everydAI

An AI assistant supporting balance between work and personal activities to increase wellbeing in the home office

Artificial Intelligence for Subjective Wellbeing

Master Thesis
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TU Delft
Design for Interaction

May 2021

TU Delft | Industrial Design Engineering

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Committee

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Preface

I come from a mechatronics engineering background and started the Design for Interaction master at TUDelft because I found myself deep inside technical niches, doing things to optimize a handful of numbers without having a clear picture of what I was doing actually means and what impact it has. Specializing in a specific technical field and focusing on it for the rest of my life was a rather grim thought to me. It was clear to me that this would not be something that would fulfil me in the long run, so I was looking for ways to break out of this niche and work on a conceptual level, create things and concepts with a real need and purpose.

Studying Design for Interaction has opened up a whole new world for me, a world of so many things to explore and directions to take. It is inherent to the Design Process to gain new knowledge about contexts to design for, people involved with their needs and desires and tools to shape solutions to fulfil them. This makes me feel excited and humbled at the same time. It excites me to think about learning new things and it humbles me to realize that there is so much I have yet to explore and learn about the world.

Concluding my studies, I wanted to work on a project which combines my understanding of technology and combine it with newly acquired design skills from the past two years at TU Delft. More specifically I wanted to unpack AI, as it is such a promising tool, yet intimidating and abstract. Approaching the end of my studies in 2020, the COVID-19 pandemic got me thinking about a context to design for. I have noticed people around me struggling with the challenges of keeping their life going after lockdowns hit and everyone stayed at home. To me the home office seemed like a context I would like to design for as it is so relevant in the current times and issues connected to working from home and people's wellbeing have surfaced caused by the sudden necessity for everyone to adapt to it.

Outlining the brief, I wanted to take on the challenge of proving to myself that I can manage a design project on my own by setting little boundaries at the beginning to give me free range along the way to shape my project. I wanted to use AI as a tool to improve the life of home office workers, using technology more on a meta-level and focus on its use-case, impact and purpose for the human good. Looking back, this was certainly not a decision that made my life easier, on the contrary rather. Working in isolation and having an open context with little guides to hold onto has definitely been a challenge until the end, but taught me valuable lessons on managing and executing a design project.

Looking back on what I have found out about AI ecosystems and the human psychology of wellbeing, I think I have only scratched the surface and opened a pandora's box of opportunities for designers to use AI for the human good.
I think personal data-driven systems are going to impact our lives substantially in the future, and a rising awareness about mental health in the digital age calls for designers and developers to work together towards creating products and systems with real human needs at their core.

Executive Summary

This project explored the domain of the home office worker to shape an AI driven concept guided by positive design principles to increase subjective wellbeing and resolving problems related to working from home.
The 13 fundamental needs, which are an operationalisation of the positive design framework, are used as components for subjective wellbeing.

Research and interviews with both managers and home office workers have shown that people working from home experience difficulties to detatch and take effective breaks, feel guilty for doing personal things during office hours, and lack routines to structure their day.
Exploring possibilities to use AI as an integral part of a product design addressing these problems have shown that recent developments in natural language processing make it possible to process and work with abstract human concepts.
Two interaction concepts were tested to gauge promising concept directions and explore possibilities of how to intervene in people's established routines.
Co-creating use cases for AI to act in a product to increase work/life balanece, combined with previous ideas and insights have led to the final concept vision.

The final concept vision is an AI driven to-do list concept which helps users to maintain work/life balance by giving personalised tips and suggestions for balancing activities and informing people about their fundamental need fulfilment. It is a concept vision leveraging the capabilities of natural language processing to classify human tasks, learn form behavior and personal data and give users individual suggestions tailored to their needs and interests.

The concept vision was tested with home office workers in real-life conditions for one week using a „Wizard of Oz" prototype.
Evaluations of the prototype have shown interesting insights into the perception of receiving personal suggestions from a machine and a promising response to the concept. Especially regarding needs classification and tracking triggered curiosity and left users wanting to know more about their need fulfilment pattern.

The concpet offers the starting point for the use of AI for the human good using fundamental needs and subjective wellbeing at the core.

Content

List of Abbreviations

AI … Artificial Intelligence
AI4SG … Artificial Intelligence for Social Good
ANN … Artificial Neural Network
DS4SG … Data Science for Social Good
GPT-3 … Generative Pre-Trained Transformer 3
NLP … Natural Language Processing
OWB … Objective Wellbeing
SWB … Subjective Wellbeing
ViP … Vision in Product Design

Glossary

Artificial Intelligence
A field in technology describing data driven systems which can predict an outcome based on modelling existing datasets

Artificial Neural Network
A layered computing system inspired by the human neuronal network in the brain to process information, adapt connection strength between nodes (neurons) making it possible to learn.

GPT-3 - Generative Pre-Trained Transformer 3
A natural language processing tool by openAI able to detect contextual information in natural language. It is pre-trained on vast amunts of data from texts on the internet.

Natural Language Processing
A sugfield of linguistics and computer science concerned with human language in computer systems and how it can be analyzed, processed and „understood“ by machines.

Objective wellbeing
A category in wellbeing describing external contributors to human wellbeing like financial situation, political stability and health.

Subjective wellbeing
A category in wellbeing describing internal contributors to human wellbeing like Pleasure, Personal significance and virtuous activities.

Vision in Product Design
A design methodology for ideating meaningful concepts for a future scenario by deconstructing the current context, building a context to design for and identifying important context factors for ideation.

1
Introduction

Goal of the Project

The Goal of this project is to propose a concept leveraging the capabilities of AI and shape it in a way to serve humans in improving subjective wellbeing within the home office context, resolving friction from merging the private space with work activities.

Artificial Intelligence for the human good

Artificial intelligence is claimed as a technology promising to change the landscape of nearly any domain, yet it is still mostly used by big corporations and experts in the field, limiting it's availability in the toolbox of designers. Many applications of AI are still exploratory (to test out its capabilities) or profit driven in nature. With this project I want to try and unpack the inner workings and potentials of AI and use it as a tool for designing for the human good. AI should perform with and for the human, and both should learn from each other (Kuijer & Giaccardi, 2018). Technology should complement to improve and support the human, instead of replacing us.

The Home Office and a need for improving Subjective Wellbeing

Flexible working arrangements and working from home has become more and more relevant for organizations and the work force. People start valuing work/ life balance more in comparison to high salaries. The sudden switch to full time home office caused by the global COVID-19 pandemic however, has shown that there is still a lot of room for improvement when it comes to wellbeing in the home office. Some issues can be attributed to imposed lockdowns, others are rooted in the merging of work activities into the private space, blurring the boundaries between them, which were before defined by commuting, changing scenes and having face-to-face contact with coworkers.
Wellbeing is a complex domain within psychology. This is why The positive design Framework (Desmet, 2013) and its components "Design for Virtue",

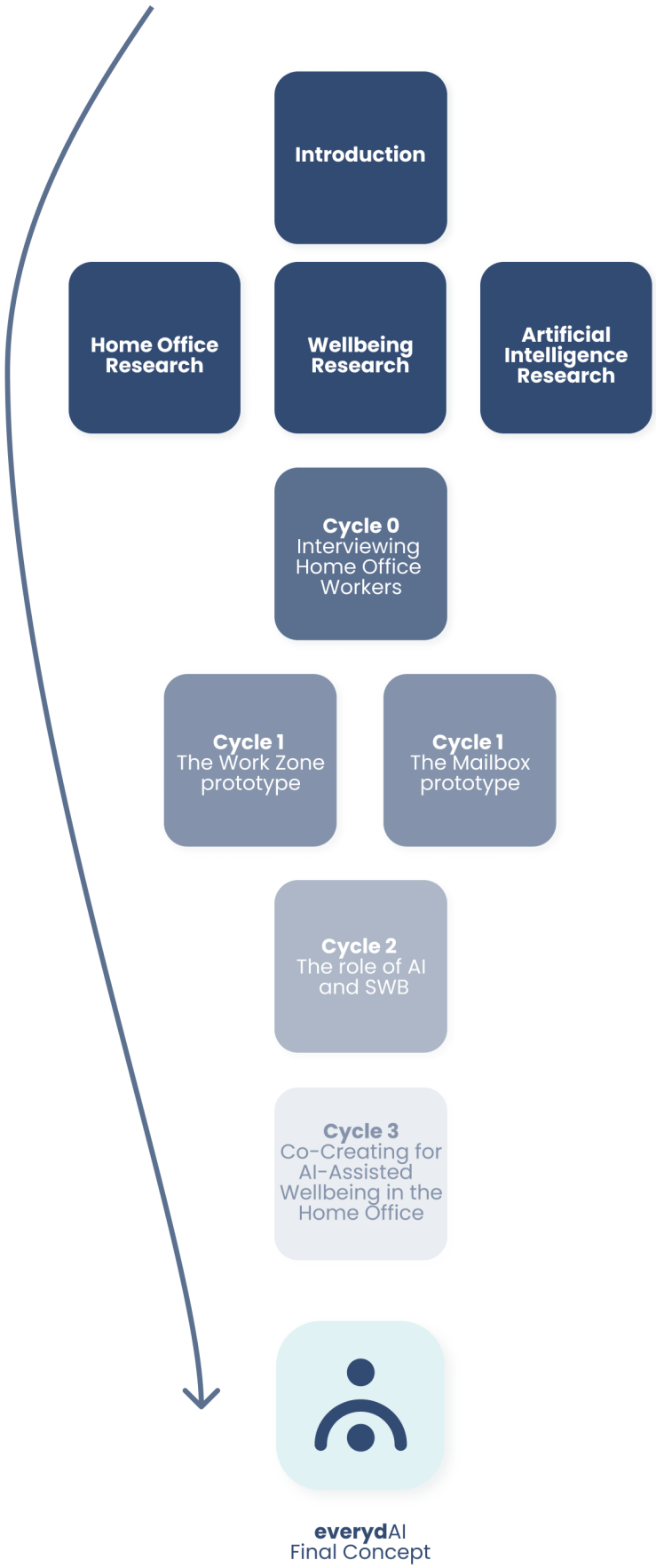
“Design for Pleasure” and “Design for Personal Significance” is used as a starting point and guide throughout this project.

Research Question

How can AI help resolve inhibiting factors of subjective wellbeing caused by working from home?

Approach

The project was approached in multiple cycles of research, design activities and testing. I chose this approach because of the openness of the research question and project as a whole, which calls for an approach allowing to shape and map out the context iteratively and ultimately condense towards a final design,



Setting the stage for the project

Research-deepdive into the main topics

Validate Research Insights and get real stories from people

Testing how to intervene for improving subjective wellbeing

Reflecting on the Role of AI and subjective wellbeing in my project

Getting inspired by peers for the ideation of the final concept

Figure 1-1: The Project Process visualized

having explored a number of directions. This makes sure that the impact of the final design is relevant to the home office context and subjective wellbeing of the home office worker, as well as using Artificial intelligence in an appropriate way, leveraging its advantages as a tool.

Project Process

The project was Kicked off with a deepdive into relevant topics Home Office, Wellbeing and Artificial intelligence. Starting out with an analysis on reports on Home office and current developments and predictions for the future by company whitepapers and reports, I could form a picture of the pain points by stakeholders (Home Office Workers and Managers) and a likely prediction of the future working environment.

Going further, an exploration on what constitutes wellbeing was made to connect the pain points of home office workers and understand predictors and influencing factors that construct wellbeing, specifically subjective wellbeing. Lastly, the domain of AI was unpacked by diving deep into the inner workings, sub-domains and use cases of the technology in order to extract capabilities the technology offers, to use it as a tool to address the pain-points at hand.

After the research phase, some interviews with home office workers and managers were conducted to validate research insights and gain more detailed, qualitative information and real stories and scenarios outlining the daily struggles comparing in-office vs. home-office. Drawing a frame around people's setup and activities throughout the day, I found specific situations that tell a story of people having trouble structuring and separating their minds from work even though their productivity was up compared to in-office.

Thematic clusters were formed from the insights to visualise areas for design interventions, which were then processed in a ViP* (Vision in Product Design) cycle to structure interview and research insights and form a basis for the first ideation and prototyping round. The first Ideas were then condensed using the Positive Design framework, resulting in two low fidelity experiential prototypes to test two concept directions: Separating work and life, and strengthen Team cohesion. Insights from these Tests gave an indication of promising directions to pursue and appropriate levels of intrusion for my design intervention.

*Vision in Product Design is an interaction-centered, future-oriented and context-driven design method which asks the designer to deconstruct a current context and recreate a future one to design for as the basis for ideation.

By taking some time to reflect upon the complexity of the project and to make the design direction more concrete, a cycle of reflection on the topics of the role of AI and Subjective wellbeing in my project helped focussing and establishing a vision for the final design.

Due to the fact that the process up until this point was executed by myself, in combination with a lack of inspiration by contact and conversation with my peers (caused by the lockdown situation), I tried to open up the scope of possibilities by organizing a remote co-creation session applying methods for exploring exotic ideas. This would prevent from being stuck in a tunnel and potentially missing good directions to pursue.
Structuring the ideas generated in the co-creation session I noticed many overlaps with my ideas I had in the first ideation cycle, but it inspired me to create the final concept where AI is used as an integral part of the concept. Had I not done this step, I would most likely have gone with an idea like the “Work Zone” generated in the first cycle, which perhaps would not have used the technology to its fullest potential.

The final concept -everydAI- was chosen with enough wiggle room available to incorporate insights gained along the way. In short, it is a personal to-do list module living in organisational software used for work (like trello) which gives appropriate suggestions for activities, the possibility to share interesting activities with others and help structure work/life balance by putting the personal life back on the desk.

1.1 The Home Office

Focus: Emloyees and Managers

The Coronavirus as a trend accelerator

Working from home has been a significant trend in the last years (Faulds & Raju, 2021), already growing before the global COVID-19 pandemic which forced us all into our homes. The sudden necessity for many to shift from an office into working from home has demanded quick adaptation by companies, employees, and managers. Due to the high level of digitization of today's world, many tools to facilitate remote work were available like desktop video conference tools (Zoom, Windows Teams, Cisco WebEx, ...) and collaborative document and file sharing platforms (Google Drive, Onedrive, Dropbox,...). Consequently, the overall screen time has skyrocketed not only because of increased professional usage of computers and smartphones (for communication) compared to in-Office, but also for entertainment purposes which is caused by imposed lockdowns (Wong et. al, 2021).

The future of work

The Tools and protocols put in place in order to facilitate the transition into the home office were a big investment for many companies. Productivity levels seem to remain roughly the same when comparing in-office and working from home (Faulds & Raju, 2021), which means the home office (or at least parts of it) is here to stay (Hill et. al, 2003).Though a completely remote working style will unlikely be the model of the near future, companies want to exploit the positive benefits of the home office like shorter commutes, more flexibility for employees and a wider pool for recruiting. Employees also report in favour of working (partly) from home, mostly seeing benefits in time gained by the lack of commutes, eco-friendliness through reduced emissions, being closer to family, and more flexibility in terms of working hours and locationn (Deloitte, 2018).

One predicted future work mode likely becoming popular in the coming years will be transitioning into satellite offices scattered around in strategically favourable locations in order to facilitate team work and more autonomous subgroups and departments. The main office often located in bigger cities will not be expected to die out completely but shrink in size and mainly serve the purpose of housing the most important activities and tasks such as board meetings and management (International Workplace Group).

The sudden necessity to work from home due to the global pandemic has showed new challenges stemming from the merger of private space and work. According to recent studies by IWG (International Workplace Group), HIRED (hired.com) and the World Economic Forum (WEF), the top issue faced by remote workers was "unplugging" from work. Without the change of location and predefined office hours, many had difficulties dividing professional and private time.

"I'm concerned that my manager doesn't see the full extent of my contributions when we are not together in the office which will slow down my career trajectory" - Home Office Worker (HIRED, 2020)

According to reports from BBC and the WEF, another struggle turned out to be a lack of face-to-face communication with colleagues and supervisors. One third of the people surveyed by the WEF were concerned that their effort wouldn't be appreciated fully because of the lack of in-office contact and distance to peers and supervisors(figure 1-2, left).

On the other side, according to reports from the BBC and biospace, managers are concerned about "keeping the spirits up" and providing the same level of leadership for their employees remotely as they could in the office. Managers surveyed by the WEF were mostly concerned about reduced employee focus and productivity followed by declining team cohesion, maintaining company culture and overworking (figure 1-2, right). However, research shows that remote work on avereage results in a higher productivity (Hill et. al, 2003)

Struggles of Remote Workers

Concerns of Managers

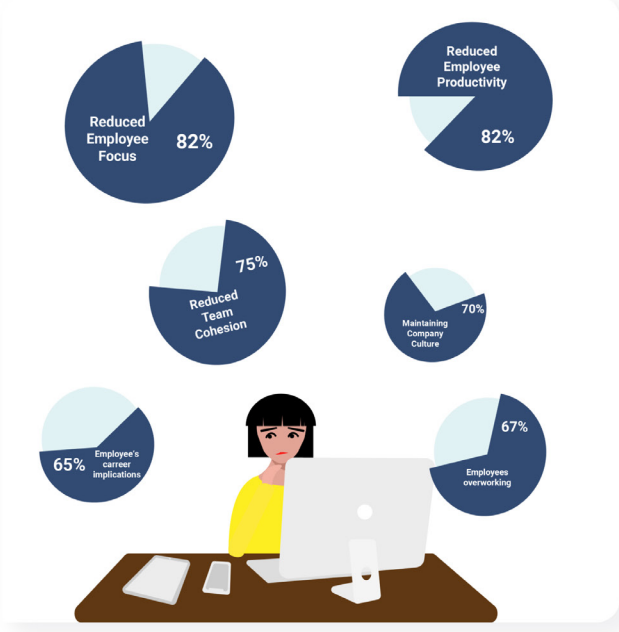


Figure 1-2: Research findings for struggles of Remote Workers (left) and concerns of Managers (right)

Key Takeaway: Struggling to unplug from work appears to be the main issue for home office workers.

Future Scenario (BBC Worklife)

The home office Is most likely here to stay, but in what form and to what extent? Experts predict a hybrid model as the future of working, which combines the benefits of the home office (less commute, more flexibility of employee schedules, bigger recruiting pools, ...) with the benefits of traditional offices as a collaborative space for teams and face-to-face meetings. The predicted hybrid model consists of a smaller main office still located in larger cities (where important meetings and activities are still carried out), combined with a set of surrounding smaller offices strategically scattered to be reachable by local team members in order to shorten their commute but still offer an office environment (figure 1-3). These satellite offices would serve as a meeting- and collaboration space for teams' autonomous activities. Lastly, depending on their nature of work and team preferences, employees will be able have a level of choice to work from home, the satellite office or the main office.

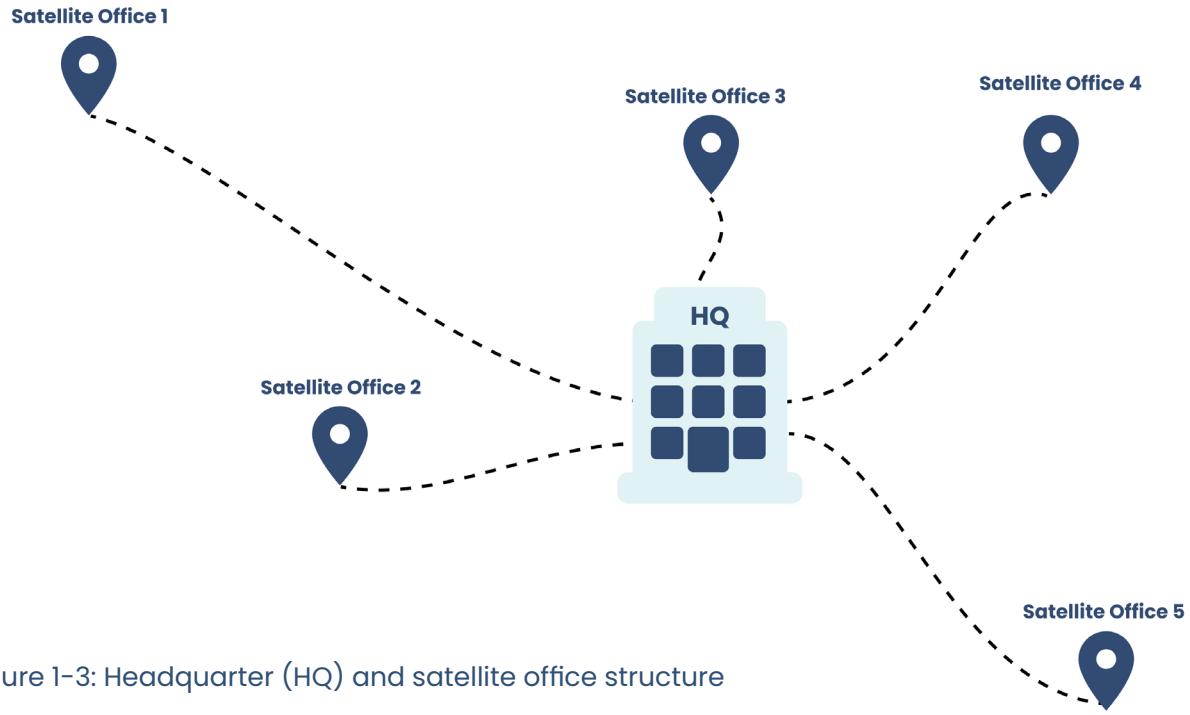


Figure 1-3: Headquarter (HQ) and satellite office structure

This model is one possible, but likely outcome for larger enterprises (100+ employees) in a postpandemic working scenario and forms the frame for this project. This implies, that some current issues in the home office which are caused by the pandemic (like isolation and job instability) are considered less relevant. Factors that are part of this scenario like having the choice to meet your team on occasion, working from home and shorter commutes are considered relevant for the project.

Key Takeaway: The likely future working scenario for employees in larger companies will be mostly working from home with occasional meetings in satellite offices.

1.2 The Wellbeing of Home Office Workers

Due to the pandemic and the resulting rush to get most employees to work from home, some problems have surfaced resulting from bringing office activities into the private space. Beyond losing connection to teammates and uncertainty about the job position, many companies are noticing a significant increase in calls to employee helplines reporting issues and concerns about employees' wellbeing (IWG, 2020).

But what exactly is wellbeing?

Precisely defining and assessing wellbeing is a complex topic as it is influenced by so many individual and circumstantial factors (Dodge, 2012). Traditionally, wellbeing is assessed via self-assessment through surveys (Deaton, 1997; Brim 2004). Only recently with the rise of big data, algorithmic data processing and a sharp increase of time spent online by people, new data sources for assessing wellbeing are explored (Voukelatou, 2020) and AI technology is explored to assess correlations and predictors of wellbeing (Margolis, 2020). These approaches are called "Data Science for Social Good" (DS4SG) or "Artificial Intelligence for Social Good" (AI4SG) (Voukelatou, 2020).

Generally, wellbeing it can be categorized by two main categories which are objective wellbeing (OWB) and subjective wellbeing (SWB). Objective wellbeing mainly describes concrete and quantifiable external factors that depend directly on your environment and living condition. It forms the basis and influences SWB, but will not be the focus of this project as addressing OWB would call for a system-design project rather than design for interaction.

SWB on the other hand is less quantifiable and describes more abstract concepts which are about long-term psychological health, fulfilment and emotions – in other words happiness.

Subjective Wellbeing

Subjective wellbeing constitutes mainly in longterm psychological wellbeing and has traditionally been assessed by self-reporting in surveys (Pavot & Diener, 2009; Frey and Luechinger, 2007) like the MIDUS (Midlife in the United States) longitudinal studies.
Existing literature focuses more on contributing sets of factors rather than on a concrete definition of what constitutes wellbeing or specifically subjective wellbeing. However, depending on the source these lists include different factors and often contain factors from the OWB category which makes for a fuzzy environment to draw distinct boundaries from.
Such lists of contributing factors can be found in the works of Carol D. Ryff and Ed Diener:

Ryff, 1989 – "Happiness is everything, or is it?":

- Autonomy
- Environmental mastery
- Positive Relationships with others
- Purpose in life
- Realisation of potential and self-acceptance

Or more generally - Diener, 2009 in "Subjective Wellbeing":

- Happiness
- Life satisfaction
- Positive affect
- Negative affect

The aim fo the project is to take the essence on what contributes subjective wellbeing, explore factors and possibilities through design interventions and discover opportunities for AI to benefit the user and ultimately increase SWB. Therefore, a framework of TU Delft's own design for happiness expert Prof. Pieter Desmet is used as a guide for the design process and for considering SWB in the design process – The Positive Design Framework.

The Positive Design Framework (Desmet & Pohlmeyer, 2013)

The positive design framework developed by Pieter Desmet and Anna Pohlmeyer at Delft University of Technology specifically addresses the issue about how design can contribute to individual happiness and SWB. The background for the Framework is design for happiness and human flourishing, which is defined in the paper as "living life to the fullest", a sense of belonging and self-expression. The source for individual Happiness and flourishing is explicitly separated from materialistic gains and wealth, but rather associated to how resources are exploited and used to facilitate actions and experiences that bring people joy and fulfilment. Happiness and flourishing is more about the meaning and affordance of objects and products rather than the products themselves. A smartphone for example enables music consumption, organisation and connection to other people, it enables us to give and receive appreciation and socially interact with distant loved ones. So, products should be designed keeping these affordances in mind, as these are the actual source of happiness and human flourishing.
To structure and categorise the main contributers fundamental to happiness and SWB, the framework proposes three dimensions: Design for Virtue, Design for Personal Significance and Design for Pleasure. In (figure 1-4) you can see the positive design framework illustrated.

The "pleasure" dimension describes a rather hedonic aspect and consists in momentary pleasures, that over time and in sum contribute to SWB. Products can either be the direct source of these pleasures, or facilitate a pleasurable experience. In related work, Desmet (2012) compiled a list of 25 positive emotions that can be experienced by interacting with products.

Although Pleasure and pleasurable experiences are essential to subjective wellbeing, it takes more to flourish and live a fulfilling life. A person needs a sense of purpose, belonging and meaning in his life. For the "Personal Significance" dimension this might mean to develop new skills, progressing in your career, help you in achieving your goals or visualising them.

The last dimension "virtue" is a consequence of virtuous behavior, or doing something for a greater cause, being a morally good person. This also depends on what someone considers as good and bad, but generally contributions to an altruistic cause like charities, helping other people and doing something for a greater cause like sustainability are all part of this dimension.

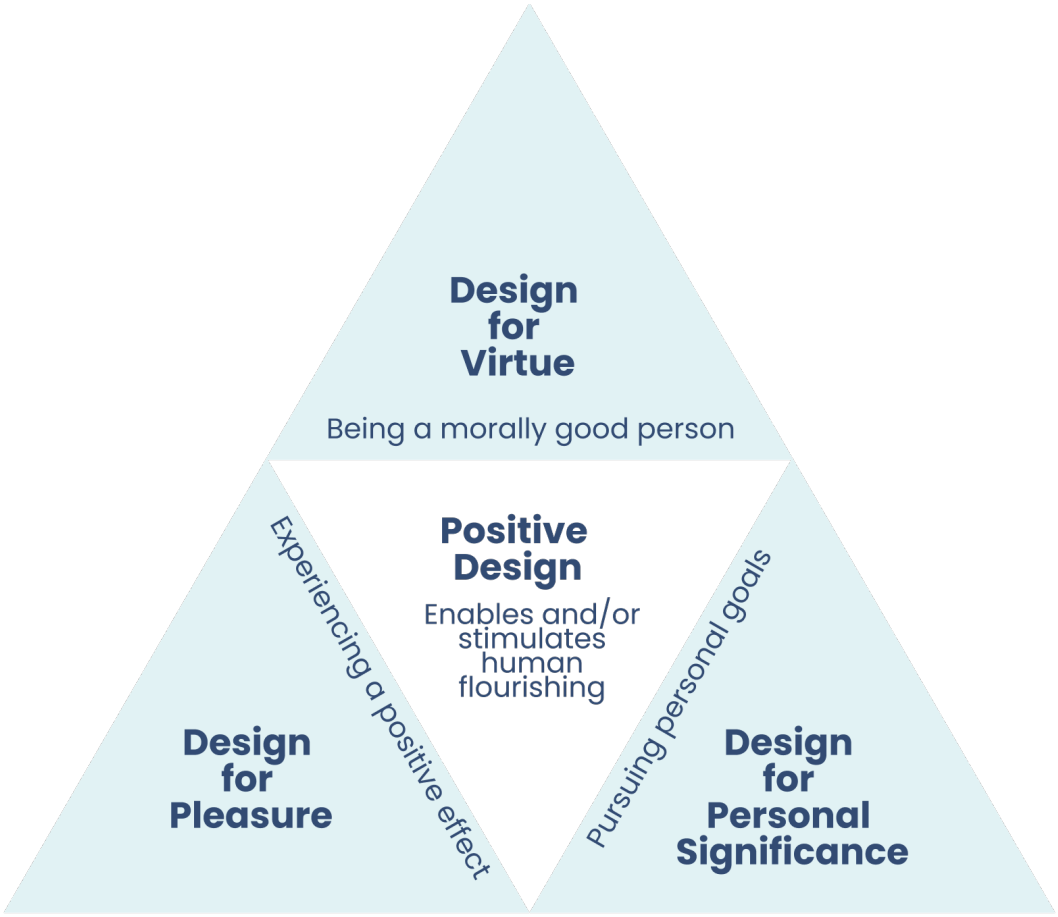


Figure 1-4: The Positive Design Framework

Common approaches are problem-solving with the aim of reducing negative circumstances, which might not result in a positive effect, but lessens the negativity and approaches a positive situation. On the other hand, a possibility - driven approach strives to support existing possibilities and create new ones. Important here is the preservation of existing possibilities and positive effects, new ones should not be created on the cost of existing ones, resulting in a net zero or even negative effect.

Key Takeaway: The Positive Design Framework lays the groundwork for handling the complex topic of subjective wellbeing in the design process.

Balance

Balance between these three dimensions is a key attribute, which is also central to the bigger goal of this project (work life balance). Because balance in this sense means different things to different people and the impact and level of positive emotions and fulfilment individuals get out of these domains might vary by personal preferences and values, this approach calls for a personal fit (Peterson & Seligman, 2004). Someone might thrive more by working on their personal goals, others by helping people and contributing to a greater cause. However, no one dimension should be compromised by a design intervention in order to amplify another, and ideally is capable to deliver holistically in a flexible manner, tailoring itself to the user and their needs. In order for a design intervention to work, a user-centered approach is necessary to understand the context, needs, wishes, values and goals of the user. By offering a targeted solution, a subset of users can be addressed, or alternatively a customisable solution can deliver a basis of more general solutions, extended with individual actions that complement the design and make it fit better.

This approach poses a great opportunity in combination with artificial intelligence, as the technology's core functionality is to evolve over time and adapt to data fed into the system, optimising by use over time and being able to adapt somewhat from changes in the data. To better understand possibilities of AI technology and how it can be applied in real-world applications, the following chapters illustrate an outline of the AI landscape.

Key Takeaway: Subjective wellbeing calls for a personal fit as people value different things more or less than others, thriving from fulfilling individual needs, whishes and goals.

1.3 Artificial Intelligence

Looking at currently operating AI use-cases like customer profiling for tailored advertisement via cookie data, language translations, chatbots, face filters etc. it becomes clear that AI has long entered our daily lives. We are constantly in contact with smart products and data processing algorithms feeding and learning with nearly everything we do in the digital space. However, there seems to be a knowledge gap between what is presented as AI vs. what is actually happening under the hood of these mechanisms. In the following sections, the AI ecosystem is explained to map out current possibilities and use cases.

What Is Artificial Intelligence?

Merriam Webster defines Artificial intelligence in two ways:

1: a branch of computer science dealing with the simulation of intelligent behaviour in computers.

2: the capability of a machine to imitate intelligent human behaviour.
Important to note on this definition is the meaning of intelligence, which is defined as the ability to learn or understand or to deal with new or trying situations. This intelligence has its limitations though and AI systems are still very much confined by many parameters defining their domain.

Machine learning is the underlying mechanism, which enables the adaptive and predictive capabilities of AI systems. Basically, machine learning optimises a statistical model, which is fit (figure 1-6) onto a certain database and use case and predicts dependent outcomes for new data input. With additional validation, accuracy can be increased, and the statistical model fine-tuned. Depending on the use case, there are several algorithms to choose from. The choice of Algorithm and fine tuning for the initial model is still done by humans who program the system, and oftentimes this includes preparing the data and labels, which are known outcomes (more about data and labels in the following section “Supervised Learning”).
Deep Learning is a subset of machine learning where ANNs (Artificial Neural Networks) take over the task of finetuning parameters for model fit (figure 1-6), given a set of constraints and directions towards which the algorithm has to be optimised for. The surprising and perhaps shocking thing is that the process occurring in big neural networks is not yet fully explainable by humans, because of the sheer amounts of nodes, operations, iterations and general “chaos” taking place during learning.

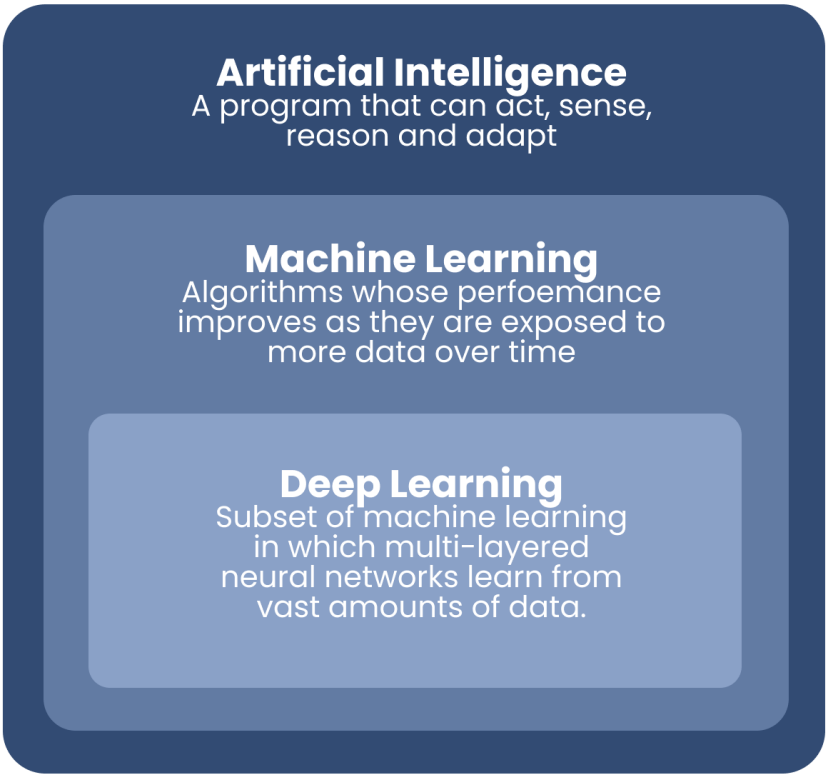


Figure 1-5: Artificial intelligence sub-sets (Singh, 2018)

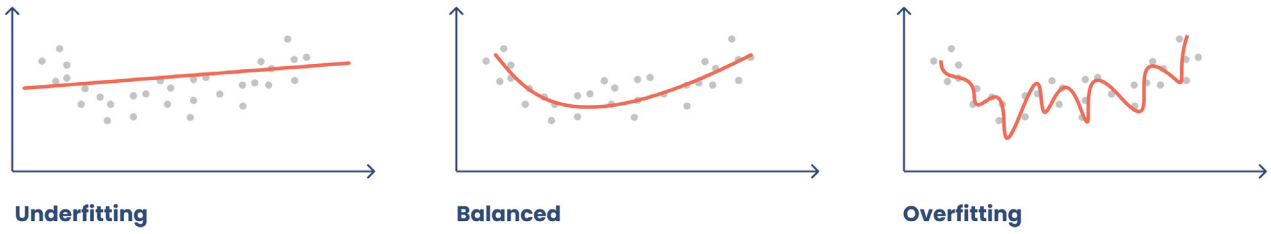


Figure 1-6: Machine Learning Model fitting - Underfitting (not tuned enough), Balanced (tuned appropriately), Overfitting (tuned too much, tries to be „too accurate„ which makes the algorithm unstable)

Machine Learning

Machine learning can be subdivided into three separate categories, which are distinctly different in what they produce as an outcome and how they produce it(figure 1-7). What all three have in common is a difference in "learning" phase and deployment. In the learning phase, the algorithm is optimised and parameters and datapoint-weights are adjusted to increase accuracy. Once the system is sufficiently trained and reaches desired accuracies in predictions, it can be deployed and work with new, unknown data. By validating predictions with this new data, the algorithm can then be further finetuned.

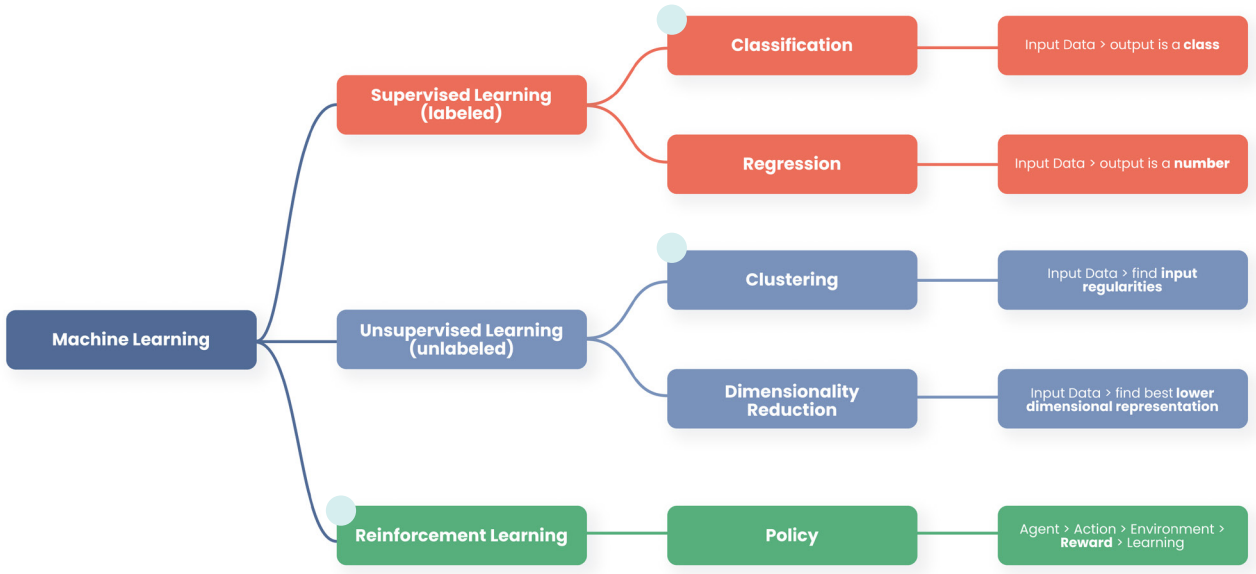


Figure 1-7: Machine Learning approaches and outcomes.

Key Takeaway: AI Clustering and Classification can be used for finding common attributes among large and complex sets of data, and Reinforcement learning can be used for shaping product characteristics to a specific case or setting (personalisation).

Supervised Learning

Supervised learning consists in starting out with a database of variables, and predetermined outcomes (labels) that the data produces. So a label is part of the solution space, while the rest of the data consists in potential dependencies to the label. By analizing and creating a statistical model that is able to predict label values with certain accuracy by looking at the rest of the data, the AI can learn and estimate with a certain accuracy which parameters determine which outcome/label. By fitting a statistical model onto the dataset, and finetuning it for the desired outcome, thereby “training it”, the algorithm is optimised for a specific use case.

In this example, the task is to predict in which bucket a ball falls, when dropped from a certain position on the top of the screen. In this case the labels are the bucket numbers, as these are the result or outcome to predict. Data points or variables contributing to these outcomes are Drop position, bounciness and ball size (bottom of the screen).
By Dropping a lot of balls from random positions, with random sizes and bounciness, a database can be established where all balls are recorded with attributes and outcomes (labels). This is the basis for fitting a statistical model (in this case KNN) to the dataset and optimize for prediction accuracy.

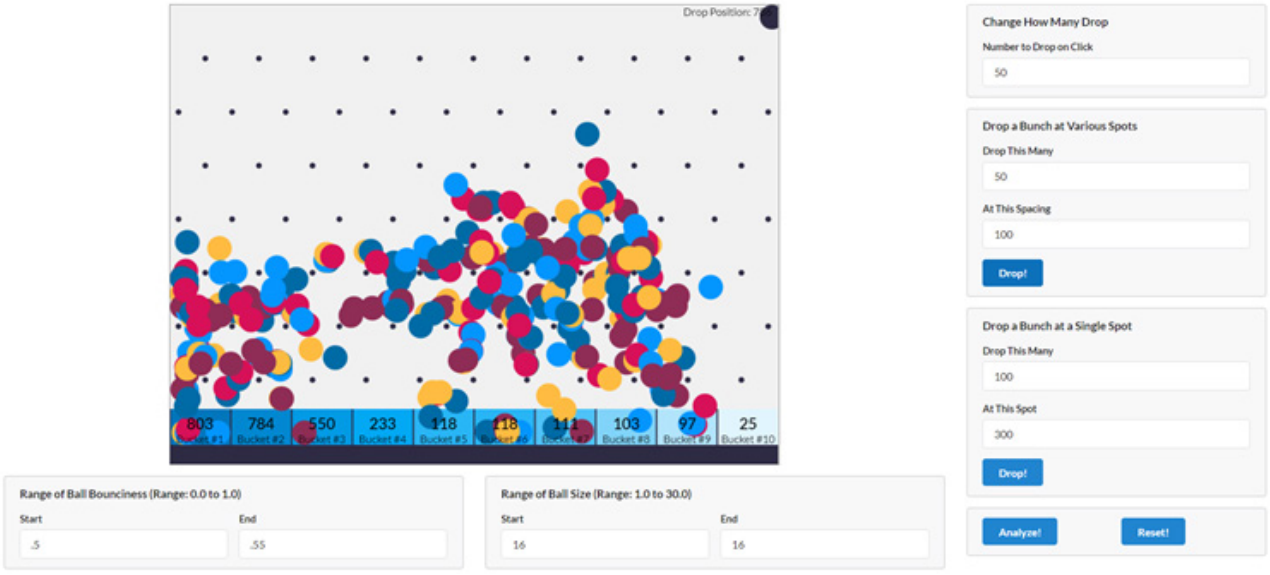


Figure 1-8: Plinko data generation for Supervised learning

Key Takeaway: Supervised learning requires a delicate consideration of a large amount of data, which can become very complex very quickly.

Unsupervised Learning

Unsupervised learning works without labelled data or known outcomes. Based on the data, correlations are detected and datapoints are clustered (like segmenting customer groups or sorting images by depicted content). In targeted marketing, this is used to group customers by demographics, acquisition, churn rates and online behaviour (Gupta et al., 2004), constructing artificial personas to make segments more personal and relatable (Huang & Rust, 2020).

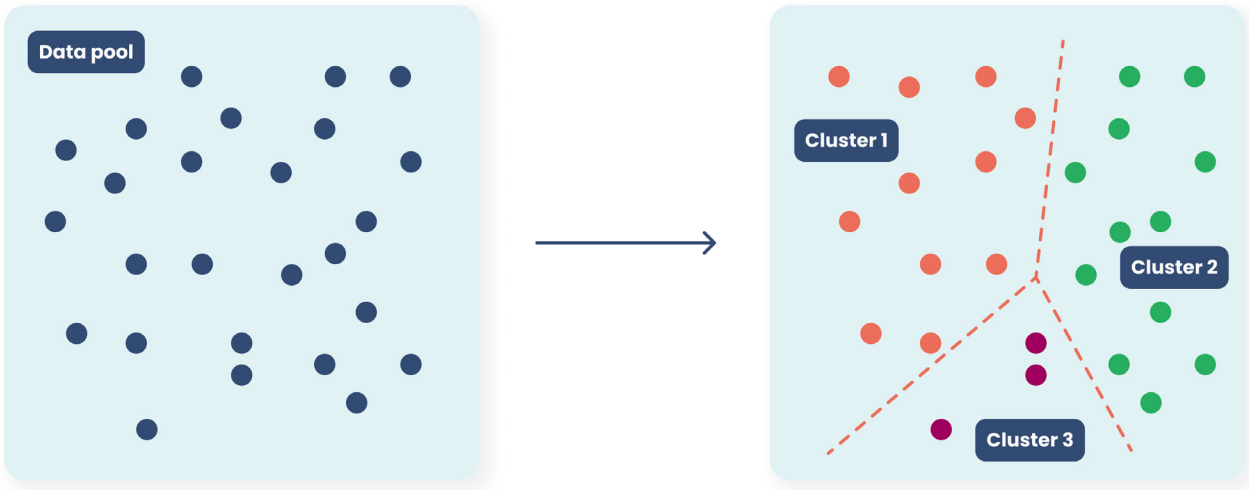


Figure 1-9: Clustering

Reinforcement Learning / Deep learning

This type of learning works by inserting the machine in an environment with constraints and letting it take decisions to navigate the environment and train over many iterations. By interpreting behaviour and rewarding a desirable outcome, the machine optimizes the decisions across iterations. An example for this would be moving forward using the constraints of a body with joints and muscles, giving the machine autonomy in deciding which muscles to contract and which joints to move.

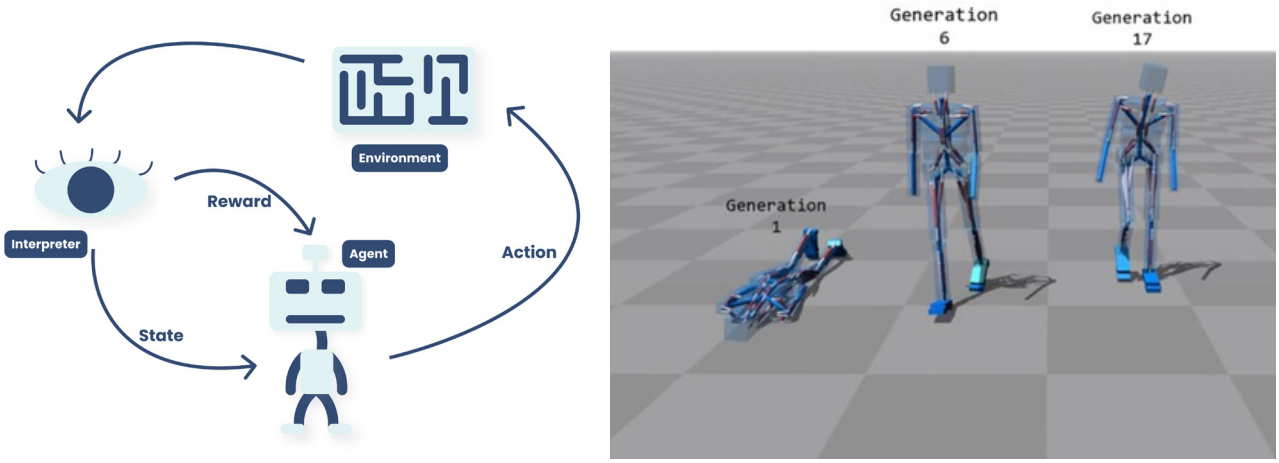


Figure 1-10: Reinforcementlearning on a meta-level (left), Outcomes after various learning cycles trying to walk (right)

Reinforcement learning could be used in my context with the premise of learning how to increase subjective wellbeing by changing product behavior, tracking and adapting autonomously according to periodically assessed wellbeing levels.

AI Use Case: Marketing with Persona-Profiles

Persona-profiles would be a useful approach for personalisation and adaptation to individual users, given the previous insight that SWB is inherently subjective and calls for a personal fit.
In marketing, AI is used for targeted content personalisations. Depending on what users have consumed in the past and their real-time online behavior, relevant advertisement content from individual vendors can be displayed.
AI can predict, what type of content a visitor will engage with based on big amounts of data from consumed content, building persona profiles and group visitors into interest clusters. This is a powerful tool for marketers to attract and persuade potential customers into purchasing a product.
In fact, most users already expect and prefer this type of individual approach and the perception of being targeted as an individual (Munro, 2020). Because an algorithm can discover gaps, opportunities and correlations much quicker, more accurate and in a dynamic way, using it to curate content has become the standard in online marketing.

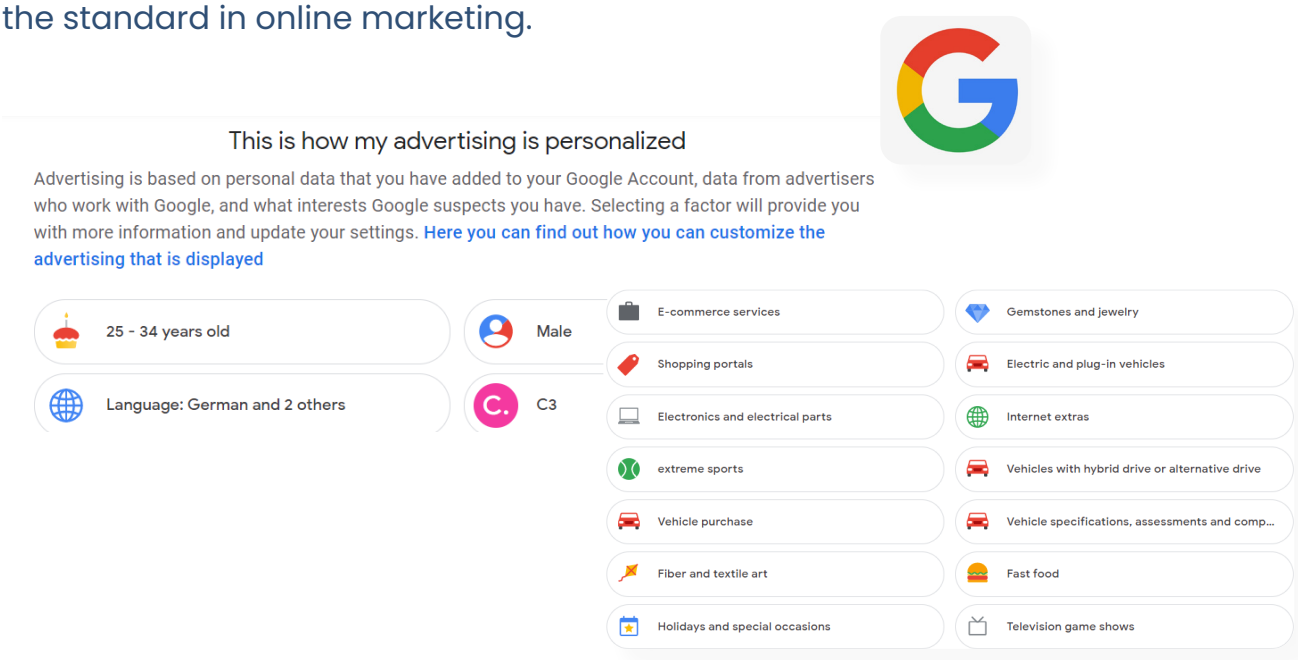


Figure 1-11: My very own Google-ads interest profile with hundreds of tags

I was curious about how accurate these personalisations really are and found out that my Google account's interest profile contained hundreds of almost spookily accurate interest tags.
In this setting, personal profiles are used to sell me things and generate profit, but potentially it could also be used with a more human-centric lense.

Key Takeaway: AI created persona profiles offer good potential for custom behavior and precise targeting based on abstract topics like interests and behaviour.

Natural Language Processing for human context analysis

Thinking about how technology could handle a complex and abstract human concept such as SWB and break it down into managable and actionable data, Natural Language Processing (NLP) is starting to offer viable possibilities of „understanding human language.
GPT-3 (Generative Pre-trained Transformer) by OpenAI is the biggest natural language dataset as of the time of this project with 175 Billion Parameters (the values that a neural network tries to optimize during training) which makes it the largest and most accurate NLP mechanism to date (Brown et. al, 2020).
By having analysed large amounts of natural language, GPT-3 can draw associations between words and in which context they are used.
The basic function of GPT-3 Is predicting the next "X" words following a given input, creating coherent streams of text, Illustrated in figure 1-12 (left).
Re-training the model to a specific context and teaching it to generate outputs to context-specific inputs adapts it to create powerful applications like code generators (debuild.co), sentiment detectors (askviable.com) and much more.
In order to do this, the model has to be shown examples on which inputs should generate which outputs and with this information, adjust the weights and parameters of the system (figure 1-12, right).

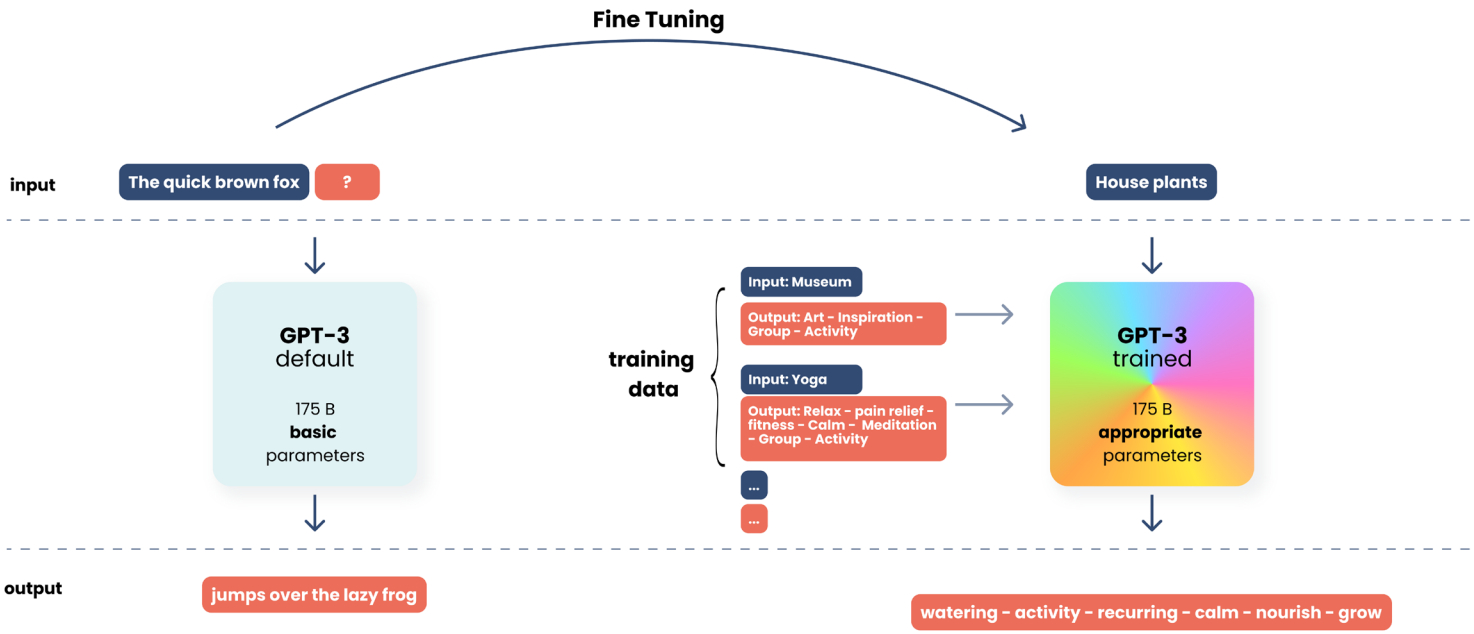


Figure 1-12: GPT-3 function – default (left), pre-trained and primed for detecting (right) correlated tags to an input token(expression).

Key Takeaway: GPT-3 (and following generations of NLPs) is a powerful tool to work within a close-to-human, abstract context, which makes sensible personal assistants feasible.

Conclusion of the Introduction

To conclude the introductory section and research about the future of work, wellbeing and Artificial Intelligence, it becomes apparent that there are a number of problems that stem from merging the private space with work, relating to the wellbeing of home office workers. In the post-pandemic future scenario set for this project, some of these problems are assumed to be resolved by the ending of the pandemic (like lack of social contact, isolation and job insecurity). Arguing for a DfI approach, Interactions are a key element in improving the subjective wellbeing and work/life balance in the home office to address the remaining issues at hand.

Artificial intelligence can be a powerful tool for adaptive functionality, optimisation and objectifying data by fitting statistical models. Through recent developments in natural language processing, the functionality of AI can be leveraged and applied to areas that are very close to us humans, making systems more intuitive and accurate, translating and understanding our way of communicating and behaving into usable data.

As a Design for Interaction project, I think designing something that has an impact on the subjective wellbeing of home office workers fits well with the user-centric core of the track. I think these more intrinsic factors are what DfI is about, and I feel like addressing Objective Wellbeing would be more of a strategic/system level centered project (with the exception of physical health maybe). This is why SWB will be the domain to focus on going forward.

Key Takeaways:

The likely future working scenario for employees in larger companies will be mostly working from home with occasional meetings in satellite offices.

Struggling to unplug from work appears to be the main issue for home office workers.

The positive Design Framework lays the groundwork for handling the complex topic of subjective wellbeing in the design process.

Subjective wellbeing calls for a personal fit as people value different things more or less than others, thriving from fulfilling individual needs, whishes and goals.

AI Clustering and Classification can be used for finding common attributes among large and complex sets of data, and Reinforcement learning can be used for shaping product characteristics to a specific case or setting (personalisation).

Natural Language Processors like GPT-3 offer a promising opportunity to transform close-to-human contexts into usable data for technology integration, which make sensible personal assistants feasible.

AI created persona profiles offer good potential for custom agency and precise targeting based on abstract topics like interests and behaviour.

Next steps

Going forward, I will investigate the Home office domain further by talking with people working in the home office to validate relevant research insights and to get real stories and qualitative details about people's life in the home office. The insight gained from the interviews will then be synthesised and structured into clusters which forms the basis for ideation and design exploration. By interviewing people and hearing stories about how they cope with working at home, I assume that new research questions, assumptions and opportunities for design interventions will arise. These will then be explored with multiple design cycles to map out the design space and test potential design interventions and interaction concepts.

2
Cycle 0
Interviewing Home Office Workers

Focus: Emloyees and Managers

In this cycle I will interview employees and managers working from home to validate relevant research insights and to get real stories and qualitative details about people's life in the home office. The insight gained from the interviews will then be synthesised and structured into clusters containing quotes from participants, forming the basis for ideation and design exploration.

Purpose

The first round of interviews was conducted with the purpose of validating quantitative insights from the researched material about home office workers and to garner deeper insights, motivations, values and a more precise picture of the real home office context. In this phase, both the manager and employee side are investigated to get information on manager-employee dynamics and see if there are differences in both cases (both sides work from home so managers can be considered as home office workers too).

Research Questions:

RQ1.1) What are people struggling with (especially regarding Subjective wellbeing components)?

RQ1.2) How are manager-employee dynamics contributing to the SWB of home office workers?

RQ1.3) How do people imagine themselves working in the future?

RQ1.4) Did people change their working habits when transitioning from office to home office and if so - what and why?

2.1 Interview Preparations

Sample

The interviews included 7 individuals in total, which all have experienced part time and/or full-time home office work arrangements for extended periods of time within the last years and can be categorized in 3 main clusters:

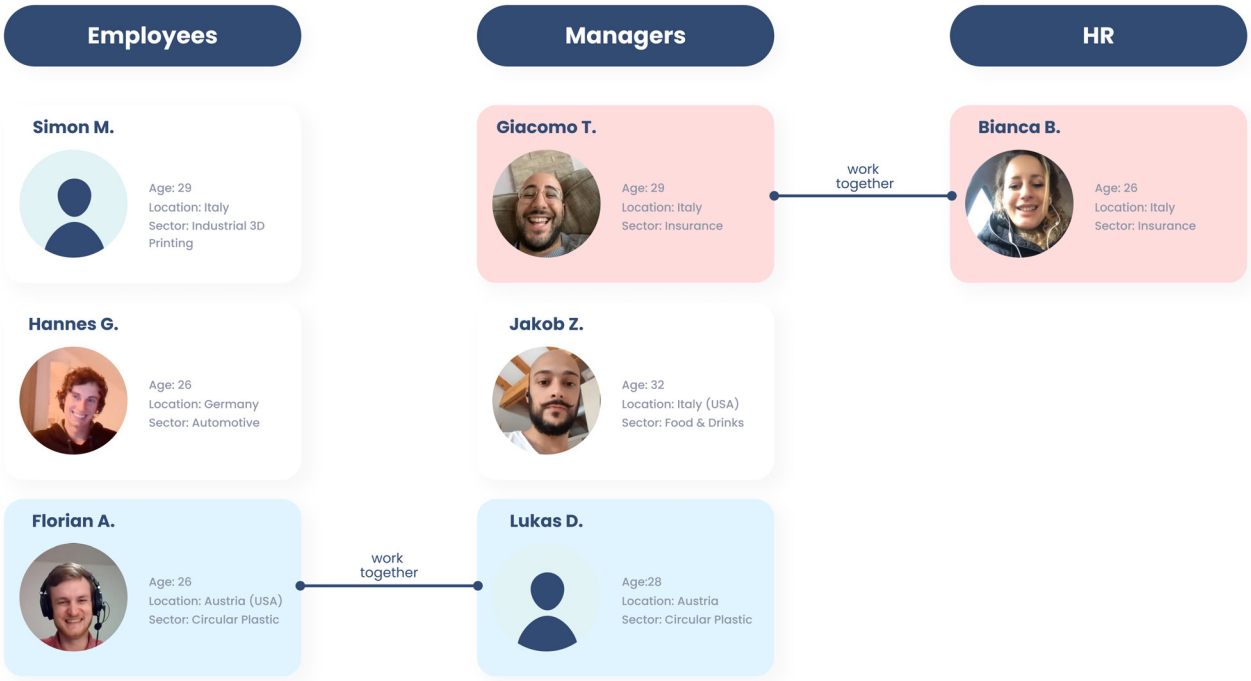


Figure 2-1: Interview Participants

Bianca the HR manager is seen as separate because of the specific responsibility of monitoring and optimizing interpersonal communication between team members and supervisors, as well as enabling a healthy work experience in the home office. Insights garnered from this individual is seen as less of an investigation of their personal experience in the home office, but rather as inspiration for approaches taken by industry professionals to enable a healthy home office experience for others.

Due to practical reasons (personal network), the pool of participants has a low average age which makes it a limited and skewed sample. This can have several implications on the results such as not having children, flexible living arrangements, technology savviness and agility. For the design, they will form a more focused target group to design for which could make for a better fitting product tailored to this sub-group of home office workers.

Sensitizing Participants

Before interviewing, I want to prime participants to start thinking and reflecting on their experiences related to the home office. Sensitizing (making people sensitive for the context) helps making people aware of everyday experiences and what is meaningful to them.
In order to sensitize the participants prior to the interviews, they were given a preparation document containing a general explanation of the home office context and three main topics to reflect upon. The participants were instructed to spread out their reflections over as much time as possible and to take notes while doing so. They were also encouraged to come up with personal stories and reflections beyond specific points mentioned in the document and to use it as a starting point rather than a strictly prescribed instruction.
The three topics contained in the preparation documents were:

- Environment

How did people change their environment at home in order to facilitate working from home, what is their current arrangement and how did it change over time?

- Communication

How did communication with supervisors and peers change when switching into the home office and how do they feel about communicating remotely?

- Mental State

Did working from home impact the general mental state, social relationships and personal fulfilment and if so, how did it change?

(Full Documents in Appendix B)

During the interview, two main techniques were applied in order to stimulate the participants and reach deeper levels of information, desires and values.

The path of expression

The path of expression maps out how people's past experiences and future desire are connected to the "now", their status quo, through memories and dreams (Sanders & Stappers, 2012). This scheme helps people recall by starting with the freshest memories, then going back further into the past, to then project into the future on the basis of their experiences.

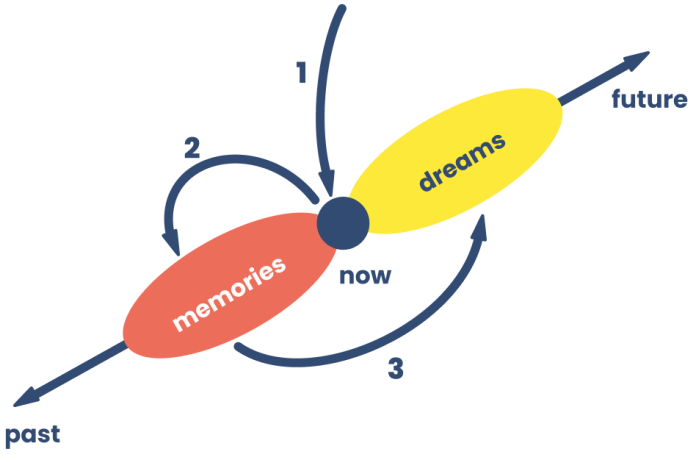


Figure 2-2: The Path of expression (Sanders & Stappers, 2012)

The path of expression framework enables people to connect meaningful experiences from their past and present and using that as a basis for projections into the future. This path was used as a guidance during the interview. Starting out the conversation by talking about their current situation sets an easy baseline for both going into the past and future while being a good conversation starter and easy for subjects to talk about as it requires little thinking. Moving along the interview, a reflection into the past was discussed comparing it to the current situation and letting the subjects tell their stories and memories, and finally ending the interview with wishes and expectations for the future regarding their work environment.

Laddering

Laddering is an interview technique derived from the Means-End theory (Gutman 1982), aiming at discovering deeper levels of information and underlying causes behind issues. By descending a ladder with targeted follow-up questions, the interviewer can probe deeper one rung at a time (rung = question).

Example from one of the interviews:

Subject: "I miss casual communication with my colleagues."
Interviewer: "Why are you missing that now?"
Subject: "Because I can't just look over and have a chat with them now that everyone is at home."
Interviewer: "What would you chat about?"
Subject: "I don't know, like when something happens, a small success or setback then I could tell someone."
Interviewer: "Why do you like to tell someone?"
Subject: "Because for example when I compile a programme and it fails, then I could share my frustration with someone, that feels kind of relieving. I still like to do it with my roommates sometimes, but obviously they can't understand what I am talking about sometimes."

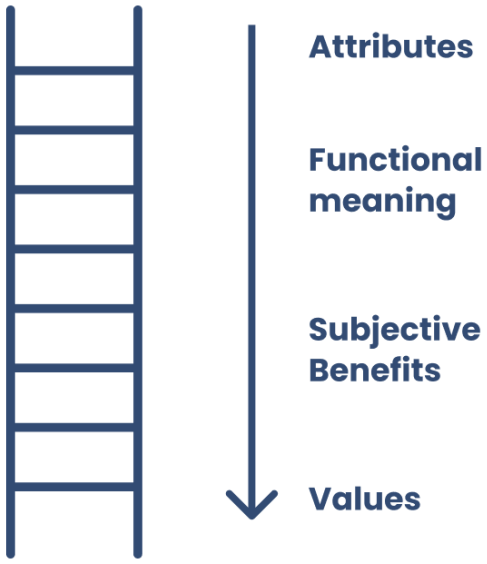


Figure 2-3: Laddering Technique

It is also possible to go sideways and jump from ladder to ladder by asking questions like "What tools did you use to communicate now that physical communication was not possible anymore" to move on from the previous ladder and descend on the next one (Abeele & Zaman, 2009).

This technique has some limitations in that the questions can become somewhat childish and tiring for the interviewee, so a clarification on how the interview will take place is important for the interviewee not to get perplexed. Fortunately, in this case all the participants had an established personal relationship to the interviewer (me) and thus seemed to feel comfortable in diving deep and revealing personal stories and information.

2.2 Interview Insights

The complete material was synthesised and reduced to cluster them into repeating themes for further processing in preparation for ideation. After laying out all the information, there were numerous occasions where participants reported the same or similar experience and issues, which points to a reasonable coverage of relevant information by the number of interviewed people. In the following section, the resulting insight-clusters are described with some additional descriptive quotes from the interview.
(Additional Insights in Appendix B)

Trust and Responsibility

This category revolves around the benefits of giving employees and teams the responsibility of self-management and communicate a sense of trust, belonging and self-expression instead of applying pressure to perform and monitor performance. Giving home office workers more autonomy, combined with result-based check ins and communal stand-ups instead of micro-managing, appears to be appreciated by both managers and workers and contributes to flourishing and growth of employees.

2 Participants: Bianca (HR), Lukas (manager)
Regular meetings with new people are appreciated, also for conveying the team spirit.

3 Participants: Jakob, Giacomo, Lukas (managers)
Giving people trust and responsibility strengthens the bond with them and makes them grow as people, accelerating their career paths.

1 Participant: Giacomo (manager)
"We try to motivate new people to ask as much as possible so they learn to work in autonomy. They have to become owners of their own work."

Key Takeaway: Autonomy seems to make people thrive and grow professionally, having benefits for both them and their company.

Flow State

This Cluster is about increased depth of immersion when working from home, meaning people are less distracted and work for more intensely for longer periods at a time without taking a break. This is generally seen as a good thing by both managers and employees alike, the big issue is breaking up the more intense phases and disconnect, in order to regenerate. Also, the resulting increased productivity seems to be hardly measured or rewarded. In this cluster, the impact of the opportunistic sample (26 – 32 years old) should be taken into account because no participant has children (or even pests). Although most participants experience increased productivity at home, they also feel less informed about general happenings and sentiment within the company compared to working in the office.

5 Participants: Bianca, Giacomo, Lukas (managers); Florian, Hannes (employees)
It is easier to enter a deeper working flow at home compared to the office.

Participant: Simon, Hannes (employees)
"I actually work during my breaks, sometimes even while I'm cooking."

Key Takeaway: Working phases are longer and more intense at home.

Routine

"Routine" describes some self-initiated physical activities in facilitating a psychological separation between personal and professional time. Reportedly, these can take the form of closing the screen of the laptop, opening and closing the door to an assigned home office room, physically moving and changing location.

2 Participants: Simon (employee); Lukas (manager)
Physical rituals like closing the laptop to go on the home trainer or closing the door to the home office make a mental cut between work and private.

Key Takeaway: Routines and habits, especially physical ones help separating work and life and facilitate getting a „clearer mind".

Distant Colleagues

In the core of this cluster lies the loss of connection specifically to colleagues that are not directly involved in people's team and projects. This is caused by the lack of real in-office casual contact among workers from different departments. It might have negative consequences in maintaining company spirit and contribute to a feeling of loneliness and lack of direction. Also, judging the outcome or progression of Colleagues' and employees' work gets harder for managers when confronted via exclusively digital means, widening pre-existing knowledge gaps.

1 Participant: Giacomo (manager)
It is harder to judge work and productivity in home office, especially from fields less familiar to us Managers.

Unfounded Guilt

Unfounded guilt describes some sort of lingering pressure caused by digital communication and an increased urge to always be responsive and available in the home office, leading to sustained psychological stress and increased difficulty of disconnecting from work. Participants of the interview have stated examples that go from "not wanting to unload a dishwasher because they felt it was supposed to be working time" up to "expecting to be called or messaged throughout a vacation despite a clear communication to management about not being reachable."

1 Participant: Simon (employee)
"I cannot empty the dishwasher right now, honey! I have to work! Even if that is ridiculous and would make no difference at all. I just feel bad doing personal things during work time."

Key Takeaway: People struggle with taking breaks and doing things for themselves during the day because they feel bad doing them during „Work Time".

It's hard for people to fully exploit the flexibility of working remotely because they struggle getting out of the „working mindset".

Conclusion of Cycle 0

Probably the most notable and impactful insights gained from speaking to home office workers is the constant feeling of having to be available for communications like calls and email, even outside office hours. Merging the private space with the work domain has the consequence that detaching mentally from the psychological "work mode" and taking recovering breaks in between intense working phases becomes more difficult (figure 2-4). This is especially problematic given that the actual productivity of home office workers appears to be at least the same or even higher compared to in-office. People feel less justified to take breaks as they only have a temporal measure by which they can judge work time. In the physical office casual breaks seem to be perceived as more justified as "they were at work". Spatial changes and physical routines appear to help facilitate a change in mental state and disconnect form work, however people also fall back on doing small tasks later at night. Regarding organisation and responsibility, the insights point to better performance by trusting employees and giving them more responsibility which also strengthens team and company cohesion.

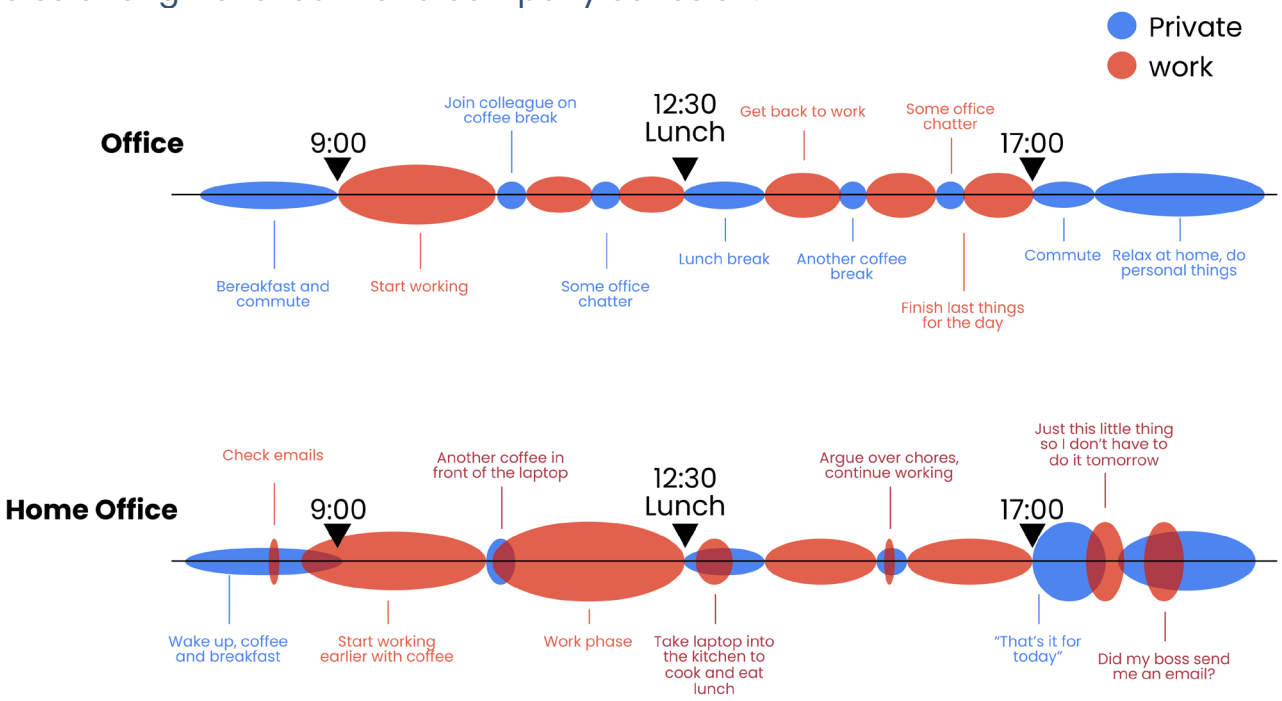


Figure 2-4: Work/Private balance in the home office compared to the office.

Answers to pre-interview Research Questions

The following are answers to questions I had before going into the interviews.

RQ1.1) What are people struggling with?
Problems they are struggling with are: technical problems, disconnecting form work, digital communication, personal connection to colleagues. For the context of this project going forward, it is important to distinguish issues that arise from the pandemic and issues that arise from working at home - I will focus on the latter.

RQ1.2) How are manager-employee dynamics contributing to the SWB of home office workers?
Although micro-managing seems to decrease when employees work remotely, communication outside of working hours have become a bigger psychological burden for home office workers. Initiatives imposed by the employer to improve employee wellbeing also appear to have little effect in the long run.

RQ1.3) How do people imagine themselves working in the future?
Most participants see the benefits in working remotely and picture themselves working from home at least partly in the future. They still see value in working at the office, but would use it for activities where it makes sense and gives them a benefit. They would like to choose depending on what environment is more suitable to the tasks they have to fulfil.

RQ1.4) Did people change their working habits when transitioning from office to home office and if so - what and why?
Most people start earlier because of the lack of commute, and the expectation to be able to quit earlier in the day. This unfortunately seems to rarely be the case though and they end up working more despite starting earlier. Also devices are carried around in order to continue working and people end up working while doing personal activities like cooking or making and drinking coffee which leads to ineffective breaks.

Key Takeawas:

Autonomy seems to make people thrive and grow professionally, having benefits for both them and their company.

People struggle with taking breaks and doing things for themselves during the day because they feel bad doing them during „work time“.

Working phases are longer and more intense at home.

It‘s hard for people to fully exploit the flexibility of working remotely because they stay struggle getting out of the „working mindset“.

Routines and habits, especially physical ones help separating work and life and facilitate getting a „clearer mind“.

People lose connection from their team and co-workers, decreasing team cohesion

Next steps

Now that I have a basic idea and some real stories as a reference for my design process, I want to structure information in preparation for the first ideation and prototyping round.

Going forward into structuring the insights, a ViP* cycle will lay out the basis for the first ideation cycle. By ideating to create concepts addressing the pain-points of home office workers, I aim to resolve issues and test appropriate design intervention that benefit the users while testing how to intervene in people‘s existing working routines in a way that doesn‘t create another burden for them. I chose the VIP method to structure information and inspire ideation, because it is a relatively open method which allows to explore any direction for a future scenario, whether this is far in the future or closer to the present time. It leaves space for mapping out a context in which my design will operate in, which is the first step I have to take given the little restrictions at this point in the project.

The generated ideas will then be filtered using various criteria like the Positive Design Framework, transformed into interaction prototypes and tested on participants to evaluate their impact on SWB criteria and appropriateness as a design intervention. This way I will hope to get a feel for promising directions to further pursue.

*Vision in Product Design is an interaction-centered, future-oriented and context-driven design method which asks the designer to deconstruct a current context and recreate a future one to design for as the basis for ideation.

3

Cycle 1

Improving subjective wellbeing in the home office

Focus: Emloyees and Employee-Manager relationship

Purpose

The Purpose of this cycle is to ideate, prototype and test two interaction concepts to get a feel for appropriate design interventions for home office workers and test some ideas addressing different pain-points to improve their SWB. „The Method Vision in Product Design“ is used as a basis for ideation and leads until the ideation of a (or multiple) concept(s). Out of the generated ideas, I chose to test two concepts focusing on different issues to not take a specific direction yet, but uncover promising leads and insights regarding these two different approaches.

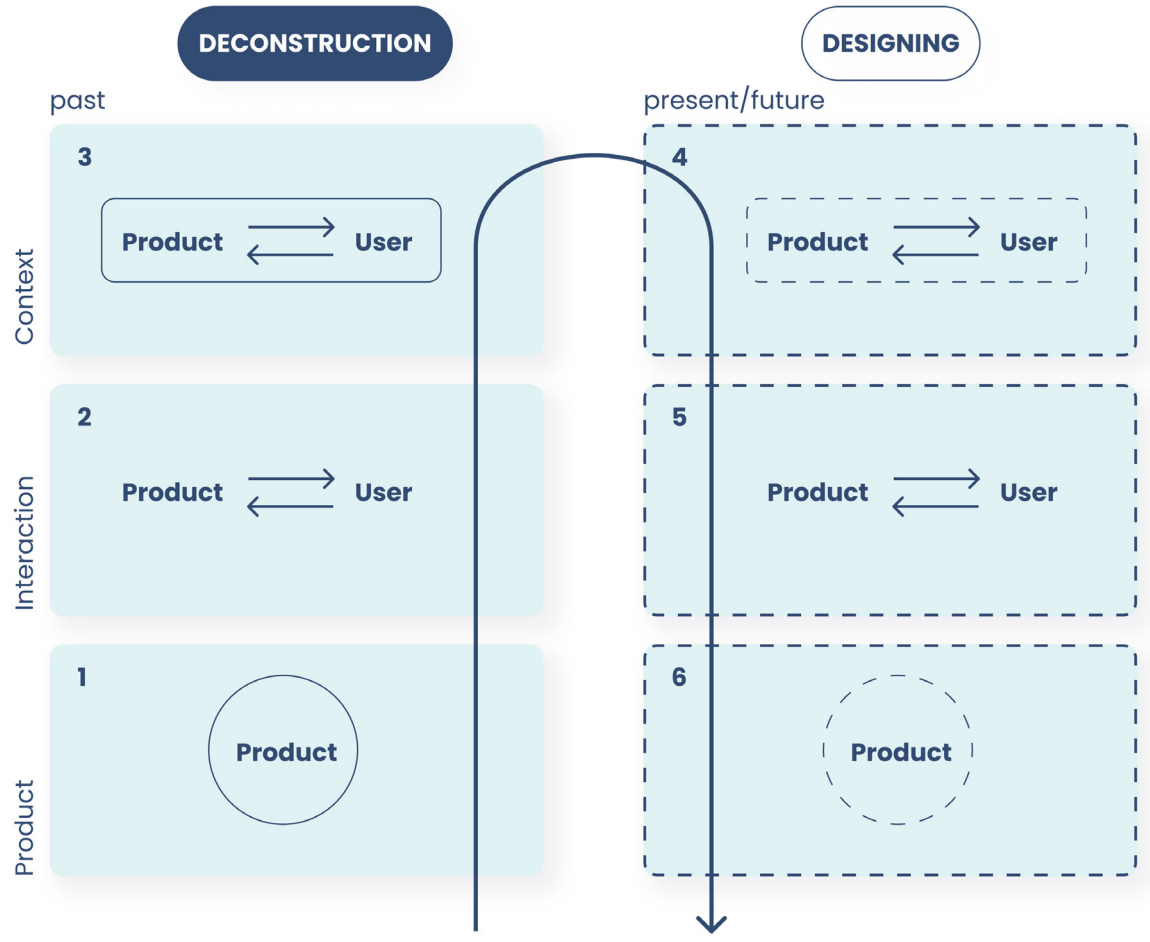
For this first round, AI takes a bit of a back seat in ideation, as the focus lies more on how to intervene into people‘s days and observing the impact of addressing different issues through technology in general.

Research Question:

RQ2.1) How can a design intervene in people‘s life appropriately by addressing pain-points without compromising any SWB dimension?

3.1 ViP - Vision in Product Design

To kick off this first Prototyping cycle, the ViP method (Hekkert and Van Dijk, 2011) was applied in order to lay out the status quo, draw a frame of the context and come up with a concrete design goal and interaction vision(s) for the first ideas and experiential prototypes. This method was developed to offer a structure within which the right questions are asked at the right time in order to help guide a meaningful design process. Considering the big impact of products on society, daily life and wellbeing, the method emphasizes on the designer's responsibility to shape and create products that give people meaning or value, putting them in the centre of attention. This makes the method go well in line with this project's goal of exploring ways in which Machine Learning and technology can be used responsibly as a tool to create products ultimately benefitting the human.
The ViP process is divided in two main phases which are the deconstruction phase and the design phase (figure 3-1). These phases consist of 3 steps each, which will be described in further detail in the following sections.



Figrue 3-1: The ViP Process

Deconstruction (Step 1-3)

This first half of the ViP method (figure 3-1, left) serves as a warmup, using insights and the status quo, preparing for the second phase in which a new domain and context are generated. I chose to focus on products and services people mentioned when asked to explain their current home office environment and habits around it, in order to take a realistic starting point relevant to the investigated target group. The result of this first phase serves as inspiration and fertile basis for future context construction and ideation by deconstructing current concepts and context.

Designing (Step 4-6)

The second half of the ViP process serves the purpose of categorizing new insights about the context to be designed for and constructing a domain and interaction vision for designing.
Starting out by forming a Domain description, the design phase is kicked off by loosely defining the design direction. Therefore, the Domain description at this stage should not limit the realm of exploration too much, but rather act as a rough direction, into which more specific context factors can be attributed to. In this case the domain description was focussed on the Home office worker:

"A product that benefits the subjective wellbeing of people working at home."

With the addition of the future scenario in which working partly or fully from home is a predominant model of working, but factors like the complete lockdown caused by the pandemic (coffee shops closed, imposed curfews, etc.) are not considered as the norm.
The formation of the design goal and interaction vision is the culmination of all the previous steps taken in the ViP process. The goal is to formulate a design goal and interaction qualities that support it, then going back and forth between interaction qualities and design goal, refining them step by step, until solid and clear statements have been established.

Design Goal:

I want people to take meaningful and effective breaks throughout the day and actively support them in detaching from work.

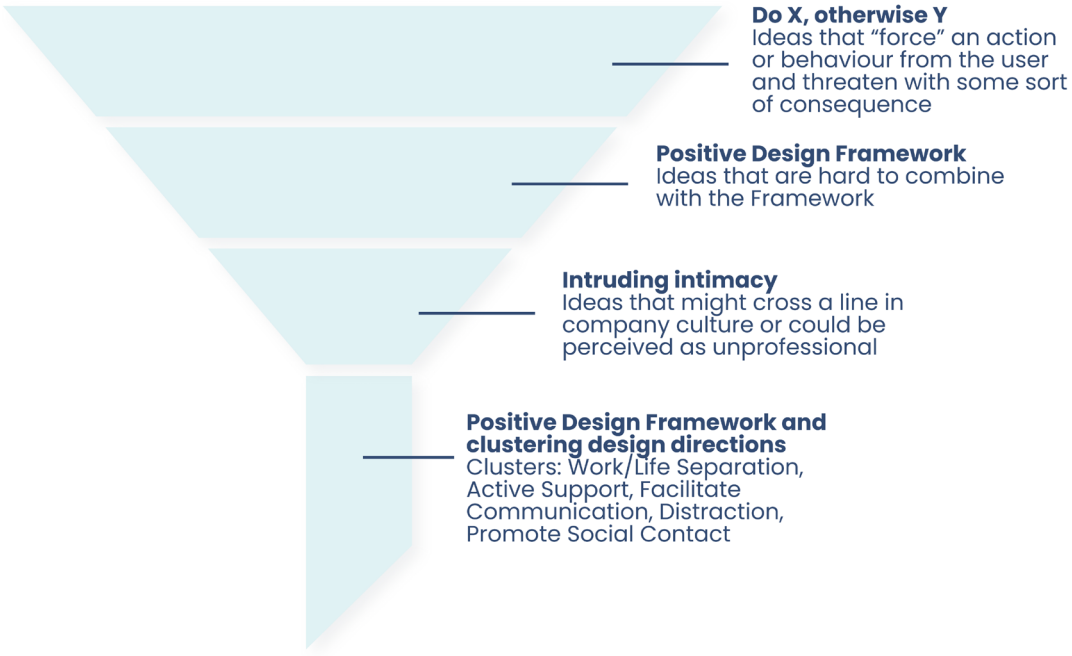
Interaction Vision:

Interacting with my concept should feel engaging, supportive and relieving. Like getting supported by an always available sports coach, which helps keeping spirits up and work/life balanced.

Selecting Ideas

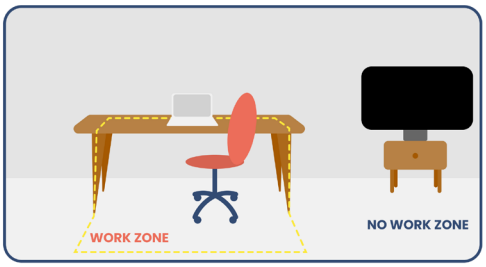
After generating 20 ideas on my own given the insights from research and some criteria were introduced in order to choose ideas to consider and elaborate further for the first prototyping cycle (figure 3-2). These criteria were oriented considering strenth of hitting the design goal, the project frame (Positive Design Framework) and insights about the home office from interviews.

The clusters of “Facilitate Communication” and “Work/Life Separation” were the most promising concepts fulfilling components of the positive Design Framework while not compromising any or potentially be too intrusive. They were transformed into low-fidelity interaction prototypes to test interventions into the working day of participants. The main goal of this first testing round is to figure out how to intervene in an established working routine and schedule of a home office worker, and whether the aim of the concepts to improve SWB can be realistically reached.

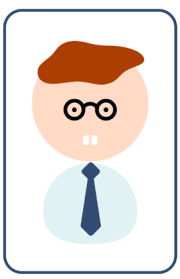


Chosen Concepts:

WORK ZONE Cluster: Work/Life Separation



THE MAILBOX Cluster: Facilitate Communication



THE NEW GUY

Fritz Bunsenbrenner
Material Scientist
32 years old
new full time employee

Fritz is the archetypal engineer, has anti-social tendencies and finds it hard to integrate into new groups. He has only just started working in your team, but shows little interpersonal engagement and initiative. He is an expert in his field and has shown an impressive track record when it comes to his body of work.

Figure 3-2: Idea filtering process and resulting ideas

3.2 Concept 1: The Work Zone

Focus: Separating work and life

Because the change in environments trigger a change in mental state (going in and out of the office or home office) and routines like commute or after-work workout help mental separation between working and relaxing, these effects are leveraged in the work zone. An assigned space with boundaries is defined within the home, within which all work-related programs and communication function. Once the user (and device) move out of this space, work related tools and communication are not active anymore. This gives full control to the user to physically move in and out of this space and thus also changing state of mind along with it. This avoids checking emails on the couch, or taking the laptop into the kitchen while cooking and eating and should result in more effective breaks. Vice versa, this concept could be extended by not allowing personal communication and entertainment inside of the space to further strengthen the separation between work and private while maintaining the ease of going in and out. The space would be defined with virtual walls that could be visualized via light projection for example.

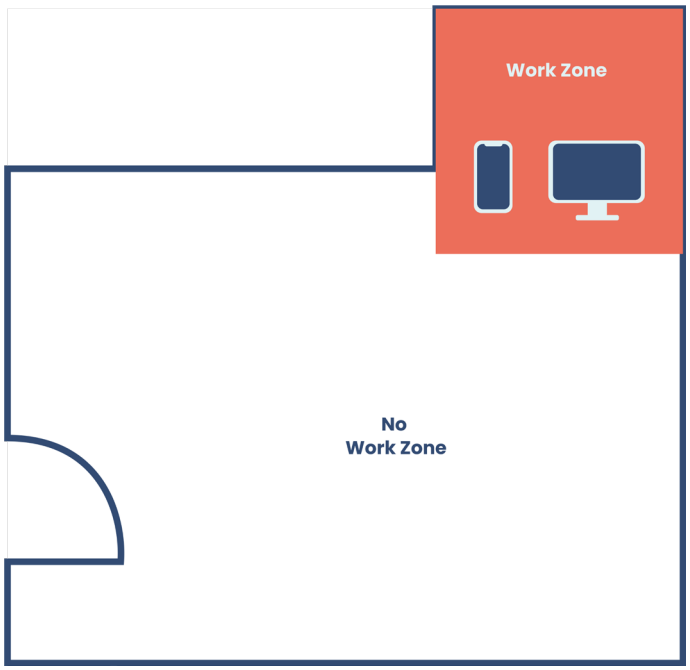


Figure 3-3: The Work Zone Concept

Prototype

The concept of the work-zone consists in assigning a physical space delineated with a barrier within which you are supposed to work. The idea is that work-related communication and tasks are only possible within this space, the rest of your home has the "work functionalities disabled" so you can also associate a limited working space. The idea was inspired by stories from the interview where physical transitions (opening and closing the door to an assigned home office toom) and routines (like going out for a walk or closing the laptop and hopping on the home trainer). This concept also tries to tackle the negative aspects of always being available and constantly connected, leading to a lingering urge to be active and responsive even after regular working times and in explicitly offline situations.
Inspired by the "deconstruction of the context" phase of the ViP cycle, this concept takes the intended flexibility and portability of the phone and laptop and reverses it by limiting this very aspect. In this new context the flexibility leads to a negative psychological burden and poses an opportunity to change for the home office context. Work and life activities can be separated and batched together by excluding them mutually, especially communication and notifications which should be beneficial to their wellbeing (Fitz et al 2019).

For this test, the users were instructed to physically mark their workspace with tape as in figure 15 (so its presence remains apparent) and only work and communicate with colleagues from within this space (if not absolutely impossible).

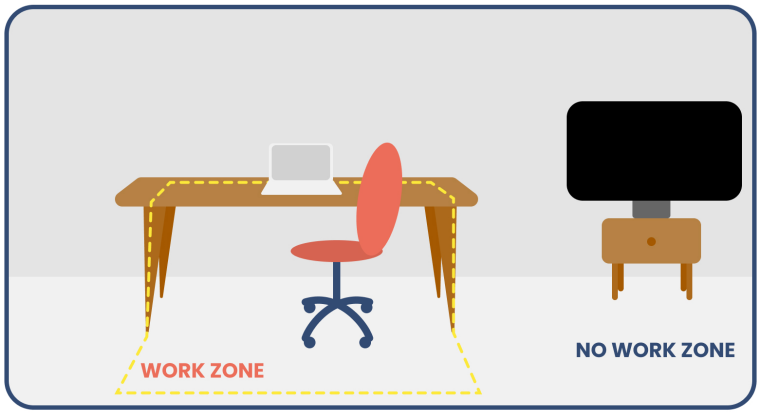


Figure 3-4: Excerpt from the Instruction sheet for the "Work Zone experiment"

Prototype Research Questions:
P1.1) Is the concept comparable to the routine of going in and out of a real office and do they feel justified to not work outside of the space?
P1.2) Do people associate new meanings to the zone vs. outside of the zone?
P1.3) How intrusive to the participant's life vs. effective in getting their mind off work is the concept?

Testing

Susanna and Livia tested the workspace individually for 5 days each, also following the Instructions in Appendix C

Figure 3-5: Work Zone Participants

Testing objective:

- Getting mind off work outside
- Take small breaks as a consequence
- Introducing a "cut" between personal and work
- Feeling safe outside of the work zone (stress & guilt-free zone)

In figure 3-6, the work zones marked by tape by the two participants (Livia and Susanna) can be seen. Both rectangular around a table, as expected. The biggest difference was the location: Susanna's Zone was in the bedroom and Livia's zone in the living room.

Figure 3-6: Pictures from the two work zones

Concluding the Work Zone Concept

The physical separation has some major benefits like the feeling of being "safe" outside the space and having full control of the situation by physically entering and exiting the space crossing the border. Surprisingly, the introduction of this barrier triggered some explicit reflection moments in participants while they were outside of the space, putting in perspective the time spent working and time spent relaxing, as well as certain habits built around working remotely.
One participant reported:
"While I was out having a small cigarette break, I thought of re-entering the zone to continue working a bit but then I though enough is enough, that's it for today."
A point of critique towards the strong separation was the desire to fulfil certain low priority and more lightweight tasks outside of the space, in order to be able to join other family members and spend time with them while working. This of course would mean that the concept has to be be more adaptable to individual needs and preferences.
(Additional Insights in Appendix C)

Answers to prototype Research Questions

RQ1.1) Is the concept comparable to the routine of going in and out of a real office and do they feel justified to not work outside of the space?

Yes, participants felt justified not working outside of the space, but in combination with imagining that the concept was introduced by their supervisors. Before entering the zone in the morning and in the evening after work participants felt calmer. The act of going in and out of the space felt easy and participants reported feeling in control.

RQ1.2) Do people associate new meanings to the zone vs. outside of the zone?

One participant reported as feeling "safe" outside of the zone, which suggests that the psychological stress is not associated to the whole home anymore, but focused in the work zone. The Zone was yet not perceived as "unsafe" or "bad" and did not make participants hesitate to enter.

RQ1.3) How intrusive to the participant's life vs. effective in getting their mind off work is the concept?

The concept was effective in the sense that it triggered a reflection about work/life balance and justified not working at the right times. Also the physical presence and act of crossing over it was perceived as having a stronger effect of work/life separation than time boundaries which they struggle with. However, in specific cases where participants would have liked to work outside of the space for certain tasks, it had a negative effect by being too restrictive.

3.2 Concept 2: The Mailbox

Focus: Strengthen Team Cohesion

The Mailbox concept is a communication channel geared towards increasing team cohesion within a working group. While official communication via email, phone and videocalls and chat services like slack are used a lot, they serve a strictly professional purpose. What was once office chatter at the coffee machine or overhearing conversations and joining in on it, is now lost due to the physical separation. This concept consists in a more casual communication channel to bring back office chatter and sharing of experiences with co-workers who can relate, in order to strengthen and maintain the bond between team members. The value of sharing experiences with co-workers (feeling relieved by telling someone, enjoy or suffer together, talking to someone who can relate) was an output during the interviews with home office workers.

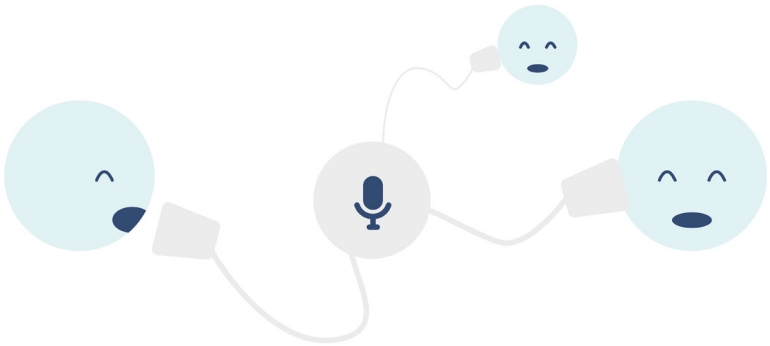


Figure 3-7: The Mailbox Concept

Prototype

The mailbox concept is a casual communication channel (for this test a Whatsapp channel to not use work tools) in which colleagues can leave voice messages and share interesting things that might also be of interest to others, share small successes and setbacks throughout the day. Also, if a certain message is specifically directed to someone in the group, the channel makes it possible to "eaves drop" and join in if they have something to say. This is inspired by casual office talk and overhearing conversations between people in the same room. The concept testing was done using a Whatsapp channel (figure 3-8).

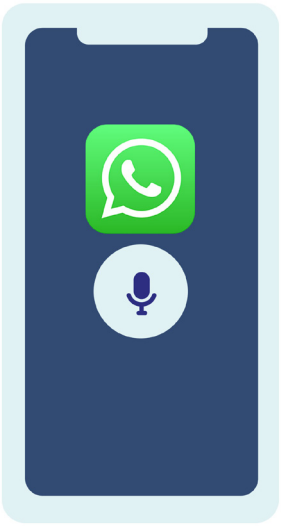


Figure 3-8: Whatsapp channel

Prototype Research Questions
P2.1) Do people want to share moments and hear from other people's stories?
P2.2) Do people feel closer to their co-workers when listening in?
P2.3) Is the concept effective in replacing office chatter and taking time to record and listen to messages?

Testing

Florian, Lukas (figure 3-9) and I were testing the mailbox for 7 working days following the instructions in Appendix B. As they fortunately already work together so the experiment can take place in a more real scenario.
Due to circumstances in the specific situation with my participants, this the mailbox was adjusted to include a fictional persona (figure 3-10) which is new to the team. This persona was played by myself by changing my profile picture, changing the name my participants saved me at and giving them a description of the persona (Appendix B). Throughout the test I have shown a rather shy behavior, but tried to open up more and more day by day.

Figure 3-9: Mailbox Participants

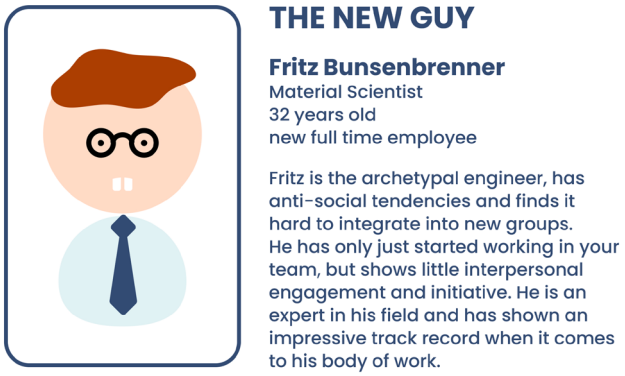


Figure 3-10: Fictional Persona

Testing objective:

- Feeling of being relieved when sharing information and experiences
- Feeling of being part of the team and closer to co-workers
- Seeing a value in participating in the conversation
- Taking small breaks when sharing and listening to messages,
- Developing a routine when to listen to messages

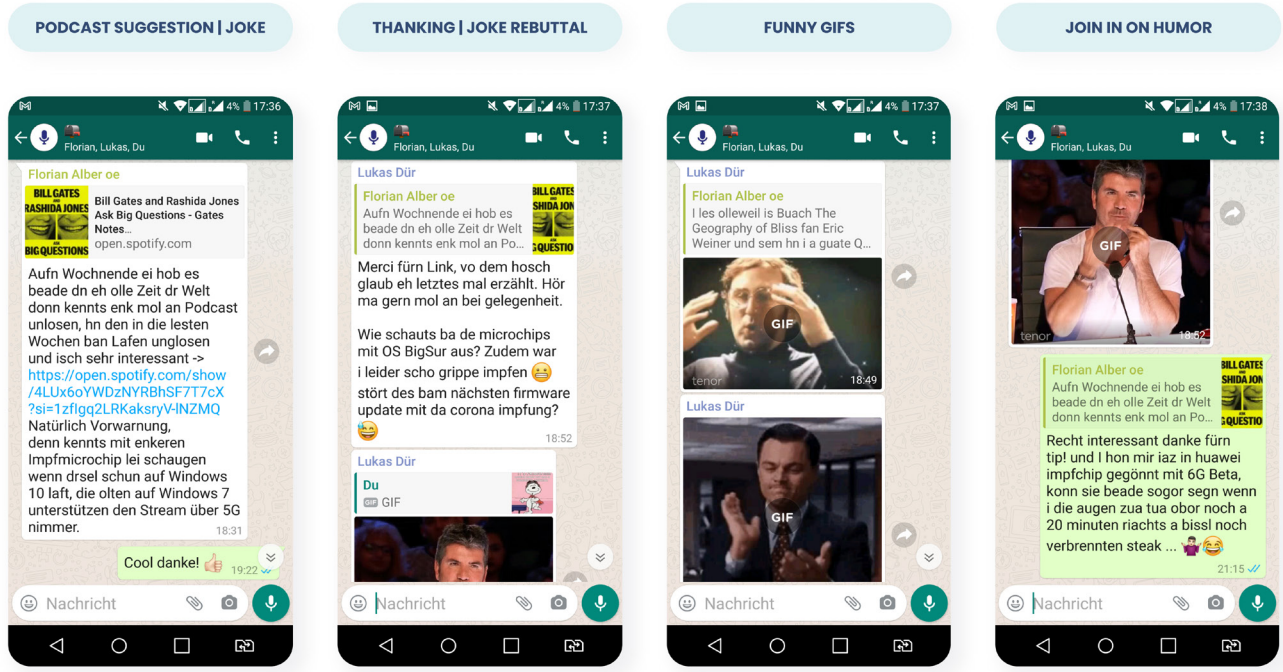


Figure 3-8: Screenshots from the Mailbox conversations

Concluding the Mailbox Concept

While there is a general need for casual communication among co-workers, the mode of communication (voice, image, written, etc.) should not be limited as this imposes a barrier for sharing. This could be observed in the scarce use in specific situations for sharing voice messages, the expressive nature of images and videos for telling jokes and memes and the utility of sharing clickable links for direct access to interesting information. The benefits of including and bonding with a new team member resulted positive, as this form of casual communication and sharing of knowledge contributes to "getting on the same page" with others and promotes a feeling of being part of the team and getting included on a more personal level.
(Additional Insights in Appendix C)

Answers to prototype Research Questions

RQ2.1) Do people want to share moments and hear from other people's stories?

People rather want to share jokes, entertaining content and information others might be interested in. The channel was rather an outlet for general casual communication than sharing specific moments. People probably felt it was too unnatural to actively decide to take a device and record a message just for sharing a small experience. However, sharing a relevant podcast to learn from was perceived as valuable for the sender and receiver.

RQ2.2) Do people feel closer to their co-workers when listening in?

People indeed feel closer to their co-workers when listening to their voice messages, however the barrier of recording them is rather high compared to the benefit of the person recording. People prefer using voice communication out of convenience reasons and when it fits the situation.

RQ2.3) Is the concept effective in replacing office chatter and taking time to record and listen to messages?

The concept turned out to be used more as an information sharing and joke channel to bond over in written messages, gifs and useful links rather than chatting via voice messages.

Answer to initial Research Question for Cycle 1:

RQ2.1) How can a design intervention intervene in people's life appropriately by addressing pain-points without compromising any SWB dimension?

The design intervention should have low barriers to use it, so that people can easily interact with it without having the feeling of it being an extra effort. The intervention should not be too strict and give people full control on when, how and for what to use it. Assigning spaces to specific activities is a strong way introduce a mental cut between them.

The ViP Cycle inherently does not aim at answering questions, but rather stimulate to ask the right questions like:

Where could be an opportunity to redesign an existing product to better fit the boundaries of the constructed future context?

Which Context factors should be prioritized and what type of different behavior do they demand or influence?

Organizing information in the ViP cycle, constructing a context to design for and testing first interaction conepts, new questions and insights surfacing were:

• How can AI play a key role interacting with humans to help them balance work and life?

• Which specific behavior should I focus on to best reach my goal of improving SWB and work/life balance?

• Products people already use are good opportunities to reshape or extend to serve requirements of a new context as they were designed for a different context with different requirements. In my case, remote working tools could be reshaped or complemented by adding features to not only facilitate remote work, but also support the private life.

Key Takeaways:

Having a physical manifestation separating work and life has a positive impact on people's mindset by associating new meaning to spaces, but it calls for more flexibility.

The tape separating the Work Zone from personal space triggered a reflection in Livia where she thought she was productive enough for the day, while Susanna felt safe in the morning before entering the work zone and generally felt more at ease outside of it, making it easier for her to relax. However, Susanna would have liked to work outside of the zone for more lightweight tasks in order to stay closer to family.

There is a value in inspiring and getting inspired about shared interests. The book and podcast recommendation are „Freetime activities away from screen".

People enjoyed getting and giving others in the group recommendations for books and podcasts about topics of shared interests and bonded over the same topics.

A product should not be too limited in its use, people will shape them according to their personal preferences and needs.

Although the mailbox concept was intended to be a voice channel, the voice messaging function was only used when specifically appropriate (while driving). For sharing information and communicating casually, people shared more useful clickable links for quick access and gifs for funny expressions.

Next steps

As these first interaction prototypes had AI sitting in the back seat and only considered technology as a whole, I have to introduce it back into the project and reflect about appropriate agency of AI in a product design for my context. Also, the Positive design framework is defined very abstract, which sometimes makes it hard to apply in a concrete manner. To operationalize the positive design dimensions, I need something more defined. In the next cycle I will explore the role of AI and SWB further to appropriate it into my project.
From here on, I decide to concentrate on on the SWB of Employees as individuals because I see that fostering the potential of autonomy of employees in the home office has the greater impact on their SWB, while employee-manager and employee-employee relationships can be secondary issues possibly addressed as additions and recommendations complementing the core focus.

4
Cycle 2
The role of AI and SWB within my project

Focus: Emloyees as Individuals

Purpose

In this cycle I will have a fresh look on AI and SWB given the Insights gained in the process until now, trying to figure out how to incorporate both better into a concept. The project frame in the previous cycle has narrowed down to addressing „loss of team cohesion“ and „separating work and life“ - In this cycle I will look at AI and SWB through a broader lense to focus more on their purpose within a product.

Research Questions:

RQ3.1) How can AI be used in a meaningful way into a concept design to help keeping work/life balance, increase their SWB and fit their individual needs?
RQ3.2) How can I operationalize SWB dimensions to guide product functionality and impact?

The Role of AI in my project

I see two general possibilities in how to incorporate AI in my design process.
The first possibility is to use AI externally to statistically extract the most relevant indicators of subjective wellbeing, creating concepts to tackle problems that negatively influence these factors within my context, and validating by again analysing data generated from testing these concepts. A final concept could then be iteratively improved by repeated statistical analysis on product attributes and resulting self-reported wellbeing.
The other possibility is to make AI an integral part of the product functionality. For this approach, a base model can be created which is trained on the relevant context and optimizes autonomously by shaping parameters according to user interaction and

AI as an analysis and validation tool

On the basis of "Predictors of subjective wellbeing using Machine Learning and Propensity Score Techniques." (Margolis, 2020) dissertation, general predictors of SWB are validated based on multiple MIDUS (Midlife in the United States) surveys building the underlying dataset. Deficiencies in these predictors caused by working from home opportunity for Design interventions within the context of this project. The statistically strongest predictors of subjective wellbeing were the following:

Intuitive results with strong correlation:

- Physical health
- Work situation
- Financial situation

Surprising result with a strong correlation:

- Control over one's life:
  - Control over life
  - Control over work situation
  - Control over one's health
  - General autonomy

Other strong indicators:

- Environmental mastery
- Purpose in life
- Positive relations with others
- Engaging in Romantic activities
- Disengagement from stressful events
- Human contact and social activity

The underlying data for this study was retrieved by a series of longitudinal studies and self-reporting. Picking out predictors that are relevant to my domain like “control over one’s life” “Positive relations with others” and “disengagement from stressful events”, I could try to resolve issues connected with these predictors and then iteratively validate them by analising user-test data with a similar method as Margolis (2020), possibly even shaping a concept that does not involve AI as an active functional component.

AI as an integral part of product functionality

To leverage the plasticity of AI systems, the underlying core of my product could have a base model (general parameters, figure below left) which is pre-trained and refined for the general context and task at hand (relevant parameters, figure below, middle). By using and interpreting user behavior (figure below, top) and input from interactions with the product (and other cues), the algorithm and parameter weights can be shaped to individual users for perfect fitting and tailoring (Iterative adjustments, figure below right).

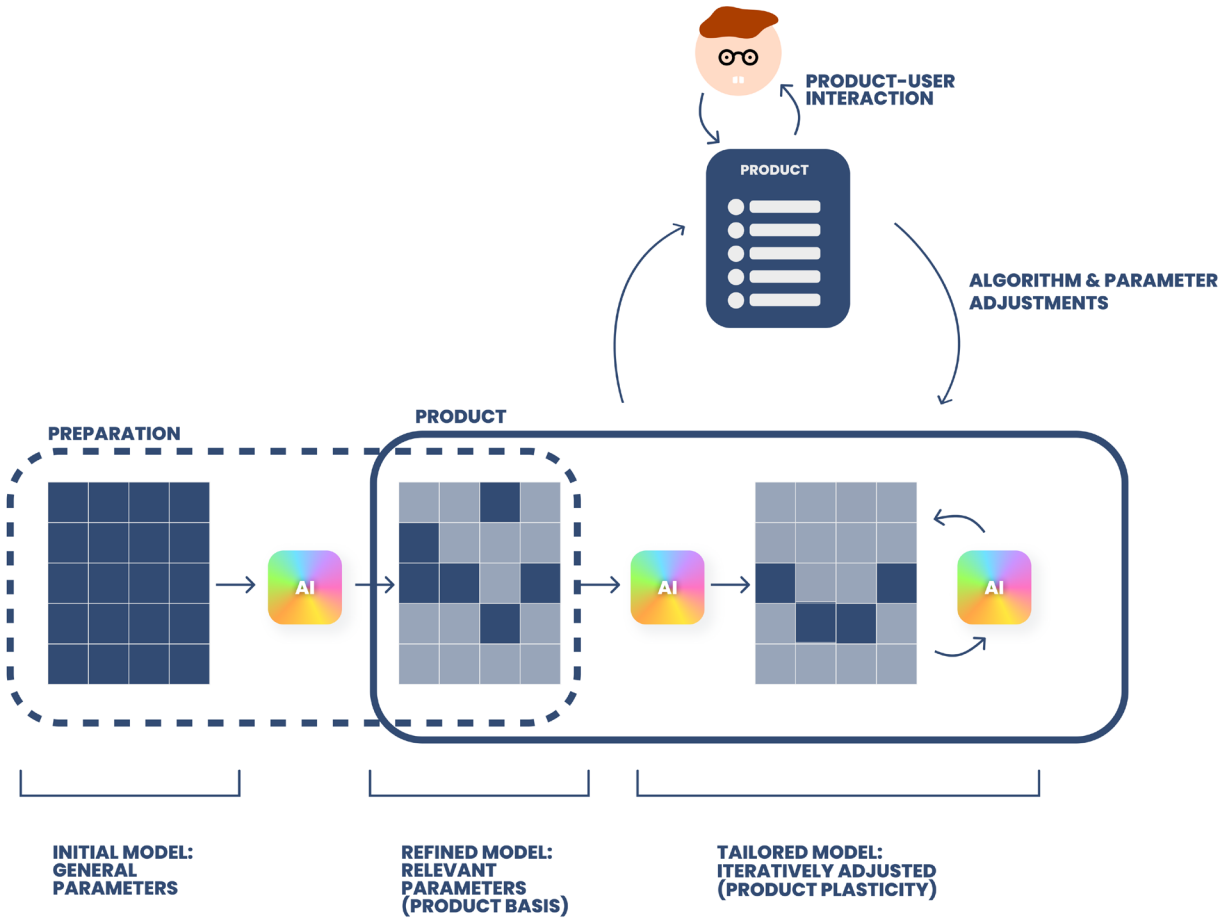


Figure 4-1: AI as an integral functional part of the product

Inbodied Interaction (Schraefel, 2020)

The human body and mind are in constant state of adaption in response to environmental changes. Adapting these environmental changes can either occur slowly an progressively like learning a new skill or happen within an instant like trauma after a shock. In my context of the sudden switch to working from home, the slow transition into working from home was accelerated and became reality from one moment to the other.
With changing external factors which influence our body and mind, underserved parts either have to be stimulated with a substituting alternative or simulation of a lacking component. For example, Astronaus's muscles shrink when not in use in space, so they have to train with rubber bands substituting gravitational force, in order to maintain a functioning body for when they come back to earth. In the case of the home office, I can observe underserved parts like casual social contact with colleagues, lack of structure - a struggle to balance work and life, a lack of justification to disconnect. The opportunity for my design intervention lies in offering a substitute or help home office workers fill in these gaps. This does not necessarily mean that the deficiencies should be directly substituted or tried to be recreated as in (figure 4-2), but rather supporting the user's adaption to a new normal and shape life to fit this new context. Perhaps by doing so, and involving the user in the shaping process towards the new normal, an even more beneficial situation can be reached, using the benefits of the home office to its fullest and creating an even better situation than before.

Figure 4-2: People making memes about the missing everyday habit of commuting in public transport to start and end their working day.

The 13 Fundamental needs

The 13 fundamental needs are derived from Maslow's Hierarchy of needs (Maslow, 1943) and operationalises the Positive design framework by Desmet (2013) thus making it more tangible and suitable for being functionally integrated into a concept. The list of 13 fundamental needs also contains a set of sub-needs and consequences from being over exaggerated (Full Detailed List in Appendix D).

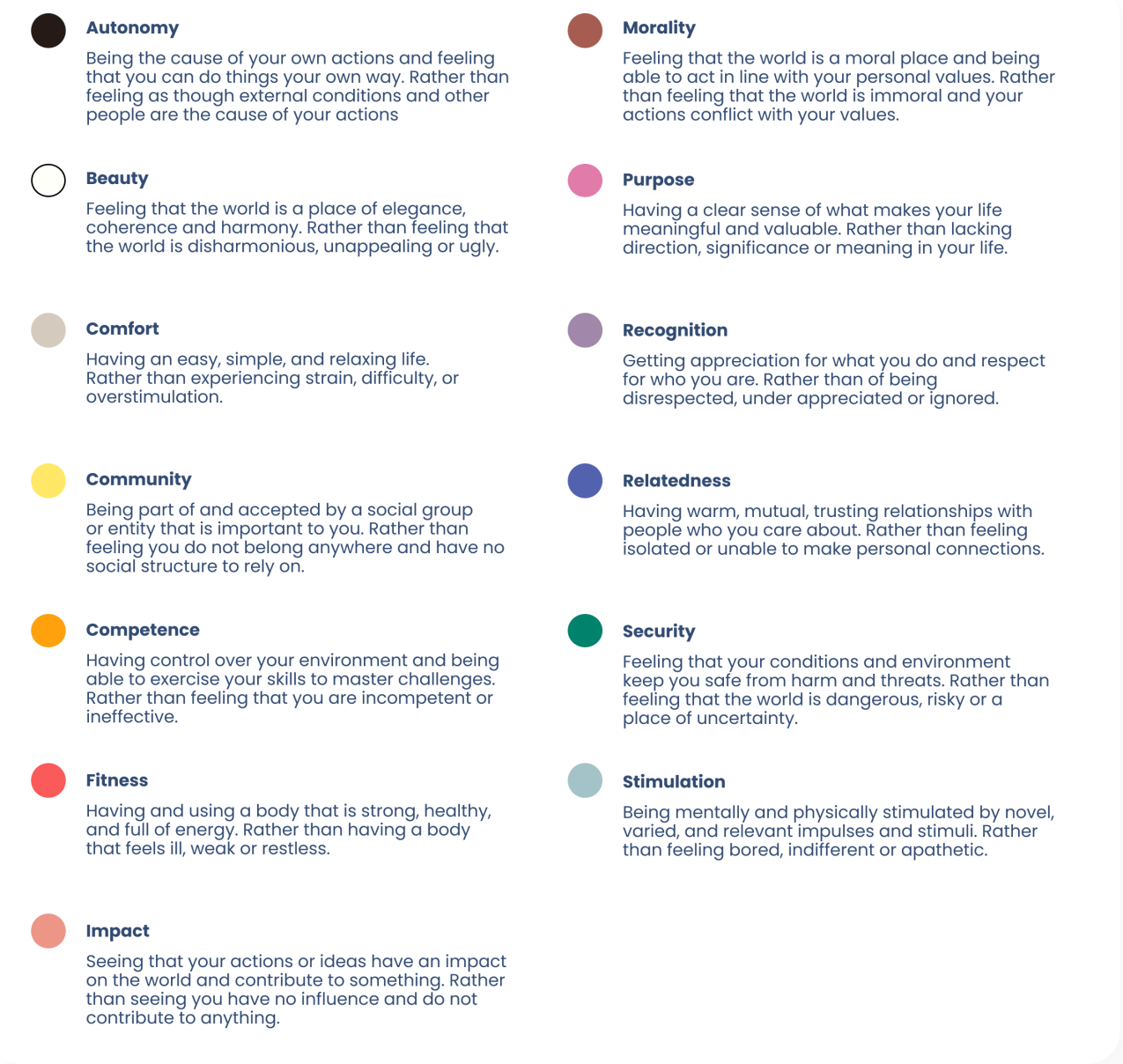


Figure 4-3: The 13 Fundamental Needs

Drawing from research, observations and insights from the previous process, I have extracted the most relevant fundamental needs in the home office context:

Autonomy

Being the cause of your own actions and feeling that you can do things your own way. Rather than feeling as though external conditions and other people are the cause of your actions.

How it connects to home office workers:
Home office workers experience an increase in autonomy for working matters, but it impedes into private matters, where autonomy seems to decrease out of guilt. People feel less justified to take time for themselves.

Comfort

Having an easy, simple, and relaxing life. Rather than experiencing strain, difficulty, or overstimulation.

How it connects to home office workers:
A lingering urge to complete work tasks and respond to communication from supervisors makes it hard for home office workers to relax and detatch their mind from work in breaks and even vacation.

Community

Being part of and accepted by a social group or entity that is important to you. Rather than feeling you do not belong anywhere and have no social structure to rely on.

Relatedness

Having warm, mutual, trusting relationships with people who you care about. Rather than feeling isolated or unable to make personal connections.

How it connects to home office workers:
Due to the physical separation and lack of spontaneous contact and office chatter (in the office), home office workers experience isolation from their peers which potentially leads to a decrease in team cohesion.

Fitness

Having and using a body that is strong, healthy, and full of energy. Rather than having a body that feels ill, weak or restless.

How it connects to home office workers:
Office work is already sedentary, so working from home eliminates physical activity for commuting and moving within a bigger space like the office. Also the decision to be physically active is higher, as it seems people made it a habit to go to the gym in connection to the commute after work (before coming home) so they were "already heading somewhere".

Purpose

Having a clear sense of what makes your life meaningful and valuable. Rather than lacking direction, significance or meaning in your life.

How it connects to home office workers:
Being isolated at home and lacking a sense for the company "mood" and contact within the team, the feeling of working towards a common goal is parcially lost.

Stimulation

Being mentally and physically stimulated by novel, varied, and relevant impulses and stimuli. Rather than feeling bored, indifferent or apathetic.

How it connects to home office workers:
A lack of physical context change routines (commute and going for lunch) and merging office activities into the private space also merges the perception of time as "all days feel the same"

Addressing this selection of the most relevant fundamental needs for the home office worker will be the focus for the final design.

Activities as the key to wellbeing (Wiese, Pohlmeyer, Hekkert, 2019)

Product experiences that facilitate meaningful activities to their users play a more important role in increasing wellbeing than products that only satisfy the hedonic dimension. A lasting increase in wellbeing is associated with activities that extend beyond the interaction between the user and the product. The products in this case can offer, initiate or maintain these activities by design and should preserve their positive impact by establishing long term routines and habits for meaningful pursuits, progressing towards a user's goals.
SWB calls for a personal fit, it is inherently subjective, so it is evident that appropriateness of activities varies from person to person. (Petermans & Pohlmeyer 2014).

Petermans and Pohlmeyer further state that designers cannot and should not have ultimate control over people's SWB, but rather design facilitating environments to reach this goal by actively involving people.

Key Takeaways:

AI can analyze statistical data to find surprising and unexpected connections and correlations between influencing factors and outcome in SWB psychology.

The 13 fundamental needs are concrete enough to be operationalized into a product design.

Initiating and maintaining activities by design and preserving their positive impact by establishing long term routines and habits for meaningful pursuits is the key to long term wellbeing

Answers to Research Questions:

RQ3.1) How can AI be used in a meaningful way into a concept design to help keeping work/life balance, increase their SWB and fit their individual needs?

AI is already used in wellbeing research as a statistical evaluation tool. However, to leverage the full potential of the technology, I think it should be used as an integral part of the product because of the powerful potential in shaping itself to individual contexts and being better than humans at identifying correlations between influencing factors of SWB and their outcome.

RQ3.2) How can I operationalize SWB dimensions to guide product functionality and impact?

Starting out with a sub-set of the most relevant needs in the home office context, an AI driven system can aim to satisfy those as a priority for home office workers, then move on to include more needs over time.

Next steps
Next, another round of ideation will be held in the form of a co-creation session of other students. To get out of my bubble and perspective on the project, I will involve other DfI students to gather inspiration from before narrowing down to a final design.

5
Cycle 3
Co-Creating for AI-Assisted Wellbeing in the Home Office

Focus: Emloyees as Individuals

Purpose

In order to not miss interesting possibilities and opportunities for this project, a co-creation session with three DfI students from the Industrial Design faculty at TU Delft was planned. In this cycle I want to get inspiration on more „out there“ ideas involving AI to see if there are unexplored concept directions and promising ideas which I hadn‘t thought of on my own. Presenting participants with more general insights and a rather rough frame defining the context to design for, I will facilitate an open co-creation session, then judge and shape the outcome taking into account all key learnings I gained in the prior cycles. The presented information was deliberately chosen to be rather open, not to overload participants with things to consider, but ratehr diverge to find new direactions for the final concept and focus on the role of AI within the concept.

Research Question:

RQ4.1) How can I appropriate AI into a viable and feasible concept which resolves the struggles of Home office workers?

The three Waves of Ideation

In preparation, the planning was done to facilitate the three waves of ideation (Parnes, 1961) (figure 5-1) starting out with an idea purge to get all obvious ideas down. Next, a round of absurd questioning with six absurd questions* was taken as a base for rounds of ideation, followed by another round of ideation, with instruction to take AI into account and converge towards a more concrete product application. The technique "Absurd questioning" is specifically designed for a diverging phase in the design process, because it yields more exotic ideas. Last, remaining ideas and extensions to previous ideas could be brought up in the final free ideation round.

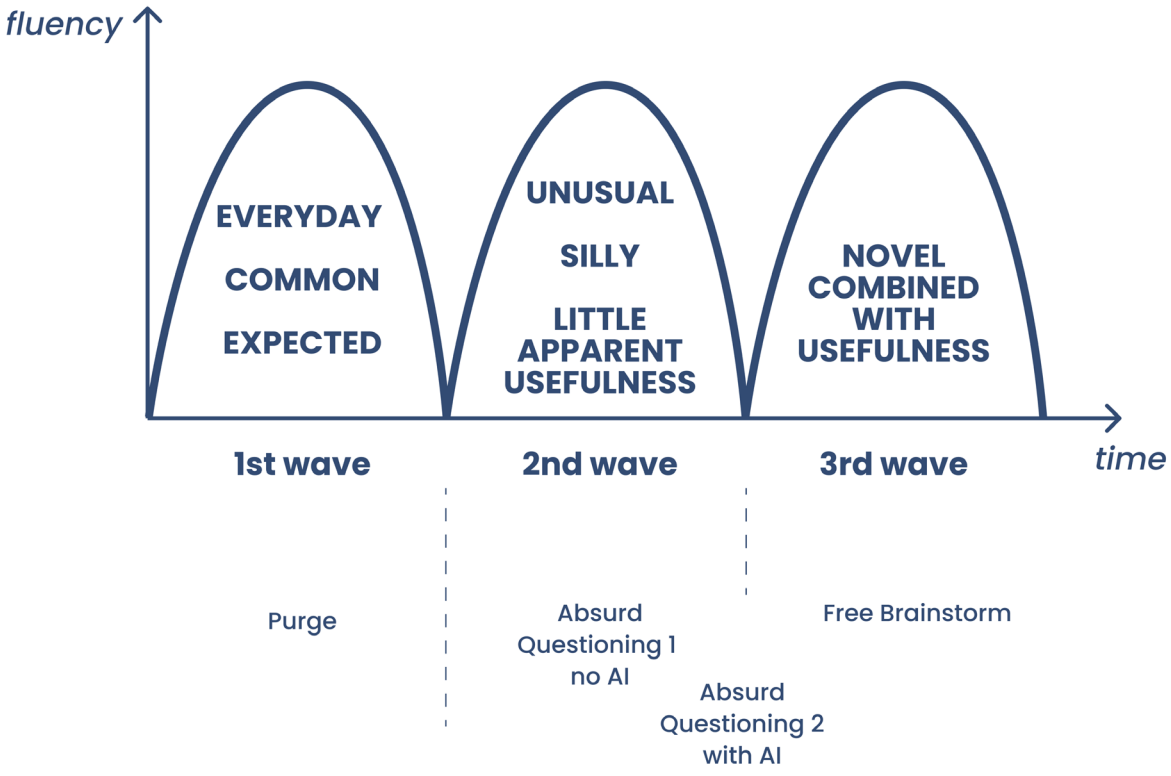


Figure 5-1: The three waves of ideation: Co-Creation Session Planning

*For example „How can we facilitate work/life balance in the home office" turns into „Resonate work/life Justice in the pre-biotic soup office".

Program

1 Introduction to the topic

At first, participants were briefed with a general overview of insight categories from the Interviews in cycle 0, in order to understand the domain and the context of the project. They were also presented with a future scenario to design for in order to give them a frame in which the ideas would live in, as well as a demo-graphic and a Question to answer for with the ideation:

"How can we facilitate work/life balance in the home office?"

This question is formulated rather simple and broad, because participants have only recently been presented with the context and should not be too confined in order to explore more "out there" ideas.

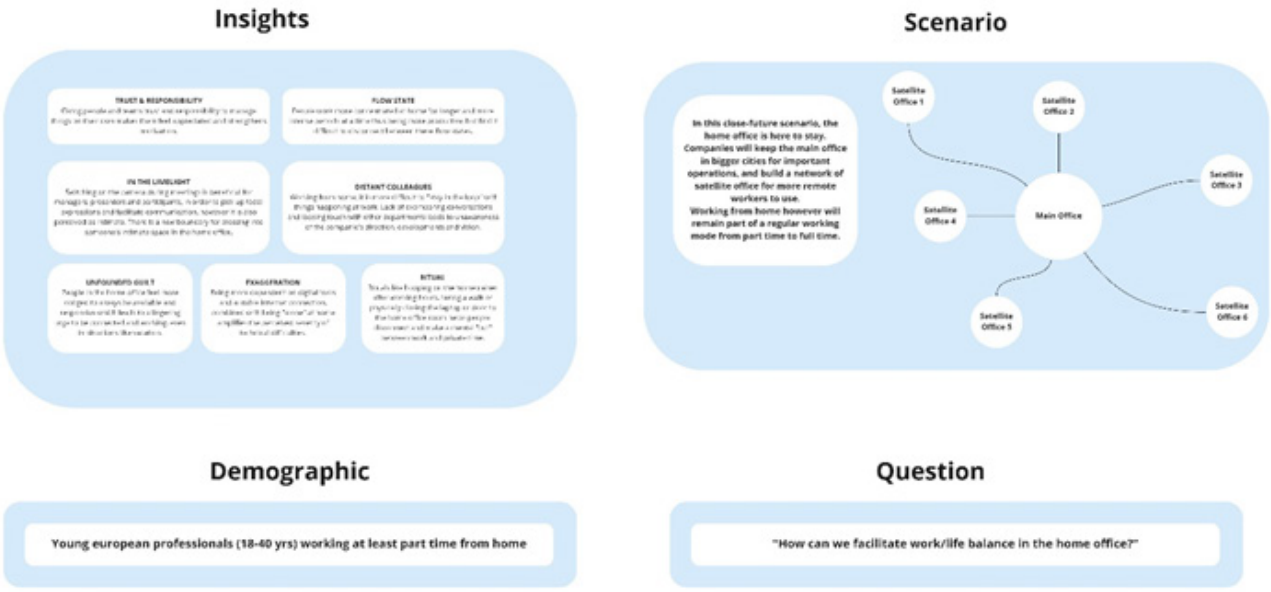


Figure 5-2: Introductory Information for participants

It is important that participants feel free to explore every idea that comes to their mind, no matter how crazy and unrealistic it might be. During the whole process it is also possible to look at other people's ideas and be inspired by them or extend them. This triggers what's called „social purging" which usually occurs in the second wave, where the resource group (participants) makes some sort of competition out of coming up with the funniest and most creative ideas.

2 Idea Purge

The idea purge serves the purpose of getting rid of "obvious ideas" that are close to solutions already known or already existent. In this step quantity is better than quality and as many ideas as possible should be roughly sketched out within 5 minutes. Ideas generated in this phase are not necessarily bad, but tend to be rather dull and not very novel. However, participants can always come back to ideas from the idea purge during the session.

3 Absurd Questioning

Absurd questioning works in three main steps which turn the original question into absurdity. By taking the original question, choosing three words out of the statement, and inserting them into the top of a matrix, word associations are generated ranging from nearby, to creative, to absurd. Each original word should have 9-12 counterparts.

Next, six new statements are constructed using the new words from the matrix, making the original question absurd. These new questions then serve as a starting point to ideate around for 3 minutes. By driving the question into absurdity, new analogies and fields for inspiration are tapped into, facilitating "thinking outside of the box".

Example:
How to: Stimulate work/life Friction in the Family office?

4 Absurd questioning – AI

After these first six rounds of ideation, the participants were asked to consider Artificial Intelligence while ideating and start thinking about converging to more concrete ideas. They were given 5 minutes of time to choose questions from the previous six rounds to ideate for. Participants were also allowed to take and expand ideas already generated. This round marks the transition form the "silly phase" to a more realistic phase, in which ideas are starting to take the shape of concrete applications, and ideas are combined and extended into more useful concepts.

5 Free brainstorm

At last, the ideation rounds were concluded with 5 minutes of free brainstorming for dumping remaining ideas and refining existing ones. After this, an open discussion was held talking about the session itself and generated ideas.

Mapping Ideas

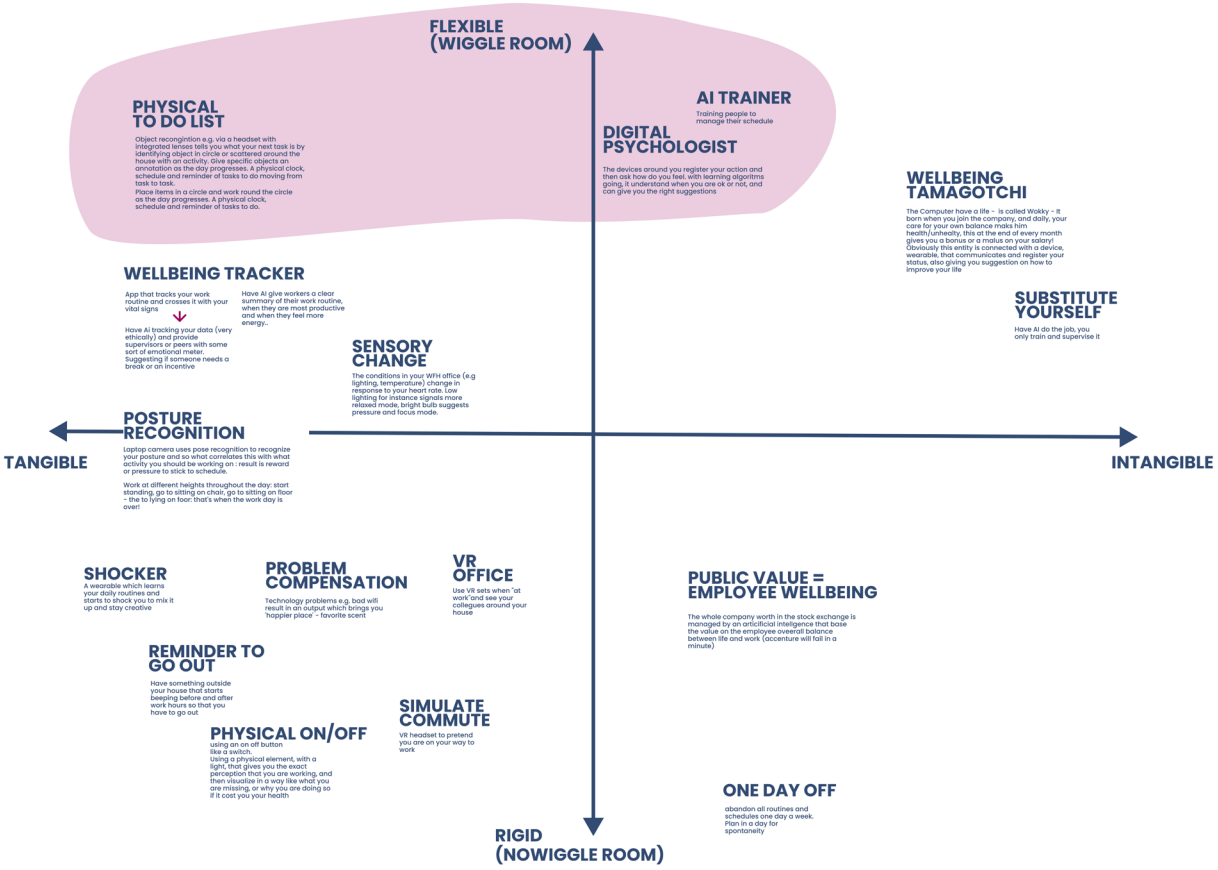


Figure 5-3: Mapping ideas along tangibility and wiggle room, concepts with enough wiggle room are marked in pink.

The most promising ideas and concepts generated during the session were then mapped onto a coordinate system with the x-axis ranging from tangible to intangible to better gauge which direction I want to take for the final concept. Tangible in the sense of this graph means having a physical or active role involving the user directly or as a consequence of product interaction.

The y-axis ranging from rigid to flexible. This is done in order to choose an adequate region for the final concept, where enough wiggle room is necessary to shape the concept into my context with all the knowledge and requirements gained during the whole process (something that the resource group could not consider given the limited time and knowledge involved in the creative session). In (figure 5-3) the pink region marks my region of interest, as at this point I wanted the final concept to lean towards tangible, and have enough flexibility to be fit well into my concept and combined with previous insights. The Concepts „Physical To-Do List“, „AI Trainer“ and „Digital Psychologist“ are located just in this sweetspot for the final concept and will form its basis.

Key Takeaways:

The co-creation session has yielded some interesting concepts, however given the „Absurd Questioning“ technique, the ideas generated were rather rough concepts and lacked a deeper level of definition.

A combination of ideas taking aspects from some concepts which offer room to incorporate details and insights I have garnered throughout the project will form the final concept.

Answer to Research Question:

RQ4.1) How can I appropriate AI into a viable and feasible concept which resolves the struggles of Home office workers?

AI as an inspirational and supportive entity (AI Trainer and Digital Psychologist) leaves enough space for incorporating multiple if not all fundamental needs, capable of individually supporting the development of routine and activities to increase SWB.

Conclusion and Reflection:

Reflecting on the process and compiling this map, tangibility is not necessarily considered as only concerning the embodiment of the product but also related to the impact and interaction with the product.

A digital coach which motivates you to be more physically active, detach from screens and helps forming new routines can also be considered tangible, even if the embodiment and communication is digital. For me it is important that the concept has a good chance to actually be used in a realistic scenario, rather than produce a concept that would be considered as very creative and novel but would probably end up in a fringe at best.

Intervening and adapting interactions with digital tools people already use for work purposes is a strong opportunity to optimize them taking a more user-centric stance and reshaping them to not only support productivity but also individual wellbeing. I like to tend to digital intervention as I see a great opportunity and duty to contribute to their development and propose a wellbeing direction to balance out efficiency and productivity driven approaches.

6

everydAI

The final concept

Focus: Emloyees as Individuals

Overview of findings and Learnings

I want to intervene digitally, as our routines have grown to be adapted to be in front of the screen for most of the day (if you work from home), for work and private purposes. It would be powerful to intervene digitally with physical manifestations, getting people off the screen more and triggering this in a space where the problem arises - in front of the computer while working.

Key Insights and components for the final Concept

Autonomy seems to make people thrive and grow professionally, having benefits for both them and their company.
However, It's hard for people to fully exploit the flexibility of working remotely because they stay struggle getting out of the „working mindset".

Routines and habits, especially physical ones help separating work and life and facilitate getting a „clearer mind".

Initiating or maintaining activities by design and preserving their positive impact by establishing long term routines and habits for meaningful pursuits is the key to long term wellbeing.

A product should not be too limited in its use, people will shape them according to their personal preferences and needs.

AI as a tool for personal fit actively involving people.

AI can analyze statistical data to find surprising and unexpected connections and correlations between influencing factors and outcome in SWB psychology.

Natural Language Processors like GPT-3 offer a promising opportunity to transform close-to-human contextx into usable data for technology integration, which makes sensible personal assistants feasible.

AI created persona profiles offer good potential for custom behavior and precise targeting based on abstract topics like interests and behaviour.

Framing the Final Concept

The concept is a proposal for the use of Artificial Intelligence for the human good. Rather than resulting in a tightly defined and ready-to-be developed outcome, everydAI embodies a startingpoint for the development of digital assistants for subjective wellbeing with fundamental needs and modelling human behavior and context at its core. The concept is imagined in an ideal scenario with certain assumptions regarding people's behaviour and asks a lot of new questions, leaving doors open to further research (More on that in the Project Conclusion).

As a designer, working with AI and using it as an integral part of a product where a certain accuracy is required to test it is a difficult endeavour due to the complexity and required knowledge and skill-base for creating functional prototypes. What my concept will offer is a new perspective on values for AI driven systems, enabled by natural language processing. For testing this specific concept, I created a semi-automated „Wizard-of-Oz" testing setup to evaluate the core principles while remaining in the scope of the project.

INTERACTION VISION

I want the interaction to be effortless, familiar, quick, inspiring, thought provoking, like.

DESIGN GOAL

I want to help young home office workers exploit the benefits of autonomy by inspiring them to form meaningful habits and routines to increase their long term subjective wellbeing.

This Design goal boils down the key insights of my process until now from hearing the stories and pain-points of home office workers, to seeing how they interacted with my low fidelity prototypes, to inspirations coming from the co-creation session.

On a higher level, seeing how the world changes, having to adapt to a new normal, with this design goal I want to support home office workers in getting the most out of it and be able to enjoy the home office experience for their advantages. More specifically I want to assist users in taking advantage of autonomy for their work and for their private life.

6.1 Concept Vision

The everydAI plugin is a self-contained and AI supported to-do list module for personal activities, which lives in task based organisational tools for work like Trello, Asana, Jira or notion (figure 6-1). It consists in a to-do list for your personal tasks (daily or long term), gives custom suggestions based on your behaviour (listed tasks and completion characteristics), preferences and needs. The suggestions by everydAI are initially based on a sub-set of the 13 fundamental needs most relevant to the home office context (figure 6-2).

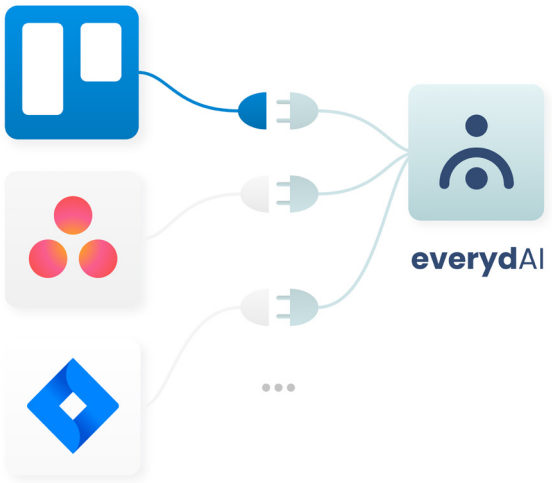


Figure 6-1: the everydAI Plugin

Figure 6-2: The 7 most relevant fundamental needs for home office workers.

Over time, to add variance and explore other domains that potentially bring joy to the user, the System can start suggesting activities extending into more fundamental needs. This way the system can inspire the user to explore new things.

Target group:
Young professionals working in teams or departments mostly from home with a possibility to work in satellite offices on occasion (Post-Pandemic).

By placing the personal to-do list into the organisational environment for work (figure 6-4), eases switching back and forth between between work and personal activities.
This is done to counteract the introduction of work activities into the personal space (home) caused by working from home (figure 6-3).

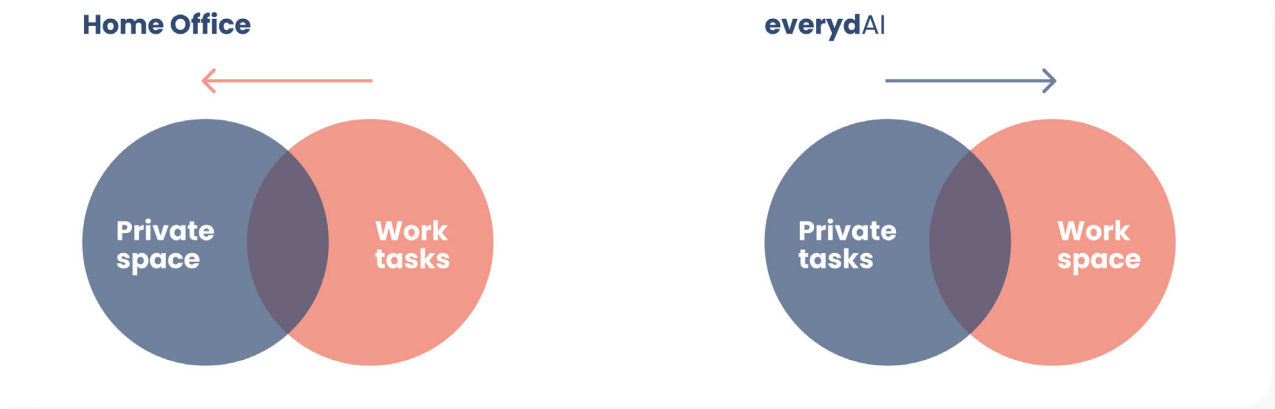


Figure 6-3: everydAI reintroduces private tasks into the work space of home office workers.

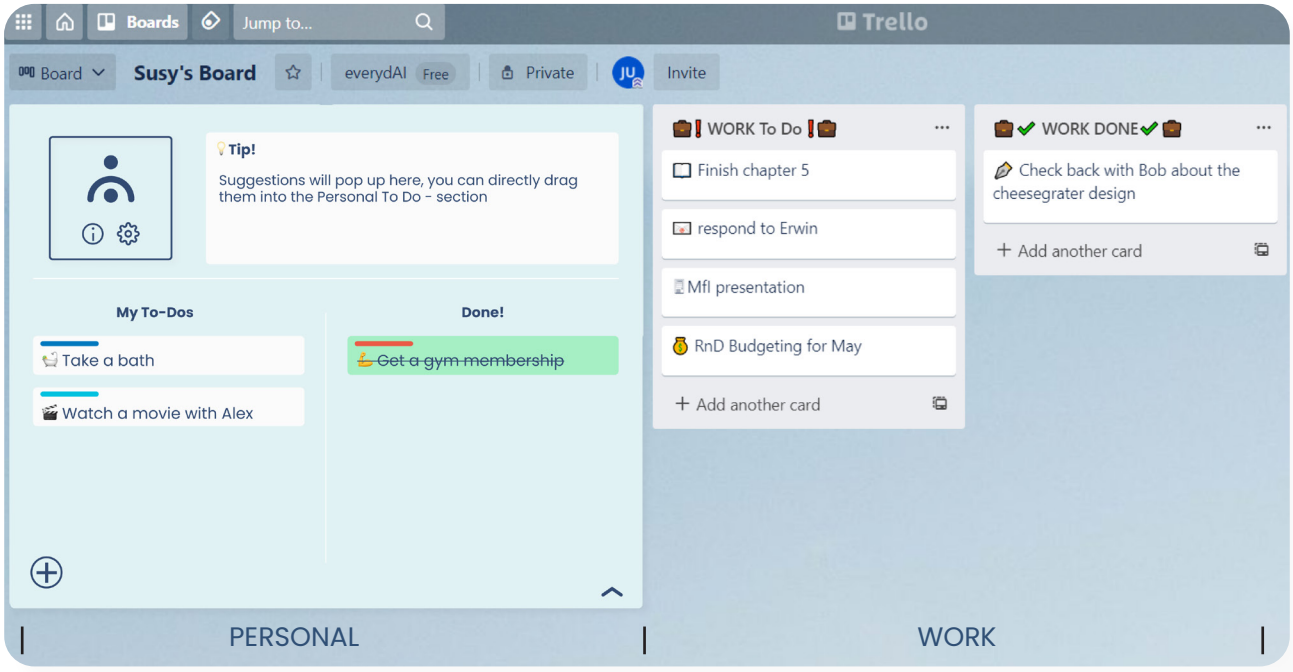


Figure 6-4: everydAI window inside Trello

Drawing analogies to the work zone experiment where stepping over the boundary was the gateway to switch between personal and workspace, everydAI is the gateway to switch between work and personal activities.

The novel approach of everydAI is both introducing routines and structure to a new context of working at home to facilitate balance and reduce ill-being (figure 6-5), while also actively supporting and increasing subjective wellbeing by suggesting fulfilling activities to cover fundamental needs and introduce variance.
To strengthen the positive impact, the system is designed to nudge the user towards experiences and products that facilitate experiences as this is crucial in successfully improving subjective wellbeing on a long-term scale (Pohlmeyer & Desmet, 2017).

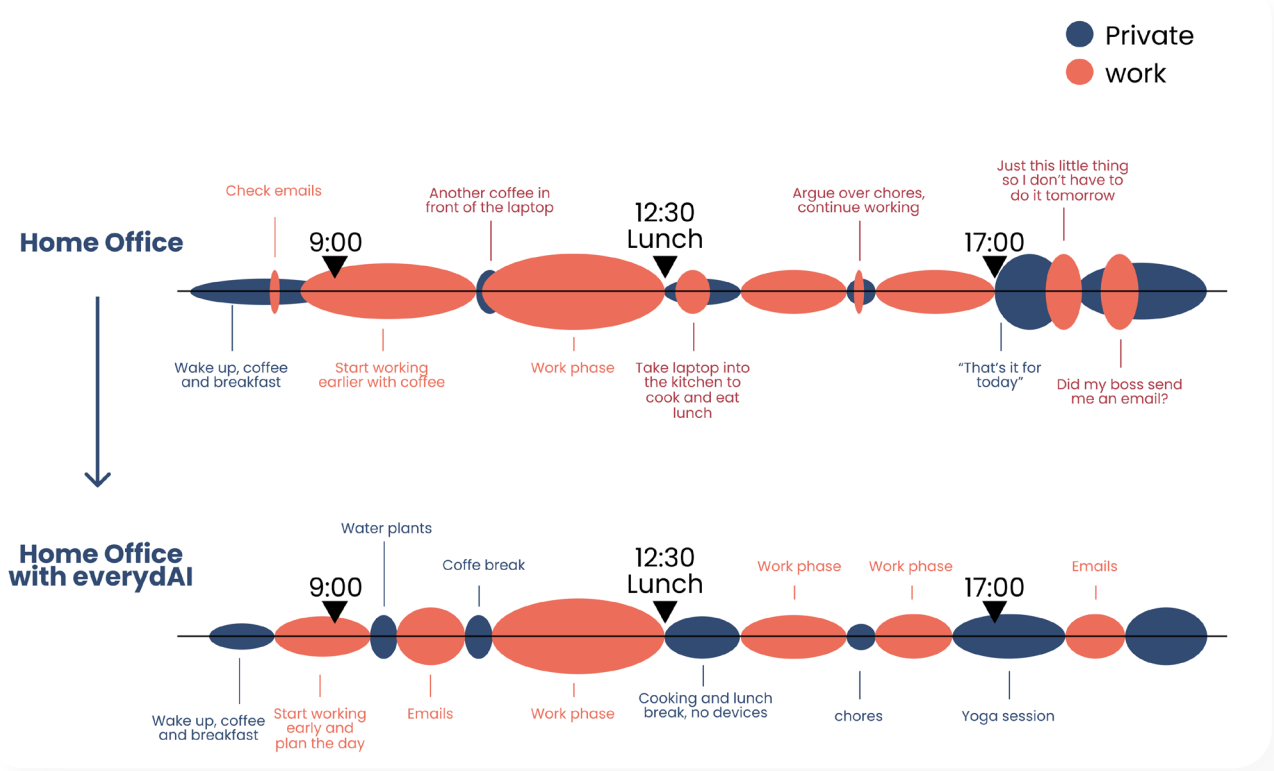


Figure 6-5: Home office experience currently (top) and with everydAI (bottom)

Why a To-Do List?

Writing down tasks and crossing them off after getting them done is known to be satisfactory activity making us feel a sense of accomplishment and progress. Some people even go as far as writing down tasks retrospectively after they have already been executed just to feel the satisfaction of crossing them off. Listing items and visualising them introduces structure to a home office worker's life where it is necessary, and support autonomy – one of the 13 fundamental needs, and strong predictor of Subjective Wellbeing (Margolis, 2020). Organizational tools and to-do lists like Trello, Notion, Jira or Asana are already widely used in remote work, spiking in usage during the COVID-19 pandemic and generating vast amounts of usable data about employee's working behaviour (Leonardi, 2020).

The everydAI concept is a combination of ideas (figure 6-6) generated by the co creation session from Cycle 3 and my own ideas from Cycle 1 (To Do list with an integrated Digital psychologist specialized on fundamental needs and supporting you like a trainer).

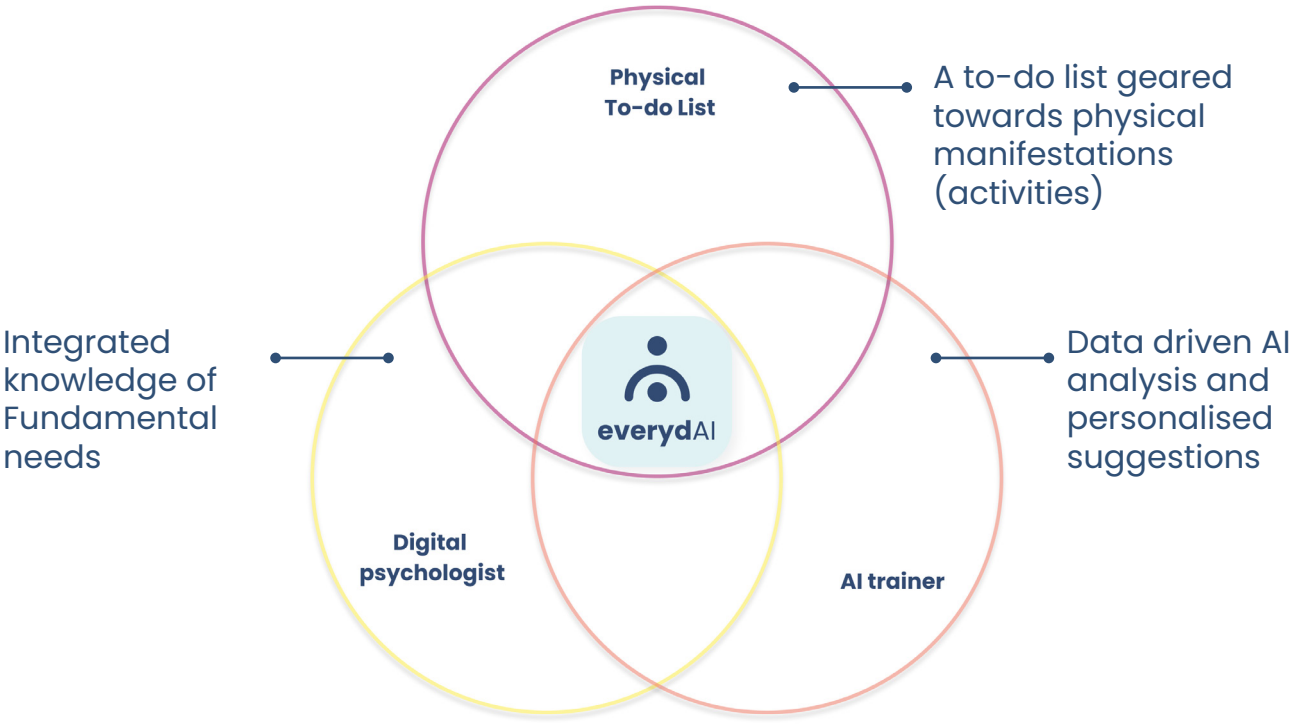


Figure 6-6: EverydAI components from previous ideas

How does it work?

In the figure below, you can see the basic functions of the everydAI window: Create new tasks, drag them into „Done“ and get custom suggestions on activities and structuring activities in the top section.

The individual tasks inserted by the user are classified and color coded according to relevancy to the 13 funamental needs. The user can click on them to reveal assigned need categories and get information on what types of tasks they fulfil.

The module does not intervene in work related tasks, as working routines and productivity seems not to be an issue for home office workers (don't try to fix something that's not broken). However, tips on taking breaks are triggered right after a user finishes a work-task to act at a good moment for a break.

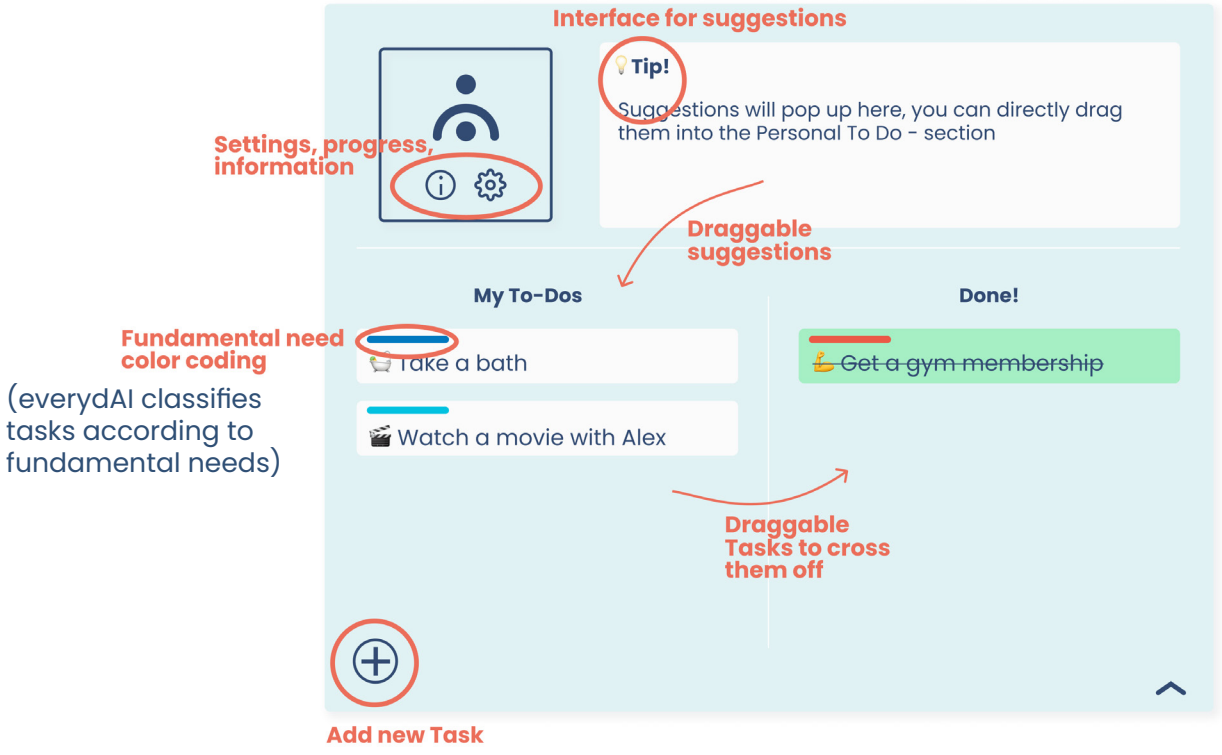
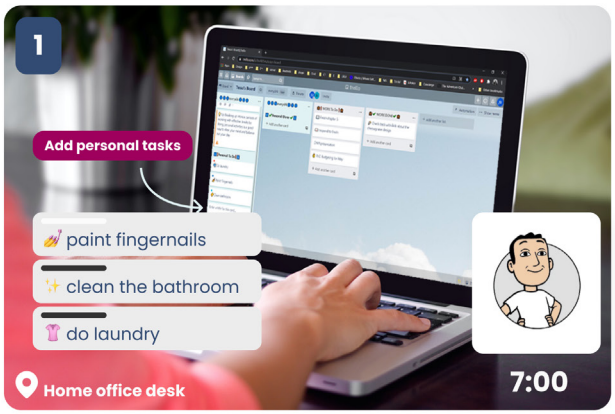
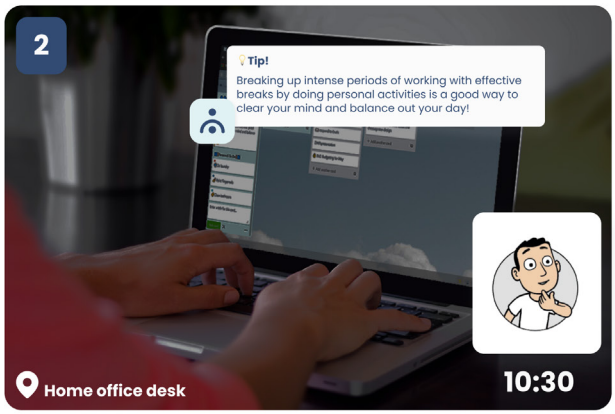


Figure 6-7: EverydAI module for personal tasks which resides in work organization tool as separate section

6.2 Interaction Scenario

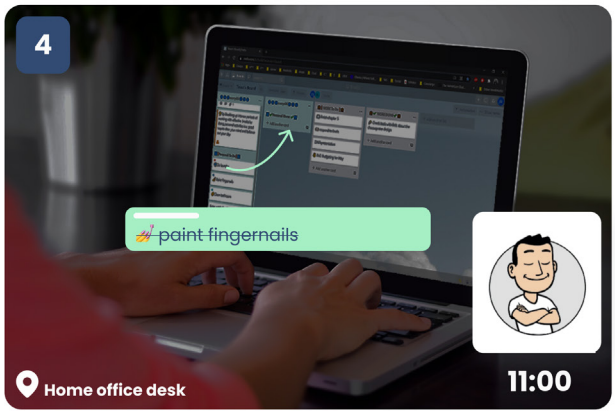


Tessa sets up personal tasks for the day in everydAI at her home office desk. She adds “do laundry”, “paint fingernails”, and “clean the bathroom”. She then checks what she has to do for work in the same window to the right of everydAI. She feels motivated and ready for the day.



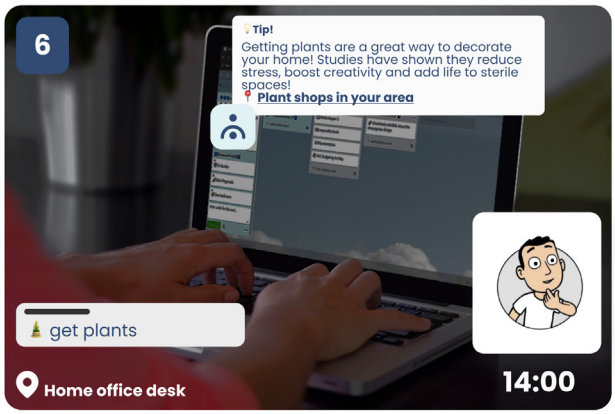
As she crosses off one of her work tasks, everydAI prompts a tip: “Breaking up intense periods of working with effective breaks by doing personal activities is a good way to clear your mind and balance out your day!” She looks at her personal to-to list within everydAI and decides, she deserves a break and wants to paint her fingernails.

She gets up, grabs her nail polish and makes herself comfortable on the couch. She leaves the computer behind and switches on some music to relax to. She feels she’s doing a good job and deserves to treat herself a bit.



After the nail polish dried, she returns back to her desk to cross off her personal task “paint fingernails”. She feels a sense of accomplishment as she moves the task to the “done” section and tackles the next task for work.

Tessa is getting a bit bored of her surrounding, as she finds her home office a bit bland and sterile.



After lunch she gets back to work and sees a new tip from everydAI: “Getting plants are a great way to decorate your home! Studies have shown they reduce stress, boost creativity and add life to sterile spaces! ” She is curious as she would love some plants and checks out plant shops near her. She decides on one and adds it to her personal to-do’s

6.3 everydAI functionalities

Persona

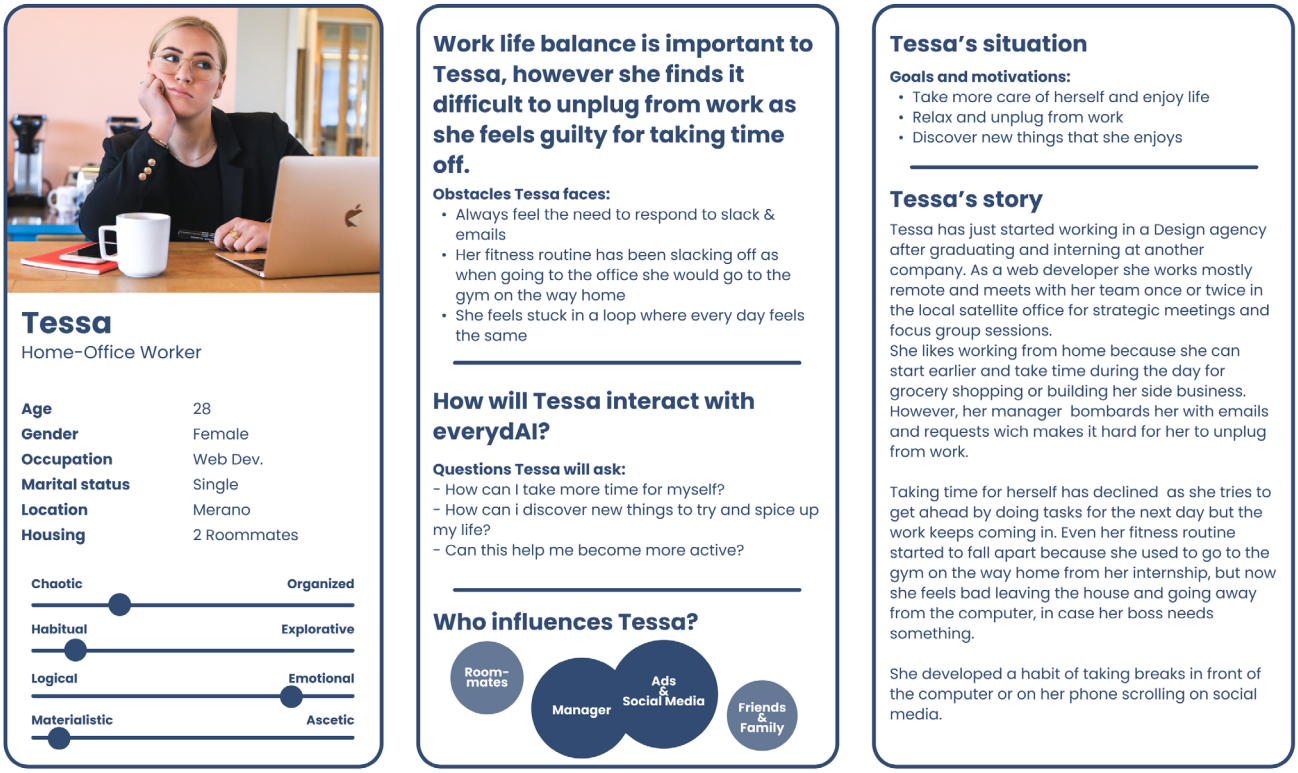


Figure 6-8: Tessa's persona description

Tessa's Needs:

- Autonomy
- Fitness
- Stimulation
- Community
- Relatedness
- Purpose
- Comfort

1: Setup - Introducing Structure

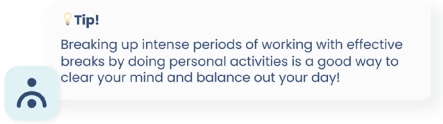
1.1 Setup - Curiosity

Tessa's friend Lisa recommends her everydAI, as Tessa was complaining to her about needing to get her mind off of work more.
Tessa installs the everydAI Trello plug-in as she already uses trello for work.
She starts to set up the first personal tasks she wants to get done until the end of the day.

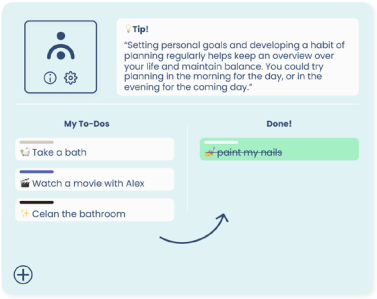
1.2 Structure Day

Tessa plans her daily tasks in the morning, but often ends up bunching up tasks for herself together at the end of the day.

As she is finishing a work task and wants to tackle the next, everydAI prompts a tip for her to break up intense working periods with personal activities.

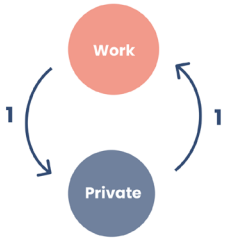


1.3 Form a habit



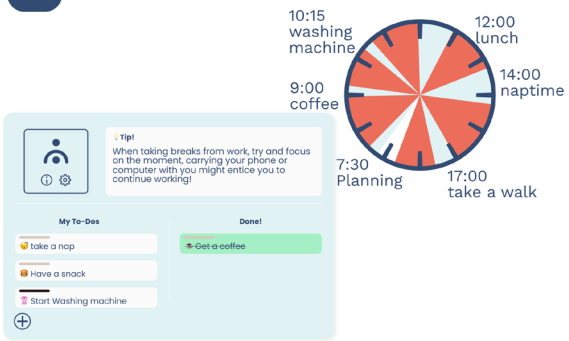
Tessa forms the habit of setting daily tasks in the morning, then doing them and crossing them off on when she finds time throughout the day.

1.4 Alternating Tasks



Tessa forms the habit of doing one task for work, and as she finishes it, she does one for herself.

1.5 Small tasks



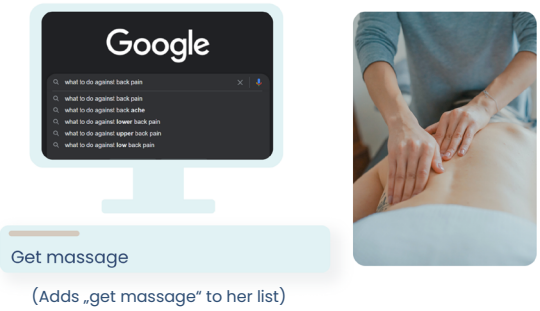
She inserts **small activities** she can use to break up her day and take some smaller breaks in between working phases without using her phone or laptop.
At the end of the day she feels like she **got done a lot** and she feels good about herself.

Needs fulfilled with help of everydAI:

- **Autonomy**

2: Active > Passive

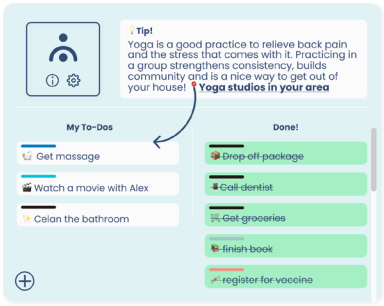
2.1 Need for physical activity



(Adds „get massage“ to her list)

Tessa notices that she has **problems with her back** recently, so she goes to search what she could do against that. She decides to get a massage.

2.2 Activity suggestion



The next morning she gets a suggestion about practicing yoga to treat her back pain and get out of the house more. She had already thought the occasional walks are not enough exercise, so she decides to check for yoga studios and registers for an introduction session.

2.3 Meaningful Routine

She likes it and decides to go there **regularly before lunch** as it helps her with her back pain and lets her clear up her mind from work. She also met some **new friends** in the group and meets up with them outside of the yoga sessions.

Needs fulfilled with help of everydAI:

- Fitness
- Stimulation
- Community

3: The baking competition

3.1 A new passion

Bake mom's cake

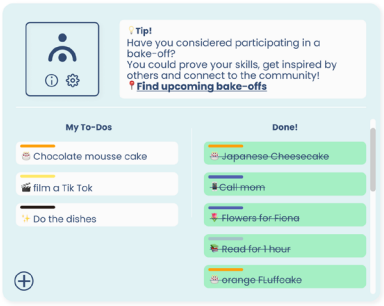
...a few days later

Japanese Cheesecake

Orange fluff cake

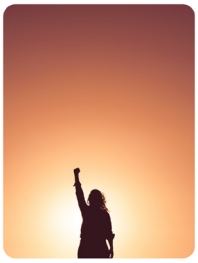
Tessa's mom gave her a cake recipe. She got hooked and **started baking** all kinds of cakes and enjoys them with her roommates, who love them.

3.2 Take it to the next level



everydAI points her to baking **competitions** where she could **prove her skills**. She hadn't thought she was good enough, but her roommates pushed her to register for one as they love her cakes so much.

3.3 Meaningful Routine



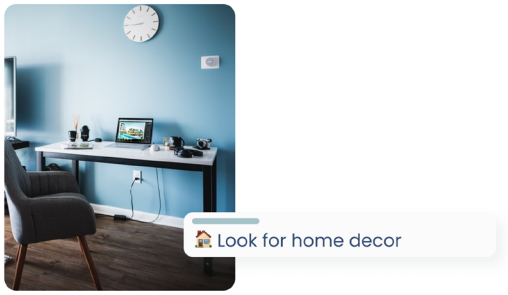
Surprisingly to her, her quirky pastel macaroon cake took the first place! She feels a sense of **accomplishment** and was amazed about other people's creations and **swapped some recipes** with them.

Needs fulfilled with help of everydAI:

- Community
- Relatedness
- Competence
- Recognition (new)

4: Purposeful decoration

4.1 Bland environment



"...a bit boring"

Tessa feels like her home, especially the work space could need some more **decoration** as she is spending more time there working. She wants something more **stimulating** and **enjoyable**.

4.2 Suggest for bigger impact

everydAI suggests getting plants as they reduce stress, boost creativity and add life to sterile spaces. Tessa likes the idea of having more plants in her home. Thinking about it, she doesn't even possess one, so she goes and searches for plant shops nearby.

4.3 Caring for her jungle

Little by little she filled the whole appartment with new plants as they help her **relax** and the **routine of watering** is like a moment of meditation for her. She feels a sense or **caring** and purpose as she observes her little babies grow.

Needs fulfilled with help of everydAI:

- **Purpose**
- **Stimulation**
- **Comfort**
- **Beauty (new)**

After weeks of using everydAI, Tessa feels like she has found some new passions in her life that fulfill her and maker her happy. She feels in control of her work/life balance, has found a structure and routines that fits her well and decides to switch off everydAI as the suggestions became obsolete.

6.4 everydAI's inner workings

Persona Profile

To make appropriate suggestions, everydAI compiles a user profile containing information on interests and keeps track of fulfilled needs to find blind spots and suggest accordingly to shine light on them and fill them.
For a quicker adaptation and more accuracy, Google's already existing profiles for targeted advertisements could be integrated via Google sign-up for everydAI. Working with cookie data, everydAI gains access to Tessa's surfing history for sites where she accepts the usage of cookie data. Given that younger generations are becoming more opent to share personal information inexchange for a better and more personalized user experience (Echoworx, 2019; Munro, 2020). This goes in line with targeting younger professionals who grew up using technology - digital natives.

Figure 6-9: Tessa's persona profile inside everydAI

Tips on usage and structure

Especially in the initial phase, it is important to intervene in the right moments and assist the user in finding a work/life symbiosis which works for them. Therefore, a set of predefined tips on how to use everydAI is given to motivate the user to try out different things and see what works best.

1: Setup - Introducing Structure

Tips on using everydAI

>Trigger: usage behavior

- **First Use**:
"Breaking up intense periods of working with effective breaks by doing personal activities is a good way to clear your mind and balance out your day!"

- **If planning is irregular**:
"Setting personal goals and developing a habit of planning regularly helps keep an overview over your life and maintain balance. You could try planning in the morning for the day, or in the evening for the coming day."

- **If planning is regular**:
"Good job on regularly planning your activities, this is key for keeping track of progress and have a structure to grasp onto."

- **If Tasks remain undone for a long time:**
"It is important to keep your list clean and dynamic, so it doesn't intimidate or make you feel bad for procrastinating. You can remove activities if you can't find the right moment for them."

- **If Tasks are done after 1-5 days:**
"You're doing great on accomplishing your tasks! if you want to see your progress, you can scroll through all the things you've done and see which needs you are fulfilling for yourself by clicking on the colored bars."

- **If a break structure is established:**
"When taking breaks from work, try and focus on the moment, carrying your phone or computer with you might entice you to continue working! "

- **General**:
"When taking breaks from work, try and focus on the moment, carrying your phone or computer with you might entice you to continue working!"

Figure 6-10: Tips on using everydAI and their Triggers.

Needs Classifier

The needs classifier takes the task “Take a bath” inserted by the user and finds contextual information in the form of related tags. Then, the system finds contextual overlap to needs and selects the highest ranking one to tag the task.

In case tasks are written with little information like “bath” instead of “take a bath”, the natural language processor can make an eductaed guess knowing it is a “to do”, so it can understand the user probably means “take a bath” when writing just “bath”

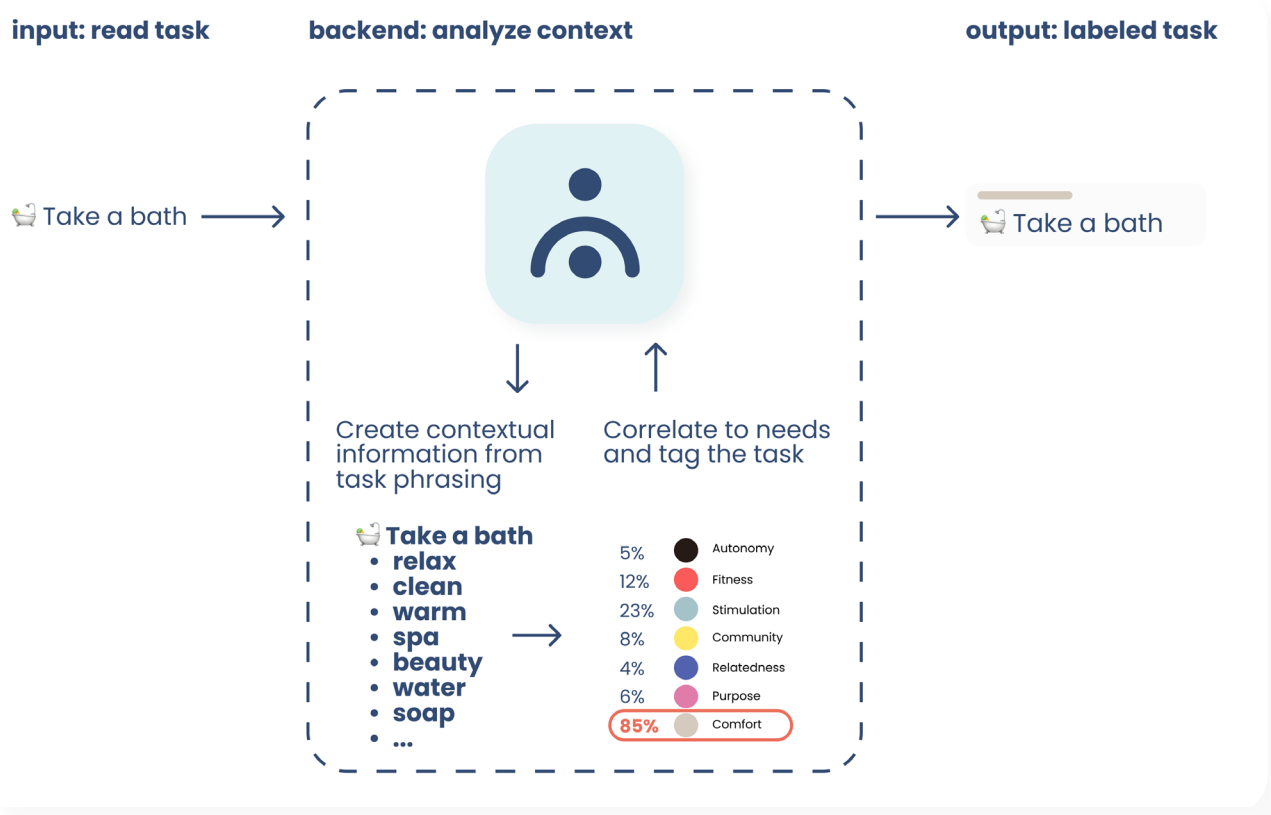


Figure 6-11: Need classifier for contextual understanding and association to the fundamental needs via integrated NLP (Natural Language Processing)

Needs Tracker
Fulfilled needs are stored in a registry to track their fulfilment and detect low scoring needs to suggest for. Depending on the user's behaviour towards fulfilling certain needs, they can be weighted to readjust appropriately to the things that are important to the individual using everydAI. This could be achieved in a more open conversation with the system asking how people feel and were impacted by fulfilling certain needs. The user can access this information to learn about themselves and to see how the system works.

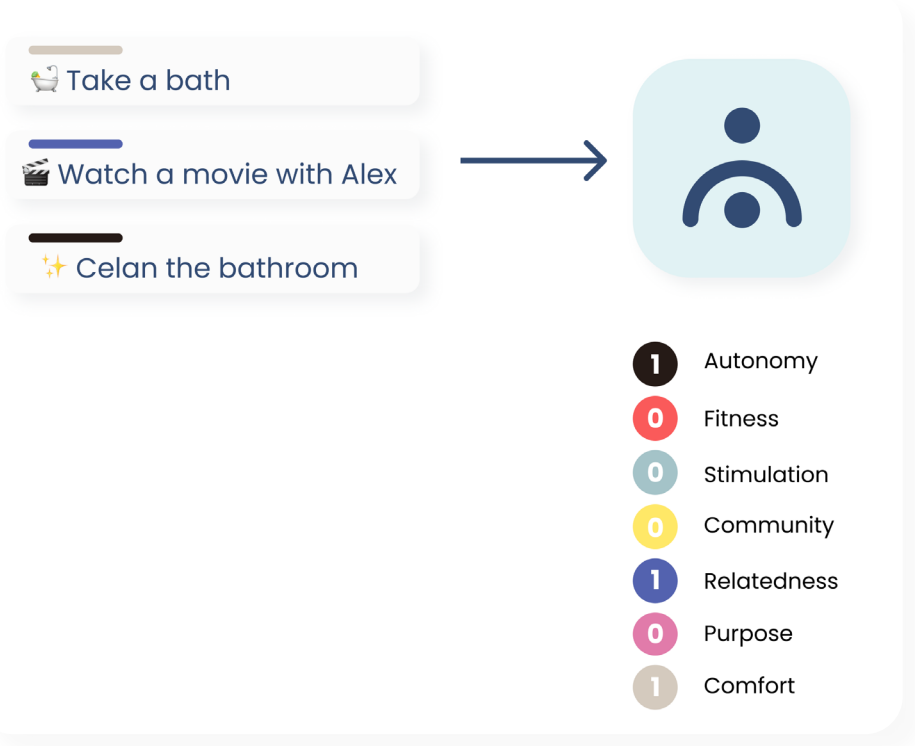


Figure 6-12: Need fulfilment tracker

Detecting opportunities for interventions

Cookie information and listed tasks are scanned for opportunities of potentially increasing need-fulfilment. The algorithm is pre-trained to look for options which involve the user in activities and routines. In this case, a problem „back pain“ which is resolved by „Getting a massage“ is analysed and everydAI proposes an apporptiate solution to cover needs and fit the persona profile to have better chances of being of interest to the user.

2: Active > Passive

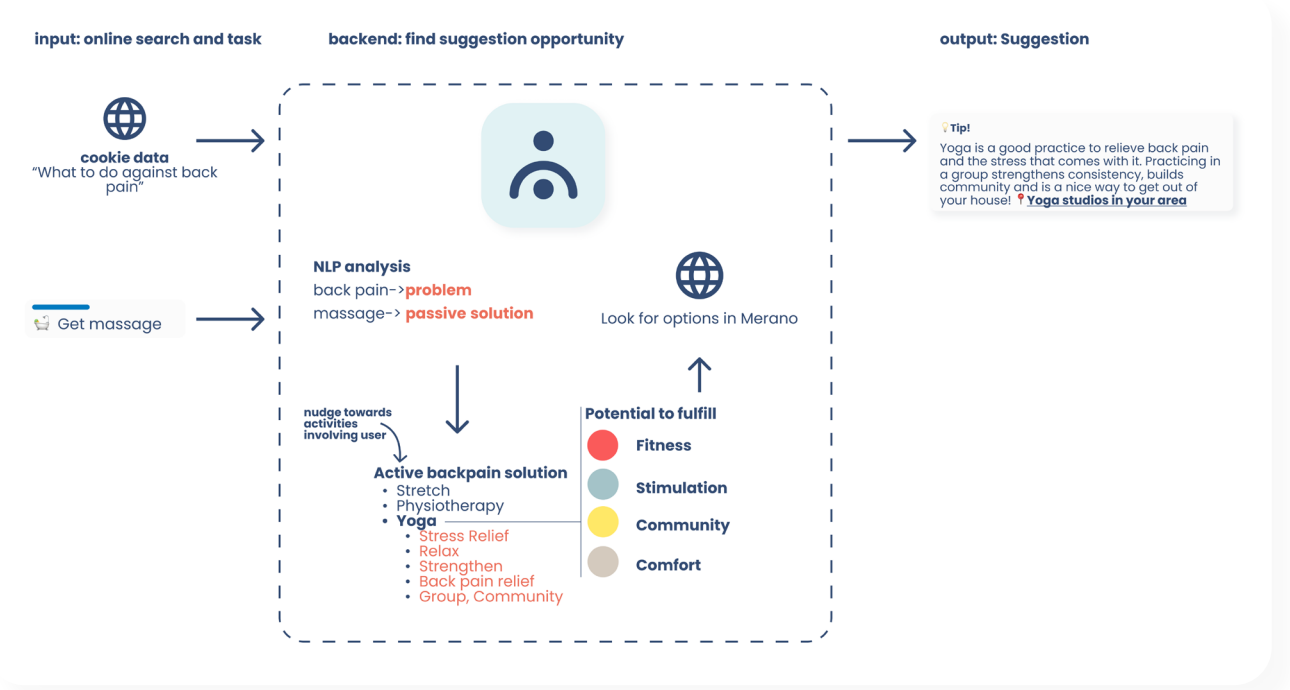


Figure 6-13: Optimisation mechanism towards activities and routines fulfilling fundamental needs via NLP (Natural Language Processing) analysis

6.5 Concept Evaluation

With the final concept test I want to evaluate all parts of the concept vision in a real life setting, to validate core aspects and gain deeper insights into how people interact with to do lists, respond to suggestions from a machine, and react to different levels of personal data use. Because the concept is more of a vision than a concrete and tested blueprint for a product, a „Wizard of Oz" prototype simulating an autonomous concept makes the validation feasible before jumping directly into more technical prototyping.

The test is carried out with a „Wizard of Oz" prototype on Trello involving two participants (figure 6-14) over one week. The everydAI module is recreated using in-platform functions and automated actions, as well as plugins for refining the appearance (figure 6-14). The board is shared between me and individual participants. I will be playing out the role of the everydAI system classifying tasks and giving custom tips to the users.

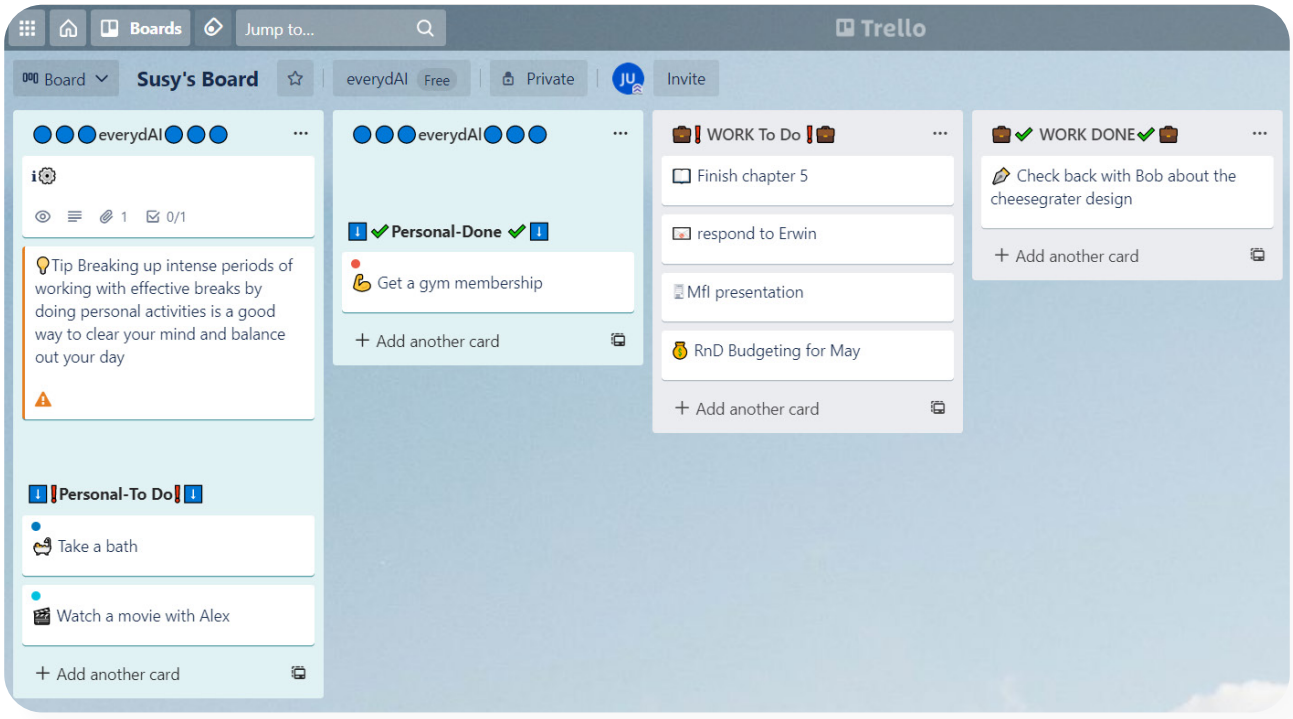


Figure 6-14: Concept prototype realised in Trello to enable „Wizard of Oz" Testing

Because the concept is more of a vision lacking some validation of its components, I wanted to test the core concepts in a realistic setting and have people interact for several days with it autonomousel. This way the participants don't have to imagine a scenario, which is expected to yield deeper and more realistic results.

What do I want to answer by testing?
1) Does the concept help participants to get their mind off of work?
2) How are the suggestions perceived and are they valuable to people?
3) How is the needs classification and tracking perceived and are they valuable to people?
4) What perception do participants have with different levels of personal data usage?

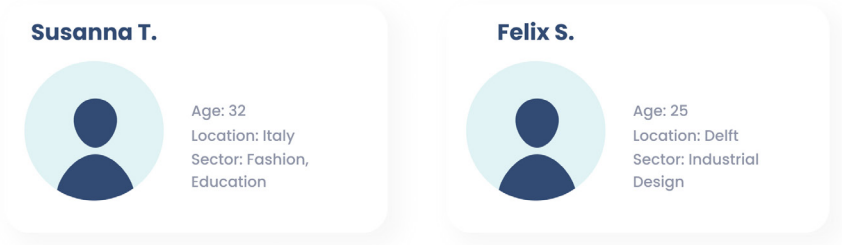


Figure 6-14: Final Test Participants

Prototyping with Trello Automation

Trello's automation integration called „Butler" allows for programming triggers and actions, so called „Rules" (figure) within it's system. This makes it posisble to prototype a reactive system, in my case notifying me when participants add new tasks so I can classify the needs as the AI. Once participants have planned some tasks to do, I can automate the pop-up of a suggestion or tip and have it triggered by the user moving an item into the „Done" list, so it pops up and grabs attention while they are in Trello and have finished a task.

Figure 6-15: Trello integrated Butler Rules

To tweak the appearance and be more flexible in displaying headers, colors and layout of Trello lists and cards, I made use of various plugins: Separators, List Highlighter and Pro4Trello to get closer to the look and feel of the ideal concept. „Trello Cards Optimizer" is an extensive tool offering the possibility of many tweaks, however some functions i needed were found to not work properly so I refrained from using it in my case.

Testing two degrees of personalisation

The protocol for testing varied between the two participants in the level of personalisation of suggestion and „personal data usage“. By giving personal suggestions based on mroe intimate knowledge of Felix‘s interests, preferences and character, I played his version of everydAI with a rateher detailed and private knowledge to then observe the reaction to very personalised agency of the system. Susanna on the other hand got more generic suggestions and tips which are based only on interactions with the prototype and contents she put into to-do items.

Testing Limitations

The final concept evaluation only looks at a small timeframe at the beginning of interacting with everydAI. To fully evaluate and understand the product‘s impact on subjective wellbeing, a bigger timeframe of testing would be needed to assess long-term changes in subjective wellbeing.

Testing with a „Wizard of Oz“ prototype comes with my own bias when acting as the underlying AI system, even if I try to stay objective and act according to what the system would do. Even though I know participants and have knowledge about their interests and I can see their behavior in the prototype in real-time, information I can work with is limited compared to a fully implemented prototype.

The understanding of behavioural patterns within everydAI and the to-do list application for work can be deepened and the database on tips can be widened to address problematic behavior which has not yet been identified as of the time of testing the first prototype.

A sample size of two participants is relatively low and could make for very different experiences and results, however given the scope of the project, isolating circumstances, and the purpose of an initial validation of the concept vision it is a good startingpoint.

Evaluation Methods

AttrakDiff
To assess the usability and appearance of the concept, I will use the AttrakDiff questionnaire. For the context of the concept evaluation I will give participants the questionnaire to rate it according to hedonic and pragmatic qualities before diving into an interview.

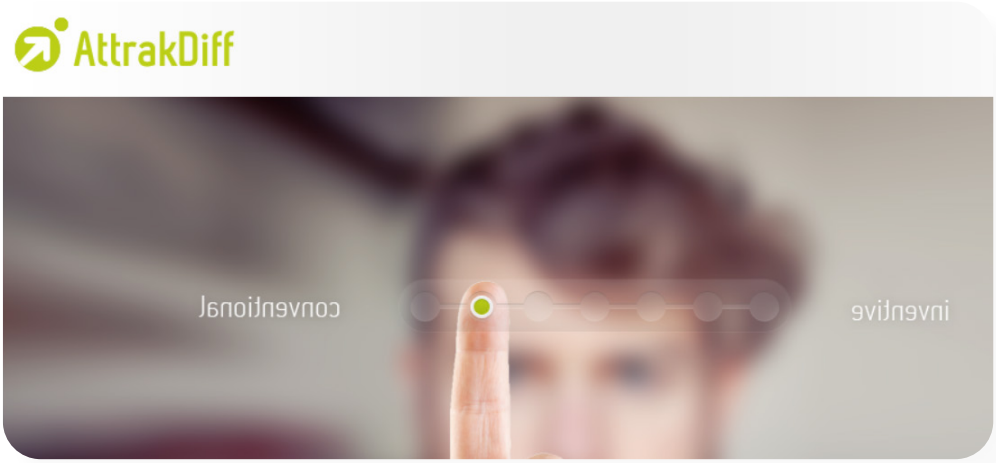


Figure 6-16: AttrakDiff

Interview using PrEmo (Desmet, 2018)
After having participants rating the concept with the AttrakDiff Questionnaire, I will use the PrEmo emotional self report icons and structure the interview into multiple stages: Setup, Initial use and tps, activity suggestions and impact on behavior and wellbeing. With this method I want to gain a deeper understanding on emotional responses when interacting with everydAI and activities suggested by it.

Figure 6-17: PrEmo Emotion Cards

6.6 Results

Overall Quantitative response
Although only two participants evaluated the concept with the AttrakDiff survey tool, the results show little variance. The concept being task oriented was expected, as this is the core of the concept. The concept could improve in hedonic qualities as expected, however it is in a surprisingly good area in terms of desirability. In fact, one participant would have liked to continue the test out of curiosity of what would happen thinking some parts of the prototype were fully functional.

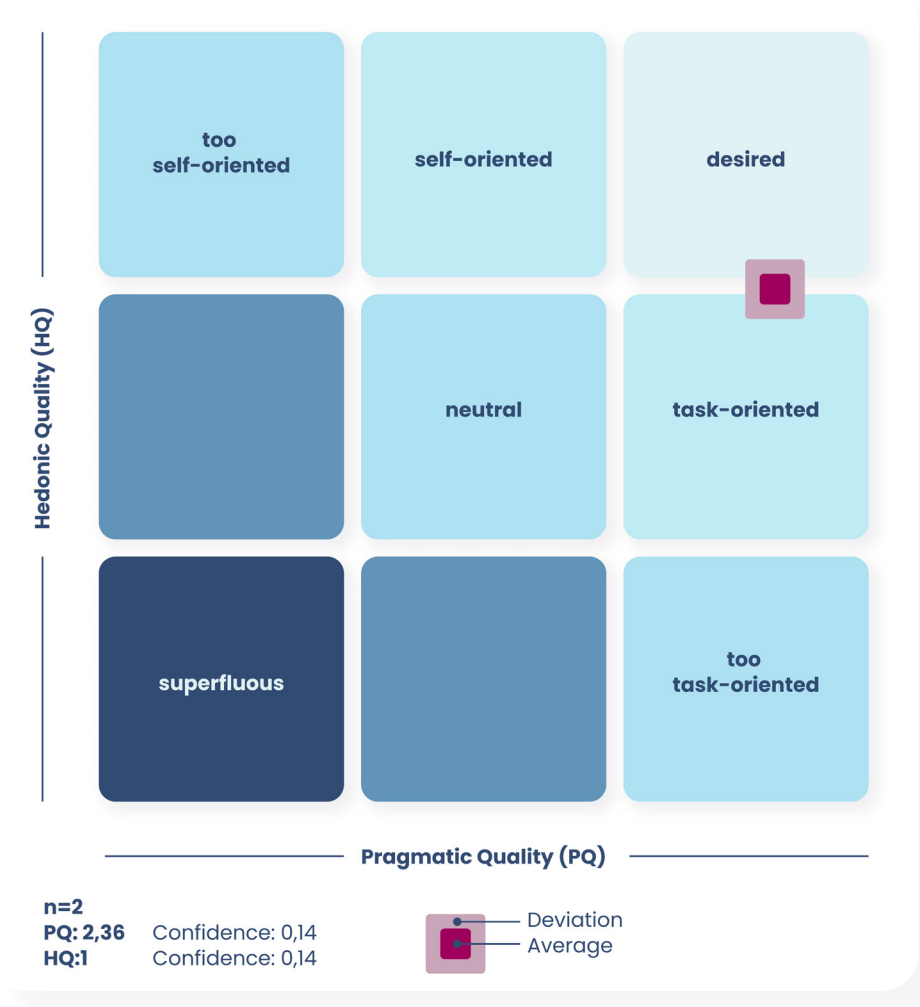


Figure 6-18: AttrakDiff Portfolio Results

Looking at the specific word pairs the participants rated, it is noticable that It feels neither isolating nor connecting to people. Designing for social interaction, connecting people through the system itself or via connecting suggestions could improve this. The concept could also be bolder and more novel, and thus potentially spark more curiosity and fascination.

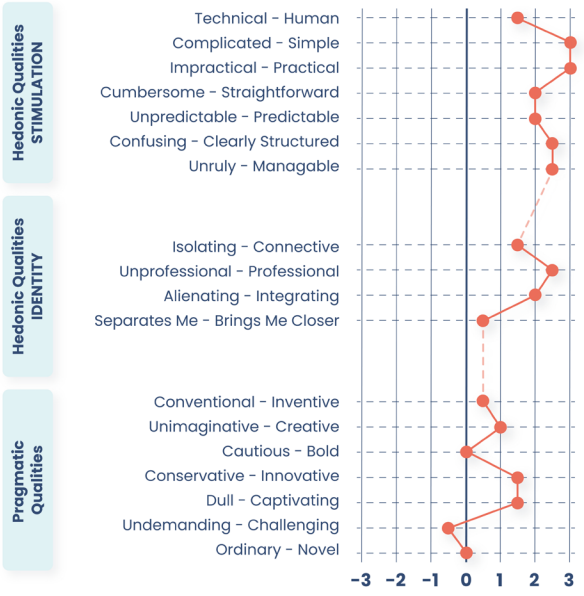


Figure 6-19: Relevant word pairs (adjusted not to include appearance related pairs)

Figure 6-20: Diagram of average values (adjusted not to include appearance related pairs)

The concept scored well in pragmatic qualities, probably because of the prototyping within trello which makes it easy for people to use and is a very popular tool known by both participants. The hedonic qualities of stimulation could improve, perhaps by making the concept more engaging and attention grabbing as participants have reported suggestions being too subtle. Also people check in with Trello less often as expected by memorizing several tasks and only coming back to the platform once or twice a day thus having less opportunities for interaction with the concept.

Crossing the Line of Trust
As suspected, participants are willing to engage in a trade-off in sharing personal data in exchange for a better user experience. Both participants have the habit of generally accepting usage of personal data as a default, and questioning data usage once interactions get too personal. For example suggesting to go skateboarding on a sunny day implied that the system predicts this hobby from cookie and location data. Having this type of knowledge about predicted real world activities without explicitly expressing it has crossed a line in trust and made Felix rethink sharing his personal information.

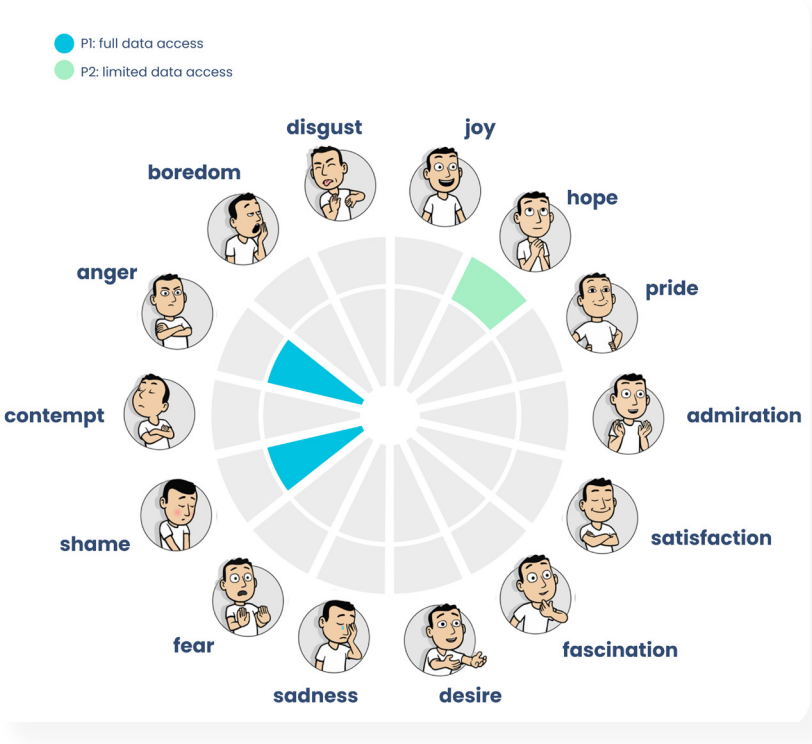


Figure 6-21: Premo evaluation on the topic of trust

Participant 1:
„The system knowing that i skateboard and giving me a suggestion about it has made me suspicious. I get that it would assume it because of my location (often at skateparks) and browsing history, but still. This translation of an activity I regularly do in the real world, and me not telling the system specifically that it is one of my hobbies makes me suspicious. Maybe if those situations would reoccur I would disable the data usage."

Participant 2:
I think we live in a post-privacy age and to be honest, I am used to it. I think If I should be afraid of an algorithm knowing what I am doing, then maybe I shouldn't be doing it in the first place. What would cross the line for me is if my peers or worse even, my boss could have complete insight into my data. I would feel uncomfortable for example if my boss could see when and where I read emails because I would fear them making judgements on me without me knowing.

Needs Classification and Tracking for sparking user action
The classification (and labelling) of tasks into corresponding needs and tracking them over time has shown a more promising result than the targeted suggestions themselves. People were curious about all fundamental needs, not only the ones they were fulfilling and wanted to know more, in order to make decisions themselves in trying to fulfil them. Classifying the tasks did shed light on the impact of their actions and educated participants on the deeper meaning and influence on their wellbeing. People often „just do“ things without thinking too much about it. Classifying the tasks made people more mindful about their actions. Counting fulfilled needs sparked a curiosity on what they are missing, wanting to know more about the whole spectrum of needs that can be fulfilled.

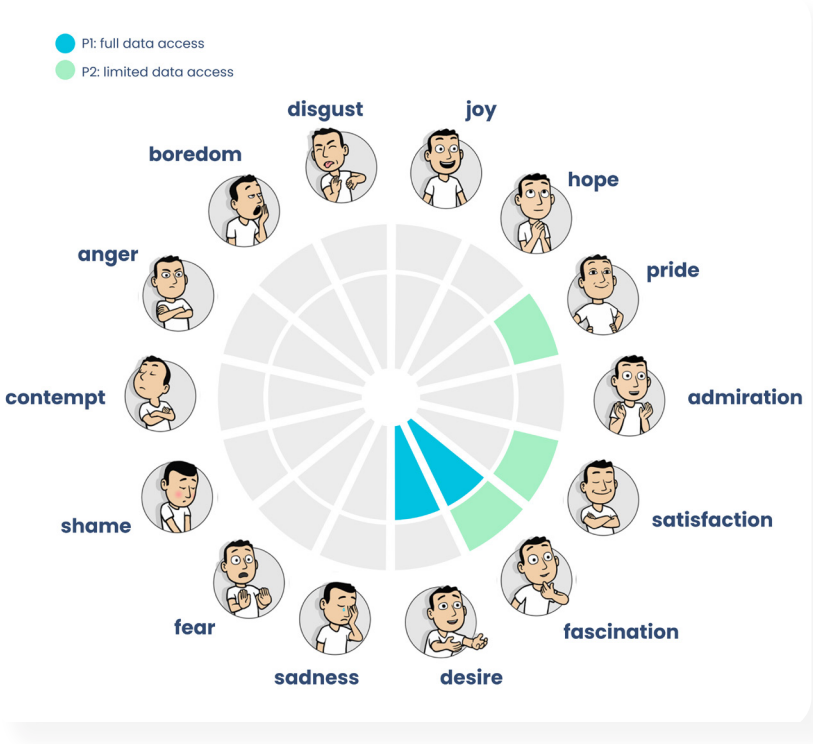


Figure 6-15: Premo evaluation on Needs classification and tracking

Grabbing Attention

Participant 1 has reported a sudden switch from admiration and fascination about the suggestions, into anger as the suggestions infered personal activities and crossed a line into being „too intelligent“. Partcipant 2 has perceived the notifications as rather „spammy“ because of the use of emojis, so she did not always pay good attention and read the whole suggestion. She reported that the popping up of the suggestions is not „alarming“ enough for her so she woudl whish for more intense signaling.

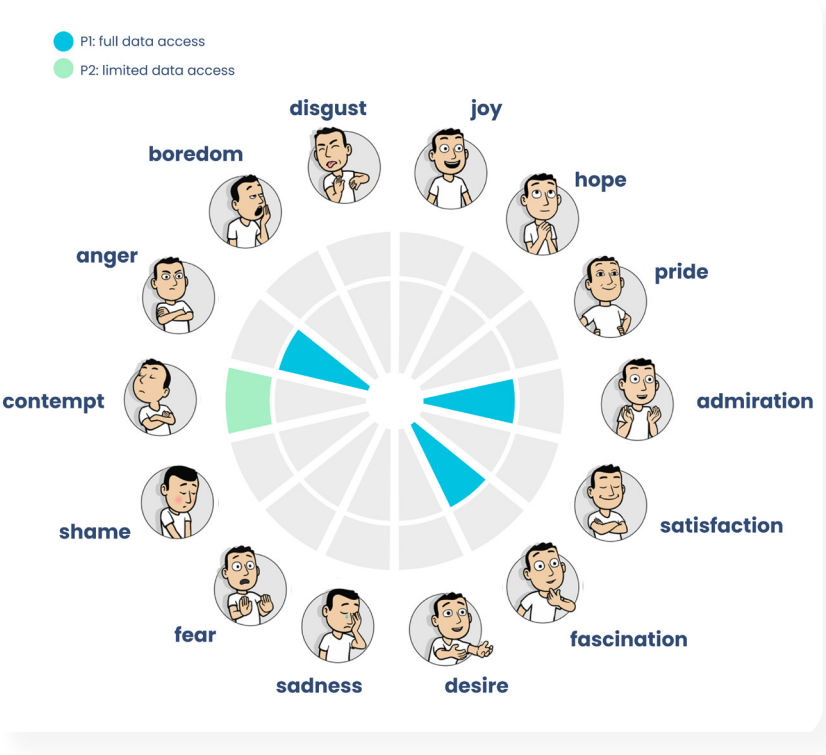


Figure 6-15: Premo evaluation on Needs classification and tracking

The Indolence of changing Habits

Habitual changes are hard to achieve as people cling on to their existing and established routines and habits, wanting to stay in their comfort zone. Suggestions for small changes (informing people of events or educational content) are generally well accepted, however introducing completely new types of regular activities (like running every morning for example) are received with a higher resistance. Changing habits is a slow and delicate process hard to judge from a short test and observation, but participants tend towards accepting smaller suggestions, which in sum could lead up to bigger habit changes. However, this needs further studying.

Conclusion

Although the concept was not very successful in getting participant's mind off work directly, interacting with it has triggered a reflection and curiosity about their needs and need fulfilment. It is also hard to observe adaptation of habits within the span of a week and the concept was not geared to get participant's minds off work in a distracting and immediate way, but rather to stimulate them in adapting more beneficial routines over time.

Personalised suggestions and trust in everydAI
The suggestions should focus less on offering a perfect fit with the user's interest, but rather be more open and suggesting types of activities than specific activities, to spark user agency. Perhaps the suggestions should also be communicated in a different way, adapting more to peoples different level of response to attention grabbing signals.

The needs classifier and tracker
The needs classifier and tracker showed the most promising response, as they sparked curiosity and fascination in both participants. Showing users the needs they fulfill and what they are lacking in, giving them room to act on themselves to resolve lack of needs goes well in line with the aim of the concept in supporting autonomy in individuals. Perhaps leaving it up to the machine to pick out activities like envisioned, is already a step too far and the focus should lie in educating by objectifying subjective activities. An interesting insight was that assigning a need to a seemingly mundane task has given one participant a small „a-ha" moment when realizing that executing it actually has a deeper meaning to it.

Changing habits
It is hard for people to change habits, and the most powerful spark for changing habits is if it comes from people themselves. Perhaps in reaching the goal of changing habits for the better and introducing new routines for improving wellbeing it is a more promising approach to educate people in a way so they can make the right decisions in improving their wellbeing on their own. The suggestions in this case

Ansering the Design Goal
The design goal for the final concept was to help young home office workers exploit the benefits of autonomy by inspiring them to form meaningful habits and routines to increase their long term subjective wellbeing. Testing in only a small frame of time with a „Wizard of Oz" prototype, it is difficult to claim its success in triggering the formation of meaningful habits and routines. However, the concept was successful in sparking curiosity and inspiring people to think about their needs and trigger a desire to learn more and improve upon fulfilling their individual needs.

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Outlook and Recommendations

Going forward, the recommended step is to explore, how to put the needs classifier and tracker more into the focus of the concept and test more long term impacts of interacting with it. Also, because the complexity of working with AI systems has not allowed me to explore this integrated approach within the scope of the project, an experimentation phase is required to validate the potential of Natural language processing algoritms to be trained to become a classifier for fundamental needs.
Furthermore, the concept as it was invisioned now is very much focussed on individuals, which could potentially increase isolation. Exploring more possibilities on how to connect people, especially peers who work together (which was one of the big issues I found out along the way) could make the concept more focused for the home office woker.
The topic of task management should also be explored further, as people have very different approaches in managing, and my research has focused less on task management itself, but more on finding an appropriate case for AI to benefit home office workers to increase their subjective wellbeing.

7
Project Conclusion

7.1 Answering the Project goal

The concept everydAI answers to the project goal to propose a concept leveraging the capabilities of AI and shape it in a way to serve humans in improving subjective wellbeing within the home office context, resolving friction from merging the private space with work activities.
Using fundamental needs as an operalisation to address subjective wellbeing as a frame for Natural Language Processing to act within a concept is an appropriate case for AI as an integral part of it. Although within the scope of the project, I have not been able to experiment with Natural language processing systems, I believe that the concept is feasible now or in the near future considering applications of current NLPs like GPT-3.
Both subjective wellbeing and artificial intelligence are complex topics to navigate and work with during a design process, so the final concept is more of a vision rather than a ready-to-be made concept.
Starting out with investigat ing both managers, home office workers and relationships between them, I have decided to focus down on the individual

7.2 Reflection on the process

I started out with big ambitions for this project, wanting to work with AI and do multiple rounds of prototyping while addressing psychological issues and change peoples behavior, all with a rather openly defined project without collaborating with a company. I have realized that I certainly did not do myself a favor with this approach and had to face the difficulty of working with such complex topics on my own within a design project. However, I like to challenge myself and I think I managed to push through difficulties I faced and come up with a concept that goes in line with my initial brief.
Along the way realizing the difficulty of working with AI, especially when a certain accuracy and level of integration is required, I had to take the decision to make my final concept more of a vision rather than a blueprint ready to be made.
I took this decision because I prioritized finding an appropriate case for AI to be used for its capabilities and potential rather than taking a more artistic or speculative approach.
I think AI will most certainly be a big influence in our future and I will certainly stay involved and up to date with its developments. I think AI driven personal assistants will pop up more and more, but rather in subtle ways resolving frictions quietly instead of acting as humans. I think personal data usage is a very delicate but important topic which people of my generation and younger have become numb to. I think it is our all responsibility as designers, developers and humans to educate each other and try to contribute to a safer and more human future.
I also want to keep diving into the topics of subjective wellbeing and psychology, as I was expecting more of these topics being treated in the DfI track.
Looking back with all the experiences I had working on the project and the gained knowledge about handling a design process, I think I would either have framed it even more openly to allow for a more direct approach to problem solving, or define it tighter to make more iterations and refinements on a more concrete concept. For me the biggest challenge until the end was the requirement I set myself to use AI as a tool. Generating the first ideas without including AI so much, I had the feeling of being already so close yet so far from the final concept which made me feel like constantly drifting in and out of a sea of possibilities.
Regarding the timing of my project, I had some difficulties gauging when the right moment is to double down on a concept and focus towards a final concept. Some extra time has helped me to recalibrate and set a direction.
I think overall it was an exciting project given the circumstances of the COVID-19 pandemic.
I really enjoyed testing and co-creating with other people, eventhough via video calls, but I was lucky to have a supporting network which allowed me to interview, test and co-create and I am thankful for everyone who helped me in the process.

References

Abeele, V. V., & Zaman, B. (2009). Laddering the user experience. In User Experience Evaluation Methods in Product Development (UXEM'09)-Workshop.

Arora, N. K., & Mishra, I. (2019). United Nations Sustainable Development Goals 2030 and environmental sustainability: race against time.

BBC. (2020, October 23). Coronavirus: How the world of work may change forever. BBC Worklife. https://www.bbc.com/worklife/article/20201023-coronavirus-how-will-the-pandemic-change-the-way-we-work

Brim, O. G., Ryff, C. D., & Kessler, R. C. (2004). The MIDUS national survey: An overview. How healthy are we, 1-36.

Brown, T. B., Mann, B., Ryder, N., Subbiah, M., Kaplan, J., Dhariwal, P., ... & Amodei, D. (2020). Language models are few-shot learners. arXiv preprint arXiv:2005.14165.

Coronavirus: How the world of work may change forever. (n.d.). Retrieved November 1, 2020, from https://www.bbc.com/worklife/article/20201023-coronavirus-how-will-the-pandemic-change-the-way-we-work

Desmet, P. (2012). Faces of product pleasure: 25 positive emotions in human-product interactions. International Journal of Design, 6(2)

Desmet, P. (2018). Measuring emotion: Development and application of an instrument to measure emotional responses to products. In Funology 2 (pp. 391-404). Springer, Cham.

Desmet, P., & Fokkinga, S. (2020). Beyond Maslow's pyramid: introducing a typology of thirteen fundamental needs for human-centered design. Multimodal Technologies and Interaction, 4(3), 38.

Desmet, P. M., & Pohlmeyer, A. E. (2013). Positive design: An introduction to design for subjective well-being. International journal of design, 7(3).

Deloitte. (2018a, July 22). The Deloitte Millennial Survey 2018. Deloitte Turkey. https://www2.deloitte.com/tr/en/pages/about-deloitte/articles/millennialsurvey-2018.html

Diener, E., & Ryan, K. (2009). Subjective well-being: A general overview. South African journal of psychology, 39(4), 391-406.

Dodge, R., Daly, A. P., Huyton, J., & Sanders, L. D. (2012). The challenge of defining wellbeing. International journal of wellbeing, 2(3).

Deaton, A. (1997). The analysis of household surveys: a microeconometric approach to development policy. The World Bank.

Echoworx. (2019, January 4). Generation Z, Personal Data and Digital Trust: Unlike Any Before. Medium. https://medium.com/@Echoworx/generation-z-personal-data-and-digital-trust-unlike-any-before-e4378677562b

Faulds, D. J., & Raju, P. S. (2021). The work-from-home trend: An interview with Brian Kropp. Business Horizons, 64(1), 29.

Fitz, N., Kushlev, K., Jagannathan, R., Lewis, T., Paliwal, D., & Ariely, D. (2019). Batching smartphone notifications can improve well-being. Computers in Human Behavior, 101, 84-94

Frey, B. and S. Luechinger, Concepts of Happiness and Their Measurement. Marburg: MetropolisVerlag, 2007.

Gupta, S., Lehmann, D. R., & Stuart, J. A. (2004). Valuing customers. Journal of marketing research, 41(1), 7-18.

Gutman, J. (1982). A means-end chain model based on consumer categorization processes. Journal of marketing, 46(2), 60-72.

Hekkert, P.P.M. and Van Dijk, M.B.*, 2011. Vision in design: A guidebook for innovators. Amsterdam: BIS publishers.

Hill, E. J., Ferris, M., & Märtinson, V. (2003). Does it matter where you work? A comparison of how three work venues (traditional office, virtual office, and home office) influence aspects of work and personal/family life. Journal of Vocational Behavior, 63(2), 220-241.

HIRED. (2020, April 28). Releasing our First: State of Remote Work Report: Unlocking Opportunity. Hired.Com. https://hired.com/blog/highlights/2020-state-of-remote-work-report/

Huang, M. H., & Rust, R. T. (2020). A strategic framework for artificial intelligence in marketing. Journal of the Academy of Marketing Science, 1-21.

IWG. (2020, November 30). The future of work - How workspace mobility can help your business navigate the new normal. https://www.iwgplc.com/MediaCentre/Article/is-this-the-future-of-work

Jia, Y., Zhang, Y., Weiss, R. J., Wang, Q., Shen, J., Ren, F., ... & Wu, Y. (2018). Transfer learning from speaker verification to multispeaker text-to-speech synthesis. arXiv preprint arXiv:1806.04558.

Jordan, P. W. (1998). Human factors for pleasure in product use. Applied ergonomics, 29(1), 25-33.

Khanna, S., & New, J. R. (2008). Revolutionizing the workplace: A case study of the future of work program at Capital One. Human resource management, 47(4), 795-808.

Koeze, E., & Popper, N. (2020, April 07). The Virus Changed the Way We Internet. Retrieved November 2, 2020, from https://www.nytimes.com/interactive/2020/04/07/technology/coronavirus-internet-use.html

Kuijer, L., & Giaccardi, E. (2018, April). Co-performance: Conceptualizing the role of artificial agency in the design of everyday life. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (pp. 1-13)

Margolis, S. M. (2020). Exploring Predictors of Subjective Well-Being Using Machine Learning and Propensity Score Techniques (Doctoral dissertation, UC Riverside).

Maslow, A. H. (1943). A theory of human motivation. Psychological review, 50(4), 370.

Munro, K. (2020, November 22). AI-driven Personalised Marketing Part 1: The Past and Future | Katherine Munro | Medium | The Startup. Medium. https://medium.com/swlh/ai-in-marketing-the-power-of-personalisation-part-1-b4790b490731

Leonardi, P. M. (2020). COVID-19 and the new technologies of organizing: digital exhaust, digital footprints, and artificial intelligence in the wake of remote work. Journal of Management Studies.

Lomas, D. (2021, February 08). Creating positive impact through wellbeing assessments. Retrieved March 19, 2021, from https://wellbeing.weblog.tudelft.nl/2021/02/08/creating-positive-impact-through-wellbeing-assessments/

Olszewska, J. I. (2020). IEEE Recommended Practice for Assessing the Impact of Autonomous and Intelligent Systems on Human Well-Being: IEEE Standard 7010-2020.

Parnes, S. J. (1961). Effects of extended effort in creative problem solving. Journal of Educational psychology, 52(3), 117.

Pavot, W. and E. Diener, “The affective and cognitive context of self-reported measures of subjective well-being,” Social Indicators Research, vol. 28, no. 1, pp. 1–20, January 1993.

Petermans, A., & Pohlmeyer, A. E. (2014, October). Design for subjective well-being in interior architecture. In Proceedings of the Annual Architectural Research Symposium in Finland (pp. 206-218).

Peterson, C., & Seligman, M. E. (2004). Character strengths and virtues: A handbook and classification (Vol. 1). Oxford University Press

Pohlmeyer, A.E. & Desmet, P.M.A. (2017). From good to the greater good. In J. Chapman (ed.) The Routledge handbook of sustainable product design. London: Routledge. Pp. 469- 486.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. Journal of personality and social psychology, 57(6), 1069.

Sanders, E. B.-N., and P. J.Stappers. 212. Convivial Toolbox. Amsterdam: BIS Publishers

Sanders, L. and Stappers, P. J. (2012). Convivial Toolbox: Generative Research for the Front End of Design pdf by

Schraefel, M. C. (2020, March). Special topic: Inbodied interaction: Introduction | ACM Interactions. Interactions.Acm.Org. https://interactions.acm.org/archive/view/march-april-2020/introduction22

Singh, S. (2018, June 21). Cousins of Artificial Intelligence - Towards Data Science. Medium. https://towardsdatascience.com/cousins-of-artificial-intelligence-dda4edc27b55

Tao, F., Sui, F., Liu, A., Qi, Q., Zhang, M., Song, B., ... & Nee, A. Y. C. (2019). Digital twin-driven product design framework. International Journal of Production Research, 57(12), 3935-3953.

Thies, J., Elgharib, M., Tewari, A., Theobalt, C., & Nießner, M. (2020, August). Neural voice puppetry: Audio-driven facial reenactment. In European Conference on Computer Vision (pp. 716-731). Springer, Cham.

Voukelatou, V., Gabrielli, L., Miliou, I., Cresci, S., Sharma, R., Tesconi, M., & Pappalardo, L. (2020). Measuring objective and subjective well-being: dimensions and data sources. International Journal of Data Science and Analytics, 1-31.

Whillans, A., Bellis, E., Nindl, F., & Schlager, T. (2020, October 5). Robots Save Us Time — But Do They Make Us Happier? Harvard Business Review. https://hbr.org/2020/10/robots-save-us-time-but-do-they-make-us-happier#

Wiese, L., Pohlmeyer, A., & Hekkert, P. (2019, June). Activities as a gateway to sustained subjective well-being mediated by products. In Proceedings of the 2019 on Designing Interactive Systems Conference (pp. 85-97).

Wong, C. W., Tsai, A., Jonas, J. B., Ohno-Matsui, K., Chen, J., Ang, M., & Ting, D. S. W. (2021). Digital Screen Time During the COVID-19 Pandemic: Risk for a Further Myopia Boom?. American journal of ophthalmology, 223, 333-337.

Zijlstra, T. (2020, October 15). Narrow Band Digital Personal Assistants. Zylstra. Org. https://www.zylstra.org/blog/2020/10/narrow-band-digital-personal-assistants/