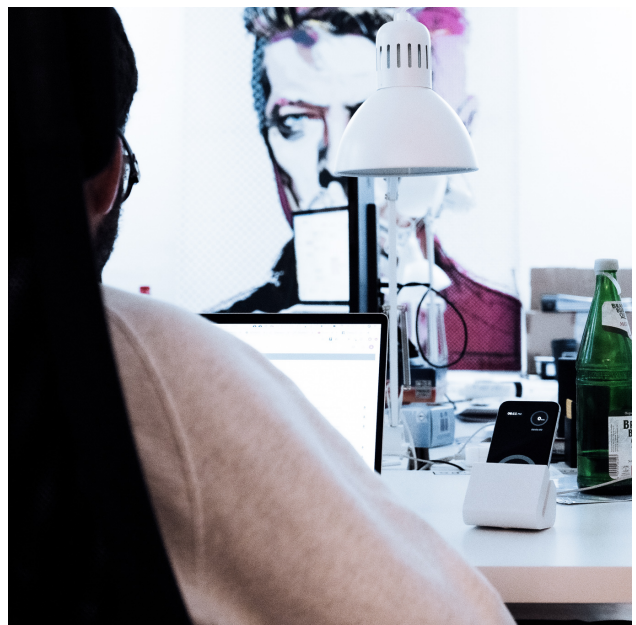
One of the most significant insights, which would prove to be essential for the final design iteration was another insight from Markus mentioned. When talking about notifications, Markus talks about making the necessary changes to the stand for it to hide incoming push notifications completely. This insight sparked a discussion within the session about the ways to achieve a notification free Focusstand. Putting the phone upside down was an idea that Leopold threw into the conversation. The idea of putting the phone into the stand horizontally and having two panels hiding the interaction hot spots of the phone was also mentioned.

> 66 *So if we would do a device, which also hides the push notification, which comes down from the top.*

Furthermore, Leopold addressed an issue he experiences with the focus goal indicator while in focus mode. When using the application in the first hour of focus base, no progress can be seen at all. The ring would only indicate the hours and fill up after one hour has passed. Leopold's issue is regarding the motivational factor of that indicator.

Another element of the discussion was the reflection screen that would pop up after a focus session. Markus explained how the emoji helped him understand the interface and the meaning behind energy and tension levels. Leopold, on the other hand, didn't notice the emoji at all and also didn't understand the differences between energy and tension. Additionally, Leopold even didn't quite understand the meaning of tension within the context. He was further explaining if physical tension is meant regarding work or personal affairs. His suggestion would be to add a

description to the meaning of the terms or find another word for tension that better fits the context.

The next discussion point was concerning the color scheme in the application. Markus mentions how, especially in the reflection screen, the colors heavily influenced his behavior regarding the mood sliders. For his energy level, he intentionally stuck to the green level, thinking it would indicate a "good" level of energy.

When explaining the spectrum concept that presented the basis for the color scheme, Markus pointed out that only using it as much as possible within the app might not be enough to get the user accustomed to the new scale, but an onboarding step that would leave the user exploring the new color scheme, might further help the learning process.

Regarding the docking station itself, Leopold had some more issues he wanted to bring up during the session. While working on finances, from time to time, he has to get other documents and is not really in focus mode during that process. Suggesting the idea of a "switch mode" would solve the issue, by giving him the ability to pause an ongoing session without taking the phone in and out.

> 66 *There should be something like a switch mode.*

There was also a problem regarding the shape of the docking station. As it was limited to a specific width, it could only fit a particular size of phone. Also having a case on did make it impossible to fit. Taking off the phone case was a big hassle to be able to use the product.

Lastly, we discussed the main screen showing all the recorded sessions. Markus points out that he finds the correlation between moods and work very interesting. Regarding a personal interest of his, he mentions how he thinks that he works better during the evening than the morning and how Focusstand could help him track the necessary data to get find out whether that is true or not.

Conclusion

Overall the co-creation session helped to ideate on new solutions and resulted in the valuable insights that would materialize in the final iteration of Focusbase.

First and foremost, the loud vibrations resulting from notifications are a big problem for a product that hopes to create a more distraction-free space. As already discussed with both participants, a silicone holder for the phone could be a first step in solving the issue.

Reduce Vibrations

Markus also came up with the idea to completely hide notifications by turning the phone upside down. This would further reduce visual distractions by physically blocking the upper part of the screen.

Physically Block Notifications

Lastly, we discussed the ability to switch between being in focus and taking a break more easily. Leopold mentioned the hassle of having to take the phone in and out continually. Having a more natural way to switch modes would enhance the experience.

Switch Mode

Focusbase

Based on the feedback gained from the co-creation session, a new design cycle integrating the insights began. The first evaluation and most significant change in terms of the experience of the product were regarding the horizontal placement of the phone. The main goal of the product is to introduce a more distraction-free environment regarding inputs from the phone. A horizontal installation would allow for a physical design that could block the two most essential interaction points of the phone.

The top and bottom part of any smartphone serve important interaction spaces. Users mostly receive notifications on the top part of their screen.

Furthermore, the head area of the screen usually serves as another interaction point for settings or controls as, for example, iOS's control center. The bottom half of the screen is, in most cases, the primary interaction point with the phone. A home button on iPhones or the swipe gestures on newer models as well as Android's navigation system is all located on the bottom of smartphones. A physical design that would limit those access point would help lower distractions from phones and the ability to interact with the smartphone.

The new and final iteration of Focusstand is called Focusbase, as it no longer serves as a stand but a horizontal base for smartphones.

Interaction

To start a focus session, a user would place the smartphone on the base, between the holder panels. An integrated wireless charger would begin charging the phone and start a focus session using the installed Focusbase application on the phone. Placing the phone directly onto the base, creates a high barrier of use, compared to the smartphone merely lying on top of an employees desk.

Hardware

The hardware design is comprised of two simple elements, the bottom base, and the smartphone holder. Visually the two aspects are divided by a horizontal "shadow" line. Two panels on the front of the device serve the purpose of blocking the content and usability of the smartphone. Behind those two panels are two silicon holders which elevate the phone and reduce vibrations of incoming notifications. A small circular cutout in the back of the holder ensures easy removal of the smartphone after a session ends. The distance between the back and front panel was carefully determined to enable users to place all kinds of phones into Focusbase. Making the product universally accessible to as many types of phones as possible was an important goal for the design of Focusbase. The full distance of approximately 18 Millimeters ensures broad applicability, including phone cases. The horizontal orientation and open layout allow different sizes of phones in terms of screens real estate to fit as well.

Furthermore, the back element hosts a QI-Wireless charging coil that is connected to a small processor in the base. The QI enabled coil enables easy wireless charging while using the base. A USB-C connector located in the back of Focusbase acts as the power supply.

Additionally, to further reduce vibrations, a silicone pad was placed directly on the bottom of Focusbase.
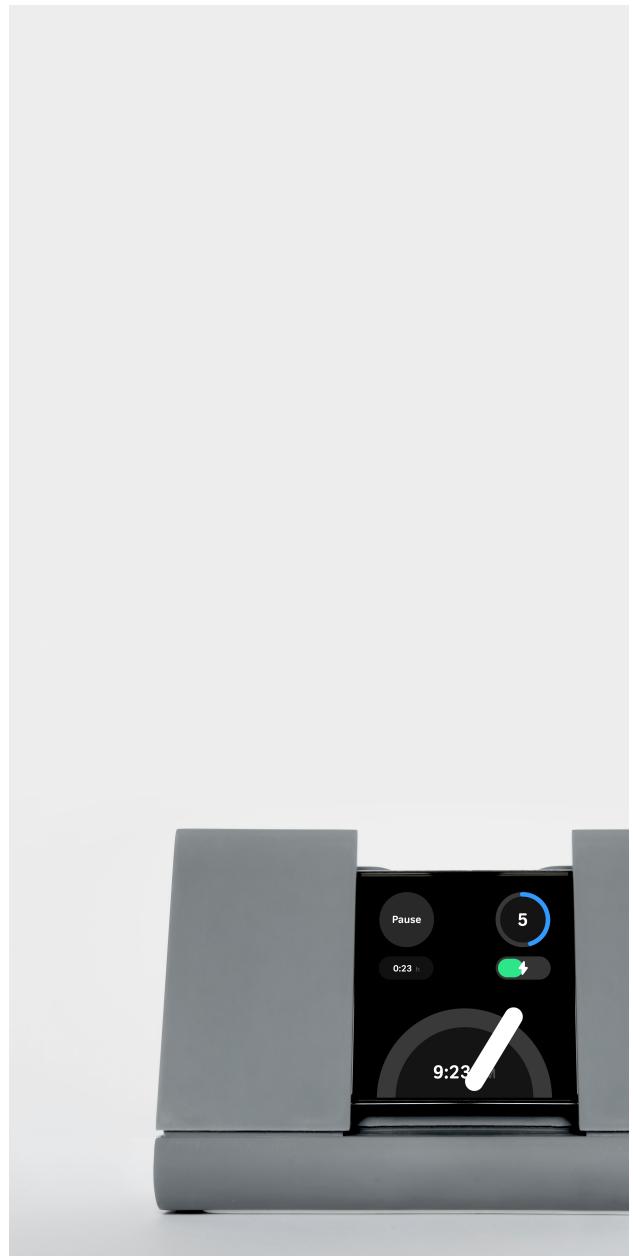
Application

The accompanying application also changed significantly in comparison to the previous version. The experience of starting a session had to be fundamentally redefined to work not only in the horizontal placement but also the new wireless charging mechanism. Unlike the previous version, where the user would plug the phone into the connector, the new interaction doesn't provide direct feedback as the phone doesn't physically plug into a cable. This missing physical feedback had to be compensated by software. As can be seen in the visual below, there are three distinct steps in the user experience of starting a focus session. To place the phone into Focusbase, the user will have to rotate the phone sideways. This sideways movement will be detected by the application, resulting in a fade out of the entire interface. This short animation already gives the user the first hint and guidance for starting the session. Next, after placing the phone into the base, the wireless charger will begin charging the phone. The charging process is recognized by the application and will start the session.

Changes have also been made to the overall layout and features of the application. The tab-bar gained a new screen called "Statistics," which let users do more with their focus data and get valuable insights into their productivity. The statistics screen is divided into two-part. The upper data layer provides a critical number for the user's overall performance. Total focus hours, sessions, and averages help put workers productivity in perspective. The lower part of the screen is all about weekly results. A graph showing individual weekdays puts the data in relation and offers intriguing insights for users.
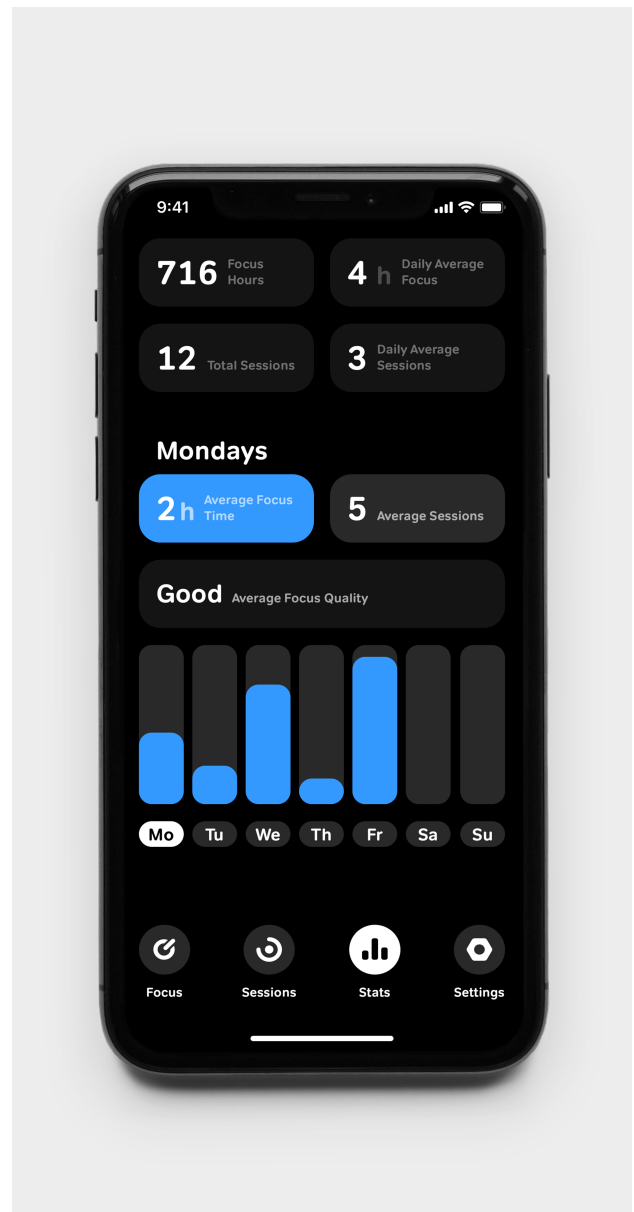
By default, the chart shows the average focus time broken down by day. This way, users can easily compare performances across the week. The blue color visually connects the diagram to the focus time. When switching to sessions, the graph changes the data to reflect the average session number broken down by weekday. To reflect the data change, graphs main color switches to white. The last interface element, is average focus quality, which will display a value on the scale from good, okay to bad.

This indication will reflect the measure focus quality that users report in the reflection screen. Additionally, all weekdays on the graph are selectable to display the corresponding data.

The main focus screen has changed location to become the first rather than the middle element in the tab bar. Furthermore, a visual tweak correctly displays Focusbase's new physical form. The animating background colors have changed to a static blue to better correspond to the key color used for focus throughout the app.

When starting a session, a new feature serving as an introduction to the focus session was added. Based on Thayer's two-dimensional mood model, we found out that reducing tension would be beneficial toward producing a more productive mood state. In order to reduce tension and gap the bridge between normal and focus state, a short breathing session will guide the user in controlling the breathing rythm.

Darviri and Varvogli published a paper in the 2011 Health Science Journal researching stress management techniques and found slow breathing to have a significant influence on stress reduction (Varvogli and Darviri, 2011).

[...] showing that the slow-breathing technique can have a significant effect [..] following the acute stressful tasks.

The interface for the breathing session has three necessary components. A text label showing basic instructions for the breathing process guides the user through three breathing sessions. Along with the animated text-label, a half-circle animates in and out. The growing and shrinking animation replicates the physical breathing process and helps guide the user through the session. A constant skip button is located to the upper right part of the screen, giving the user the ability to skip the session at will and continue the focus session.

The focus session screen itself also iterated significantly. Feedback from the co-creation session showed that a switch mode which could directly pause an ongoing session without the hassle of removing the phone is needed. This "Pause" button is now located to the upper left of the screen. Tapping it, will not only result in pausing the currently ongoing session but further visually change the appearance of the application. To significantly communicate to the user that the current session is on pause, all colors are inverted. The background turns white, and all interface elements turn black, as well as the clock finger stop.

Additionally, the focus hour indicator is now more precise in terms of progress indication. Another insight gathered from the co-creation session was the inability to see progress. Users had to wait an entire hour to be able to see any progress in the focus ring on the top right corner. It will now still show only focus hours, but the progress ring will show the elapsed time in the scale of minutes. Lastly, due to the new wireless charging mechanism, instead of the charging cable, an indicator is needed to reassure users that the phone is actually charging and letting them know of the battery status.

Once a user ends a session by removing the device from the base, he is directly presented with the reflection screen. Previously we used Thayer's two-dimensional mood model as the basis for an accurate depiction of mood. The two elements of energy and tension were fundamental for creating a coherent understanding of mood for users. Tension was especially problematic and mentioned during the co-creation session. Uncertain, was the correlation between energy and tension, as the latter refers to a negative consequence towards the resulting mood. Having a term that would positively influence mood would result in a more coherent interaction for the user. Calm expressed the opposite effect of tension and was, therefore, a suitable replacement. The resulting mood sliders of energy and calm would all result in better mood outcomes, the higher their value.

Additionally, a new slider was added to be able to measure focus quality. Looking back at the data, it is critical for users not only to know
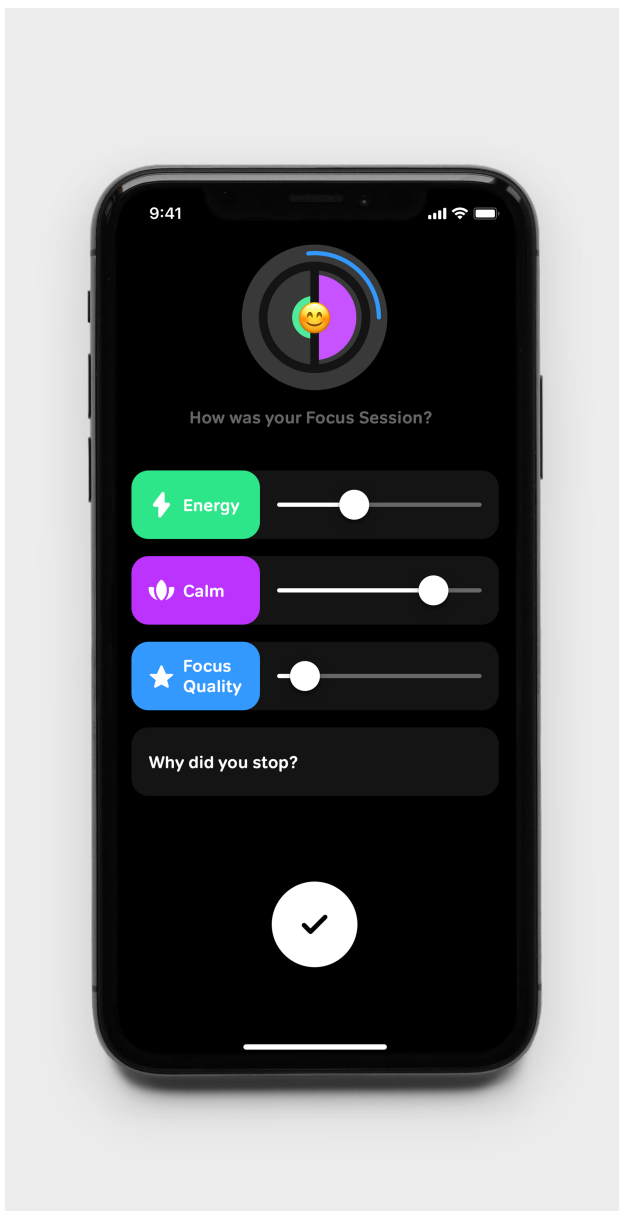
how they felt or if they met their focus goal, but further understand how productive the session actually was.

All three sliders themselves had a small explaining interface placed to the left. Using iconography, color, and an explaining text, the user could be able to understand the reflection interface quickly. Correspondingly the top mood indicator had to iterate to reflect the changes. The circular interface element for mood persisted, but the indication of energy and tension changed. Using saturation values to indicate intensity is visually not distinctive enough. Furthermore, the visual grouping for the mood element and sliders is complicated using only saturation levels. This iteration uses circle sizes to indicate intensity. The sliding interaction of both energy and calm levels results in size changes of the circles. To indicate focus quality, the familiar element of the focus ring is used. As the progression of the ring is already handled for the reach of a focus goal, the line width will communicate the quality of focus. As the user interacts with all three sliders to reflect on the session, the corresponding interface elements change sizes and line widths.

The session screen has only minor changes in term of its design. The updated mood visualization is reflected throughout the screen, and small changes have been made to the calendar element on top of the screen. Bigger spacing between weeks makes changing weeks more concise, and a blue indicator for today's date puts other dates in context. Furthermore, the full time has been added to the header of the day, to show the user the current month of the year.

The settings screen has been completely redesigned. Two simple toggles let users turn off "Suggested Notifications," which proactively suggest activities to change the user's mood and skip breathing sessions during the beginning of each session. Additionally, a simple slider lets the user adjust his typical workday in terms of hours.

Prototyping

To test the design-concept of Focusbase, it was critically important to build working prototypes. Only testing shapes and mockup app screens wouldn't be sufficient, as the experience of both Focusstand and Focusbase heavily relied on an integrated product. Hardware working together with the software and as a long term test of one week was necessary to prove the designed solutions, all elements had to be working without outside intervention.

3D printing proved to be an excellent tool for form-finding. Using Rhinoceros 3D to quickly iterate through shapes and being able to test-print results, helped the design process immensely. Testing the interaction and UX with detailed prototypes helped uncover insights regarding the right dimensions and sizing. Especially for the phone stand, physical prototypes were essential to find the perfect

layout for the on-screen controls during a focus session.

Additionally, programming the application and producing a functioning prototype enabled intervention-less testing. The working prototype enabled further engagement from testers, getting them involved in the experience of the product. The problem with low fidelity design mockups is the number of unresolved issues the user still has to tackle. Most of those problems frequently are solved when facing further development. For example, the calendar overview on top of the sessions screen looked great on a first design mockup using simple sketches. As soon as the interface element became interactive, the problem of visual differentiation between weeks became apparent. This would have been such a small detail which would have never become apparent while only designing within the scope of paper mockups.

Starting with sketches and wireframes is a great start to kick off initial ideas during early concept phases, but it is the designer's responsibility to make rapid decisions using gathered data from the research phase and validating concepts using more working prototypes that can genuinely produce impactful insights. Are higher fidelity prototypes more time consuming and harder to build? Of course! The benefit of the resulting ideas and higher user engagement during usability tests and even co-creation sessions is crucial for better design outcomes and concepts.

Another critical skill is the ability to prototype quickly. The ability to program working prototypes using production-level tools doesn't mean that designers should produce

production-level code quality. Just like paper-mockups, coding is a prototyping tool that can help designers to create testable designs.

In the case of Focusbase, the application was built using the Swift programming language. Using Xcode, an iPhone, and the necessary language skills, a simple prototype can be produced in a matter of a couple of hours. Although iterating using programming does consume time, especially within the final phases of the design process, the outcomes and design solution it produces make it an important tool for designers.

Additionally, programmed prototypes offer many more interaction layers then simple screen-based mockups. Animations, transitions, producing context between screens, and data handling are all essential aspects that designers should be involved in. In the case of the Focusbase, especially the reflection screen profited from prototyping it using Xcode. The animations of the mood elements when manipulating energy and calm sliders needed many iterations to get right. Prototyping iterations using a color spectrum to saturation levels to shape size would not have resulted in the necessary insights without the ability to thoroughly test them with users.
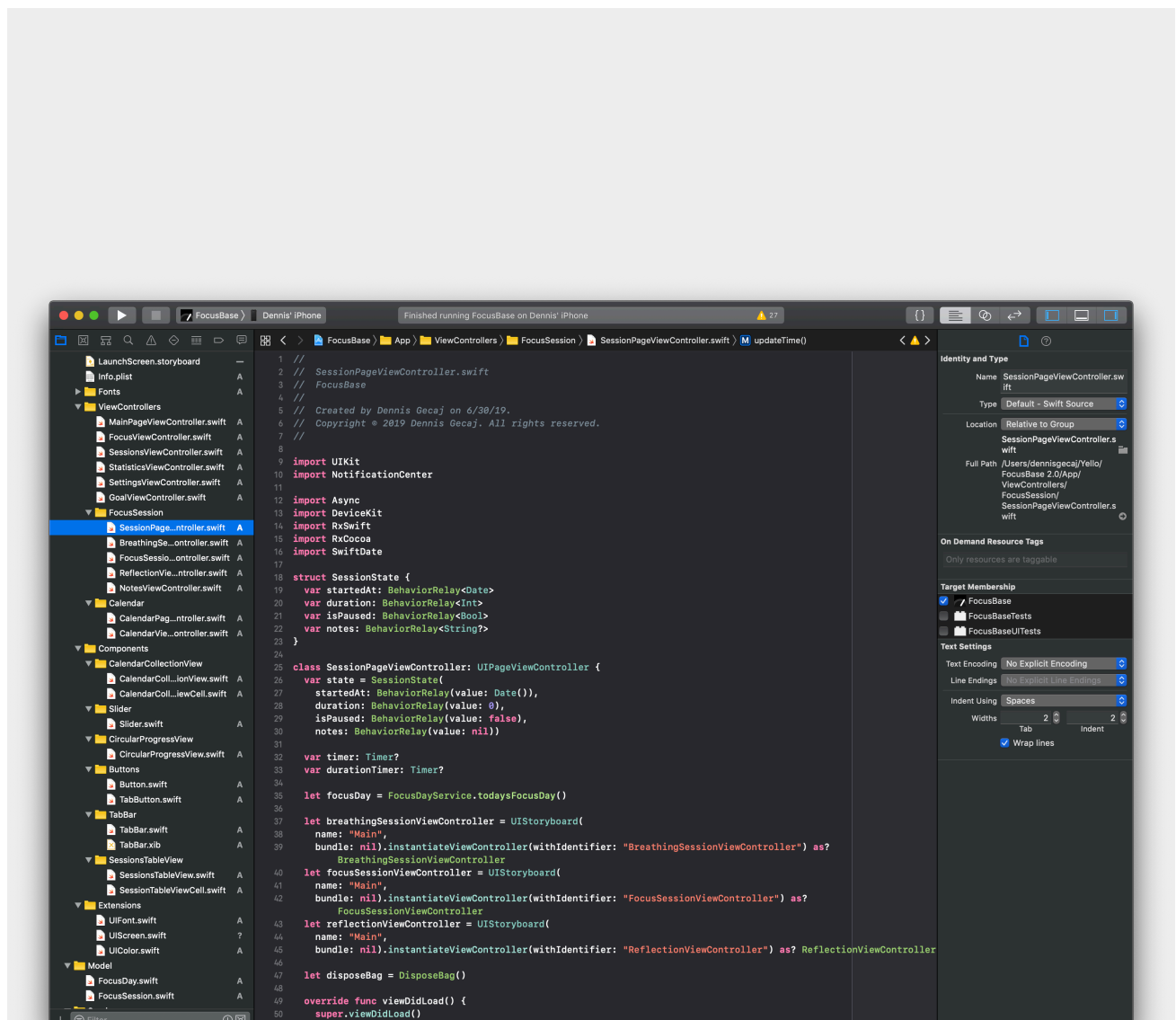
7

Validation

One-Week Test

In the final phase of the thesis project, the high fidelity prototype was thoroughly tested in context. Amelie, who already participated during the initial interview sessions, was willing to test the prototype for almost an entire week in her workplace at Lacoste.

At the beginning of the week, testing was set to commence. I visited the Lacoste offices on a Monday with the prototype and computer in hand. The setup process was uncomplicated. I introduced Amelie to the prototype and installed the Focusbase application onto her phone. I introduced the premise of the product, to reduce distractions on the phone and let her initially set up the app and position the Focusbase on her desk. Without further explaining details of the application or going through different screens, I left the product in Amelie's hands for the entire week.

It should be noted that the prototype that was tested was missing small functionalities, as presented in the previous chapter. The battery indicator was not incorporated in the application, as well as the newer focus quality indicator and the breathing sessions screen.

During the interview at the end of the week, Amelie started by mentioning an essential consequence of using the wireless charging device within Focusbase. Her phone seemed to be getting unusually warm while charging. She suggests how the might suspect the application running at the same time the phone is charging might be the issue. It's very well known that inductive chargers heat the phone more than usual and I do suspect that her phone case might be the issue. Amelie reports that she has her charger at home, which she frequently uses with the phone-case on all times. With Focusbase, she experienced the effect that the phone wouldn't start charging and had to take the case off the phone to use the product. The case itself can absorb heat and might dim the effect of a hot phone. Nevertheless, the issue was critical for her and needed further revision and consideration for a final prototype.

> ❝ *Maybe it's that I have the application on all the time and charging at the same time so it gets warm.*

Furthermore, Amelie expressed her concerns regarding incoming phone calls. While not using Focusbase, she always had her phone lying right next to her at eye-contact. With Focusbase, she mostly had the impression that her phone was more distant and not close to the eye. Her suggestion was to angle the base even more to create better eye-contact between the phone and the user.

> ❝ *It should be an angle that my eye should catch the call.*

Another big concern for Amelie was the perceived impact on battery life. Leaving the phone always turned on while charging created the misconception of damage to battery life for Amelie. In reality, the contrary is true. A smartphone, while in sleep mode, is in constant use, fetching new data, and refreshing apps. Just because a smartphone is tucked away in someone's jeans pocket doesn't mean that it is not actively working.

Nevertheless, trust has to be built between user and product. Amelie should have been educated by the application that leaving the display on while using Focusbase doesn't damage the battery more than leaving it idle on the table.

> **" I was also thinking about how it [Focusbase] impact the battery in general.**

When talking about the product features of the product, Amelie was eager to tell a short story that she connected to Focusbase. The story goes as follows:

A new coffee machine is brought to the office, and a small jar right next to it urges employees to contribute one Euro for every coffee. By the end of the first day, the jar was nearly empty. The second day, the office manager decided to hang a picture of watchful eyes above the machine. Surprisingly, the jar more than full the following day.

This story reminded her of Focusbase because she felt that the product was continually telling her of her efficiency. In her word, Amelie described how it helped her to realize that she needs to work harder. On a workday, she came back from lunch and only had two hours of her five-hour goal completed. This motivated her to work harder and get to her desired goal by the end of the day.

> **" It helped me to realize that I need to focus more.**

Coming back to the story Amelie told, later during the interview, she explains how Focusbase is not those watchful eyes telling her to work, it's a tool for self-reflection. Something just for her.

> **" This is that someone is watching me that I should work. It's for me**

The idea of a Focus Goal was also very compelling for Amelie. Putting a target that she had to reach that day was very motivational for her.

> **" I have a target and I have to reach it.**

Another exciting element Amelie talked about was that fact that on Tuesday she had to leave the office because of an emergency with her son. The rest of the day, she continued to work at home while taking care of her child. Even though Amelie left the office, she reports that she took the base home and continued using it there. At home, she changed her Focus Goal to compensate for the lost time.

Amelie continues to discuss the reflections screen and notes how tension was the only element she rarely used. Interestingly, she describes how all values regarding the session are positive indicators, and yet tension is the only negative one. As already mentioned, when describing the redesign of Focusbase, the new iteration only includes positive measurements, which make it easier for users to understand.

> **" [Tension] was not a positive KPI.**

Another issue for Amelie was the fact that she sometimes wasn't able to finish the reflection form. In case a co-worker wanted to talk to her about business-related affairs, she felt like she couldn't continue using her phone and finish moving the sliders.

> **" Then I didn't want to still play with my phone.**

When asked about push notifications, Amelie thought that the application itself, not the physical device was blocking them all the time. Not being able to visually see them and the silicone absorbing more vibrations had the desired effect on the user.

> **" I was thinking that this [Focusbase] is blocking that.**

Finally, I asked Amelie whether the entire experience of using Focusbase was helpful. She mentioned how it made her feel more responsible. She used her phone less and mostly felt like she didn't want to remove it from the Focusbase.

> 66 *I was feeling responsible, I didn't want to take it out and use it. I can say normally without it [...] I was looking from time to time [at social media]. While working with this, I never looked.*

Lastly, she admits to "cheating" regarding the use of WhatsApp. While she was not able to the application on her phone, she went ahead to install it on her computer. Amelie further explains that she noticed how she was able to continue working while waiting for responses on WhatsApp, something she wasn't doing while using the phone. The ability to quickly switch tasks, to go from texting a friend to working on spreadsheets is seamless on the computer. The switch from the phone to go back to work is much harder as she reports.

> 66 *First of all, you have it [the phone] on your hand and then I don't close it. I don't know why.*

In conclusion, Amelie likes the fact that she can distinctively measure her performance, something employees usually don't and frequently cannot do. Merely staying late in the office is no indicator of your performance. Focusbase gave Amelie the ability to measure her focus time and productivity. It enabled her to define her productivity and take action. Additionally, it also changed Amelie's behavior and made her use her phone less.

The created barrier of a running focus session that would be interrupted in case of a pickup was so high that Amelie completely stopped using her phone while in a focus session. This even leads to her installing WhatsApp web as an alternative to stay connected.

> 66 *Now it's measured, because I know now about my focus quality. Before I didn't know about it, so if you don't measure it you have no idea.*

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