Deliberate mindmindwandering for novice designers

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This project allowed me to go on a journey and explore the corners of my mind. The findings of this project I hope would be of use for design and trigger further exploration of the topic of mindwandering. The work on this project at points was challenging but always rewarding. The proposed artefact represents one of the ways to materialise the forces and mechanisms apparent in the context. It was a journey that helped me to understand my perceptions, my emotions and my limits. It helped me to gain a perspective of what is behind a creative thought, which I wouldn't be able to accomplish otherwise.

I would like to say thank you to a couple of people who were there on my journey but are not credited. Thank you, Roel Janssen for our mind-wandering lunch and music breaks and for introducing me to free software community principles that give hope for a less commercial and more social future. An international community of IDE, you make the faculty a place to be. Dear Paul and Milene, thank you for the learnings I had thought the whole project and vital reflection moments. I hope the reader will enjoy the reading.

Abstract

This project is an inquiry into design for mindwandering experiences. The project has applied a blend of Introspective Design, Research through Design and Co-creation methods to gather a nuanced understanding of mind-wandering experiments. The scope of the project is situated on the overlap of six dimensions that allowed us to form a fruitful stance. The project focused on individual creativity of novice designers, who are working from home. The proposed design solution is a product that will support a deliberate mind-wandering break of novice designers with homogenisation of perceptual information. The proposed design concept focuses on providing low variability organic change of visual information to create homogenisation of visual sensory information. The project provides arguments for conceptual understanding of the effect of micro homogenisation breaks to support deliberate mind-

wandering. The proposed concept was a result of the insights gathered throughout four phases of the project: theory research, context research, cocreation, and research through Design.

The effect of the product on creativity was measured with a predictor of creative performance-selfefficacy.

Definitions



Attention:

Internally directed Attention — conscious processing of self-generated information and mental representations, like mental imagery, mind-wandering and body signals like hunger (Villena-González & Cosmelli, 2020)

Cognition:

Default network — is "a set of brain regions that is spontaneously active during passive moments" with no task (Buckner, 2013, p351) and is active during mind-wandering (Christoff, et al., 2009)

Cognitive flexibility - capacity to shift between different mental sets, strategies, and tasks (Gevers, 2018)

Associative cognitive processes — spontaneously unfolding process that happens in semantic memory (Mednick 1962, as cited in Beaty et al., 2014)

Controlled processing or executive control function — is a sum of higher-level cognitive "adjustment processes' that include "perceptual selection, detection and resolution of conflict, and maintenance of contextual information" (Pessoa, 2009 p160).

Consciousness & Awareness:

Being conscious of X means "having X represented in subjective experience" (Schooler et al., 2015 p180);

Meta-awareness is an individual's "explicit awareness of the [current] contents of consciousness" (Schooler 2002, p339).

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Externally directed Attention-conscious information processing of stimulation in the environment (Villena-González & Cosmelli, 2020)

Creativity:

- Creativity is the ability and to produce task-appropriate and novel solutions (Kaufman & Sternberg, 2010, p93).
- Fixation an unsuitable reoccurance. of pre-existing solutions (Thoring, et al., 2021)
- Priming—"an activation of a specific mindset" (Sassenberg et al. 2017, as cited in Thoring, et al., 2021 p19)
- **Illumination** an unexpected insight (Wallas, 1926)
- Incubation —an unconscious processing (Wallas, 1926)
- Serendipity an unexpected finding of ideas, persons, things (Goldschmidt, 2015, as cited in Thoring, et al., 2021, p19)
- Creative agent —"An agent pursuing creativity goals pertaining to one or more focus areas" (Corazza, 2016, p262).

Mind-wandering:

- Perceptual decoupling/coupling: the "capacity for the mind to flexibly disengage/ engage attentional processes from sensory input" (Smallwood & Schooler, 2015, p500)
- Mind-wandering —"decoupling of attention and information processing from the external environment in favour of internally generated thoughts and feelings" (Smallwood & Schooler, 2006 as cited in Da Silva, 2023)
- Mental imagery internal representations in case of absence of corresponding stimuli (Ganis, 2012)
- Fidgeting spontaneous and involuntary small body movements (Carriere et al., 2013)

Definitions of mind-wandering: 1993) **Task-Unrelated Thought** — "cognitive processing that is unrelated, in varying al., 2019, p8) Methods Schooler, 2015). Stappers, 2008, p6); Design

Interaction quality - refers to a perceived attribution of a specific quality to an experience. Use of interaction qualities explicitly as a criterion for designing experience help to guide the design process and is a part of a Design for Interaction Educational Programme (Liu, et al., 2013).

Daydreams — is a lay language expression for voluntary task-unrelated image and thought intrusions (TUITs) (Singer, & Antrobus, 1963, Giambra,

Stimulus-Independent Thought (SIT) —thoughts that "arise from intrinsic changes that occur within an individual" and are not directly cued by the environment (Smallwood & Schooler, 2015, p490)

degrees, to some ongoing, externally oriented task" (Murray et

Experience sampling method —a research method that entails collecting self-reports regarding the ongoing thoughts of participant's (Smallwood &

Co-design — "creativity of designers and people not trained in design working together in the design development process." (Sanders &

CONTEXT AND SCOPE OF THE PROJECT

Introduction

BACKGROUND INFORMATION

Mind-wandering is an everyday experience that ranges from imagining how the day will go on the way to school to being inattentive to a conversation. The research on mind-wandering recently has accelerated, and this phenomenon is now understood to play a big part in our autobiographical planning, pretend play, goaldirected thinking, regulating of emotions and cycling of attention between multiple tasks (Baird, et al., 2011, Mooneyham & Schooler, 2013) and creativity (Baird, et al. 2012).

Although people mind-wander almost half of their waking time (Killingsworth & Gilbert, 2010), the understanding of the mechanism of mindwandering and its modulation for the benefit of creativity is still limited (Gonçalves & da Silva, 2023). There is evidence that mind-wandering supporting experiences are more beneficial for creativity than other interpolation activities (Baird et al., 2012). There is also a limited understanding of ways to support the desired mind-wandering. Some of the acknowledged ways are via training meta-awareness capacity with meditation practices (Schooler et al., 2015). In that regards there is already a shared understanding among designers on how

to design products and services for subjective wellbeing also within the framework of Positive Design (Desmet & Pohlmeyer, 2013). But ways to maximise the benefits of daily mind-wandering and enhance its desired qualities for the benefits of creativity (Gonçalves & Silva, 2023) presents a gap in applied design knowledge. Having the focus of this project on creating a specific mind-wandeirng experience allows to study and evaluate how a designed interaction is affecting cognitive processes. The presence of the aforementioned gap in interaction design knowledge together with the fact that creativity is recognised by World Economic Forum as one of 10 most desirable skills by 2025 (Zahidi et al., 2020) form a relevance of this project and create a reason for its existence.

The value of creative capacity is also recognised within broad educational context, as it supports adaptation to a rapidly changing world (Danaher, et al, 2014). Designers expecially rely on creativity as an ability that supports idea generation and allows to seek unconventional ways of solving the problem. The basic question that served as a premise for this project was: what interactions can facilitate mindwandering for the benefit of creativity?

The scope of the project is envisioned in the middle of six overlapping dimensions, which outline the details of the context for the envisioned interaction. These 6 demotions are structured with the questions: What is creativity in relation to mind-wandeirng? Where to mind-wander? How to enhance creativity? With whom to mind-wander? Who is the interaction for? How designed interaction will effect creativity? (See figure1 on page 14).

What is creativity in relation to mind-wandeirng?

To thoroughly research experiential aspects of the interplay between mind-wandering and creativity it is necessary to choose a lens of understanding of creativity which will allow to tap into those details. Various definition and lenses of creativity stress various angles of creativity: a skill, a cognitive ability, an outcome (Kaufman & Sternberg, 2010). a capacity (Danaher et al., 2014) or a process (Wallas, 1926). Specifically, the steps of creative process as defined by Wallas are: 1) preparation (research of the problem in various directions); 2) incubation (unconscious processing); 3) illumination (insightful and unexpected solution); 4) verification (elaboration and validation of the idea critically). Seeing creativity, as a process and referring to its phases is useful to connect the effect of mindwandering to a respective design process stage. Simultaneously a dynamic approach to creativity, as having changeable, "living" and situated nature is being recognised as a fruitful stance, which allows to uncover vibrant nature of this phenomena (Goncalves in Cascini et al., 2021). Part of this approach is also recognition of creativity as a universal human experience (Glăveanu & Beghetto, 2020). That means that creativity hardly can be dissected from a creative agent - an individual that is experiencing it and his/her other lived past experiences and developed behaviours and creative

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self-beliefs (Corazza, 2016). Creativity research has been ignoring and discounting this 'living' nature of creativity in favour of repeatability (Goncalves in Cascini et al., 2021). To help the necessary shift more nuanced and situated 'estimations' (or predictors) of creativity can be measured (Corazza, 2016) instead of calculating a number of replies on a not situated task.

This more living approach to creativity as an experience is considered to better reflect situated nature and environmental factors of creativity and allows to study mind-wandering as an experience.

Where to mind-wander? This project focuses on creative work from home due to the following considerations about the context. Designers and other creatives have seen challenges in keeping creativity while working from home in the times of the pandemic which forced businesses to adapt for remote creativity (Stanton, 2022). Home provides fewer opportunities for serendipitous (unexpected) discoveries unlike creative offices, where creativity conducive variation and change in the environment is greater and spontaneous social interactions are more likely to happen (Thoring et al., 2021). Changing a familiar environment is a common creative behvaiour that Innovators, writers, musicians commonly use to attain a different perspective, which is a catalysts for the illumination phase of a creative process (Csikszentmihalyi, 1997). When a designer decides to work from home he is faced with familiarity of home and a walking distance neighbourhood which do not allow easily reach a different perspective, and moving further than a walking distance from home may not desirable or even not possible due to restrained ability to travel (pandemic etc.). Familiar environments indeed benefit some of the phases of a creative process, specifically elaboration and evaluation,

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Figure 1: The outline of the scope

due to ability to maintain focus necessary to finish the idea (Csikszentmihalyi, 1997). Therefore, a scenario of working from home is less favourable for preparation, incubation, and illumination phase of a creative process, also due to relatively lower expectation to encounter unexpected stimuli (Thoring et al., 2021) due to a restrained ability to travel or absent commuting. Therefore, the use scenario is envisioned as "working from home", meaning a person is not aiming to work in the office and commute.

How to enhance creativity? Creativity can be enhanced both using 2 different strategies: with an increase in the diversity of visual stimulus or with a reduction of stimulation and experiencing a lack of visible sources (void) (Thoring, et al., 2021). Environments that create experiences of a void are conducive to illumination because it allows people to project their ideas and to fill the void [with a content of mind-wandering] (Thoring, et al., 2021). That approach of fostering creativity with reduced stimulation is forming a vision of the project.

With whom to mind-wander? Individual creativity when working from home is seen as a more appropriate context where there are more unknown spaces for intervention, rather than collaborative creativity. Keeping the primary focus of this project on individual creativity will allow keep this project feasible within the timeframe, as

-expanding the scope of the project to collective experiences of mind-wandering creates theoretical problems for the research, as most of the mindwandering research is conducted with individual mind-wandering experiences. Simply extrapolating experimental findings to collective mind-wandering is problematic. Mind-wandering as a mental activity

is experienced by an individual and is apparent to an individual consciousness as an individual experience. Even when mind-wandering happens during a collective discussion, it is still an individual mind-wandering, that was triggered by information (actions or verbal) coming another person. The phenomena of mind-wandering in a group of people and the term collective or group mindwandering is not used in the literature. Some studies indeed have been registering synchronisation in brain activity of people who cooperate even online (Wikström, et al., 2022), meaning that mindwandeirng experienced in a group setting should have special qualia. But from the perspective of practical neuroscience and psychological research collective (group) mind-wandering is still ill-defined, providing no solid methodological framework to measure and separate collective mind-wandering from other group experiences and factors during collective creativity. Therefore, individual mindwandering experience is a focus of this project that has limitation in time, since it provides a more solid methodological basis for capturing individual mindwandering.

Who is the interaction for?

Novice industrial design engineers have been chosen to be a primary focus of this project, as a group that sometimes is not yet having a good experiential understanding of creativity and because of their young age. Giambra (1993) has conducted a longitudinal study of changes of retrospective self-reported mind-wandering with age (24-77) on a sample of 93 women and 169 men over the course of 6 to 8 years. Age-related drop the in the frequency of mind-wandering was apparent across all studied age groups. This result confirmed previous downward trend of frequency of mind-wandering in study (Giambra, 1980) across population sample of 17-92 years old (n=1200). The median value of Daydreaming frequency scale median dropped 3.5% for every 5 years, with a

relative increase in 45-49 age group for both males and females. These results showcase convergent evidence of age-related decrease of mindwandering. That larger amount of mind-wandering creates a challenge for young generation, who also are more likely to experience disproportionate and unintentional mind-wandering , which derive symptoms and impairments of Attention-deficit/ hyperactivity disorder (Bozhilova et al., 2018, Hill & Schoener, 1996, Seli et al., 2015). Two considerations therefore are of meaning for the context of question: 1) mind-wandering, as a cognitive resource-dependant process is a function of age (Gyurkovics et al., 2018) therefore younger adults (17-24) exhibit greater frequency of mindwandering; 2) novice designers who belong to aforementioned age group still are developing their habits which regulate their mind-wandering: meta-cognitive capacities and reflection (McLaren, & Stables, 2007).

Recently there was a call to conduct creativity research with experienced designers (Cascini et al., 2021). However, novice design students because of their age potentially have more challenges with their mind-wandering, therefore they comprise a valuable group to research mind-wandering

How designed interaction will affect creativity?

The goal of this section is to set a trajectory of the global desired effects of mind-wandering to scope this project. Further details on how creative performance is effected by mind-wandering will be elaborated in chapter#. The effects of mindwandering on creativity are both short-term: when intentional mind-wandering is affecting creative performance just after mind-wandering experience and long-term when a mind-wandering trait is positively affecting the creative self. Specifically, self-beliefs and greater ownership of ideas (Ibaceta & Madrid, 2021), self-reported creative achievement (Agnoli, et al., 2018) openness to experience trait (Ibaceta & Madrid, 2021) are known



RQ3 What interaction qualities can support deliberate MW experience within the context of creativity of novice designers?

RQ4 What material form can support the necessary experience of MW that is appropriate for novice designers?

Existing solutions for mind-wandering are mainly focused on supporting body awareness with a supplementary object that supports observing own bodily sensations (Romans, 2022). On the figure# some of the existing products guide attention with dynamic vibration feedback (image two), white audio

Figure 2: Cycle of Short-term and Long-term effects of mind-wandering

figure). Those long-term effects create a cycle and reinforce being open to mind-wandering during the next cycle of working on a creative task.

The focus of this project is to design for a shortterm effect of the mind-wandering experience that will create immediate benefits for designers who are working on a creative task and not particularly longterm effects. Long-term positive effects of mindwandering could be enhanced with meditation training, cultivating mindfulness (Rahl, et al., 2016, Mrazek, et al,2013). That supports meta-awareness as a trait, and therefore mind-wandering. Indeed, the quality of mind-wandering can be improved with brief body-awareness practice, which in turn positively affects mind-wandering experiences, by making them more intentional (Seli et al., 2014; Seli et al., 2017). Rather this project aims to uncover what qualities of mind-wandering are desirable for the outlined context, and how to purposefully reach them with design. And researching and aiming for short-term measurable effects is more fitting for this goal

All that allows to outline the context of this project as follows: individual experience of creativity of novice designers when "working from home", which is in the middle of the overlap of 6 dimensions

RESEARCH QUESTIONS

This scope of the project allows to set the main research questions for the project:

RQ1 What are the needs of novice designers in their design process and how they can address them with

a mind-wandering experience?

RQ2 How could novice designers increase the deliberateness of mind-wandering? [support mindwandering]

Customize your sound.





Snooze: white noise machine that helps to fall asleep

Resonate: Meditation chair that uses vibrational technology to soothe nervous system





Avama assists breathing with tactile feedback by expansion and contract

feedback

Figure 3-8: Some of the existing products that support mind-body awareness and affect mind-wandering Figure 3: Snooze From "Snooze" 2023 (https://getsnooz.com/products/snooz-white-noise-machine), Figure 4: Resonate From " Resonate" 2023 (https://www.weresonate.com); Figure 5: Core from "Hyperice" 2023 (https://hyperice.com/ core-by-hyperice/), Figure 6: Ayama From "Yanko Design", 2020 (https://www.yankodesign.com/2020/10/28/thisaward-winning-breathing-assistive-stone-expands-and-contracts-to-guide-your-meditation/) Figure 7 Somneo Wake-up Animation From "Youtube", (https://www.youtube.com/watch?v=NB4RHJpHeHE), Figure 8 Soma mat From "The Soma Mat and Breathing Light" by A. Ståhl et al., 2016, Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems. Copyright 2016 ACM Digital Library.

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noise (image one) or light (image 5) other produces have a supplementary app service that help to maintain the routine and track progress (image three) (Romans, 2022). See figure# for illustration of some of existing products.

Still, they are not existing mind-wandering solutions that precisely that are specifically adapted for creative purposes, which creates an opportunity for this project. This design project aims to address this opportunity and explore areas and frames for interventions to support mind-wandering.



Somneo assists breathing with gradual change of light



Core: Meditation Trainer with vibration support and



Soma mat supports attention shift and body awareness with local heat feedback

METHODOLOGY & DESIGN PROCESS

The project can be divided in three phases: 1) Theory research phase: Literature Research; 2) Research of the context phase; 3) Conceptualising phase: Codesign 4) Experimental Phase: Research through Design with 2 experiments; 5) Evaluation phase. The main methodological approach of the project was a combination of methods Introspective Design, Codesign, and Research through Design, which allowed to address various research questions at different stages of design process.

The necessity to choose this variety of methods was driven by the need to investigate mind-wandering in its complexity both as subjective experience and as activity that is situated in a specific context. The combination of methods was important for this project, as users could be immediately aware of the desired change in the relation to mind-wandering in the same way as they might not all the time have meta-awareness of when their mind-wandering occurs (Schooler et al., 2011). That meant that more subjective introspective methods were used in early research phase to tap into those sometimes hardly reportable processes and uncover nuances of mindwandering experience from a first-person perspective. That was followed by co-design, which was focused on uncovering tacit needs of users in the context and then RtD which was focused on gathering new insight on to translate a desired experience in the context. This variety of methods allowed to answer the research question with a necessary depth, providing a necessary stance for appropriately interpreting the results of the next consequent phases. Those selected methods are do not exclude each other, but rather their combination allowed to streamline collection of necessary insights and form a vision for. A desired change in the context to a greater depth.

In the following paragraphs first the appropriateness of methods will be explained followed by elaboration on to what activities they were specifically applied.

To begin with, Introspective methods are widely recognized in experience design research. Introspective methods use autobiographical and selfreflective methods to obtain felt/lived experiential information, otherwise not accessible for external observation (Xue & Desmet, 2019). Wider acceptance of those methods in design field is a natural result of the experiential turn in industrial design, which means that intended experience becomes a primary goal of the design process (Hekkert et al., 2003). Introspective methods are specifically applicable for research of mind-wandering, as for instance Experience Sampling method of Introspective design basically constitute a core method for research of mind-wandering in cognitive psychology (Stawarczyk et al., 2012, Murray et al., 2019). Experience sampling is used to study the occurrence of mental phenomena in everyday using self-reports of the participant's experience. It will be used to conduct autoethnographic self-reports by a researcher (me) since, I comply with suggested recommendations of use for this method (Xue & Desmet, 2019):

1) Complete membership: Yes, I am a complete member of the user group—novice designer meaning the gap in experiences between target group and a researcher myself is small.

Researcher's passion: Yes, I am personally 2) motivated with respect to a topic of study.

Training for introspective expertise: Yes, I am 3) capable for deep introspection analysis also due to previous studies of Introspective Design course at TU Delft.

4) phenomenon under study is fundamentally subjective and experiential: yes, mind-wandering is a subjective mental activity, that is connected to various emotional states, but is also intermittent.

While using Experience Sampling methods framing of the instructions play an important role in supporting of participant's ability to engage in introspection themselves (Xue & Desmet, 2019, Murray et al.,

to introspect and reflect on their mind-wandering experience by additional attention to instructions for self-report. These details will be discussed later in the chapter (Methods for capturing mind-wandering). Co-design is a collaborative creativity of various stakeholders (designers and users) that are working together across the span of design process (Sanders & Stappers, 2008). Co-design is a practice requires a shift of expertise mindset to support greater involvement of the user in decision making. That in turn changes from designing categories of products to designing for people's purposes. In codesign the role of the researcher shifts from receiving information from users and later generating ideas by researcher/ designer him/herself to providing and creating tools for ideation and expression for users (Sanders & Stappers, 2008). Using co-design methods improves organizing innovation processes, supports effective decision making and improves quality of idea generation phase, because early generated ideas are intermediately validated by users themselves (Steen et al., 2011). As this project has a limited

2019). Therefore, a researcher (me), will also help user

time frame using co-creating will support faster loops of idea generation and pre-validation in the second phase, but also allow to create design artifact that will better reflect user's needs.

Research through Design is a widely acceptable methodological approach among interaction design researchers that allows to transfer theoretical knowledge to practice especially for wicked problems (Zimmerman et al., 2007). Typically, a RtD project involves iterative creation of a prototype or better called an artefact, that shouldn't be mistaken for a 'product'. This "research prototype" that designed with specific enquiry plays a core role in the knowledge-generating process (Stappers & Elisa Giaccardi, 2017). This methodology is suitable for

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research of interactions that are not yet apparent, but are preferrable in the context, which can become observable due to design intervention (prompts, design artefacts) (Stappers & Elisa Giaccardi,2017). (See Figure 9).

As at the beginning of the project there was a lack of understanding of not only what change in mindwandering experience is preferable, but how to



Figure 9 adapted from "Research through Design" by P. Stappers & E. Giaccardi, 2017, The Encyclopedia of Human-Computer Interaction (2nd ed., pp. 1-94). The Interaction Design Foundation.

- introduce it to the context RtD method will allow to tackle those gaps. Research through a design approach therefore is more suitable to study mindwandering, as there is gap in translation from theory to practice.
- Research through Design will be documented to allow other researchers to access generated knowledge (Zimmerman et al., 2007). RtD method is desirably to result in an artifact that has a possibility to become a pre-pattern that supports emergence of consequent design solution (Zimmerman et al., 2007).
- The overview of specific methods that were used in the project and their connection with research **questions are depicted** in Figure 10. Here onwards

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Figure 10 Overview of the project timeline and methods in relation to research questions.

there is elaboration for how specific methods were used for respective design activity is as follows:

1) Literature research allowed us to build a theoretical understanding of the mechanism of mindwandering, which supported the interpretation of insights during the research of the context phase.

2) Introspective design was used to conduct autoethnographic study and sample mindwandering experience. That helped to gain in-depth understanding of complexity of researched context and helped to identify types of mind-wandeirng experiences in early research stages of the project. This method also was selected to address research questions 1, 2, 3.

3) Phenomenological interviews (Bevan, 2014) were conducted to uncover the experiential qualities of mind-wandering (RQ3) that reflect needs of users (RQ1). Choosing phenomenological approach to interviewing allows to tap into creativity and mindwandering as human experience. The researcher during the phenomenological interview is interested in one person's experience in the way he or she experiences it (lifeworld), therefore questions are asked in a way and language that is familiar to the interviewed (Bevan, 2014).

Co-design allowed to directly tap into the 4) needs of the users and streamline the ideation phase. Researching such an omnipresent, daily phenomena as mind-wandering with co-design allowed to guickly uncover the most meaningful for users' factors that impact their experience (RQ1). Co-design was used to discover how users envision translation of supposedly beneficial experience to real-life context (RQ2) with some of the elements of Vision in Product Design method (Hekkert, 2004) were used, specifically design Lego serious play session and co-creation sessions. facilitation method of Lego-serious play to help users statement. That allowed to have a clearer vision of to translate their tacit knowledge of the context (RQ 4). anticipated desired change in the context at the 5) Research through Design (RtD) allowed to beginning of conceptualisation phase. That vision create knowledge of the context of use in the absence was later adapted after the co-creation phase. More of a solid framework of how to design for minddetails on the specific protocols of the interviews and wandering experience and generate knowledge on considerations on the experimental set-up for mindhow experiential qualities of a desired design could wandering research will be elaborated in the respective take form (RQ3, 4). chapters.

In conclusion this combination of methodological approaches allows us to cover the gap in knowledge of how to translate theory of mind-wandering to creating practical experience (RtD), investigate nuances of subjective experiences (Introspective design) and cocreate with a user group (Co-design). Additionally, Deliberate Mind-wandering for novice designers

Part I **Theory research**

LITERATURE REVIEW

A literature review was conducted in the domains of cognitive psychology, creativity studies and linguistics. Because associative processes, which important role in creativity relies on semantic knowledge, which is a part of linguistics studies, the overlap between mind-wandering and linguistics was also part of the research. The keywords that are related to the domain of mind-wandering that were used for the literature review were: spontaneous daydreaming, thought, mind-wandering, dissociation, default network, associative process, fidgeting, self-generated thought, mental imagery, spontaneous imagery, attention control, serendipity, cognitive flexibility (see dictionary for definitions).

A fertile ground for current research on mindwandering was established in the 1950s, by Jerome Singer and Antrobus, and the terms daydreaming (Singer, & Antrobus, 1963) and stimulus-independent thought (Antrobus, 1968) was used at the time. The new wave and exponential growth of mind-wandering research started from the work "The Restless Mind" by Smallwood and Schooler (2006), whose choice to use mind-wandering as a term showed to be fruitful for the research (Murray et al. 2019), since researchers can recognise their daily experiences of mind-wandering, and the definition encompasses a variety of experiences (see Definition of MW section,

p 26). The term daydreaming therefore has been replaced with mind-wandering in recent research and knowledge on daydreaming should be considered to belong to mind-wandering studies (Barnett & Kaufman, 2020), which provides a more nuanced perspective on this mental activity.

Mind-wandering research is facing some conceptual and methodological challenges that are acknowledged by the authors themselves. Understanding those problems has informed the choices of evaluation methods, but also the way mindwandering is communicated to the research group to help their reflection. Some of the methodological challenges that the science of mind-wandering is facing now are:

1) Finding ways to minimize the effects of research set-up on the experience that is captured. Many experiential studies may claim to be capturing unintentional Mind-Wandering, but the set-up was actually measuring intentional mind-wandering as well (situations where participants are becoming bored with the task) (Seli, et al., 2017), therefore researching ways of capturing mind-wandering is important for this research and it will be elaborated further;

2) The fact that people are not always meta-aware of their mind wandering (Schooler et al., 2011), and



DEFINITION OF

MIND-WANDERING

therefore cannot report on something they are not aware of. That creates additional challenges for designing a research set-up;

3) The literature provides with a limited 5) understanding of how mind-wandering experiences in others can be influenced and modulated in a desired way (Gonçalves & da Silva, 2023).

The main areas of research that formed the corpus of theoretical understanding of mind-wandering are illustrated in the figure11. They were the following: Definition of mind-wandering (and its 1) elements);

2) of mind-wandering Various types experiences.

Methods of capturing mind-wandering as an 3) event and a tendency to mind-wander as a trait (Da Silva, 2023, Giambra, 1993);

Short -term and long-term effects of mind-4) wandering, including on emotional well-being (Andrews-Hanna et al., 2013) and personality traits (Singer & Antrobus, 1963), mindfulness as personality

In this chapter we will first outline the definition of

mind-wandering, with its essential qualities and later

establish the difference between task-unrelated

The commonly used meaning of mind-wandering is

"decoupling of attention and information processing

from the external environment in favour of internally

generated thoughts and feelings "(Smallwood &

Schooler, 2006; Smallwood & Andrews-Hanna, 2013;

This definition has two qualities: perceptual

Smallwood and Schooler, 2015, De Silva, 2023).

thought and distraction.

trait (Agnoli et al., 2018) and openness to experience (Ibaceta & Madrid, 2021), mood (Mooneyham & Schooler, 2013);

effects of MW on creative achievement (Agnoli, et al., 2018), performance on creative task (Baird et al., 2012);

6) ways of modulation and influencing of specific aspects of mind-wandering: time-modality and level of details (Liefgreen et al., 2020), selfreferential aspect (Vannucci & Chiorri, 2018; Smallwood et al., 2011b).

Ways of measuring creativity. 7)

Ways of measuring mind-wandering. 8)

9) Experience qualities homogenisation and defamiliarization.

All branches of the research cross-pollinated each other and allowed us to build a perspective on the ways to experience mind-wandering and allowed to conceptualise what innate characteristics mind-wandering has and how mind-wandering can be captured.

environment are estimated to be low, or one is busy with a low-cognitive load task (Smallwood & Schooler, 2006). Cognitive resources because of engaging in low demands tasks [for instance a task that is or can be automated-walking or cleaning) are freed up for monitoring task awareness and engaging with self-generated content (mind-wandering).



Figure 12 Two essential elements of mind-wandering definition

In case of rising demands (a mistake in the task for instance) one's attention becomes redirected to the external environment again. People are prone to mind-wander when the primary task doesn't demand controlled processing or executive control

function (Smallwood & Schooler, 2006). Controlled processing in short is the sum of higher-level self-regulation cognitive processes that detect and resolve conflicts (Pessoa, 2009). When the task requires executive resources to maintain the information, like working memory tasks, mind-wandering is restricted, because cognitive resources of an individual are limited (Smallwood & Schooler, 2006). That means that one can perceptually decouple from the environment if one estimates the demands of the environment to be low, which happens during parallel engagement in low cognitive load task.





"a thought that occurs without intention" (Seli, et al., 2018).

decoupling and internal generation (see figure 12): Perceptual decupling means disconnecting 1) from "perceptual events occurring in the external

environment" and means that attention becomes directed away from sensorial stimulation in the

environment and towards internal content. In the context of this project that means that for instance one is sitting on a bench in the city and is seeing birds flying. One stop being "here and now" and for instance could project the experience of a bird navigating in the magnetic field mesh. One's attention is directed from sensory visual stimulation to mental imagery. Perceptual decoupling also supports mind-wandering experiences from being disrupted by the changes in the sensory input (Smallwood and Schooler, 2015). In this example, passing car distractions can be ignored if one is perceptually decoupled, meaning he is isolating his attention from upcoming sensory information.

One can redirect attention inwards and perceptually decouple from the environment of the task. Mindwandering can occur when the demands of the

Internally generated means mind-2)

wandering arises "from intrinsic changes that occur within an individual" (Smallwood and Schooler, 2015) which refers to how the thought and feelings arise internally due to the functioning of the default mode network (special brain region) that continuously produces content of thoughts (see figure 4). This also means that contents depend more heavily on memory than on concurrent sensorial information (Smallwood et al., 2011a). Following the previous example, this part of the definition means that the visual representation of magnetic field mesh is a part of one's past memory (books, videos) and this memory is retrieved and experienced again [also with modifications]. One could imagine seeing a bird from above following the lines, which was not a part of the immediate environment.

The described preciously definition of mindwandering allows to distinguish two innate qualities of mind-wandering. Recently a shared understanding of mind-wandering as an umbrella of a partially overlapping variety of types (Seli, et al., 2018b) is prominent in the literature (De Silva, 2023, Bruineberg & Fabry, 2022, see figure 13). Mind-wandering researchers in their recent review make a call for other researchers to explicitly

Mind-wandering

note which type of mind-

> Daydreaming measured by Giambra (1993) as TUTs

Meandering, Unguided Thought (Seli, et al., 2018).

Task-Unrelated Thought (TUT) "thoughts that are unrelated to one's ongoing task" (Seli, et al., 2018).

Stimulus-Independent Thought (SIT) "arise from intrinsic changes that occur within an individual" (Seli, et al., 2018).

Stimulus-Independent Task-Unrelated Thought (SITUT) combined definition (Seli, et al., 2018).

Figure 13 Mind-wandering umbrella term

Part I





wandering they are researching (Seli, et al., 2018b). That opens the doors for this project to also choose which aspect and type of mind-wandering will not be out of focus. The umbrella of mind-wandering is comprised of task-unrelated thought, (TUT), unintentional thought, stimulus-independent thought (SIT), stimulus-independent task-unrelated thought (SITUT), and meandering, unguided thought (Seli, et al., 2018b). (see figure 13). The difference between task-relatedness and unrelatedness is very clearly illustrated by Smallwood and Schooler (2015) (see figure 14). Within this project task-unrelatedness will be excluded from the definition of mind-wandering. due to the following reasons. Task-unrelatedness means being "unrelated, in varying degrees, to some ongoing, externally oriented task" (Murray, et al., 2019). Task-unrelatedness is problematic to define for design creativity, as creativity relies on the occurrence of distant associations (Mednick, 1962, Ritter & Dijksterhuis, 2014), therefore it becomes part of one's creative task to relate the unrelated. For this

reason referring to mind-wandering as task-unrelated will also not allow to measure mind-wandering correctly within this project. The bottom part of the figure 14 is providing examples of thoughts that correspond with a definition of mind-wandering used in this project which includes task-unrelated and task-related mind-wanderings.

Additionally, it is worth paying attention to the difference between distraction and mind-wandering. Distraction appears when information processing is perceptually coupled with ongoing external information. But mind-wandering and distraction are distinct as the "former depends on the process of perceptual decoupling whereas the latter does not" (Smallwood & Schooler, 2015). During distraction, attention is directed to external stimuli (for instance noise). Distraction and mind-wandering can be experienced intermittingly and blend into one another over seconds. For instance, one is being reminded of his concern to talk with a friend because of hearing a phone call and starts planning the conversation about what he should say. At this moment a person can zone out and don't pay attention Mind-wandering is a heterogeneous phenomenon, to a task at hand. At first, attention is perceptually that includes a variety of partially overlapping coupled (connected) with a sound of a phone call phenomena. A working definition of mind-wandering the (person is distracted). Then in a second one for this project is comprised of two qualities: 1) perceptually decouples from a sensory input in the attention is perceptually decoupled from information environment and mentally travels to a hypothetical in the external environment; 2) attention is directed conversation with someone who may not even be to self-generated content. Mind-wandering is calling (distraction is replaced with mind-wandering). therefore an experience of self-generated thoughts A phone reminded one of a personal concern and and feelings, while attention is not connected with resulted in mind-wandering about a hypothetical perceptions of the environment. future, as one is preparing oneself for future events (hypothetical social interaction). In everyday Main take-away conversation, we would refer to this sequence of For redirection of attention to inner thoughts, one mental events as a distraction. But in this specific should be engaging in a low cognitive load task and/ case, distraction is experienced intermittingly which or expects the demands of the environment to be is replaced with mind-wandering, which is a selflow generated mental representation of a future situation and is not representative of perceptual information from the environment. Attention is shifted first externally to the environment (distraction) and then internally to the inner content that was associated with distraction (mind-wandering).

In this chapter, the most referred experiences of low cognitive load, like having a shower, travelling on mind-wandering that are relevant to the context a bus or waiting to be served with a coffee, or riding of the project will be described, with a degree of on a bus support mind-wandering (Smallwood et appropriateness of those parallel activities for the al., 2011a). research of design interventions. After conducting literature research those types of

Researching how and in what circumstances **mind-wandering is experienced** is valuable to understand how to create suitable conditions for mind-wandering experience, including design requirements.

Literature has countless anecdotes of eureka moments and creativity improvement after engaging in routine behaviours like taking a bath or sleeping (Ritter & Dijksterhuis, 2014). Variety of everyday activities with

Deliberate Mind-wandering for novice designers

Conclusions:

MIND-WANDERING EXPERIENCES

activities that support mind-wandering can be outlined:

- Sensory homogenisation experiences
- Routine easily automated behaviours
- Body movements through space
- Waiting and transition time
- Consuming beverages or food
- Small hand movements (fidgeting, doodling);
- Experience of nature

Part I

Sensory homogenisation experiences

Let's start with an experience that has been studied in the laboratory to generate mind-wandering as the most extreme example of what a mind-wandering experience can look like. Experimental studies report that homogenous visual or/and auditory stimulation that is an unstructured (monotonous) stimulation can alter the consciousness, perception of time and cause mind-wandering. This experience is also referred to as unstructured field, homogenization experience or ganzfeld. (Schmidt & Prein, 2019). This multi-sensory experience entails exposing participants to a red homogeneous light while they are wearing translucent glasses combined with white or pink audio noise (Marcusson-Clavertz et al., 2012) (see figure15). Participants, therefore, are restricted in the variability of sensory input and fail to recognise structure in the upcoming information (Schmidt & Prein, 2019).

Homogenisation experience increases sensitivity to changes in perception such as figure-ground discriminations and can also improve performance on stimuli detection tasks right after it (Marcusson-Clavertz et al., 2012). Also, homogenisation allows one to experience detailed dreamlike mental imagery

after exposure of 10-30 min. That is because limited stimulation from the environment typically **amplifies** attention to the upcoming sensory stimulation. Especially attention is sensitive to novel stimuli. That effect is called "stimulus hunger," (Farthing, 1992, p. 192, as cited in Marcusson-Clavertz et al., 2012). The predictive coding framework of mind-wandering (Friston & Kiebel, 2009) explains why an "empty" homogeneous experience can result in mind-wandering. The predictive encoding framework implies that sensory experiences are not exclusively guided by sensory stimulation from the environment, but that humans anticipate the future and generate predictions, which are continuously checked with sensory input from the environment (Schmidt & Prein, 2019). During the homogenisation experience, the input from the environment is illstructured therefore no structured information can be matched with these predictions. As a result of strong predictive coding that differs between people, pseudo hallucinations are experienced as a false assignment of structure to the sensory noise (Schmidt & Prein, 2019). It is important to clarify, that to create "stimulus hunger" one does not require an absence of **any stimuli**, but an absence of



Figure15 Experimental setting for homogenisation (also called unstructured visual/auditory field). Image from "The Ganzfeld experience-A stably inducible altered state of consciousness: Effects of different auditory homogenizations" by T.T., Schmidt & J.C., Prein, 2019, PsyCh Journal, (10.1002/pchj.262).

meaningful stimuli [a stimuli one can assign structure 2018b). Waiting moments allow attention to turn or meaning] (Marcusson-Clavertz et al., 2012). In inward (commuting on the train, travelling in the conclusion, homogenisation experience can provide elevator, waiting for an appointment). Attention can clues to how mind-wandering experiences can be be decoupled from the environment in between created in a desired context. the announcements of the station or signals of the elevator, which is freeing cognitive resources and **Routine automated behaviours** allows for mind-wandering.

Tasks that require motor coordination, like cooking (Mires, 2023) and showering (Irving, 2022), also commonly support mind-wandering. They can be automated, resulting in a reduction of the required cognitive resources to execute them. One feels guite safe when operating familiar tools or has developed an automated sequence of actions, which is freeing cognitive resources to mind-wander.

Body movements through space and practising sports

Mind-wandering also happens quite commonly during walking (Irving, et al., 2022, Williams et al., 2018) and doing some sports (Latinjak, 2018), or driving a car (Burdett et al., 2016). Talking a walk is also recognised to enhance creativity (Heijne & Van der Meer, 2019). Specifically walking and cycling and driving are specific, as they allow a special perception of space and time. It was studied in the laboratory that visual perception of space moving forward is associated with future thinking direction of mind-wandering (Liefgreen et al., 2020). That means that the perception of a moving space, which happens during walking or cycling also contributes to the experience of mind-wandering. At the same time, mind-wandering is connected to accidents on the roads, as it decreases driving performance. Particularly critical reaction time is increased due to mind-wandering (Yanko & Spalek, 2013a). That means mind-wandering while driving, cycling, or even crossing the. road as a pedestrian is associated with a higher risk, due to inattention.

Repetitive small limb movements (fidgeting), usually signal a lack of attentional control and aim to compensate for the lack of focus and is the exertion of the body to self-regulate attention. Fidgeting is a side effect of failure to redistribute attention to desired content of consciousness and is correlated with spontaneous mind-wandering and decreased attention (Carriere et al., 2013). Fidgeting is mainly referred to as spontaneous and impulsive body movements and is also a diagnostic criterion for ADHD, however, it is now also considered a goaloriented behaviour directed to release discomfort (Carriere et al., 2013). Carriere Seli and Smilek Waiting and transition time (rest) describe how some level of noise in the nervous Mind-wandering during waiting time (on bus, or system created by fidgeting can serve to increase train) is also mentioned in the literature (Seli, et al., cognitive performance. They call it a "variability

Consuming hot beverages or food

Mind-wandering during eating happens, but it is less desirable, as attention is preferable to be directed towards processing food to prevent overeating, low metabolism, and digestion problems (Marra et al, 2020). Higher levels of mindwandering are also associated with overeating and other unhealthy eating habits, which makes eating food a more problematic space for mind-wandering (Smith et al., 2023). Therefore, splitting attention during eating is not healthy and is less desirable. Drinking tea experience, which consists of lots of waiting time between sips was also studied for its effects on creativity (Huang, et al., 2018), which makes it quite a desirable space for design, as it has less necessity to focus on sensorial information, and it is hard to overly consume It.

Small hand movements, fidgeting

mechanism" that is an adaptation of a nervous system to not get stuck in the same rail track by creating spontaneous instability. That mechanism is especially valuable during learning in

environments that are unchangeable or unstimulating (2013). Moderate level of perceptual "noise" that is added to a nervous system by **slight** variability of incoming perceptual information improves the information processing capacity of neurons. And stimuli that would normally be below the threshold level become easier to detect. (Carriere et al., 2013). Doodling (a form of fidgeting) is also a small goal-directed hand repetitive movement. When it is done intentionally can serve as a background activity that supports attention (Andrade, 2010).

Experience of nature

Experience of nature is a special type of **holistic** experience, which is supportive of mind-wandering. The mechanism for how nature works were theorised with the following: slight changes in sensorial feedback allow to restore attentional resources and support effortless cycling of attention cycling (Williams, et al., 2018). That supports building new associations. Recent research concluded that simulated (VR) experiences of nature (Plambech & Bosch, 2015) improves flexibility of thinking. Natural visual backgrounds in video conferencing calls facilitate higher creativity performance (Palanica & Fossat, 2022).

Conclusions:

The list of these mind-wandering experiences is not exhaustive, as there are other activities that support

mind-wandering. Some experiences could be a mix of several conditions, like one of my autoethnographic samples (see Appendix), where homogenisation and slight variability of information noise were apparent. Overall, a similar requirement between mentioned activities is that either the background activity is of a low cognitive load, or it consists of a waiting time. Whether something comprises a low cognitive load for an individual is also based on experience with a specific activity or how much it is automated. In confirmation of that there is evidence that familiarity with a road while driving increases inattention to the environment and mind-wandering (Yanko & Spalek, 2013b). If one is inexperienced in cycling it will create a high cognitive load for this individual. Also, the demands of the task are also dependent on our estimations and expectations of the importance of performing the task correctly. When one is subjectively estimating that engaging in mind-wandering will not decrease the performance of a particular task (like walking, doing sports or cooking) s/he allows oneself to mind-wander. However, some of the background activities are associated with higher risk due to inattention (driving, cycling, eating) and therefore require additional care if chosen as a design space. Homogenization experience and fidgeting shed light on mechanisms of mind-wandering and how it can be created deliberately. Not all activities that naturally cause mind-wandering can be suitable for design, for instance, eating, as it is a reason for digestion disgorgers. Experience of nature is special in that sense simultaneously is quite homogeneous visually, but also due to slight variability of experience creates conditions for effortless mind-wandering.

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In order to answer research question 2: how novice designers can improve the deliberateness of mindwandering could, it is necessary to elaborate on what a deliberate mind-wandering is. Deliberate (intentional) or spontaneous (unintentional) mindwandering has been captured with different rates

depending on the type of the task: during easy tasks (lower cognitive load), it was reported as more intentional, while during difficult tasks researchers captured more unintentional mind-wandering (Seli, et al., 2016).

Low cognitive load activities, especially those with low demands from working memory, meaning they do not require attentional control of task-relevant information in awareness, are supportive of mindwandering. Mind wandering competes with the primary task of the control and coordination of working-memory resources. If tasks can be automated that contributes to the increase of the frequency of mind-wandering (Smallwood & Schooler, 2006). That is important for the outline of possible trajectories for the research.

Conducting an overview of past research (Seli et al., 2017) researchers noted the need to distinguish two separate dimensions of mind-wandering: intentionality (to describe if mind-wandering is intentional) and **meta-awareness** (if an individual is aware of the episode. Their relationship is illustrated in figure 16. The overlap between these types of mind-wandering has to be observed at the beginning of the episode, as one could become aware of the episode, that was lacking intention in the first place (Seli, et al., 2016).

How those differences are typically experienced? visually organising the notes aboard. It is perceptually Let's look at examples of thoughts from the figure 16: coupled, and task related. 1) Planning and imagining a vacation during a lecture **Thought 2:** Is that my phone? Where have I put it?: (De Silva, 2023) — deliberate with meta-awareness; as a reaction to a stimulation in the environment. It 2) Comforting (desirable) experience of memory of is perceptually coupled to stimuli, task unrelated, a the sea, that was triggered after seeing a surfing distraction. board - deliberate without meta-awareness. One

VARIOUS TYPES OF MIND-WANDERING



Figure16 Discrimination between Intentional (Deliberate) and Unintentional (Spontaneous) mind-wandering. My own illustration of relationships established by researchers

becomes aware of thinking of it only after the end of experiencing a positive memory. Person can start smiling, but may not fully aware what have caused positive experince. Here initiating mind-wandering is intentional that persists for some time without metaawareness (Seli et al., 2017).

3) Reading a book and having unwanted thoughts of past relationships one desires not to think (Baird et al, 2013) — spontaneous with meta-awareness;

4) Reading a book and finding oneself at the end of the page but without awareness of the contents of thoughts (Schooler, et al, 2011) - spontaneous without meta-awareness;

To illustrate how mind-wandering is developing during working on a creative task, imagine one is having a hypothetical task of "designing an intimate interaction with Artificial Intelligence" and is sitting behind the computer. The sequence of his/her thoughts may look like this:

Thought 1: This post-it belongs to this cluster-

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Thought 3: I should call my friend about the meeting on Saturday, about going to the zoo. But I shouldn't think about it now: (perceptually decoupled from stimuli, task-unrelated and is a **spontaneous MW** as it was not desirable and not within one's intention) **Thought 4**: Calling booths disappear from the streets, but I remember seeing them in London (Perceptually decoupled, task-unrelated, deliberate MW)

Thought 5: What if providing the intimacy of talking with AI with public calling booths? (Perceptually decoupled, task-related, deliberate MW).

Schematically it looks like Working on the task->Distraction-> Spontaneous MW->Deliberate mind-wandering.

Here task-unrelated thoughts became stimulation for the next thought which turned out to be task

related. When looking at Thought4 it is obvious that if the person was not open to an experience of memories one wouldn't direct mental effort to remember the experience. Probably a person with good attention control would return to the task immediately after the distraction. But it would prevent from reaching a new creative idea, the seeds of which were in the mind-wandering which followed a distraction

Intermediate conclusions and takeaways:

1) Low cognitive load or easily automated actions serve as a great parallel activity for mind-wandering. 2) Meta-awareness plays an important role in changing the quality of mind-wandering experience, making it a more intentional mind-wandering

MEASURING MIND-WANDERING

To answer research question 3: and find out if the created design has impacted deliberate mindwandering, it is necessary to establish a methodology for measuring mind-wandering episodes to confirm that it happened.

Researching mind-wandering is entangled with a lack of ability to directly control the experience (Smallwood & Schooler, 2015). There are a couple of considerations that need to be kept in mind when researching mind-wandering:

- The feeling of catching oneself mind-wandering • might be experienced as a sense of control, and therefore be reported as deliberate by participants, In fact, it is a spontaneous mindwandering, that has been caught, producing "an illusion of control." (Schooler et al, 2011) That means that providing participants with only the adjectives "deliberate" or "spontaneous" to evaluate the quality of their mind-wanderings will not support clear self-report results.
- People commonly cannot report the change in • the contents of consciousness before becoming

mind-wandering. But also, meta-awareness is experienced intermittently, meaning it last for an instance of a time (Schooler et al, 2011).

There are usually two main approaches to capturing mind-wandering: self-caught or probecaught methods. And the evidence for the validity of self-report measures in mind wandering has been growing over the past ten years (Murray, et al., 2019). The self-report **method** means subjects are asked to voluntarily fill out our experience sampling forms, when they catch their mind wandering (Smallwood & Schooler 2006) in different ways, like pressing a response key if they notice their mind wandering. That allows to evaluate mind-wandering that has reached awareness (Smallwood & Schooler 2015). Probe-caught experience sampling means subjects are intermittently interrupted and asked to reflect on the contents of their experience. It can be done in a random manner, but also based on observable changes in performance (change of eye gaze, error on the task, which indicate that the participant meta-aware of it (Schooler, 2002), including probably had mind-wandered etc (Smallwood &

Schooler, 2015).

The retrospective self-report method can be used to preserve more natural experiences and the experience sampling data is collected at the end of the experience.

The open-ended method means participants are Measuring mind-wandering is connected to various asked to describe an experience in their own words implications that are connected to the intermittent (Smallwood & Schooler, 2015). nature of mind-wandering, which can last for a couple Out of all these methods of capturing mind-wandering of seconds and the limitation in the ability to reflect this project will be utilising the retrospective selfon the experience, without affecting it.

DESIRABLE AND UNDESIRABLE EF-FECTS OF MIND-WANDERING

To thoroughly answer research question one 1: how (Mooneyham & Schooler, 2013; Murray et al., 2021; designers could use mind-wandering in the design Agnoli et al., 2018; Ibaceta & Madrid, 2021, Irving et process it is important to research what effects mindal., 2022), which are illustrated in the overview (figure wandering has. In this chapter, there will be given 17). Mind-wandering has both short-term effects on an overview of the positive and negative effects the episode of performance that comes right after it, as well as long-term effects on personality traits. of mind-wandering. That is followed by a short Specifically, the ability of attentional control or the introduction of meta-awareness as a mediator for deliberate mind-wandering. lack of it reinforces the loop of either deliberate Negative and positive effects of mind-wandering or spontaneous mind-wandering. A person with a are usually more associated with unintentional or tendency to more unintentional (spontaneous) mindintentional mind-wandering. Recent papers showcase wandering will for instance, form a more negative different effects on beliefs, and personality traits self-concept and rate one's self-achievement



creative problem

Figure17 Effects of deliberate mind-wandering

! overly engaging in even

deliberate mind-wandering

decreases self-evaluation of

creative achievements (Agnoli

et al., 2018).

report method to capture mind-wandering, as it will allow subjects to focus on evaluating experience, rather than being repeatedly interrupted by probes.

Takeaway

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Figure18 Effects of spontaneous mind-wandering

(measured with Creative Achievement Questionnaire that people who rate their self-achievements higher (CAQ; Carson et al., 2005) as lower (see figure 18). That in turn reinforces the loop of withholding from intentionally referring to feelings and thoughts and engage in deliberate mind-wandering at next occasion. But the other is true, if one engages in deliberate mind-wandering s/he to a greater extent evaluates one's creative achievement (Agnoli et al., 2018), as the ownership of ideas is greater (Seli et al, 2016). Also, deliberate mind-wandering trait is correlated with openness to experience personality traits (Ibaceta & Madrid, 2021) and better attention self-regulation (Mooneyham & Schooler, 2013) meaning g tendency to deliberate mind-wandering has long-term effects on a personality beyond a specific episode. And the loop of a tendency for deliberate mind-wandering also reinforces itself, as openness to experience and better selfregulation allows an individual with a tendency to a more deliberate mind-wandering will be better at describing inner thoughts and feelings and therefore will rely on inner experience when it occurs and will redirect his/her attention to it (Agnoli et al., 2018) and therefore will intentionally mind-wand. From the findings of Agnoli and colleagues, it is apparent

will address their emerging thoughts and feelings and mind-wander intentionally. Deliberate and spontaneous mind-wandering is also correlated with respectively higher and lower originality of responses in divergent thinking task, a title task (Guilford, 1968, as cited in Agnoli et al., 2018) meaning that a tendency to deliberate or spontaneous everyday mind-wandering also can predict originality of ideas (Agnoli et al., 2018). Researchers were also able to conclude that the score of the **nonreactivity**¹ facet of the five facets of mindfulness scale (Baer et al., 2006) was negatively correlated with the originality of ideas. That allowed them to conclude that refraining from the evaluation of inner thoughts and feelings is correlated with a decrease in the originality of responses (Agnoli et al., 2018). That conclusion again allows to illustrate the effects of an individual tendency to deliberate or spontaneous mindwandering as a reinforcing loop, as control over the thinking process and reinforces either deliberate or spontaneous tendency (Agnoli et al., 2018). From the overview, it is apparent that most of the negative

effects of mind-wandering are associated with

Nonreactivity means allowing feelings and emotions to come and go without reacting or being caught up by them (Baer et al., 2006)

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its spontaneous nature. In conclusion, individual creativity can be enhanced with deliberate mindwandering, both with short-term and long-term effects. Those effects are mainly mediated by metaawareness (Seli et al., 2016a, Agnoli et al., 2018) and non-reactivity (Agnoli et al., 2018).

Another significant finding of this section that informs the design goal is that an excessive amount of even deliberate mind-wandering can be detrimental to the self-report of creative achievement (Agnoli et al., 2018). That means that having a strategy for design to increase the amount of mind-wandering will not be beneficial, rather influencing the qualities and context of mind-wandering will be a more fruitful strategy for Consciousness design in this project. Pre-conscious Since deliberate mind-

meta-awareness

wandering is mediated

by

it is important to establish an understanding of the mechanisms underlying mind-wandering and meta-awareness to correctly interpret the result of experimental studies within this project. Schooler (2002) has made a distinction between basic consciousness and meta-consciousness (later used interchangeably by the author with metaawareness). Basic consciousness is defined as "cognitive processing that includes perceptions, feelings, and non-reflective cognitions" (Schooler, 2002; p. 341). Meta-consciousness is a monitoring system that intermittently evaluates the contents of basic consciousness to find the relation of such contents to the individual's goals (Schooler, 2002). Pre-conscious, which is a part of unconscious processing corresponds to mental activity that is sufficient to produce experiential states if only attention is directed toward it (Schooler, et al., 2015). The relationships between those concepts that are described by Schooler (2002) are illustrated with my visual (figure#). Schooler (2002) considers metaconsciousness to allow individuals to become aware of intermittent (meaning lasting for an instance of time) mind wandering.

For this research, it would be important to establish the use of "being conscious" and "being metaaware", as in everyday conversations these could be used interchangeably, which our users could also do.



Figure19 Model of mind-wandering in relation to consciousness

Being conscious of X means "having X represented in subjective experience" (Schooler et al., 2015 p180); Meta-awareness is an individual's "explicit awareness of the [current] contents of consciousness" (Schooler 2002, p339).

Takeaway from this chapter:

The benefits of mind-wandering are mainly associated with deliberate mind-wandering, while most of the negative effects of mind-wandering are associated with lack of intention within the episode. Deliberate mind-wandering is mediated predominantly with meta-awareness. A tendency to a more deliberate or spontaneous mind-wandering has both short-term effect (originality of ideas) and long-term effect on the individual.

- Meta-awareness is experienced as intermittent and can support more deliberate mind-wandering.
- Only increasing the amount of mind-wandering is not beneficial, as it can override the benefits of meta-

awareness. Therefore, in this chapter partial answer to wandering of novice designers could be improved the research question 2 have become apparent. **How** could novice designers increase the deliberateness of mind-wandering? Deliberateness of mind- solely increasing the amount of mind-wandeirng.

with influencing contextual factors, like when and how mind-wandering is experienced, rather than

CONNECTION OF MIND-WANDERING AND INCUBATION STUDIES

In order to answer a part of the research question 1: "how novice can address their needs in their design process with a mind-wandering experience?" it is important to research mind-wandering in the context of design process. Mind-wandering and incubation intertwined phenomena, and their link will be elaborated in this chapter. Additionally, that understanding supported the formulation of questions before interviewing the user group.

Designers could already apply creativity techniques that rely on mechanisms and aim to modulate the mind-wandering but may not be explicitly aware of that. And analysing incubation studies will help to make a clearer link between creativity and mindwandeirng. Incubation is seen as an unconscious process and is one of a four-step creative problemsolving process: preparation, incubation, illumination, and verification (Wallas, 1926). Incubation means is putting a problem away but continuing to think about it unconsciously (Tsenn et al., 2014).

In earlier studies of incubation participants' content of thoughts during the break was not measured, assuming that they would be not connected to an introduced problem (Dodds et al, 2004). That did not allow researchers to distinguish activities that enable or prevent mind-wandeirng. Recent research on mind-wandering which is focused on analysing problem-solving capacity is advancing the research with a more detailed set-up with. For instance, Baird et al. (2012) compared the effect of demanding tasks (preventing mind-wandering) undemanding tasks (facilitating mind-wandering) and rest on a creative task (Unusual Uses Task) performance. This study evaluated self-reported mind-wandering during modulate their mind-wandering to react to a specific

the interpolation (break from the task) period, but also controlled for mind-wandering as a trait with Daydreaming Frequency Scale (Giambra, 1993). The results of the study confirmed that the incubation effect was present in undemanding task conditions because of a general increase in mind-wandering. Baird and colleagues explain the benefit of mindwandering through incubation (2012). That allows to guestion where is the borderline between incubation and mind-wandering? Could the quality of experience being a part of the consciousness serve as a criteria to allow calling one mental activity incubation or mind-wandering? In the end this unconscious (incubation) or conscious (mind-wandering) mental activities can be a part of the same coin. Further I will elaborate for why this presumption might be true.

Research also proves that both mind-wandeirng and incubation can be modulated by an individual without conscious processing, which unites those two phenomena. For instance, in the studies of mind-wandering the fact of awareness of the need to return to the task improved the results of participants in a control group (Gallate et al., 2012); Similarly, exposure to a smell associated with a problem during sleep is increasing a registered incubation effect (Ritter et al., 2012 as cited in Ritter & Dijksterhuis, 2014). Another example of the unconscious processing shaping mind-wandering, is that mind-wandeirng can be modulated without conscious control based on individual expectations of the demands of upcoming task. In the experiment participants could strategically time on the clock (Seli et al., 2018a). That means of automatically self-generated information that that triggers in the environment are forming an enter awareness in a specific moment in time, expectation of these triggers that unconsciously depending on the demands of the task (McVay & affect mind-wandering without conscious control. Kane, 2010). Similarly in incubation studies introduced smell Conclusion: Mind-wandering and incubation are trigger was affecting unconscious processing. Using therefore highly overlapping phenomena, and while mind-wandering is commonly referred to as a mainly these unconscious mechanisms could also serve as one of the strategies to achieve deliberate mindconscious cognitive process that can be experienced wandering. The fact that mind-wandering research and therefore reported upon, incubation is described is rationalising its effect by referring to incubation as an unconscious process, with an accent on the (Baird et al., 2012), is signalling that two concepts duration of the activity and its' results. could be part of the same phenomena describing Mind-wandering can be also modulated without its different facets: incubation refers to unconscious conscious effort based on expectations of upcoming processing, and mind-wandering refers to a shift of task demands and supposedly can share same attention to contents of consciousness that could unconscious basis with incubation. This conceptual have remained pre-conscious and because of understanding of this link was valuable to analyse that they are experienced as thoughts. It is metathe experiences of designers in regards to their cognitive resources that limit the type and amount incubation.

THEORIES OF MIND-WANDERING AND SELF-REFERENTIAL ASPECT

The analysis of the qualities of mind-wandering and its connection with unconscious incubation allows us to summarise 3 pillars of mind-wandering experience, which together create a model of this experience.

Pillar I Perceptual decoupling (redirecting attention to inner experience function), which is facilitated with low cognitive load activity (Smallwood & Schooler, 2006). The brain can process only a limited amount of information at the time, which is evidenced that tasks with a working memory load reduce mind-wandering. Meta-cognitive processes and meta-awareness is estimating the upcoming demands of the environment and allows one to direct attention inward and perceptually decouple from the environment. The brain chooses to process internal upcoming information instead of external since the demands of the environment are (or estimated to be) low

Pillar II Internally generated intrinsic changes (content quality that affects the qualities of experience), that reach consciousness and therefore become part of subjective experience. This process is by default without executive attentional control.

Pillar III Meta-awareness (monitoring) of mindwandering. Meta-awareness is the intermittent (discontinuous) noticing of the contents of consciousness. Contents of consciousness are there all the time part of our conscious experience and affect us (our mood) but they may be not part of our awareness until the attention is directed to it (see Figure 20).

In the next section, the second pillar will be addressed in more detail



The utility theory of mind-wandering (payoff minus Researching theories of mind-wandering help to cost) means that the usefulness of sensory perception understand when and why it occurs, which in turn will is concurrently weighed against the usefulness of help to influence mind-wandering in a desired way, mind-wandering. The proper cognitive system aims which is a part of research question 2. There are several to increase utility by estimating the usefulness of theories for mind-wandering, which are outlined alternatives and choosing the best payoff minus cost in box 2, but the current concerns hypothesis option. (Singer 1966, as cited in Antrobus, 2018). The consider to be most beneficial for the context of this accent here is on the continuous unconscious process, project since it explains why thoughts during mindmeaning that having problems with mind-wandering wandering have a specific content. In brief, it means means people have problems with estimating the that people react to the most salient information and benefit of processing specific information, especially goals that extend beyond the here and now (Klinger, during high cognitive load. Understanding this 1967, as cited in Smallwood & Schooler, 2015). Mind hypothesis helps to envision how this process of wandering happens when engaging with internal weighting the benefits from processing different desires and goals is of a higher incentive value rather information streams happens all the time without our than attending to the external environment. Mind full awareness. wandering phenomena, therefore, is based on and representative of competition between self-relevant, Default variability hypothesis, , which means that internal priorities and task-relevant, external priorities the purpose of mind-wandering is to restructure (Klinger & Cox, 2011). The reliability of this theory the semantic (meaning) network of memory and has been vastly proved with various experimental make it more optimal. Increasing variability of selfstudies including results that: 1) meta-awareness of generated thoughts (mind-wandering) is considered mind-wandering improved when participants were an adaptive mechanism for optimising a network of offered a financial incentive for accuracy of selfsemantic knowledge (meanings network). Default reporting (Zedelius, et al., 2015); 2) mind-wandering content production of a brain "supports and increased with exposure to a (fake) radio broadcast optimises semantic abstraction by providing multiple reporting war escalation (studies conducted in 1965 simulations that are both similar and dissimilar" as cited in Antrobus, 2018); 3) priming on a personal (Mills et al., 2018). That allows the separation of goal makes people mind-wander more (Stawarczyk, distant episodic memories and provides optimal 2017). conditions for learning and organisation of traces of memories via creating new associations. This Therefore, the contents and occurrence of mindhypothesis signifies that the re-creation of memories, wandering are highly connected with the current as contents of mind-wandering serves to enhance concerns of the individual. Mind-wandering, everyday learning. Here it is worth mentioning how therefore, plays an important role in the anticipation Mills and colleagues (2018) see pattern completion, and planning of the future (Stawarczyk, 2017, Mills, which means a memory of an event is created and et al., 2018; Baird et al., 2011). experienced from cueing by any of its components. These projections fill consciousness with continuously There are other theories of mind-wandering, that also generated mental content of mind-wandering, help to understand mind-wandering in the context of even when our attention is not directed to these

other cognitive processes.

Figure20 Model of mind-wandering experience

Deliberate Mind-wandering for novice designers

Part I

Part I

simulations. Memories appear as degraded or partial cues that may then serve to trigger further pattern completions, resulting in a cascade and stream of thought (Mills et al., 2018).

The Decoupling hypothesis (Smallwood & Schooler, 2006), stresses that mind-wandering relies on the ability to perceptually decouple (disconnect) the attention from perception of sensory input. Perceptual decoupling prevents distraction and allows one to couple attention with an internal train of thought. The process of decoupling attention allows the separation of competing streams of internally generated and external information (Smallwood et al, 2011).

Evolutionary theory. The content of mindwandering is predominantly future-focused and serves to prepare us for the future and involves autobiographical planning and envisioning social interactions. Individuals whose working memory is of high capacity are more likely to engage in mind-wandering about the future (Baird, et al., 2011). Mental time travel which is possible due to mind-wandering is also considered a reason for the ways: development of language. Mental time travel creates conditions for humans to share information about the non-present, including the past, plans, and ideas (Corballis, 2013)

From theories of mind-wandering it is apparent that 2018); mind-wandering is a mechanism that helps us to be better adapted to the future (evolutionary theory). All mentioned theories do not exclude each other but rather help to explain how mind-wandering takes part in multiple cognitive processes. Mind-wandering takes part in the completion of sensory perceptions and is an adaptive mechanism that supports learning and sensemaking (default variability hypothesis). Our brain constantly weighs the benefits of directing attention to inner stimulation and mind-wander against the benefits of continuing to persist with a task and paying attention to the environment (utility theory). In the moments the environmental demands

allow to process and experience inner stimulation the attention is directed inward (decoupling hypothesis). And current concern theory helps to explain why the cognitive system will more likely choose to direct attention inward: personal relevant goals and concerns are considered a priority, therefore a trigger representative of those will be more likely to cause mind-wandering (current concerns theory). That means that one of the strategies for design to influence mind-wandering-wandering would be interaction with concerns in some way. But will this mind-wandering be deliberate? Not all the time, as processing some concerns may be out of our intention at a specific moment, meaning a spontaneous mindwandering will occur.

But how a designed experience can help a more deliberate mind-wandering? To increase deliberateness of mind-wandering in light of current concerns theory the strategy of triggering selfreferential thoughts, meaning thinking about myself) could help. The effect of a brief reference to the idea of self-have been proven in experimental studies to change the quality of mind-wandering in positive

self-reflection on oneself out of epistemic 1) curiosity, which is a part of the quality of selfconsciousness is correlated with more intentional mind-wandering of participants (Vannucci & Chiorri,

2) a brief period of self-reflection modulated mind-wandering to have a future bias (Smallwood, Schooler, et al., 2011), which is more associated with intentional quality (Stawarczyk et al., 2018).

For design for mind-wandering that means the design would support users having a moment of observing one's physical self (looking at shadow, or reflection as an everyday example) or for instance, reflecting on one's self-image represented in the created avatar could help to increase the deliberateness of the consequent mind-wandering. This strategy of having a self-referential experience will be further explored in the design phase.



Figure21 Updated model of mind-wandering

spontaneous (unintentional) mind-wandering is correlated with attentional control problems and ADHD symptomatology establishing the model of spontaneous mind-wandering is exceeding the scope of this project. The proposed model of mindwandering will serve as a basis for the design of the mind-wandering experience in the later stages of the project. Self-referential quality of experience could support deliberateness of mind-wandering, but further research of the context is necessary to explore whether that quality of the experience would be suitable specifically for novice designers

This finding about self-referential thoughts allows to update the basic model of mind-wandering and serves as a clue for how deliberateness of mindwandering can be increased as a part of designed interaction (see figure 21) In conclusion, mind-wandering is a complex multipurposeful phenomenon that supports our cognition. Self-referential interaction can facilitate greater deliberateness (intentionality) of mind-wandering. Only the model of deliberate mind-wandering was created within this research, as spontaneous mindwandering is less desirable for creativity. Because

CONCLUSIONS PART I

The heterogeneous nature of mind-wandering results Defining mind-wandering for the scope of 1) in the sprouting of information on the phenomena the project; across domains of cognitive psychology creativity 2) Describing examples of mind-wandering research. That required a thorough investigation experiences; of experimental studies resulting in creating a 2) Highlighting the differences between theoretical basis including: deliberate and spontaneous mind-wandering and

Pillar 2

Part I

the role of meta-awareness:

3) Providing reasons for considering incubation and mind-wandering studies as overlapping; 4) Proposing a model of mind-wandering experience based on 3 pillars based on synthesis from the literature research:

5) Highlighting the role of current concerns in the experience of mind-wandering, which allows to design the interaction based on theory.

This research created a ground for conducting a second part of the project: a study of mind-wandering in the context of the design process and creativity.

Some of the research questions have been partially answered:

RQ2 How could novice designers increase the deliberateness of mind-wandering? [support mindwandering]

Deliberate mind-wandering is more supportive of creativity, unlike spontaneous mindwandering, which is negatively correlated with creative achievement. Mind-wandering could be made more deliberate with 1) increasing metaawareness during the interaction; 2) introducing a self-referential prompt; 3) deliberate creation of low variability perceptual noise (fidgeting, doodling).

RQ3 What interaction qualities can support deliberate mind-wandering in the context of the creativity of 6. novice designers?

Homogenisation of sensory information in one of the sensory channels can support a state where designers would allow themselves to mindwander, or in other words deliberately mind-wander. Low variability of perceptual information that is caused by small body movement (fidgeting,

doodling) or receiving another kind of sensory noise (for instance flickering leaves) supports information processing capacity.

Main takeaways that will inform the research of the context:

1. Mind-wandering relies on a combination of 2 inevitable qualities: the ability to perceptually decouple from the environment and the selfgeneration of mental imagery.

Cognitive load as well as the expectation 2 of upcoming demands from the environment are affecting mind-wandering, and specifically activities with low cognitive load will support mind-wandering.

3. Predictive coding mechanisms can explain why in the lack of meaningful stimuli humans selfgenerate content and experience vivid mindwandering. Homogenisation experience creates a lack of meaningful stimuli, which results in stimulus hunger. That meaningful stimulus hunger is responsible for vivid experiences of mind-wandering. The strategy of increasing the amount of mind-wandering is not beneficial for the context of this project, therefore focusing on changing its deliberateness is a valuable strategy.

Meta-awareness and brief self-reflection 5 are factors that can make mind-wandering more deliberate.

Slight variability of perceptual noise that is a result of fidgeting supports the information processing capacity of the nervous system and increases the sensitivity of neurons to detect information. For the design phase that means that slight variability in perception will support sensitivity for self-generated stimuli and mind-wandering.

Part II Context research

INTRODUCTION

The main context for the research is the creativity of novice designers. All 4 research questions from the brief were analysed during the following research activities:

various behaviours and habits, for instance, fixation (Vasconcelos & Crilly, 2016), being stuck, taking breaks, fidgeting, and the semi-structured format of the interview was supporting that. Also, the interview -an introspective auto-ethnographic sampling of aimed to uncover the experiential qualities of mindmind-wandering experience (Appendix 1). Since I am wandering, therefore a phenomenological interview a full participant in the researched user group (novice approach was more suitable (Bevan, 2014). The designer), I am an accessible source of information researcher during the phenomenological interview is on daily experiences of mind-wandering. It was interested in one person's experience in the way he conducted parallel to theory research, which allowed or she experiences it (lifeworld), therefore questions to observe and reflect on the hypothesis in relation are asked in a way and language that is familiar to to desired intervention on mind-wandering with a the interviewee (Bevan, 2014). That supports the faster feedback loop. approach to creativity as situated human experience.

-interviews with novice designers (14, see Appendix These research activities allowed me to create a 5). Interviews have been chosen to gather qualitative information on the needs and challenges the user holistic understanding of the differences between group is facing in the context of their creative work. the various needs of novice designers and create a ground for formulating a design goal. Interviews were semi-structured, as the topic of mind-wandering is quite broad and can pour out in

INTROSPECTIVE AUTO-ETHNOGRAPHIC SAMPLING OF MIND-WANDERING EXPERIENCE

have

What happened before

MW facilitating activity

What type of MW

Time moda	ality (future, pa	st, now, ate	emporal):	
🗌 past				
🗌 now				
□ future				
🗌 atempo	ral			
1st or 3rd	person:			
🗌 1st prso	n			
🗌 3rd per	son			
🗌 non-su	ojectivity			
Time→Spa	ce methoric sys	stem		
🗌 ego-pe	spective			
🗌 time-pe	rspective			
Intention (Deliberatness)			
🗌 spontar	eous			
delibera	te			
Insiaht	s to take f	urther		
Diary				

Figure22 Tamplate for mind-wandering experience sampling

conducted self-experience sampling over the period from February 15 to May 1st, in parallel with the literature study. The benefits of capturing information in this way were the fact that I could reflect on how theoretical knowledge about mind-wandering is represented in the context of my work on this project. Entries (20, see Appendix 1) were filled at the end of the day, or whenever a particular mind-wandering occurred. I have chosen opportunistic self-reporting, instead of reporting on a random timer. I created a template to check the hypothesis whether specific modalities of mind-wandering (time, self-perspective, the experience of time) could support intentionality and therefore my creativity more than the others (see Figure 22), therefore providing actionable insights to trigger and cue a specific modality of mindwandering

The second heuristic that I wanted to explore is a connection between perspective-taking and mind-

wandering. While researching the phenomenology of mind-wandering one of the qualities that are measured is 1st (I see things from my own perspective (like in the real world) or 3rd (I "see" myself from another perspective) (Andrews-Hanna et al., 2013). The experience of time->space metaphor is something that mind-wandering research is not utilising per se, but it is a concept developed by linguist scientists to describe different space->time metaphoric mapping systems that people refer to in their language and use to think about time and space change (Casasanto & Boroditsky, 2008). In the studies of Casasanto and Boroditsky participants were primed with specific space-time metaphors in the question. If participants were switching the time->space metaphor in their answer

in relation to a primed metaphor in the question it took them more time to reply. I found it related to mind-wandering as both participants had to deliberately mind-wander to shift from one space->time metaphorical system to another and mentally travel in space. See the visualisation of those two systems in Figure 23. So, I also wanted to obtain preliminary results on whether the perception of those metaphors would be connected to other desired qualities of mind-wandering, like deliberateness.

I was registering mind-wandering more often as I would normally do since I become more familiar with the phenomenon. Some of the entries were part of opportunistic observations during my routine work on this project, others contained more deliberate interventions, during which I have observed mindwandering. Self-reports of my experience sampling can be found in Appendix 1.

The insights that can be taken further to the next stages of the project are:

Evaluating the intentionality of mind-1) wandering experience as deliberate or spontaneous just based on the use of 2 adjectives was at times





Figure 23 Illustration of two space->time metaphors that reflect an understanding of time and are coded in the language

complicated, therefore a more elaborated way thoughts and make my mind-wandering more to measure intentionality will be used in the next intentional, but not yet goal-directed. During white audio noise, I have mentally travelled to different research activities with participants. One of the places since I resembled various memories (plane, options is to use the Deliberate or Spontaneous Mind-wandering scale (Carriere et al., 2013). fridge, ocean, wind). So white noise triggered various Moving via space (walking, riding a bike) simulations of past experiences, causing mental travel (mind-wandering). White noise helped to become more open to new self-generated information and further deliberate mind-wandering.

2) helps me to make autobiographical planning much faster due to deliberate mind-wandering, I also have a clearer feeling of my goals when moving through space. Probably that might be explained by more need for predictive thinking and mind-wandering of encoding);

Regarding the time->space metaphor most of the analysed deliberate mind-wandering experiences what will appear behind the corner (see predictive were following the time-based metaphor (8/12) meaning things are moving towards me. They 3) Some experiences that were facilitating were rather connected to 3rd person's perspective, which means that: I "see" myself from another intentional mind-wandering were: playing musical instruments, singing, trance dance, conversations perspective than with 1st person's perspective-"I with people, having a walk with nature experiences, see things from my own perspective (like in the real serendipitous encounters of relevant information on world) (Andrews-Hanna et al., 2013). Although this preliminary link could be valuable for understanding social media, and snaking food. Spontaneous mindmind-wandering, finding the ways to translate those wandering usually was happening as a signal of results with a designed experience is problematic, as tiredness and the need to switch the task. 4) One of the entries for the mind-wandering a preference to use one of two space->time mapping experience was listening to white noise audio, which systems is also connected with a bias for one of the I did after having a headache when trying to align two in various languages (Casasanto & Boroditsky, information. White noise is a type of homogenisation 2008). Whether the bias for a specific system or the ability to change between two is linked to creativity experience. It helped me to introduce clarity to Deliberate Mind-wandering for novice designers

Time-moving metaphor is typically a three-term relation

is a subject of future research, but it lies beyond the Deliberate mind-wandering was supported with scope of this project.

5) Also, some insight on data collection: assigning specific properties in the sense of modalities to mind-wandering is difficult at times, as one episode can capture various qualities and evolve with time. That means my participants of this research might also find it problematic and I will account for it in the next phases.

Conclusion

Autoethnographic experience sampling supported the analysis of ways of deliberating mind-wandering in the context of real-life work on the project.

break activities (playing musical instrument, singing, having a walk for instance). It is both during and after those "break" activities mind-wandering was more deliberate.

Using more elaborate scale to collect data on deliberateness of mind-wandering will be applied in the future.

Having a break from working on a project with a white audio noise (homogenisation audio filed) helped to reduce headache and stop spontaneous mind-wandering and supported more deliberate mind-wandering.



Is more creative when working under external pressure of the environment. "Others are also working" idea

"At home I am too comfortable and layback. I like to have some kind of small pressure, like seeing professional environment... At home I wander about what else should I do"

Figure 24 Example of quote template for analysis.

INTERVIEW WITH USERS: NOVICE DE-SIGNERS

The selected user group for the project is novice designers. The performance of expert and novice designers differs, but also, they vary in preferences for ideation and strategies for information search (Gonçalves et al., 2011). I have conducted 15 interviews with IDE Master students at TU Delft, which comprised of males (8) and females (7) aged from 23 to 31 with median years of experience in the design field (including internship) of 2 years.

The setup for conducting semi-structured (~30 min) interviews was as follows:

1) Before the interview, I asked participants to fill out the questionnaires consisting of two scales: Daydreaming Frequency Scale (DFS, Giambra, 1993), which allows to measure the trait of mind-wandering and includes 12 questions (see Appendix 2) Rates from 0 to 4 were matched with respective answers. That was followed by Deliberate and Spontaneous Mind Wandering Scales (Carriere et al., 2013; Vannucci, & Chiorri, 2018, see Appendix 3), which allows to distinguish the propensity for intentional or unintentional mind-wandering¹

Conducting semi-structured interviews with guestions (see Appendix 3) based on themes: how mindwandering is experienced, ways to improve creativity, ways to get out of being stuck, reflection, habits for creativity, taking a break, incubation, objects to interact with, fears/concerns in the creative process, attention self-regulation, creative environment, what is an envisioned interaction with technology for mindwandering (see Appendix 4 for a list of questions). To collect responses from participants on the envisioned role of technology in mind-wandering they were prompted with a speculative scenario: "Imagine a scenario where technology would be guiding your thought process with verbal interface or providing you cues to prime your thinking. For instance, you need to design a baby stroller and the interface would help you to recall all instances when you have seen a baby stroller, or would highlight objects, or actions in the environment that are associated with your project or question. To what extent you would like and feel comfortable using these technologies to support your creativity?". Participants were asked to respond to this speculative prompt. Interviews of participants were recorded and transcribed (see Appendix 5).

2) Analysing the quotes in relation to individual responses to questionnaires following a form consisted of 3 parts: guotes, interpretation, the tamplate: score for Daydreaming frequency and indication of a relative tendency for deliberate or spontaneous MW.

infomation and establishing mechanisms.

The map of the relationships is organised into 2 routes based on two typical attitudes and experiences of and take-away (figure 24). In the top right corner of mind-wandering: deliberate mind-wandering and spontaneous mind-wandering. Let's look at the difference between these two different experiences: People who reported more deliberate mind-3) Quotes were analysed in steps : mapping quotes wandering also expressed that they enjoy it, use on 2 dimentional scale based on scores; naming the mind-wandering to regulate mood, and are more concerns that were most relavant, synthesisng the open to their inner experiences and changes, which is in line with the literature research findings, that intentional mind-wandering is correlated with The individual results of DFS showed normal distribution with a median of 29/48 (each dot openness to experience trait. For instance, one represents a participant with a corresponding scale participant said: "I think I quite like it [mind-



Figure 25 Distibution of Daydreaming frequency score in the interviewed user group

results (figure 25).

more open to engaging in incubating and mindwandering supportive activities like slow drinking tea or having a walk with no goal to strategically reset the mind. Also, they develop habits on how to actualise their unconscious processing to the benefit of problem-solving. For instance, one participant is taking strategic naps to incubate ideas: "Every Deliberate Mind-wandering for novice designers

score number). The median is 29 with 4 groups of Scores were mapped on 2 dimensional scales with a numbered bubble representing one interviewee. Mentioned themes that were most prominent in

the interview are also mapped. The propensity to deliberate or spontaneous mind-wandering was calculated as the difference between two answers and was either marked as negative (from -1 to 0) which corresponded with proneness to spontaneous mindwandering or positive (from 0 to +3) corresponding with proneness to spontaneous.

The overview of the themes of concerns arising during the interviews is mapped out on a 2-dimensional scale (see Figure 26). Participants with higher frequency of mind-wandering (out of 48) are in the top part of the chart and interviewees with a tendency to spontaneous mind-wandering located in the left part and with a tendency to deliberate mind-wandering to the right of a graph.

Discussion of results



wandering]. I like, especially when I'm aware of it ... ". They also spend time analysing and reflecting on their own in a diary, blog, or with self-talk conversation. They are also

-047

The choice of these two scales was guided by availability (open access) and apparent past and current use (Stawarczyk et al., 2012, Gutiérrez, et al., 2019)

Part II



Figure 26 Themes are mapped on the 2 dimensional graph around the participants that were mentioning them, as significant for their design process

-049

time I have a design issue, I solve it in my dream. I 3) participants explicitly refer to self "controlling" note things down in the morning if I have dreams. current mind-wandering with image of past self: I must do sleep meditation and grounding myself "When ...[I] take time to plan, I got to assume that and relaxe [before going to bed]. I will take a nap the [me] has planned something in his brain. So, and think about this. But if I am stressed it will when we [current me and past me who planned] not be going to work ". Therefore, this first group choose not planning, so it looks like the head is not matching, and probably the previous me had a who are prone to deliberate mind-wandering are providing themselves with enough time to not think better overview of the project". From this list of about their current concerns and goals (also within examples, it is apparent that use of the image of the project), take deliberate breaks and have habits external persona with a "controlling" role helps to reflect on the concerns that are triggering mindto reduce mind-wandering. That is different to wandering. how people with more intentional mind-wandering The second group of the interviewed designers are describe having control over one's thoughts since participants who were prone to spontaneous mindwandering. For this group taking a break to incubate "other" to engage in meta-cognitive control. Also, is causing stress: "Maybe it is a bit extreme. It is habits of reflection on mind-wandering are missing, hard for me to take breaks. I need closure and

they are less reliant on the personified image of and quite often they rely on interaction with then again take a break", however, they feel more others to reflect. open to the experience of mind-wandering and Also, these two groups differ in their view on what enjoy mind-wandering when they feel the **usefulness** role technology should have in their mind-wandering: of a parallel activity of cooking and cleaning: "I am those with more deliberate mind-wandering wouldn't confident, and I make them automatically. it feels like interference with their thoughts, but those less stressful ... so my mind is half busy and is less who are prone to spontaneity would prefer external stressed. In a meantime I can think. My mind is half attentional control support with a voice interface. busy doing something". Participants will continue That difference is quite essential, but in the short to work on a problem, even when they feel stuck and term can help participants with spontaneous mindrunning in circles: "I will force myself I just need to wandering to become aware of their spontaneous do it.... Sometimes I can feel that the number of mind-wandering. But, having this voice interface to ideas that I am generating. they are repetitive". substitute meta-awareness of thoughts may not help That means some designers struggle recognising to develop own meta-awareness, and learn to selfthat they need a break to afresh their perspective. regulate mind-wandering, but will only externalise Also, these participants use external control and meta-cognitive functions to the interface. perceived pressure to reduce their mind-wandering, Also, there is an important role of tactile experiences in which shapes in different behaviours in the choice of mind-wandering. Manipulating clay, paper, doodling, working environment: 1) presence of other people "drawing" lines on the hand with other finders and behaving professionally forces one to take more touching various materials were supporting mindcontrol over one's attention: "I have to feel some wandering. When fidgeting appears spontaneously, kind of small pressure...I need to be cool [people it is a reaction of the body to support attentional and space] and be enough for the [professional] control. But when fidgeting is done **deliberately**, like place where I am" 2) assigning "controlling and doodling that split of attentional control between judging" role on the people around to reduce activity and mind-wandering it supports deliberateness mind-wandering: "I work with people because and made mind-wandering more enjoyable. Fidgeting people will judge me if I'm not working. Yeah." Additionally, one factor that is affecting a couple Deliberate Mind-wandering for novice designers



Figure 27 Environmental press and two behaviour adaption pathways that shape mind-wandering habits and experience.

of participants, is whenever they have been interacting with a mobile phone or computer, they would spontaneously mind-wander to "what else they can do there", which was negatively affecting performance: "And I'm working on that project. And I suddenly remember, oh, I need to buy this book that I was thinking about. And then I suddenly go to bold.com. And I start buying. ... So yeah, I think the trigger doesn't help. So, I try to sometimes and I feel like my mind is wandering like unconsciously, I try to minimize the triggers as well. I would just not use my laptop; I would sit with the book". Participants were using strategies to minimise the use of a "multipurpose" computer, which triggers all sorts of unfinished" tasks"

I have chosen to focus my design on a group of participants who are more prone to spontaneous mind-wandering. Working from home for these participants doesn't create enough perceived pressure and breeds spontaneous mind-wandering. That serves as another argument for why novice designers who have a tendency for spontaneous mind-wandering find it hard at times to work from

home. At the same time, environmental press also forces designers to work from home, as they feel they can more easily engage in behaviours that might seem unprofessional (playing with clay, walking in circles, working on the floor, doodling) but which help them to mind-wander.

Outlining these two pathways (see Figure 27) allowed to uncover adaptation pathways in the context based on the tendency to deliberate or spontaneous mindwandering

The next part of the analysis was highlighting 5 mechanisms that shape the behaviour of different groups of participants, as they aim to reach an optimal level of mind-wandering, which is depicted in Figure #. The presence of these mechanisms is in line with optimal arousal theory. It means, that organisms are motivated to maintain an optimal level of arousal, which is pleasurable, whereas being under-aroused or over-aroused is unpleasant (Leuba, 1955, as cited in Litman & Jimerson 2004). That means that one mechanism would move novice designers who have a low tendency to mind-wander towards the top of the chart and they will adopt behaviours to increase their mind-wandering, while the opposite is true for



Figure 28 Mechanisms that shape behaviours that effect mind-wandering

designers at the top of the chart, they will aim to Mechanism 2: an opposite strategy that people who have a high level of mind-wandering use to organise their design process, which results in not taking a break in the middle of a task. Mechanism 3: increasing information intake: talking with stakeholders, reading more to increase mind-wandering. Mechanism 4: Seeking others' perspectives to reduce spontaneous mind-wandering is used by those who have a higher level of mind-wandering (top left corner), but it is less deliberate. Because participants sometimes have problems with detaching from their current perspective, they need to interact with "others" to reach this dissociation, step back and reflect. That interaction with "other" can be reached via talking to others, making presentations, and imagining how others would hear it, which helps to reduce mindwandering with the same perspective. One example here can be mentioned that illustrates the needs of participants in this space of the chart. One participant mentioned that it helps in his design process to "talk to my flatmates.... they don't know they are being used..... if there were no code of conduct. you activated my brain now I need to leave". Talking to another agent (person) forces one to look at

decrease it. This consideration that an optimal level of mindwandering is desirable correlates with the finding from the previous research phase, that an increasing amount of mind-wandering can diminish the benefits of meta-awareness and be detrimental to creative performance (Agnoli et al., 2018). Outlining those mechanisms, that shape behaviour is important to influence the context of my design deliberately. Let's start with participants that reported low levels of mind-wandering on the Daydreaming Frequency Scale. They have adopted mechanism 1 To support their creativity and increase the amount of mindwandering, they withhold from cognitive closure to keep the task "open" to keep mind-wandering on the task (see Fugure 28). Participant 10 created this habit: capturing thoughts on notes and reorganising them at the end of the month: "I love to have like spare sticky notes, or some laptop doesn't matter if it's physical or not. And then convert them in like a more precise file on word with bullet points". That makes him keep thinking of "unfinished ideas" since reaching cognitive closure will stop mind-wandering.



Figure 28 Design opportunities spaces that are suitable for specific groups of people, based on the mechanisms and behaviours that they exsert

oneself with the "other's eye", which supports more flexible thinking. The presence of this mechanism most likely indicates that mind-wandering can be more fruitful if one is able to see his own current perspective as unfamiliar. Mechanism 5: Participants who are positioned in the middle of the graph (have a moderate relative level of mind-wandering with a tendency to more intentional mind-wandering) mainly use habits to increase their meta-awareness (journaling, meditation) that they also use to regulate their mood and solve the concern that is triggering and engage in photo or writing journaling. This also spontaneous mind-wandering.

There could be other factors and needs shaping the behaviours of designers, but those were the most prominent ones shaping the behaviours.

Based on the described mechanisms there are five design opportunities that could be outlined in the context. Some of the design opportunities compensate for the mechanism that shapes novice designers' behaviours, and some are transferring habits from the user group that is nearby on a map. For group 1 (see image) who have a low level of mindwandering "journaling" will be most beneficial, as some participants also mentioned they had problems

keeping track of what they are wandering and could easily forget the content.

Group 2 have no problems in questioning their perspective of their mind-wandering, but sometimes has problems with mediation: "I have never been able to do it", therefore designing an intervention for improving the habits would be the most useful for them.

Group 3 is more aware of their mind-wandering, can easily return in time to the mind-wanderings, means they are easily primed with their previous mind-wanderings (thoughts) and sometimes are not able to afresh a "perspective": "I would like to have something ... now you are not allowed to think about the project. The best things happen when you're not thinking about it." They deliberately practice defamiliarization from their perspective to support their creativity. This is how one participant explains it: "Defamiliarization or decentring... The context can be even expanded in this sense because once you're decentred from the previous perspective, then like maybe the different journey will be drawn then like maybe the context will be shifted to another physics -053

[mechanisms]". And how he applies it in practice: "I in the 19th century as a cognate feeling (Romand, sometimes try to stand there I have never stood, for 2020). The quality of familiarity (unfamiliarity) is example, in the middle of the room ... or really at the hardly irreducible to any other kind of experiential corner of the room then really I see some other object quality, as it allows us to feel our perceptual contents which was interrupted it was affecting my interaction (information) as something that we are acquainted with the space and how is it is influencing of all with simply because they occur simultaneously in experience". Here the participant was defamiliarizing consciousness (Romand, 2020). A simple example of from a familiar environment by choosing to step back an defamiliarisation experience is when one is listening and observe the familiar and habitual from outside to his own voice talking out loud, as normally we don't and more explorative experinces would be beneficial.

Group 4 are aware of their mind-wandering, but sometimes needs personification of external pressure to reduce their mind-wandering. Taking to a past self in an "experiential way" could be a strategy for this group.

Group 5: Would benefit from defamiliarization oneself from past perspective since they acknowledge sometimes not reflecting at the right moments in their process and don't realise that they are wasting time and spontaneously mind-wandering over the same question. That causes the feeling of lacking progress and being stuck. For instance, one participant described it like this: "Realising that it shouldn't be overcomplicated- is my way of getting unstuck, what is the easiest way? [she asks herself]." Therefore, the same strategy of defamiliarization during mindwandering would be beneficial for this group.

Therefore, defamiliarization as a quality of experince pay attention to it. The aim of defamiliarization is to would be of benefit for novice designers who mindreach a state of "unprompted" perception, where one can separate oneself from habitual predictive wander spontaneously. At the same time, all other groups can benefit from this strategy, as they also coding (projections). Defamiliarization supports have problems with refreshing perspectives when reaching a fresh perspective, and in the literary necessary. This strategy also corresponds with the narrative, it is achieved by prolonging the perceptive flexibility of thinking, which is a part of creativity process and drawing attention to the bizarreness of techniques. the habitual. Artists also reach the defamiliarization effect by making viewers perceive the image without relying on familiar or habitual "perceptive effort".

Defamiliarization is today mostly referred to as a narrative tool, but it has its roots in the study of emotions and psychology in Britain and Germany

Defamiliarization is explained through the concept of "other" by the philosopher Robert Musil, meaning to perceive the world differently from how we normally perceive it. This is how he describes the experience of "other" condition: "Everything was shifted out of the focus of attention and has lost its sharp outlines...and yet manifestly there were still other centres filling it again with delicate certainty and clarity" (as cited in Nanay, 2018).

Therefore, defamiliarization is the effect and quality of the experience, that is desired to be experienced

Part II

by novice designers in the context of their design process. The same experience for the same person can feel unfamiliar or familiar solely based on inthe-moment expectations and contents of his/ her consciousness proceeding the experience. For instance, if one returns home from a long travel things start to look unfamiliar, as they were not in sight and were not a part of conscious experiences and not reminding of personal concerns. Therefore, defamiliarization is a contextually sensitive quality and engages with the dimension of expectation of users.

How to reach a degree of defamiliarization effect of an experience by influencing sensory perceptions? One of the ways to achieve defamiliarization and dishabituation from the current content of consciousness is via a mind-wandering break (Schooler et al., 2011). After this mind-wandering break, one has refreshed capacity for dedicated processing (Schooler et al., 2011). Homogenisation experience considering optimal arousal theory (Leuba, 1955, as cited in Litman & Jimerson 2004) can support defamiliarization since it changes the habitual perceptive effort. Homogenisation experience provides a break with unstructured information, that lowers the arousal. According to optimal arousal theory, if organisms are under-

aroused (i.e., bored), they are motivated to increase their arousal to an optimal level by seeking out and investigating curiosity-evoking stimuli, including internal stimuli with mind-wandering (Leuba, 1955, as cited in Litman & Jimerson 2004). That means that homogeneous perceptual experiences with low variability of sensory information, which can appear somewhat boring and unstimulating, can support the need to generate internal content and increase arousal, causing deliberate mindwandering. In fact, neuroscientists have captured increased activity in brain regions associated with mind-wandering during homogenization experience (default mode network) (Schmidt et al., 2020). Low variability of sensory information, which happens during experiences that are guite homogeneous (for intense observing ripples, moving trees) creates sensory noise and supports the nervous system in not getting stuck in the same track (Carriere et al., 2013). Therefore, designed interaction with homogenisation experience will lower the arousal level by providing low variability sensory stimulation, creating a break from working on the task. That homogenisation break will support effortless and deliberate mindwandering, due to "information hunger" due to lack of meaningful stimuli (Marcusson & Clavertz et al., 2012), which in turn will defamiliarize the mind from



Figure 29 Homogenisation experince as a strategy for design in the context of working on a creative problem

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previous habitual perceptions (Schooler et al., 2011). should allow for defamiliarization (Requirement After that, the mind is more open to new experiences, 8). Therefore, the design goal that wil guide the including mind-wandering and refreshed returns trajectory of furthe research foth interaction in the to working on creative tasks. How homogenization context can be more clearly formulated as follows: experience is situated in the context of creative work From the interviews, it was also apparent that is in Figure 29. designers would like to have the possibility to have Having homogenisation experience, therefore, is a support in their mind-wandering whenever they need way to achieve delabialization and return to a task with it, as it is hard to predict at which exact point in time

a refreshed perspective. Homogenisation experience

Design an experience to support the mindwandering break of novice designers with a homogenization effect that is adaptable to the scenario and context of "working from home"

CONCLUSIONS PART II

This research part phase was focused on researching the context of mind-wandering for creativity. And the main conclusions of phase two can be elaborated by addressing the research questions:

RQ1 What are the needs of novice designers in their design process and how they can address them with a mind-wandering experience?

Novice designers have different needs in relation to their mind-wandering depending on their propensity experience as a break from work will allow to afresh (level) of daily mind-wandering and its quality the perspective with low variability stimulation (deliberate or spontaneous). Five mechanisms were Therefore designed experience should have a quality outlined that shape the behavioural adaptations of homogenisation. of designers and exert specific habits for mindwandering. The overarching tendency in the context RQ2 How could novice designers increase the of creative work is that novice designers tend to deliberateness of mind-wandering? [support mindreach optimal levels of mind-wandering (not too high wandering

mind-wandering at times can last for a course of seconds.

one would have a need for a mind-wandering break.

and not too low). 5 different design opportunities that align with the needs of novice designers were outlined. Designers with a tendency to spontaneously mind-wander acknowledge a lack of necessary awareness to properly reflect and defamiliarize from their current perspective. And they would benefit from effortlessly modulating their mind-wandering in a different way. This chosen strategy is one of several strategies, but it allows to research the details of perceptual qualities in more depth. Homogenisation

Part II

Information from the interview and autoethnographic a habit. Therefore, designed interaction should feel experience sampling allows to outline the following conclusion:

1) supports the deliberateness of mind-wandering.

2) Homogenisation experiences (white audio noise) with low variability of sensory information as a break supported the researcher's (mine) clarity of thinking and shifted spontaneous mind-wandering to deliberate.

Information gathered from the interviews allowed to conclude that novice designers would benefit from various ways to improve the deliberateness of their mind-wandering, for instance, habits of journaling and mindfulness will increase their meta-awareness and support deliberate mind-wandering. For other designers interaction with others to redirect their mind-wandering and defamiliarization from the current perspective would help in that case. Other ways to improve the deliberateness of mindwandering were proposed: creating a memo of self in an experiential way and explorative experiences of space and self-priming with a problem. Out of mentioned strategies, defamiliarization was chosen as one to proceed with.

RQ3 What interaction qualities can support deliberate MW experience within the context of the creativity of novice designers?

For some novice designers to engage in mindwandering interaction they need to feel the subjective usefulness of the whole interaction, for it to become

useful in the context. Since one of the requirements of mind-wandering supportive activity is that it should Moving through space (or perception of it) be of low cognitive load, usefulness can be reached via either integrating design in already performed everyday low cognitive load activity (cleaning etc) or deliberately making a low cognitive load task as a main purpose of interaction (fidgeting, playing simple game). If the activity is not of a low cognitive load that will not allow it to perceptually decouple from the external environment. Users should consider the demands of the environment to be low, to be able to mind-wander. That is possible in the moments of perceived privacy when one is not expecting to be disturbed. Therefore, perceived privacy is of the requirements for design (R1).

> Homogenisation is the quality of the perceptual experience, that supports deliberate mindwandering during the experience and will allow to defamiliarize from a previous perspective. and will allow to reach different perspectives during mindwandering. Homogenization quality, therefore, is the requirement of design (R2). Taking away the

> RQ4 What material form can support the necessary experience of MW that is appropriate for novice designers?

> This question will be further explored in the next phase. Interviews with designers confirmed that fidgeting and tactile interaction with varied materials is supporting mind-wandering.

Part III **Co-design**

INTRODUCTION

In the previous phase of research of the context design methods was chosen to support externalisation and goal was formulated, which served as trajectory for verbalisation of otherwise tacit knowledge of users further research of the complexity of integration a about the context and interaction. The aim of this phase was to research what environmental factors are desired experience in the context of working on a creative problem. Two co-creation activities allowed crucial for the experience (Research Q3). There were 2 activities part of this phase: Lego serious play (see to make apparent the nuances and requirements in the context that were not explicitly communicated Figure 30) and co-creation workshops. These two by the users in the interviews. The design for mindactivities were chosen, as they allow users to make wandering experience relates to complexity that their considerations about the context and desired people and users might not be aware of the mindinteraction explicit. This phase allowed to gain more nuanced understanding of the requirements for wandeirng, and therefore the knowledge of how requirements the design should have may also not be mind-wandering through the lens of the users. explicitly communicable. Therefore, using co-creation

Figure 30 Exploratory lego serious play session





LEGO SERIOUS PLAY EXPLORATORATION

Two exploratory workshops with Lego were awareness to reflect. conducted. The main question for the exploratory activity was how desired homogenisation experience to what mind-wandering, homogenization and could be manifested and integrated into design work. Building with LEGO bricks is a process that allows facilitating guided workshops with adults to encourage reflection and channel dialogue and it is used for innovation in the business environment 1. and problem-solving (Lego, 2023). Using LEGO would help participants to open and discuss abstract gualities, creating representations with bricks. I have conducted two sessions with 6 participants in total 2. from a user group. (see Figure 30).

The main task for participants during the session was: to create an experience that will help to deal with feeling stuck while working from home on a creative problem. The question was framed in this way, as homogenization experience will specifically be valuable in the moment of feeling stuck, and lacking

Session set up. Participants had an introduction defamiliarization are, also with visual prompts to help them imagine what it might feel like. Participants had 3 rounds of building with 3 tasks which lasted in total for around an hour.

The sensitising task of budling one's memorable mind-wandering experience. Created examples of mind-wandering models are illustrated in the Figure 31.

Mapping of associations on a term homogenisation. Making a model of experience to address design challenges with homogenisation quality. Responses to this task are in the Appendix 6 Mapping of associations on term 3 defamiliarization. Making a model of experience to address design challenges with defamiliarization guality. Responses to this task are in the Appendix 6

After each round of "building" participants presented their results briefly. Other participants and a researcher were able to ask to follow-up questions. The main insights from the session were related to the details for situating the interaction:

1. The first insight was: The home environment is not necessarily good for mind-wandering. For instance, one participant created a model describing how she fills mentally stuck in front of the unchanging wall in front of her desk, which makes her feel she cannot move mentally and physically. She depicted how she moves to a balcony to mind-wander

work at home and the is no view in front of me. My computer is against the wall. So I want to move forward (mentally and psychically). Sometimes at home would move to the **balcony**. So I can see neighbours, kids, sky (clouds). And then I can just stare. And when I hear people I will think what are they doing? [more pen to experience] without trying to think what I am seeing. I feel the sun on my skin [more focused on body sensations, unlike when I am behind the monitor]



Figure 32 One of the examples to depict Mind-wandering



Figure 33 An example for how to help mind-wandering







MW When playing football





Tramplin and the journey



while observing movement: kids playing, curtains moving (see Figure 32) wich means being exposed to some dgree of variability in chnage of stimuli. This illustrates an image of the context that novice desigers specifically face. Because they usually have limitated space without overiew of a large space when working form home.

2. Habituation of mind-wandering ritual allows one to foresee a predictable result and stop the negative mind-wandering loop. The idea "I know what concrete experience will help to change my way of thinking" supports certainty in the mind-wandering ritual. Therefore, interaction should have the potential to become a ritual (Requirement 9). Having a ritualistic space or environment that has a predictable positive effect allows us to reduce the stress of feeling stuck

3. There is no one-fit-all mind-wandering experience. Participants had different preferences for sensory channels to focus their attention on during mindwandering. Some proffered observing wind (visual channel), some listening to familiar music (audio) and some had more attachment and fascination with tactile soft sensations (fidgeting, while playing with clay). Therefore, it will be more beneficial for design to focus on a limited number of perceptive channels, rather than trying to cover all of them. A specific preference for low variability sensory noise in one of the channels means the individual will create a ritualistic habit that works best for him/her. Some would play with a piece of clay; some would tap with a leg or listen to familiar music.

Observing movement was also something participants referred to as beneficial for their mindwandering. One participant was mentioning that observing flying kites or curtains moving is supporting her small mind-wandering breaks. For design that means that observed change in sensory channels should be somewhat predictable, but organic. For visual channels that means movement that resembles behaviors of amorphous objects will support mindwandering.

Novice designers preferred to move away from the working desk to mind-wander. That means that

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the ability to move through space, during interaction could support the desired mind-wandering and portability is one of the requirements (R9).

Conclusion:

Participants were describing that changes in various sensory channels triggered their mind-wandering. They had various preferences, but to limit cognitive load it is important to focus on stimulation of one curtains or clouds, looking at nature and moving sensorial channel as a core of the experience, which I have chosen to be visual. Participants have explored the quality of homogenisation and defamiliarization, but it required some time for participants to envision what those qualities are to then create new experiences with them, therefore more co-creation

sessions were needed. Having the first session allowed me to clarify more clearly the design goal. Takeawav:

After the discussions with participants, it was apparent that they use homogenisation experience, to reduce arousal and have micro or longer breaks by observing seemingly predictable objects (moving leaves). Those examples entail concrete objects that have a meaning, but if one focuses attention on the low variability of visual change in these objects it is supportive of mind-wandering, like homogenisation

CO-CREATION SESSION TO ENVISION CONTEXTUALIZED INTEGRATION.

experience.

Since previous research activity revealed that mindwandering relates to ritualistic behaviours, there was a need to understand what material form would support the interaction in the context. Co-creation allowed to directly tap into the needs of the users and materialise interaction in the context, which helped to answer research question 4.

Participants of two co-creation sessions were all Industrial Design Engineering students of TU Delft. way that will support mind-wandering as a break. with a homogenization effect (visual) that is adaptable to the scenario of "working from home" Participants were introduced to the topic, with exploratory and sensitising tasks.

There were two co-creation sessions, and the prototypical ideas from the 1st session were introduced in the second part of the second session to provide new prompts for inspiration (see Figure 34).

The overarching set-up of the sessions was:

Introduction to mind-wandering and 1. homogenisation experience term with sharing

inspirational collage of experience to help participants imagine the desired effect (see Figure 35).

Participants were introduced to a requirement-perceived privacy, and an explanation for how it is envisioned for product use. It means having an intermittent expectation of not being disturbed, which can be reached via wearing glasses, having headphones or being on the top of the hill. People may also communicate their desire not to The main task that participants had was to create a be disturbed by looking at the phone. Even if mindwandering is done in a public space and a person is observed, she/he has a reasonable expectation for the environment not to be demanding of a person to react to it, or it requires to react to it to a lesser extent.



Figure 34 Connection of 2 co-creation sessions



Figure 35 One of th images that wasshow participants to represent homogenisaton experience, own image of a tree in Delft , 2023.

Co-creation 1. In the first session, participants were private space and therefore reduces the possibility exploring how homogenization experience can to be disturbed. Participant 3 imagined a scenario of become part of their mind-wandering during creative using it in the train to create beams of reflected light work. Participants had 7 min to sketch ideas and 10 in front of oneself to mind-wander while being on a min to build the prototype. Three participants have come up with the following ideas:

Wearable Participant 1: expandable part on the sleeve; vision see-through limiting structural element from the cardboard; Participant 2: A Fidgeting device that creates sounds (a mini drum); 3) Participant 3: a reflective fan.

A short presentation of ideas was followed by a discussion to hitchhike and evaluate others' ideas. Participants have found a reflective fan the most feasible, as it was resembling conventional objects, which is appropriate to use in public spaces. Participant 1: "Yes I would definitely use it... if it is a fan, but also has additional function I would buy it". The fan allows to create of a







Figure 36 Combinatorial idea, as a result of co-creation session 1.

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Takeaway from the co-creation session 1.

Participants of the first co-creation session found fidgeting-like interactions as supporting their mindwandering, although the formulation of the task or provided prompts did not mention fidgeting, for instance playing the drums and using a fan requires repetitive hand movement. That means that participants recognize that continues tactile interaction with an object, which is fidgeting, will support mind-wandering,

Co-creation two

It was held in the local public library with a more inviting environment. The overview of the set-up of the session can be found in the Figure 37.

Procedure: Three participants (novice designers) were introduced to the term mind-wandering, design problem and the requirement of perceived privacy.

The tasks sequence was as follows:

Task 1: First participants had a brainwriting task of

how fog, disco ball, and leaves shadows can be a part of a product experience. After 5 min they were passing worksheets to their neighbor who had to hitchhike on ideas. This activity was introduced to support hitching and generate the guantity of and pool of ideas to be transferred to the next phase (Heijne & van der Meer, 2019).

Task 2: Participants were asked to sketch how a prototypical idea from a previous session can be transformed

Task 3 Building a prototype as a synthesis of ideas considering the introduced requirements of perceived privacy.

Task 3.1 Participants were asked to think out loud and adapt the prototype to fit some challenging factors (see figure37)

As the result of the co-creation session 2 participants have come up with 3 ways to integrate mindwandering support into the daily object:

1) Glasses that limit the vision angle with the structural pattern. These could be taken off easily



Figure 37 Co-creation session 2 timeline

and are ideas directed

at reducing visual

information intake and

defamiliarising from

a habitual perceptive

with a reflective part.

The reflective part was

flexible and allows to

distort the perception

of the environment to

change the perceptive

effort. It is portable

and allows one to dissociate from the

the gaze.

Wearable cap

effort.

2)

environment quite fast, Figure 38 Co-creation session by simply redirecting

3) Hand tools to engage with the environment. may require extra cognitive effort, and can increase The idea of a fan was transferred to a reflective alertness, which will prevent mind-wandering glove, which required more hand movement and Highly reflective surfaces in proximity to 2) eyes, which can be embedded in the hat also can gave agency in changing the perception of the provoke overstimulation. Although it serves well environment with own actions or directing and manipulating the light. The reflective glove was the as a private focus spot for eyes and allows one to defamiliarize from the perception of the environment one that was inviting explorative behaviour. That also inspired participants to remember how they used to fast, positioning eyes for a prolonged period in a be more explorative as a kid and touch the bushes, top position can be tiring and walls, and environment with their palms more. The uncomfortable. Also, using prototype induces the behavior of exploring dark it on the go can also cause corners or observing the materials would support disorientation and vertigo, as the mind-wandering of adults as well. Participant visual information is moving in 3 showed how she would walk with the glove and different directions. direction observe reflections or use extended palms to 3) Third become more sensitive to the environment. was focused on using light-

After a group discussion, these considerations were mentioned by participants (see figure 40 on the next page):

1) Glasses that distort the perception of the environment (see Figure 39) for illustration of possible effect. Althought seem versatile, glasses that will distort vision in close proximity to eyes, still

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producing objects (glovelike ideas) with one hand to explore the environment. It was a more feasible one. It allows us to defamiliarize from the environment, by introducing a



Figure 39 Example of posible effect from glasses, that was created using AR filter

low variability visual change, which is the essence of homogenization experience. This concept is possible

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to use on the go, and the user will be able to monitor the environment around them with a side gaze to predict the demands of the environment. Because of this, the attention can be directed towards observing the light and later to internal thoughts to mindwander. That is not so much possible with glasses that limit or distort vision, as they are not allowing this awareness and can create a feeling of unsafety because of the inability to predict the upcoming threats or challenges from the environment. That makes the concept of a light-producing object the most desirable direction to continue the research through the design phase. Drawings made by participants can be found in Appendix 7.

The main takeaway from co-creation sessions is:

During two-cocreation sessions, participants explored how the homogenization experience can be translated into a product they can use as a part of their working-from-home routine. Although fidgeting was not a part of the assignment participants have kept incorporating hand and palm movement or fidgeting in their prototypes and ideas, like waving

with an analogue fan, using a mini one-hand flipping drum. That means fidgeting, meaning operating some tool with hands that involves repetitive movement participants recognize as beneficial and supportive. Novice designers recognize the benefits of fidgeting, which means they would find it reasonable to buy a product positioned as a fidgeting product. This means that ability to fidget with hands during product experience should be considered a new requirement. Observing organic behaviours of either reflected or directed light is recognized by users as supportive of mind-wandering. Therefore, low variability of visual change should be organic to support the desired effect.

Also, visual feedback shouldn't be overstimulating, as it will prevent from mind-wandering. It also should be considered as one of the requirements.

The next question that follow from this activity is: What specific qualities of homogenious feedback would influence mind-wandering without causing overstimulation? For that experimental testing was conducted with different visual feedback, which will

Participant 1 Participant 3 Participant 2

Figure 40 Results of transformation of ideas from co-creating session 2

CONCLUSIONS PART III

A variety of research activities allowed to explore the The following co-creation allowed to directly context of mind-wandering in detail and generate tap into the needs of the users and learn about a nuanced understanding of how mind-wandering the requirements for interaction in the context. experience can be integrated in the context. Co-Participants of the co-creation session have creation allowed to directly involve users (one of the created varied various concepts that incorporate stakeholders) in the design process of a product. homogenisation quality in the product use. Users The design goal from the previous context research were introducing fidgeting in their ideas, therefore phase allowed to formulate a vision and a stance, fidgeting became of the requirements for design. from which to further formulate research questions Co-creation activates allowed to formulate the in the next phase. Design goal was not limiting the research questions for the details of the interaction research at this phase, but rather provided verbal for the next phase of the research. clarity for communication with the participants of Other insights that had become milestones in the co-creation session. Also, formulation of the research after this phase were the following. The design goal allowed to reason the rationale for the preference for specific sensory input that would set-up of the co-creation activities. This research be supportive for mind-wandering differs across phase started with the insight that low variability individuals, as people prefer more tactile, visual, and homogenisation experience can support more or audio low variability sensory noise. Therefore, deliberate mind-wandering. The first exploratory introduction of all mentioned stimulations is not Lego session helped to externalise tacit knowledge feasible and reasonable in one product because of of users about on how homogenisation experience the rising cost. But also, it can cause overstimulating, can be integrated in the context. The session as users might not be able to direct their attention in revealed that some novice designers may lack in one sensory channel and ignore the other channels. their immediate reach next to the desk low-variability Therefore, aiming to targeting a broad spectrum of stimuli that support mind-wandering. The need for stimulations is not feasible if one aims to keep the portability of the product is required, as changing product accessible. Therefore, this project aimed to target users who would prefer visual sensory feedback location is something designers habitually do to mind-wander. Novice designers sometimes are and fidgeting during mind-wandering. Fidgeting limited in their ability to shift to another space when tools are something users actively search to buy to working from home. Therefore, creating a dedicated replace phone scrolling behaviour, therefore users habitual space or object with a predictable effect will find fidgeting ability as useful and therefore will would be necessary. make a product desirable.



Part IV **RtD**

INTRODUCTION

The aim of Research through Design phase was to gain knowledge on ways desired qualities of experince, including homogenisation quality can be translated in metarial form that is fitting the context (Research Q4). Research trough design was focused on creating artefacts or elements of experinces that allowed to elicit behaviours and generate required knowledge of th interaction (Stappers & Elisa Giaccardi, 2017). That knolwedge was later used to create a prototype that is of higher fidelity and synthesises collected insights. This phase consisted of visual percpetion

experiments, followed by interations on embodiment and final evalution testing. Insights from the previosu phase of the research allowed to form a question about what type of change in the visual feedback would be more supportive for deliberate mindwandering. Two visual precpetion experiments were: 1st on the details of variability in visual feedback, that will create low cognitiev load; 2nd on the percpetual effect and appropriatness of introductin of selfrefferntial element — a flipped shadow — to the interaction. These two experiments were targetting

activities

were



Figure 41 How specific RtD activities are related to the elements of mind-wandering model

VISUAL PERCEPTION EXPERIMENT

The next research activity was focused on how making it more homogeneous. The tested 3 videos specific visual feedback with homogenization would were the following: influence mind-wandering.

Set-up of the experiment. Participants watched 3 1) Video of leaves creating shadows on the wall, short video clips (each 1 min) with different degrees which is a realistic visual experience, which lots of of details on their computer using a shared link, people are familiar with (link to the file that was used which was distrusted in the social network among during experiment); novice design students. The invitation to fill out the 2) Moving floating particles that resemble glowing guiz was suggesting using it also as a break from microorganisms floating in the water. Here movement working. After watching each video, they had to was faster than in video 1 (link to the file that was answer 2 questions regarding how frequently they used during experiment); had deliberated or spontaneous mind-wandering 3) Movement of a seemingly monotonous pattern. while watching it. At the end they were asked which I have created a video to create a homogeneous one they would prefer to observe during the break experience with small particles moving to and out on the wall at home and were shown illustration to of the centre (link to the file that was used during help envision possible integration. (see Figure 42) experiment).



Figure 42 Illustration that was shown to participants as a part of experiment.

The choice of tested samples was guided by the The relative difference between the score on insights that appeared from the previous phase: Deliberate and Spontaneous mind-wandering is observing the organic behaviour of light was calculated, which creates a more deliberate (green) recognised as beneficial for mind-wandering. Also, and more spontaneous tendency (pink on the chart). the literature confirms that natural experiences Results Then number of participants with specific tendency are facilitating the restoration of attention due to intermittent mind-wandering and soft fascination for mind-wandering was calculated and illustrated (Williams et al., 2018). Therefore 2 sampled videos in the Figure 43 (next page). Shadows of levaes was causing a tendency to deliberate mind-wandering in were resembling nature, and the third was focused on limiting the change in visual information intake, a greater number of participants. Full data is availbile Deliberate Mind-wandering for novice designers

The frequency of deliberate mindwandering was measured with a question: "I allowed my thoughts to wander on purpose while watching ... " with a 5-point scale from rarely to a lot. Selfreported spontaneous mind-wandering was measured with a frequency statement: "My thoughts were wandering spontaneously while watching" and the same 5-point scale options. These questions are adapted from Carriere et al., 2013).

Data analysis

Part IV



Relative tendency to mind-wandering caused

Figure 43 Relative tendency to mind-wandering while watching different videos. Numbers refer to number of participants

in the Appendix 8.

Also, on the question "Which one of them would you prefer to observe during your break from work?" 10/14 answered seeing shadows movement. They explained it with the following: "It's organic and calming. Feels familiar but is also not boring", "It it as the least preferable. One person explained it: feels natural and real, like a scene that could happen somewhere else. It makes me feel like a teleport I needed to make sense of the images, so it was

to somewhere but not here". The last comment refers to mind-wandering and people creating an "association with a calm environment [which] allowed me to disconnect more than the other two". The least proffered was "moving pattern"-7/14 have chosen "With the other two (particles and pattern) I felt like



Figure 44 Illustration of the difference in percpetions for 3 tested options.

-069 ability to "allow their thoughts to wander". The combination of too small details plus increasing the speed of movement in the sample with floating particles did not allow participants to wander deliberately, rather it made them overly focused on movement. Therefore, an optimal level of stimulation would be preferable. A movement that resembles organic objects' behaviour (moving leaves) for instance creates enough sensory noise to support mind-wandering but is not overstimulating. Therefore, the designed artefact should allow to observe a slight change in behaviour (R6) and limit the information overload by too fast change (R5).

harder to let my mind flow, it required more attention", meaning it was overstimulating. And another comment in regards to visual experience was that: "It had a bit of a dizzy-making effect.". The overview of the details of the differences between three options of stimulation is illustrated in Figure 44. Takeaway from his RtD activity Visual homogenisation experience to support mindwandering should resemble organic (nature-like) behaviour and nature-like experiences, as that will provide an optimal level of stimulation. Very fast animation was pulling too much attention to the environment, which did not support participants

IDEATION WITH MATEC

To generate out-of-the-box ideas that would support words defamiliarization, sameness, homogenisation, the homogenisation as a break from perceptions, and defamiliarization, is generated. After that 2-word I have used the MATEC method to ideate with pairs are selected and then the combination is forcefitted to generate solutions to the problem (Heijne specifically selected words: defamiliarization,



Figure 45 Illustration of MATEC ideation method

sameness, and homogenisation with are connected to the design goal: creating a homogenisation mindwandering experience for designers in the scenario of working from home. This tourniquet supports divergent thinking and allows us to reach ideas beyond the obvious. Then a matrix of associated

word 5.4

& van der Meer, 2019). See Figure 45 for illustration of the steps. The result of the ideation is illustrated in Figure 46 (see next page). Ideas that have more potential for further research are circulated with yellow.

Defamiliarization with seeing one own changed shadow is something that can become part of the same visual experience. Painters also use mirrors to detach from the habitual vision of the painting and see the reflected image to become aware of their projections. Seeing one's own flipped shadow projection is a simple but potentially impactful part of the interaction, therefore it became part of the next research activity.













Figure 46 Results of MATEC ideation

FLIPPED SHADOW EXPERIMENT

-071

One of the findings from the literature review stage with leaves, which immediately made them feel of of this project was that a moment of self-reflection vacation and have set them into a relaxed mindset. could support deliberateness of mind-wandeirng. Seeing one's shadow mirrored also supported Therefore, the goal of the testing was to understand detaching from the regular view of oneself. It also whether seeing one's shadow appearing would made some participants think of planning to go support mind-wandering and not interfere with out (future-directed mind-wandering) or looking at mind-wandering. themselves sitting at the bench (retrospective mindwandering). Also, objects randomly appearing in The set-up of a small-scale experiment (6 the frame were supporting curiosity "of what is it." curious to figure out what it was.

participants, who were TU Delft Industrial design Engineering students) was as follows: a camera was One participant mentioned something was captured used to apply AR filter on a person, which created in the frame accidentally, and then she was more a shadow in the visual environment (see Figure 47 for illustration. I asked participants to interact Created interaction required more attentional control with a shadow and gathered their feedback with a and did not support automation of movement. One short semi-structured interview. The tendency for participant mentioned "I would like just to observe deliberate or spontaneous mind-wandering way the movement" passively. Participants did not feel measured using 1 question for self-reporting the they could allow themselves to freely wonder, which frequency of deliberate mind-wandering "I allowed reflected in the tendency to apontaneous mindmy thoughts to wander on purpose" and one for wandering (see Appendix 9). a frequency of spontaneous mind-wandering "My One participant mentioned that having this dedicated thoughts were wandering spontaneously" (questions experience would make him feel less guilty about adapted form Carriere et al., 2013). Self-awareness mind-wandering. So, having a dedicated space and was measured To what extent were you aware of time for oneself would make mind-wandering more yourself". pleasurable and more open to the experience.



Figure 47 Set up of th experiment

Results: The experience supported the awareness self-awareness is possible to create by seeing one's of one's own body movement, and therefore oneself shadow, but since the shadow was flipped did not (5/6 participants), therefore it should support more allow one to mind-wander freely. Therefore, this intentional mind-wandering Also, some of the element of the interaction is thought to be redundant participants mentioned they did like the association and was not included in later stages.



The main takeaway from this small sample experiment: tested interaction required more active engagement, which then doesn't support the homogenisation experience and lets the mind freely wonder and observe the visual change.

Also having a dedicated space and creating space and environment to mind-wander would support feeling less guilty about taking a seemingly "not useful" break. A moment of
PROTOTYPING: RESEARCH ON EMBODIMENT

Previous research activities allowed to further research the idea of a light lamp that creates a homogenisation experience and allows to observe organic movement. Later, research through the design phase was focused on rapid prototyping and synthesis of ideas developed earlier. The product should be adaptable to the changing needs of the users, and immediately available to initiate quickly when necessary. The most basic prototype for this idea was the following: a hemisphere with a reflective inside. I have developed 3 prototypes with different sizes and interaction scenarios that synthetized insights from previous phases: 1. Bigger lamp with 2 rotating elements to create changing pattern of light. The light is supposed to be directed to the ceiling or walls.

These three concepts were provided to users (5 students of TU Delft Industrial Design Engineering) so they can form an opinion of desired experiences, it was followed up with a couple of opened ended questions (see Appendix 10). Most novice designers preferred a smaller light source with a mandala light pattern, which created a greater feeling of intimacy and perceived privacy. A couple of participants expressed an idea to make it soft and puffy at the back.

After discussions with users, the following concept for interaction has emerged. The scenario of use would be as follows: The user would be using ambient light while working. But at some time, users would start to pick up the phone as a sign of the need to take a break and mind-wander. Then an interaction would be initiated by the lamp, and an abstract floating blob would appear. Users can ask AI a question and the lamp would create an abstract shape based on association with one of the worlds in the text prompt (see Figure 49). The representation of possible visual feedback could look like in the image below. Mindwandering would happen automatically, as a reaction to an abstract prompt. It can potentially replace "social media scrolling breaks" that novice designers do to mind-wander and allows to afresh the contents of consciousness with new self-generated content. Although this concept is feasible, to create such a product, it would require an expensive light projection system, wireless data connection and microphone, which makes it not accessible for novice designers. That makes this device competitive with smart home AI systems.



Figure 49 Recognise lamp idea, with possible feedback form the lamp

Choosing direction for a flexible duration of the interaction, so the Throughout all three phases of the project there user can interrupt the experience and return to have been collected several design requirements the task if desired (R12). Accessibility to the value have been: perceived privacy, homogenisation in the of the product is a very important requirement for visual field, adaptability to various contexts, limiting novice designers, as they usually are limited in their information overload, ability to observe the change financial resources (R3). The number of requirements: in behaviour, guick start, allowing defamiliarization, perceived privacy, homogenisation experience and portability, ability to become a habit. Fidgeting accessibility, are of double value as they are more was included in the requirements as it will support definitive for achieving the effect of experience mind-wandering (R11). Design should also allow and desirability of the product. To choose between



Rapid prototype



Large table lamp with 2 rotating element to create pattern in light



Small hand-size lamp that affords easier fidgeting

2 rotating elements

testing light



Lamp with a fidgetting ball

concepts, I have used the Harris profile (1961) to Based on Harris profile the chosen concept direction evaluate the concepts based on requirements. Some earlier more feasible concepts from the co-creation session were also included. Based on the profile the most highly scored idea would be Wander Beam, a portable light source, scoring 24/30 (see Figure 50). The second listed idea of a Recognise Lamp is more feasible to become an office environment creative tool for intentional mind-wandering breaks, or as an remain organic. To achieve these effects 2 layers of omnipresent abstract prompt that stimulates mindwandering during brainstorming. But for this specific context and the listed requirements its overall score is 3/30, which makes it less appropriate for a chosen context. The concept that has the second place in rating is Glasses to limit vision(14/30). It is followed by a version of a wander beam concept that adds the additional function of a fan to it. It makes the product more desirable to use in public but makes the product less adaptable to various conditions.

is a Wonder beam, a portable fidgeting light source.

Further prototyping

To continue developing the prototype of the Wander beam I have ideated on the light properties with the shape of the laser cut pattern that creates the organic light effect. The created pattern of light should laser-cut plates to partially block the light that freely moves to mimic how layers of leaves move and create an organic-looking maze with low variability of change. I have tested a couple of patterns: 1) organic ellipses and lines to mimic leaves and brunches and 2) shapes that resemble gaps in the crown of the tree. 1st cutout shape was working better for a small size of the light source and created a more organiclooking pattern than the second one. I have modified the cut-out one, so it has radial symmetry.





Figure 51 Further prototyping



TOTAL SCORE

Figure 50 Harris Profile scores

30

3

12

14

11



testing with a paper cover: supports more intimate scenario of use

This did not change the light properties significantly (see Figure #) but allowed to have more visual unity in the look of the product. The pattern was inspired by a dandelion flower, but it is ambiguous enough to create other associations, like sea creatures. So, I decided to proceed with the last option, as it results in higher aesthetic appreciation than the first one due to the symmetry (for unity) yet ambiguity (for variety) of visual stimulation (Post et al., 2017).

Another iteration of the prototype was testing use with a semi-transparent cover. It changes the interaction scenario from projecting the objects to the more intimate scenario of looking inside of the object. The cover was rather limiting the possibilities of use; therefore, it was redundant.

For the form of the product, it is important to be able to hold it in one hand, therefore it should be quite small. I moved the first rotating part outside of the bowl, which allowed me to make it smaller and added small waves to support the grip, but it also provided a more organic look (see Figure 52 for image of the visual effect on the next page).





Figure 52 Images of the product and visual effects

FINAL EVALUATION



Figure 53 Final evaluation

The final evaluation was aiming to find answers to the question of whether the mind-wandering was affecting creative performance, as well as evaluating user experience in the context of working on a creative task (see Figure 53 for th eimage of final evaluation).

The research questions that were guiding the design of the evaluation set- up were the following:

Will the use of the product improve self-efficacy and therefore can be used to enhance creativity? Will the use of the product result in a tendency to more deliberate mind-wandering? How does the product appeal to the users? Do users find the product appropriate to become a part of their creative work routine? How the use of the product affects the visual perception of the immediate environment?

To evaluate the product various factors that affect the creative performance were measured. Creative selfefficacy has been proven to be a reliable determinant of creative performance and is defined as a self-view or belief "that.

one can produce creative outcomes" (Tierney & Farmer, 2002, p. 1138). Self-efficacy was developed by a motivation psychologist Bandura and is the "most instrumental in predicting performance in a specific domain" (Bandura, 1986, as cited in Tierney & Farmer, 2010, p.227). Self-efficacy is especially suitable to study creative performance, as "Innovativeness requires an unshakable sense of efficacy to persist in creative endeavours when they demand a prolonged investment of time and effort, progress is discouragingly slow, the outcome is highly uncertain, and creations are socially devalued when they are too incongruent with pre-existing ways." (Bandura, 1997, p. 239, as cited in Mathisen & Bronnick, 2009). Self-efficacy has been proven to be a predictor of creative output in a natural work setting (Tierney & Farmer, 2010). Introducing the tested product to an experimental group is supposed to affect self-efficacy both as an external and internal determinant (Gist and Mitchell, 1992, as cited in Tierney & Farmer, p278): 1. As an external contextual determinant it will create the attitude in participants that they have a tool to rely on as a source; 2. Since the product is facilitating mind-wandering it will support the generation of content of consciousness, creating an internal determinant for self-efficacythe feeling that one is able to generate ideas.

Self-efficacy is preferable to study in the experimental setting where the temporal gap between the measure of self-efficacy and a creative task is short (Tierney & Farmer, 2010. Indeed, a measure of self-efficacy is suitable to study of short-term effects of specific interventions following a pre-test-post-test control group study design, where one group receives the experimental intervention and the control group doesn't (Mathisen & Bronnick, 2009). Self-efficacy is measured just before the beginning of the task, and right after the task in both experimental and control groups. Measuring the change of creative confidence is measured as -beliefs in one's ability self-believes repeatedly within short intervals of to think or act creatively (Karwowski and Beghetto time is a valid method, which allows us to capture 2018) It was measured using creative self-concept the dynamic and situated nature of creativity, which 100 scales consisting of 7 questions (Beghetto and reflects the approach of this project. Additionally, Karwowski 2017, Goncalves, 2022, see appendix#) micro-longitudinal studies have been conducted before providing a task; about creative self-beliefs in the classroom context 2) measuring self-efficacy about a provided ideation (Beghetto & Karwowski, 2019), therefore this research task with a 100-point scale immediately before task set-up has already proven its validity. If self-efficacy engagement. increases because of the use of the product that will 3) measuring self-efficacy about one's creative allow to conclude that the product will consequently performance just after the completion of the provided improve creative performance. To control for the task with a 100-point (Beghetto and Karwowski 2019). factor that executing an ideation task can influence creative self-efficacy, a controlled study will be **Evaluation set-up** executed to address this factor. The question on self-The experimental group consisted of 4 females and 2 efficacy will be measured on a relative (0-100) scale males, with a median age of 25 and a median of 2,5 from "No confidence" to "Full Confidence" to solve years of experience in design (including internships the problem in a creative (useful and original) way. and freelance work). The scale was not provided in between numbers to The type of mind-wandering was measured with prevent participants from remembering the number an adaptation of the Deliberate or Spontaneous they score. mind-wandering scale with 6 questions on a 7-point

The idea generation task was chosen as a creativity how frequently mind-wandering happened during task among other steps in the innovation process, as creativity tasks. The quality of mind-wandering is the ideation task usually requires mind-wandering measured by calculating: Median of Deliberate Mindto generate and incubate ideas. Ideation tasks are wandering (out of 3 questions) minus the Median commonly used for incubation research (Cardoso & score of Spontaneous Mind-wandering (out of 3 3 Badke-Schaub, 2009), and less for mind-wandering, questions), which resulted in a positive or negative where unusual uses task is more common (Agnoli value, which represented a relative tendency for a et al., 2018). The ideation task is a more suitable specific type of mind-wandering. cognitive task for this study, as it will allow to the simulation of the idea-finding phase of the creative Defamiliarization from the environment was process with a short testing time. The task that measured with a question: was given to participants was "Design a way that 1. How was your visual perception of the allows people to pick up a book from a shelf (e.g., environment affected by the use of the product? with in a library) that is out of their reach, for instance, 9 point scale varying from: above their head". This task was previously used in "I habitually perceived things- Things felt familiar incubation studies (Cardoso & Badke-Schaub, 2009). and regular" to "I was perceiving things NOT in a The measurement of self-efficacy is done across 3 familiar way - I felt estrangement". points:

measuring the basic level of creative In order to evaluate user experience Attrakdiff scale 1) was used, as it is a reliable tool to measure a user's confidence beliefs related to the performance problem-solving. Creative experience in a short time. This tool allows to evaluate domain—creative Deliberate Mind-wandering for novice designers

liker scale which measured with a self-report of

the desirability and attractiveness of the product via the hedonic and pragmatic qualities of the experience (Hassenzahl, Platz, Burmester, & Lehner, 2000). It uses 28 semantic pairs with a 7-point scale. At this stage of the product development, mainly Hedonic Quality Stimulation (HQ-S) and Overall Attractiveness (ATT) were quality of interest. HQ-S refers to the level of personal development of acquiring new knowledge and abilities that a user hopes to gain from the use of a product and ATT refers to the overall attractiveness of a product (Perrig, 2018).

To gather more detailed feedback on user experience at the end of the session semi-structured interview was conducted. The list of questions can be found in Appendix 11.

The timeline is visually represented in the Figure 54. Yellow activities were focused on capturing creativity, purple – capturing mind-wandering quality and blue evaluating and getting feedback on user experience. The discussion part was captured with audio recording on a phone and interactions with the product were photo and video captured.



60 min in tota

Figure 54 Final evaluation timeline

Data analysis

Quantitative data.

Following a dynamic approach to measuring creative confidence, data can be compared.

interpersonally and the average pattern of change for an individual. The trend for self-efficacy change is calculated as the difference between self-efficacy measures before and after the test. 5/6 participants in the expected rental group reported higher self-

efficacy after finishing the task, unlike 4/6 in a control group, who performed a task without a product. The median growth of self-efficacy is higher in the experimental group (+16.05) in comparison to the control group, which is +5.5 (see Appendix 14). That means that the use of the product was correlated with an increase in self-efficacy after the use. That result should be also interpreted, to account for the median value of basic creative confidence and time of professional experience. The score of basic creative confidence was higher in the control group (75.5/100) than in the experimental (65,1/100). That means that although participants in the experimental group had a lower basic level of creative confidence, their rise in self-efficacy still was more significant. Groups also differed slightly in the median years of professional design experience: the experimental group was slightly more experienced and had 2,5 years of median experience in comparison to 1 year for the control group. The factor could have also contributed to the obtained self-efficacy results. But in conclusion, an experimental group in comparison to the control group had on average higher increase in self-efficacy. These results have its limitation due

> that participated in the study. The use of the product also influenced the originality of ideas. Participants in the experimental group mentioned original ideas:

to the small number of users,

1) Shelves moving closer to

a person based on gaze (inspired by Harry Potter movies) (P6);

2) Roller coaster (P5);

3) Redesigning shelves with walking on shelves with books (P4);

4) Hooking the books, which have hanging elongation (P1); fishing the books (P5). Other ideas from the evaluation can be found in Appendix 13. Mind-wandering tendency. In the control group also 2/6 participants had a tendency towards deliberate mind-wandering, and one had a neutral tendency,



Figure 55 Exmaples of the ideas from experimental group

while in the experimental group, 4/6 participants observations of the behaviour of participants and had a more deliberate mind-wandering. Therefore, what they were talking out loud as a reaction to there is preliminary data that the product was the product, they were explicitly referring to their causing deliberate mind-wandering. However, from memories of being in nature, fantasy books. It was



Figure 56 Results from experimental group





Figure 57 Results from control group

apparent that specific interaction with a product was causing mind-wandering as it was causing not only one but a number of associations for one individual. But separate more large-scale studies of longer periods of interactions with a product would provide more definitive results.

Defamiliarization:

Participants in the control group mentioned slight visual defamiliarization from the environment median is 6 on a 9-point scale (see appendix#).

4 out of 6 participants have felt defamiliarization to various degrees, one remained neutral one remained closer to a familiar visual perception. In the control group, all participants mentioned the perception as closer to familiar on a 9-point scale. That allows to conclude that a product is causing defamiliarization, changing the perception of the environment.

Attrakdiff scale results:

The results of the user experience scale Attractive were averaged and visualised in the Figure 58. HQ-I means that indicates how well a user identifies with the product. In the tested prototype it is not so high, and some of the feedback participants mentioned that it was not precisely fitting their hand size (Participant 4) or they would prefer to create or choose a pattern themselves (Participant 4,5) to support identification with an object. Word pair isolating/connective and separates me/brings me closer and alienating/integrating are the most of interest, as this product aims to create private space and more negative score on those qualities is more connected to privacy and having isolated space, which supports the desired requirement of experience (perceived privacy). In connection to users finding, it is presentable, it can be interpreted longer break, moving to the sofa with it or going as, despite they find it not a premium, they wouldn't out with the product. For instance, participant 3 mind showing it to others around. on a question "Can the product become a part of Hedonic quality stimulation is graded highly in your routine?" replied: "A part of the break while working... probably fidgeting while drawing, but during a break for sure, play with the lights. It is nice and calming. Soothing". Participant 4: "I would

the qualities of captivating, creative (see figure#). Participants did not score the product as challenging, which is beneficial for this design goal, as the use of the product should require low cognitive load, which supports mind-wandering.

The overall attractiveness score for the user experience is +1.55/3. Users find it especially pleasant, attractive, and inviting. For instance, participant 1 connected it with a shape: "It is very inviting to hold, the shape".

Qualitative data from the interview:

On the question of whether the use of the product can become part of their routine 6/6 users have answered yes.

There were two scenarios of how participants were using a product, which were discussed during the postexperiment interview:

Using as a fidgeting device, 1) while working at the computer. Fidgeting creates a low cognitive load activity (spinning), which allows easily direct attention inward to mind-wandering. In this scenario, users would hold it in their hands and the product would give support of mind-wandering without the need to look at it. For instance, participant 3 mentioned in after experiment interview:

"I like the fidgeting aspect of it. It allows you to immerse yourself in your thoughts and elaborate on them and make connections"

2) Using it as a homogenisation (micro or pause ideating and play with this". longer) break from the task. Users would focus 3) Use as the ambient background light. and direct their gaze to the visual feedback and Participant 3 for instance said: "If I had it in the manipulate the object to interact and explore the environment, continuously, sort of visual noise... environment. This break could differ from having a something that is going around continuously. small break while sitting at the table, or having a Automatic and moving itself".



Description of word - pairs

Figure 58 Results of Attrakdiff

Deliberate Mind-wandering for novice designers



Figure 59 Photos of particpants

4) Using on the go and exploring the room (home or even creative office). Participant 5 stated just at the beginning of the interview:" I can take and go around during daily activities. Take it from one room to another in the office". Participant 4: "I don't want to be sitting looking at the screen anymore... so probably I will be having it in my hand walking around in my room, directing it to any walls" (P4). The portability of the object allows one to use it during walking breaks and invites exploration of the environment. Participant 4 mentioned: "That [walking with it] also works in the office setting and then gets back to the task. In the office, it would be more of a subtle setting with reduced brightness, and I would look inside of it...I imagine walking with it".

The same participants mentioned that they enjoyed both fidgeting and having the ability to set an automatic mode where they would be more observant.

Some of the desired changes in the product that were repeatedly mentioned were:

1) Some participants (P1, P2, P3, P5) would like to have an automatic mode, where it would move by

itself and allow to just observe ambient light movement for a prolonged period. That was a limitation of the prototype which did not allow to reach smooth prolonged rotation of the element.

Reducing the size: P3, P4, P5, and P6 2) mentioned reducing the size, to make the product more portable and inviting to use in one hand for fidgeting so one "would just forget" that they have it in their hand (P3). Participant 5: "In my vision, it is more a small thing that you can play around...a fidget".

Some participants wanted the product to 3) initiate interaction (Participants 5, 6) and invite them to be picked up and interacted with or a" reminder to take a break" (P4). That invitation should be Subtle enough to be ignored and sustain attention: "A change of form (that would be the best way to catch my attention" (P5). If the user would decide he has found the focus and doesn't need a micro or longer mind-wandering break. Ideas on how the device should "read" when it is valuable to initiate the interaction split. P5 did not mind being listened to (for instance him creating a fidgeting noise, which signals the need for a mind-wandering break), but others were cautious of being listened to. Having with visual effects, saying that it reminds them of randomised check-ups or reacting to increased kaleidoscope (P1, P2, P4), ripples on the water (P2), phone pick-ups could be a strategy mentioned by flower pebbles (P2), bonfire (P3): "It reminded of a bonfire it hypnotised me". Participant 6.

4) Changing the pattern on top to have a Participant 2 described the visual experience as: "It different visual effect and keep discovering (P2) is just mesmerising. It reminds me of a flower field of or making the top pattern yourself, so it feels like pedals falling. Very nice, because of the structure it a more personal item. For instance, participant 4 is everyone different when you look at it. You can see mentioned: "If I could have different patterns, or the flowery pattern in it". make my pattern, It is meant for creative people, I Exploring the pattern makes participants curious to could change it". engage with it every time, and have a soft fascination

5) Ability to alter the intensity of the light. (Williams et al., 2018) like when observing nature, yet Some participants liked to look inside of the object enough predictability and homogenisation of visual instead of the outside: "It was interesting to see what experience to direct attention inward. The object shape itself reminds of a flower (P2, P3), a pebble was happing inside". 6) The product is more intended for personal stone (P2). Participants were curious to observe the patterns created by the device and were exploring going to use it in a group setting... even if they are the interaction of light with different objects (table, wall, hand, walls, glass object, curtains) in the environment.

use, when not feeling observed "I will not be designers."

Participants 5,4,6 acknowledged they see the product helping them to replace the habit of scrolling on the of creativity, these findings were mentioned: phone, which they do to mind-wander. Participant "if you need a break, I can say it works both ways... 4 made a very clear comment: "I was looking for to stimulate ideas and clear your mind." (P3). "If I am working towards the deadline that is sort of distracting, when I face a creative block I can go back [to using a device] and have ideas" (P4). This comment indicates that novice designers recognise the benefits to overcome a creative block and clearing the space in the mind for new ideas that appear due to mindwandering. It "opens more spaces in your mind... like a break from your task... like when you go out for a walk" (P4). Participant (5) was also when he run out of ideas and stopped drawing, started to fidget, knocking with fingers on the table, humming music, ticking with his tongue and that was also the moment when he started to interact with a product. After interacting with it for a prolonged period (around 3 min) and experimenting with the light, which allowed him to remind a childhood memory he was able to come up with ideas: roller coaster and flying broom to move in the library, fishing books (see Figure 60).

another thing to do...instead of just being on my phone, anything to help that... I wanted to pick up reading, but I find it hard to push to another activity in the middle. Or just a break, to stop looking at the screen" and having this product would be a nice replacement "in short breaks". Participants 5,6 would like to see it integrated into existing tools she is already using and familiar with. Participant 5: "It should be blended in one of the daily objects... that you are more used to having it in your area, and then a device itself ". Participant 6: "I will fidget with the tools that I have Those seem something I know already. I don't have to explore it as it is more integrated". Which in the context of home could be a pen or a cooking tool. That would allow us to make objects more desirable and feasible.

Being more open to those experiences and Participants had mainly positive associations Deliberate Mind-wandering for novice designers

About placing the use of the product in the context



Figure 60 Ideas of Participant in experimental group

externalising those ideas is valuable, even if they are not feasible per se, as they could serve as a bridge to more feasible ideas. For more focused creativity which requires persistence that device is seen as not suitable, but that was also not an intention and was outside of the design goal and problem definition. Also, the presence of light in the environment made participants more curious about observing behaviour and being open to the experience that comes next: "At some points the lights were on my sheets... and I stopped writing, Oh how was that happening.. wow... okey" (P4).

Also, participant 5 recognised that the product supports breaks: "If I am dealing with something so complicated... which makes me an overthinking it is a good strategy [to use the product], which makes one more mindful... struggling with something badly. The moments I want to be in my the most possible creative mood".

The limitation of the prototype was that the light source was not bright enough, that's why curtains were lowered down slightly to make light more visible for the experiment.

Another observation that again confirms previous findings: mind-wandering is highly personal and is also a learned behaviour, where some participants prefer different types of hand movement: P4 mentioned rotating with two hands, and P6 more squishing. Also, some would like the product to produce sounds P2, and P5, while others enjoyed observing visual change. Therefore, that makes mindwandering supportive products highly connected to personal sensorial preference, and aiming to cover all various preferences of participants will not allow to add substantial value to the experience and unnecessarily increase the price of the product.

Some of the adjectives and adverbs that were mentioned by participants about the product experience: hypnotised, mesmerising, curious, inspiring, creative, inviting, open more spaces, calming, soothing, attractive, immerse, make connections, surprised, wow, different, motivating, explorative

Conclusion

The conducted evaluation has allowed us to answer 4. the following questions:

1. Will the use of the product support improved self-efficacy and therefore can be used to enhance creativity?

Result of the evaluation study allow to conclude that Median increase of self-efficacy is higher was +1.55/3. Participants enjoyed the associations in experimental group than in control group. that were caused by the appeal and visual effects of Participants in experimental group were more open to the product. inner experience and were reinterpreting the pattern 5. Do users find the product suitable to again and again creating different associations. That become part of their creative work routine? allowed them to come up with more original ideas All users mentioned they would love to have this in comparison to a group, like a rollercoaster around product as a part of their routine. Users have the library and AI that provided one with a book recognized 4 scenarios they would like to use the based on eye gazing. These two especially were product: triggered by childhood memories, which participants 1) As a fidgeting object while visually focused mentioned in the discussion, which were specifically on the task caused by the visual field that was created by the 2) As a way to create an ambient environment. product. 3) As a micro or longer break from creative work

2. Will the use of the product support tendency to a more deliberate mind-wandering?

4/6 Participants tended to have a more deliberate mind-wandering in the experimental group in exploring the surrounding with a product. comparison to 2/6 in control group. The product use These four scenarios of use can be illustrated in the caused deliberate (also enjoyable) mind-wandering figure# and is result of the research of the product and allowed participants to mind-wander to variety use and multitude of experiential memories.

3. How the use of the product affected the visual perception of the environment?

4 out of 6 participants have felt defamiliarization to various degrees, when using a product, which means that it changed they regular perception of the environment.

How does the product appeal to the users? Participants find the product to be creative, captivating and novel, which together support Hedonic quality Stimulation on Attrakdiff score (+0.78/3, that means users find it stimulating. The overall attractiveness score for the user experience

to afresh a perspective and get out of being stuck with having a homogenization visual experience (P4); Use on the go during walking, exploring 4) the room or in the creative office. Participants were

Preferences for mind-wandering are especially personal, which makes it hard to design something that fits a particular preference for sensory support: more visual, more sound-based, more movement based. As this product was mainly focused on lowvariability visual low homogenisation feedback it fits better people who has this preference.

RTD PHASE CONCLUSIONS

Conducting multiple research through design activities allowed to answer Research question 4: how desired mind-wandering experience can be translated in the appropriate material form? The RtD phase consisted of two perception experiments and a final evaluation of the proposed concept. Visual perception experiment to understand what degree of visual change would be most supportive of mind-wandering. That resulted in undemanding that movement that resembled organic phenomena was the most pleasant and not overstimulating. Rapid prototyping further allowed to discover what specific interactions with an object users would prefer in the context. That resulted in the choice of the Wonderbeam concept that was tested in the final evaluation. Final evaluation allowed to collect information both on the user experience and effect on

the creative performance. Overall, the results of the evaluation of the product allowed us to conclude that users would like to use this product as a part of their routine and highly appreciated the visual experience that was created, calling it "mesmerising".

Participants in the experimental group showed a median greater increase in self-efficacy after the given creative task, which is correlated with the use of the product. Participants who were using the product expressed various memories (also by one participant), where their minds have wondered, after the interaction. Product use also was causing a tendency to deliberate mind-wandering.

Research through the design part of the project allowed me to attain applied knowledge of how mind-wandering could be enhanced in the context.

General Conclusions

The proposed design of a homogenisation fidgeting dedicated product that has an expected result. That light source was focused on supporting the mindwill help to deliberately take a homogenisation wandering break of users. The proposed concept was break. The product creates visual stimulation and a result of the insights gathered throughout all three tactile stimulation, by engaging with it, the user phases of the project. The proposed design focuses may somewhat automatically change the perceptual on providing low variability light feedback to create effort and his/her mind-wandering becomes more deliberate in a lack of meaningful stimulation within a homogenisation in the visual field. Additionally, it affords fidgeting with one hand, as users find the attention. Observing this visual change creates fidgeting useful, and this element of the product will a low cognitive load activity for the user, therefore provide additional value but also will support mindthe proposed design is mainly creating supportive wandering by providing additional tactile feedback. conditions for mind-wandering with a low cognitive In essence, the product is allowing to make a ritual load task (see Figure 61). There are other ways to out of the mind-wandering breaks with a specifically make mind-wandering more deliberate, for instance



Figure 61 How created design is targetting mind-wandering in a model

General

by providing instructions for creating a necessary selftalk and mental set that activates intentional mindwandering. That pathway is giving more agency to the person itself and requires more meta-cognitive resources. As this project was conducted within the context of Design for Interaction Master the focus was shifted towards understanding of conditions in the environment that will support deliberate mindwandering.

The project brief started with research questions, that were appropriately answered in the course of the research.

RQ1 What are the needs of novice designers in their design process and how they can address them with a mind-wandering experience?

Novice designers have different needs regarding their mind-wandering depending on their propensity (level) of daily mind-wandering and its quality (deliberate or spontaneous). As living organisms people aim to reach an optimal level of arousal In the first phase of research of the context 5 mechanisms were identified that will help to engage in deliberate mind-wandering in the context of the design process. Among these 5 mechanisms, defamiliarization was selected, as one that allowed us to research the perceptual aspects of mind-wandering in more allow to decouple from it. depth. Creating an experience that would help to refresh the perspective and changing the perceptual effort by engaging in homogenisation experience is have been chosen as a strategy.

RQ2 How could novice designers increase the deliberateness of mind-wandering? [support mindwandering]

Novice designers would benefit from deliberate mindwandering. The deliberateness of mind-wandering can be increased by focusing the attention on low variability sensory stimulation created during the homogenisation experience. Homogenisation would be appropriate as a break from working to create

intermittent sensory information hunger, that results in self-generation of content: mind-wandering. Other ways to increase the deliberateness of mind-wandering, including self-referential aspects, fidgeting and moving through space were also discussed.

RQ3 What interaction qualities can support deliberate MW experience within the context of the creativity of novice designers?

Homogenisation of information in one of the sensory channels is the quality of interaction that will support mind-wandering.

Perceived privacy is also one of the qualities that are required for mind-wandering, as one has to feel at least intermittingly that demands from the external environment are low and one may not react to them for some time. Interaction should remain low cognitive load to support mind-wandering. When sensorial information would be overstimulating, it would prevent mind-wandering, so moderate levels of arousal would be a necessary quality of a mind-wandering experience. All these qualities will support essential perceptual decoupling of attention from sensory information in the environment. It is not the lack of any sensory stimuli that causes mindwandering, but exposure to specific stimulation can

RQ4 What material form can support the necessary experience of MW that is appropriate for novice designers?

The RtD process allowed us to uncover various useful and feasible ways that allow us to create desired mind-wandering experiences. The selected concept was focused on the homogenisation o visual perception and fidgeting interaction, however different strategies to target other sensorial channels are also possible (audio, tactile) to better reflect the preference for the specific channel of stimulation. During the RtD phase, various design possibilities that reflect the needs of the users were exposed.

Recomendations

To get more determined results separate study for measuring mind-wandering during product use and a separate study with a focus on use experience would be preferable. The setup for evaluation of mind-wandering would preferably also include measurement of a general tendency to mindwandering (for instance Daydreaming frequency Scale from Giambra 1993), which will allow comparing the effect of the product to the base level of mindwandering.

Another consideration that can be accounted for in future research of mind-wandering supporting products, is that introducing a new product and then measuring mind-wandering that is caused by a product is quite problematic because it doesn't create a low cognitive load condition. Introduction to a new product cause for some moment some cognitive load. If the study is combined with the measurement of performance on a cognitive task the need to "learn" even in 1-2 min how to use the product will impede performance during that time. That's why in this project participants were given time to briefly accustom themselves with a product before the introduction to a problem. Otherwise, they could have withheld from using it, because it takes away so necessary cognitive resources to perform the task. Another solution to this problem could have been intervention to a control group with another type of product predicants have to briefly learn to use. But

this creates complications, as whether this "control" product is causing mind-wandering should be also controlled. Therefore, studies of measuring mindwandering caused by a product should be preferably conducted after a person has got familiar with a product and learned how to use it. This is a small nuance and is a question of 5 additional minutes to the length of the study.

To Enhance the evaluation set-up of mind-wandering products it would be beneficial to select the tested group based on their preference for a specific channel of sensory stimulation. This might be hard to identify for people themselves, therefore an experiment for different sensory channels or measurement tools with a number of questions would help that. This preference might be apparent from birth or learned, as exposure to specific sensory input will make it slightly more easy to mind-wander for this specific person

Reflection

This project allowed the researcher to tap into deep the layers of my consciousness and perceptions. I am very thankful for the ability to work on this project and for the gained knowledge on creativity, cognition mind-wandering and design and without the expertise of my supervision team it wouldn't be possible. This project brief has challenged me to communicate phenomena that are of subjective nature.

During the project, I have been able to apply my skills in facilitating creativity and introspection of others, context mapping (when analysing the interviews), and visual representation skills.

Definitely working on this subject matter has improved my reflection and introspection skills, as I had to separate what constitutes the content of my consciousness from why it is there and what cognitive processes are occurring.

At the start of the project, I had a somewhat idealistic view of phenomena, that there should be mechanisms of mind-wandering that are not so much influenced by personal experience, and are true interpersonally. A thorough investigation of those perceptual mechanisms is something that lies beyond the scope of this project, but I hope I could uncover some elements of those.

I hope this project provides a grounded perspective for how creativity can be deliberated in real-life context.

Appendecies

Appendix 1: Auto-ethnographic experince sampling

Reflection on MW trance dance

0 0.00000	March 12, 2023 9:00 AM		
≡ Tags	Daily trance dance		
\equiv repetitive be	Empty		
+ Add a property			
Y Add a comment.			

What happened before

I was more focused on the result of the work, which prevented me from reaching the flow. Rather than seeing and anticipating that I will discover something new, I was more focused on getting 2 days in time forward.

MW facilitating activity

I went for the trance dance group session at X in TU Delft from a yoga teacher.

What type of MW

time modality (future, past, now, atemporal)

🗆 past

<mark>∠</mark> now

□ future atempora

1st or 3rd person

1st person perspective

3rd person perspective

peception of time ac-perspective

time-perspective

Insights to take further

I tried blindfold dance dancing class for an hour. there were other people in the room. During the dance I had the illusion of a curved floor, as if the floor became more round and kinda appeared behind my foot. That intensified the feeling of things going towards me, rather than me moving towards them. At some point I could reach the feeling that actually it is not me moving, but things appear in front of me. At some point you loose the feeling of space and actually I start to feel myself everywhere, with no connection to space. I did not have any mystical experiences, but sometimes, I would try to avoid hypothetical wall which I was projecting there to appear.

Also sometimes I could feel wall from above, maybe that was the effect of that could still feel the light changing and interpret it in some way.

I was naturally doing a lot of circular movements, but also at some point I started to move backwards, forward in zigzags. This movement also gave losing the feeling of presence within the body.

I did not have any particular thoughts, as I was more focused on my emotional experience. The instructor asked to ask the question. After some time of dancing I was able to detach from the question and actually asked myself: why do I formulate it in a specific way, and what in me asks this question. So that in way allowed me to detach from ego-perspective.

Reflection on MW

O Created April 21, 2023 9:00 AM Daily

≡ Tags

≡ repetitive be... Empty

+ Add a propert

Y Add a comment.

What happened before

Interview with participan

MW facilitating activity

reading the interview script where participant had similar to mine way of imagining things

What type of MW

time modality (future, past, now, atemporal) 🗆 past 🗆 now □ future 🗹 atempo 1st or 3rd person 🗌 1st prson 3rd person non-subjectiv Experince of time: eqo-perspective ✓ time-perspective Intention spontaneous deliberate

Insights to take further

I was thinking over the way I usually imagine ideas and relationships. I actually I was thinking over the way I usually imagine ideas and relationships. I actually think more in a geometrical way, Meaning I imagine relationships in lines and things being circled. I just ask myself what is the most important there, what is the essence of this relationship? After setting myself this question I think what part of the phenomena is more connected to something. I like how it has to be turned to create a sequence, what changes from one instance to another? What remains?

Reflection on MW white noise again

@March 8, 2023 8:00 AM O Created Daily white noise i≣ Tags repetitive behaviour

What happened before I was a bit not confident in what steps are necessary to do next and lacking the feeling of relevance.

MW facilitating activity White-noise with closed eyes sitting in the chair

What type of MW

time modality (future, past, now, atemporal) D past now future (with reference to past experience)

atemporal 1st or 3rd person ego-perspective

V time perse

These ideas that came during white-noise experience:

I made a connection of two papers that I was reading and made a thought more clear, that fidgeting is a way to signal about the passage of time.

Insights to take further

Having white noise experience was helpful to reach Clear insights and synthethise information in new way;

Reflection on MW

O Created @February 25, 2023 8:00 AM Daily walk i≣ Tags

What happened before ontaneous mind-wandering

MW facilitating activity I was walking outside

What type of MW (retrospective/future)

Insights to take further

Diary

Walk helped to organise thoughts and feel more in deliberate with my thoughts.

Reflection on MW

Reflection on MW

 Created 	@March 1, 2023 8:00 AI
≔ Tags	Daily walk
\equiv repetitive behaviour	

What happened before Felt quite good and more flexible in my thoughts

MW facilitating activity I walked outside.

What type of MW (retrospective/future) Mainly future-spective but it is still to some extent unnecessary at this point. Like planning the future possibility, and projecting it

Insights to take further

Dropping and changing the activity helps to stop mind-wandering on a specific topic

Reflection on MW

Reflection on MW guitar

O Created	@March 5, 2023 8:00 AM	
i≣ Tags	Daily	playing music
■ repetitive behaviour		

What happened before

Working at the computer

MW facilitating activity Playing a guitar

What type of MW (retrospective/future)

Insights to take further

Helps me to manage my mood and more flexible in my thinking.

Diary

Also reading a book and imaging the characters helps me to process some other personal goals that I have and my stance on them, allows me to the a third person perspective and dissociate from ego-perspective on my goals and take a step back. That helps me with my mod regulation, and stop consider the situation as while/black one

Reflection on MW guitar



Appendix 1: Auto-ethnographic experince sampling

MW facilitating activity

What type of MW (retrospective/future)

Insights to take further

I am MW because there is something needs to chnage and alight the desired (future) state and current state. So knowing the concern, supports intentionality and meta-awareness. Asking questions why I experience it helps.

Reflection on MW

@March 11, 2023 8:00 AM Created i≣ Tags Daily reading ≡ repetitive behaviour

What happened before Reading fiction

MW facilitating activity

I was distracted by personal relevant goals, which prevented me from reading

What type of MW

time modality (future, past, now, atemporal) D past now ☐ future atemporal 1st or 3rd person ego-perspec time-perspective Deliberate deliberate

Spontanco

Reflection on MW



I can reach flow taste when I play music, when I stop thinking about the outcome.

Reflection on MW



What happened before

conversation with my flatmate

MW facilitating activity eating

What type of MW

time modality (future, past, now, atemporal): Past now future □ atemporal 1st or 3rd person 1st prson 3rd person non-subjectivit Experince of time: go-perspective V time-pers Intention spontaneous

Insights to take further

deliberate

Conversation with a friend about blueberries triggered my mind-wandering.

My neighbour mentioned a video game, when he saw blueberries. Having those memories primed his mind-wandering. Once he mentioned it I also thought of memories of me playing these sort of game. This was more deliberate mindwandering to my memory of a game.

Reflection on MW



What happened before I was reading the paper and than I mind wandered using the phone and found about Ukrainian artist

MW facilitating activity

Looking at the painting that was having the illusion of movement. The fact that the painting creates perceptual illusion and you move your eyes around which creates mismatch In your projection and perception.





What type of MW

time modulity (future, past, now, atemporal): D past The reput D future atemperal 1st or 3rd person 1st prson 3rd person non-subjectivity Experince of time: ego-perspective V time-pers Intention spontaneous deliberate

Insights to take further

Visual illusions of mo may support min (contemplating art.

Diary

Reflection on MW

```
@March 10, 2023 8:00 AM
O Created
                   Daily abstract thinking morning writing
i≣ Tags
≡ repetitive beha
```

What happened before

Insights to take further

In the morning I had more verbal MW I wanted to decide what should I do first and make a plan for a day, so I stayed in bed in semi-sleeping state with closed eves, before I have return to the habit of what I should do in the moring. Being is this not fully awaken state helped me to have clarity in my thinking, and remain feeling of relevance of information. Depersonalising the thoughts helpd to stop mind-wandering.

Reflection on MW

O Created	@February 21, 2023 8:00 AM	
≔ Tags	Daily moving through space	
\equiv repetitive behaviour		

What happened before

i was unconfident in how to converge my ideas the brief.

MW facilitating activity I took a ride and thinking on the way while cycling was easier, I could structure my reasoning better and get to the conclusion very fast

What type of MW (retrospective/future)

Future introspection, future planning. Creative problem solving

Insights to take further

Moving thought the space and habitual movement helped to make decisions fast and see the essence.

Diary

Appendix 1: Auto-ethnographic experince sampling

Reflection on MW

O Created	@May 2	1, 2023 8:00 A
≔ Tags	Daily	singing
≡ repetitive behaviour		

What happened before I was stressed about a problem

MW facilitating activity

I took singing class which stopped my mind-wandering and made me more happy about doing the work.

What type of MW

time modality (future, past, now, atemporal):

D past Now future atemporal 1st or 3rd person 1st prson □ 3rd person non-subjectivit Experince of time: go-perspective

time-perspe

Intention spontaneous

deliberate

Insights to take further

Breaks for hobbies could help to reduce spontaneous mind-wandering



Reflection on MW

@February 20, 2023 8:00 AM O Created Daily hobbies as way to regulate mind-wandering i≣ Tags

What happened before

I was reading a book in the train in the positive mood

MW facilitating activity

I was reading a fictional book. And I have notice that I was MW and side-tracking from the content when the words were triggering my associations to a personal problem or concern that has a meaning to me, like my relationships with people. Associating can be vaguely related, or feel like similar emotion, or triggered by the word that is connected to the context of my personal concern.

What type of MW (retrospective/future)

This is more past introspection on the conr

Insights to take further

I can see that the triggers relate to some concerns or inability to predict this particular future.

Diary

Reflection on MW

Reflection on MW

O Created	@February 17, 2023 8:00 AM		
i≣ Tags	Daily	distraction	
repetitive behaviour			

What happened before

I was mainly having retroactive mind wandering that was related to be disturbed in my reading.

MW facilitating activity

Distracted by talking loud people around.

What type of MW (retrospective/future)

Future in the past (my old future introspections that were related to specific past memories of interaction with the people

Insights to take further

It took some time to return to the reading after spontaneous mind-wandering

Diary

Today I was MW when I got tired from reading the papers. Also, distracted by people around me, which caused spontaneous

Reflection on MW

Reflection on MW

@May 4, 2023 8:00 AM O Created i≣ Tags Daily memory pattern interpretation

What happened before

MW facilitating activity

When scrolling Instagram, I have encountered a meme, that referred to my childhood memory of mind-wandering experience.

What type of MW



Insights to take further

Looking at the carpet that hangs on the wall, while lying in bed in the darkness? This is experience that a lot of kids from eastern Europe resonate with, where the culture of handing those carpets prevails. Memes are "unit of cultural information spread by imitation", meaning the experience has its universality and is recognisable. I vividly remember I used to spend what felt like hours visually perceiving how natural organic shapes of the carpet morph in the darkness at night and organise into something that I tried to recognise. That abstract structured shapes created enough stimulation in otherwise homogeneous dark noise to support projections and mind-wandering.

This experience triggered a positive memory, that's why I wanted to return to the memory and experience it, which also helped my research of mind-wandering at the time.

Figure# Picture from the social network. "Childhood without Internet. How kids used to fall asleep in old times".



Reflection on MW

@April 10, 2023 8:00 AM O Created i≣ Tags Daily gate effect ≡ repetitive behaviou

What happened before Worked on a project at the computer

MW facilitating activity

Getting out of the room allows me to reflect on what I was doing and the frame of my thoughts better. Suddenly I have clarity for the next step, which is sometimes hard to see when working at the computer

When I went out from the building I was able to reflect better on why I was doing a specific task and got more confidence that I have direction fo why I am referring to a specific research.

What type of MW

time modality (future, past, now,
v past yes-
now
future
atemporal
1st or 3rd person:
Ist proon
3rd person
non-subjectivity
Experince of time:
ego-perspective
time-perspective
Intention
spontaneous
deliberate

Insights to take further

getting outside of normal environment allows to detach from goals and support reflection

Diary

Appendix 1: Auto-ethnographic experince sampling

Playing for incubation

@February 21, 2023 10:01 PM O Created i≣ Tags Daily playing music ≡ repetitive behaviour

What happened before

I felt a bit stuck and circulating isame ideas and I took a break to play the guitar to stop nind-wandering.

MW facilitating activity Playing guitar

What type of MW (retrospective/future)

While playing guitar I was not thinking of anything else, I was able to let go of the thoughts. It helped me to feel more content and purposeful.

Insights to take further

Engaging in familiar activity and playing music could help regulate mind-wandering

Diary

Playing for incubation

Reflection on MW

@February 16, 2023 8:00 AM O Created i≣ Tags Daily repetitive behaviour ■ repetitive behaviour

What happened before

I came home and had a break after food by eating a small snack (sunflower seeds), which actually helps me to mind wander

MW facilitating activity

eating sunflower seeds repetitive automatic behaviou

What type of MW (retrospective/future) Retrospective about the day

Insights to take further

it helped me to process some concerns and triggers that I had during the day, and to make priorities and decide whether I have to react to or ignore some information that I have encountered today. It is activity I do regularly and I do loose a track of time when I am engaged in it. Mostly it was a retrospective MW because I did not set a goal for myself, or I did not an urgent question that I need to solve.

Reflection on MV

Reflection on MW White noise

 Created 	@Marc	h 6, 2023 8:00 AM
≔ Tags	Daily	white noise
≡ repetitive behaviour		

What happened before

I was organising information and transferring the quotes from readings to the miro board

MW facilitating activity

White noise audio

What type of MW (retrospective/future)

It was more first person perspective(3 min of mi

Fiest I went to the past trying to recognise the noise, whatever it reminds me of. A sea, waves—an airplane— driving in the car —my friend —my past experience of me being in the mountain at the top and hearing the wind from the side—my thought calmed slowly down and I could focus on the individual frequencies (low frequencies and what they remind me of and higher frequencies and what do they mean), but my brain very fast became more calm, so actually allowed to have less MW and in a way stopped trying to recognise the noice.

- The perceptions were a blend of visual and verbal, first it was guite verbal, but later moved to a more visual imagery ;

---The thoughts were more focused on the past, but later I feel I started imagining the scenes that were more abstract and stopped having clear 1st person perspective.

Insights to take further

First thoughts are very spontaneous and it is hard to dissociate from them and still more goal-driven: to recognise the experience, but later it turns into an exploration of the perception.

Maybe white noise is not recognisable to allow for more MW in the beginning --> but later the brain fails to recognise it and desensitise oneself from he stimulation, so the attention is transferred to inside.

After the white noise my brain became more calmer and I stopped having a headache

Reflection on MW

O Created @April 4, 2023 8:00 AM i≣ Tags Daily future planning help to regain motivation

What happened before

MW facilitating activity I was writing a report and thinking of my research questions and my plans for the future of 5 years

What type of MW

time modality (future, past, now, atemporal):
🗖 past
now
V future
atemporal
1st or 3rd person:
1st-proon
3rd person
non-subjectivity
Experince of time:
ego-perspective

	time-perspective
Inte	ntion
	spontaneous
~	deliberate

Insights to take further

It is hard to distinguish between spontaneous and deliberate MW. Evaluating this episode on the result, whether it brought me some useful knowledge that I can use in the present. Maybe that thought was a bit too far away from my current goals or what is necessary for my task now, but they helped me to gain perspective on my work today.

Reflection on MW

© Created	@March 24, 2023 8:00 AM	
i≣ Tags	Daily	seeing familiar as not familiar

What happened before Walking in the station

MW facilitating activity Being in public space with lots of people

What type of MW

time modality (future, past, now, atemporal):
🗋 past
v now
future
atemporal
1st or 3rd person:
2 1st prson
3rd person
non-subjectivity
Experince of time:
ego-perspective
time-perspective

Intention Spontaneous deliberate

Insights to take further

In the station I recently was overwhelmed with the amount of people as I haven't been t the station for weeks. I became aware of how I am expected to move in space.

Appendix 2: The daydreaming Frequency Scale (Giambra, 1993)

400	L.M. GL
	TABLE 1. THE DAYDREA
1.	I daydream
	A. infrequently.
	B. once a week.
	D. a few times during the day.
	E. many different times during the day.
2.	Day dreams or fantasies make up
	A. no part of my waking thoughts.
	B. less than 10% of my waking thoughts.
	D at least 15% of my waking thoughts.
	E. at least 50% of my waking thoughts.
3.	As regards daydreaming, I would characterize my
	A. never daydreams.
	B. very rarely engages in daydreaming.
	C. tends towards occasional daydreaming.
	E, is a habitual daydreamer
4.	I recall or think over my daydreams
	A. infrequently.
	B. once a week.
	C. once a day.
	E many different times during the day.
5.	When I am not paying close attention to some job
	A. 0% of the time.
	B. 10% of the time.
	C. 25% of the time
	D. 50% of the time. $E_{1}75\%$ of the time
6	L. 75% of the time. Instead of noticing people and events in the world
0.	A. 0% of my time lost in thought.
	B. less than 10% of my time lost in thought.
	C. 10% of my time lost in thought.
	D. 25% of my time lost in thought. E = 50% of my time lost in thought
7	I daydream at work (or school) [Note: Work is de
	A. infrequently.
	B. once a week.
	C. once a day.
	D. a few times during the day.
8	E. many different times during the day. Recalling things from the past thinking of the fut
0.	A. 0% of my waking day.
	B. less than 10% of my waking day.
	C. 10% of my waking day.
	D. 25% of my waking day.
0	E. 50% of my waking day.
7.	A, infrequently.
	B. once a week.
	C. once a day.
	D. a few times during the day.
	E. many different times during the day.

IAMBRA

MING FREQUENCY SCALE

self as someone who

b, book or TV, I tend to be daydreaming

ld around me, I will spend approximately

lefined as any kind, not just for pay.]

ture, or imagining unusual kinds of events occupies

(Giambra, 1993)

10.	Whenever I have time on my hands I day dream
	A. never.
	B. rarely.
	C. sometimes.
	D. frequently.
	E. always.
11.	When I am at a meeting or show that is not very interesting, I day dream rather than pay attention
	A. never.
	B. rarely.
	C. sometimes.
	D. frequently.
	E. always.
12.	On a long bus, train, or airplane ride I daydream
	A. never.
	B. rarely.
	C. occasionally.
	D. frequently.
	E. a great deal of the time.
-	

Appendix 3: Deliberate and Spontaneous Mind

Wandering Scales (Carriere et al., 2013; Vannucci, &

Chiorri, 2018)

Deliberate

- 1 I allow my thoughts to wander on purpose.
- 2 I enjoy mind-wandering.
- 3 I find mind-wandering is a good way to cope with boredom.
- 4 I allow myself to get absorbed in pleasant fantasy.

Spontaneous

- 1 I find my thoughts wandering spontaneously.
- 2 When I mind-wander my thoughts tend to be pulled from topic to topic.
- 3 It feels like I don't have control over when my mind wanders.
- 4 I mind wander even when I'm supposed to be doing something else.

Appendix 4: Semi-structured interview for designers

Guide for the interview.

Questions were structured to first, get a response of Imagine a scenario where technology would be what mind-wandering feels and is understood by the guiding your thought process with the verbal participant. In some cases when the participant was interface or providing you cues to prime your asked for clarification on what mind-wandering is and thinking. For instance, you need to design a baby then it was clarified. If a participant would move to stroller and the interface would help you to recall the topic the interviewer would follow and restructure all instances when you have seen a baby stroller, or the sequence of questions. Before the interview would highlight objects, or actions in the environment participant was filling the questionnaire evaluating that are associated with your project or question. To their trait of mind-wander, which also sensitised them what extent you would like and feel comfortable to the situation when mid-wandering could happen. using these technologies if they would support your Interviews were recorded using a mobile phone and creativity? transcribed to text.

The list of questions:

How does mind wandering feels for you and how it affects your design process? When you are stuck what do you do to help it? What tools do you use to guide your thinking processes? What behaviours do you do when you want to feel more creative? How do you feel about taking a break while you are working? What objects do you like to interact with during your design process? How do you like to reflect? What environment do you prefer for your creative work? Do you have any fears or concerns about your design process?

How would you like to improve your design process?

Reflection on a speculative scenario:

Appendix 5: Transcript of the interview with novice

designers, Participant 2.

How much of your thoughts you spend in daydreaming or fantasies away from the task?

I have spent a lot of time. I act upon my daydreams, I look up stuff on their thoughts. So, it gives some directions. Wikipedia is very rheometric, there is no hierarchies, but any pages can connect to any other page. You can wonder My mind wanders from one concept. Part of concept captures attention.

Are you aware of the fact that you are MW?

I am not unaware of it. Act of being aware. I am not conscious's. Ohh Am I wandering

I am aware of your thinking. My thoughts got side-trcked. I will be aware of it sometimes. I should stop but I want to rap up roots. I can open tabs. I don't want to abandon it so I wan to do that first before I go back to the original task. To track the thought process. Press the navigation button to see where it goes.

In thought's... less explicit. One journey. It doesn't branch out. Experience parallel thinking. Multiple trains of thought. Two divergent path no too hard, intermittent.

That's interesting I will finish ne thought and come back to it later. I have it spatial representation. You have a clear distinction between lines of thought's. One thought leading to different things. Because I envisions thought as Wikipedia articles.

How would you describe the relation of the times when MW appears spontaneously to the times when you aware of it? It is undesirable MW, all the time.

It helps me develop. There are many wondering which shapes who I am, they are not intentional. The wandering happens which something cannot help my attention. Boring, just having to do it, but it would never happen, when there is super stimulating media. Doesn't happen when I scroll through reals. I have been stimulated by media in my life, but my mind did not wonder. I was trying to force myself to do work again, I was really enjoying the journeys. I was forcing myself to do something that is a bit borning.

It is never conscious attention. I was presently surprised by it. I donna if it intentional. If it is mind-wandering. Forcefully placing yourself in the position of wandering donna if it will work. I satisfied with the amount.

Media addiction is a mind killer, so it prevents MW. Screens, visual games. Movies sometimes. Very slow movie can wonder. Thought provoking.... Is good. If I am in nature it tends to happen

You are drawing the M on your hand. Rythmic motion and a shape. I have been doing it lately and had many different types of fidgeting.

What type of experiences and corresponding interaction qualities can support deliberate MW within the context of the design process?

And how do you recognise it?

What do you do to overcome fixation during your design process? Such a broad guestion. I would like to what I am doing. I want to know my process to be more intentional. I have the idea of what I can have moments.. but it rarely. I am not coming up with more I am doing... I will just think of something. I don't consider an things. You can have one idea when it is blocking it. Not per se alternatives for how to structure the process The first approach that is a good idea. One think it is the best solution. Unsatisfied that comes to mind. I have used very different process. They were with the solution, but it is the only thing that I keep returning. very unintentional. I want to have a good idea of how I want to A lot of the times you are aware of it than you are out of it. I am tackle it. U

not supper worried about. But I have natural drive to come with What behaviours you do when you want to feel more creative? weird ideas, presupposes that I cannot. When you are stuck what do you do?

Do you engage in incubation during your design work?

I will just either walk around in a certain place or watch related documentary, or wait for the ideas emerged. I will do it so this happens. Ideas emerge subconsciously, but not when I was waiting for them to emerge. When I am tired or annoyed. When I step away from the problem... I don't want to think about it anymore, I have frustration, fatigue. Desire to do other stuff Do you use any tools to guide your thinking processes?

I don't think that I am doing, visualisations, ideation atmosphere, I need to remove myself from the screen, because I will start wandering about, Computer has so much, so many possible stimuli you can follow up. Nothing that is not stimulating for me to come up. Consciously bruuding on something, hen you are not actively. Will ideas into existence. Pushing you to come up with ideas.

More verbal ideas are coming. Very abstract. They start abstract. Can be quite visual, but the pint to which an idea enters, is an

designers, Participant 1.

How does MW feel for you? Do you feel like you have control over it? Understands mind-wandering as letting your mind wander a bit

free.

How is Mind -Wandering affecting your design process?

Sometimes It can generate some good ideas because it makes me see the same problem from different perspectives and angles. maybe inside my mind, I can escape my previous frame wok. My thoughts are a bit connected to each other I usually can go back. Why I am wondering about this... the things that not going to happen in my life. I wonder things I keep procrastinating.. what will happen if I have fishtail if I had been French... I find myself wandering about these things, mostly it is about me... this different...unrealistic...things. Sometimes it is entertaining. I try to do it.. I feel stuck in the design process trying to go for a walk and push my mind to wander freely... try to even look.

What activities... going for a walk, talking for flatmates... my mind wanders... bothering me.. what my friends are saying I realise yes... I start wandering.. they don't know they are being used. Or can I just say bye.. if there were no code of conduct. you activated my brain now I need to leave... trying to help me. Now I nee dot write it down or do something with my hand.. my mind is already wandering. Talking an idea... my mind-is wandering.. I need to do something with it.

I should carry a notebook. I go with

I rely a lot on my memory which is not good... when studying.. remembering the lesson. I rely a lot on that.. hinder a notetaking aspect.. I would like to take more of that hobbit, visual notetaking... I would alike to do it .

Do you use any tools or tourniquets (writing, visual, etc) to guide your thinking processes? (or mind-wandering)

Diagramming, figjam, figma, miro, but it is better for diagramming iterate more easily.. I can write connection.. visually counting a mind-map of my thought's. I do it a lot on the computer.

What makes you feel certain during your ideation? (tools, brainstorming sessions) Do you feel confident to ideate on your own?

I like to set a bit ... in groups? In activity, so I am build up on each other ideas. If I can use other people's, sometimes you can use the alphabet, and write ideas. It actually works.. just force myself to write something, or doodling sometimes I find ideas that way when doodling. Depends on what I am exploring. The assignment was more about a smart watch. But nowadays it becomes more abstract I don't even doodle anymore. More text... some ideas are more abstract, frameworks, learning experiences.

How do you feel about taking a break during your design process? not because I feel creatively stuck.. let's rest for an hour.. I will force myself I just need to do it. Maybe it is a bit extreme. It is hard for you to take breaks. I need closure and than again take a break. Through some things an than take a break.

How do you experience fixation and are you able to recognise it? Sometimes I can feel that the amount of ideas that I am generating. they are repetitive, they are at the end of the day... I have been talking 3 ideas... more out of the box... why not try to think more extreme, because these ideas, challenges on Wednesdays... very similar to the Wednesday ... fixated in the same solution space. Not all solutions should go around education.

What do you do to overcome fixation during your design process? Fixation can be in specific topic or functional view on a problem, but it can also be a

Thinking abut criminal ideas, crazy but maybe too extreme too aggressive but, they can just be fun ... thought some jokes. Do you engage in incubation during your design work? And what

do vou do to incubate on a problem?

How do you like to reflect on your thoughts?

Mainly writing down.. I need to let's write down a problem statement. Because I can see if my story makes sense... my story makes to others. I do a lot of writing. Storyboarding... it takes too . really nice doodles. In flatland how they do it. Talk to yourself out loud sometimes helps. I keep it in my mind. I sometimes talk on the street outload.

Do you have any objects in your environment that you like to interact with during your ideation or thinking process?

Helps me to express orally...when I doodle.. thinking in groups I am also fidgeting. I need to roll a paper in my hands. In what ways... allow my thought s to flow more easily I think .. I boy.. mind connection and how it is connected... if that happens.

What behaviours you do when you want to feel more creative? Behaviour that help mw... going for a walk.. those things I did in 1st year of bachelors, because feeling stuck is for newbies. Sometimes I have learned to push myself to thought everything and sometimes I realise in 1st year of bachelors... break helps... let's relax my mind .. forcing myself to write down things also works. I was worried about quality.. I have this 1 hour, 30 min, giving yourself a time limit. I take of plants if I take a break. Stare at the plants.. those friends that keep taking and you not really listening to them.

Concerns. Do you have any fears or concerns regarding your desian process?

How to collect the mind-wandering a bit better... I do wander a lot but I don't write it down, and stimulate I never sit don and mw, I am never prepared.. let's MW. The reason I don't collect a lot of the thought's.

Do you use some practices to gain a better control of your attention?

I did mediation before but I don't do it anymore. I don't do much right now. I don't have a time for it. I don't do a lot of mediation. Sports help and I barely do on the weekend. On the weekend I don't do anything stay sane and creative.

Imagine a scenario where technology would be guiding your thought process with verbal interface or providing you cues to prime your thinking? To what extent you would you feel comfortable to use this technologies if it would support your creativity?

I would like something a bit more conversational... as if I am talking with ... my ideas something that is my housemate something I trust and talk to and have conversation and gives me prompts, trained to... Ai should be able how it is being fed keep up and stop it and write down .. when I talk with a friend.. with Ai you can stop your friend. But I don't know to what extent.. I would train myself in mind-wandering ... if the prompt is out of the blue... if it is not connected to something that I am thinking ... should be connected to my previous thought's.. all my thought's are somehow connected.. this tool is giving me random things... not connected to the situation and the context.. If it is connected to the context .. you were thinking .. apparently messy flow, but it is connected, very chaotic and messy from here to here... very turmoil. Amazing youtube video ... diagrams how social media works.. YouTube is chaotic but it has come connection .. super chaotic, but there is always a connection. Than if you look with a video from 5 ideo ago .. how did I end up here? With thoughts is the same... oh yeah. If it ican help me.. it shouldn't' help to collect, but not organise. Than it would be rationalising. We need to rationalise we need it, are we ready to do this , what are the boundaries.

I have tried chat gpt? There is this translation.. deep L. I use it to reflect., which is a bit weird., I keep transiting back and forth from Spanish? Synonyms all the time.. write down this is my story and statements and diagramming . in I write blocks in diagrams. text in a diagram... write back and forth an di put it... it is part of my diagramming process. Chat GPT .. giving too much. It changes my... I need a little twist..... a few synonym and make it a bit better

Can you .. with deep I ... write what I am thinking it gives an interpretation., I need a prompts it allows mem to thing. I don't want to give a prompt. Extra thinking ..

What spaces make you feel more creative Surrounded by people as well, and sometimes I need my space, like upstairs like to do some writing tasks... my reflections I like silence spaces... I listen to as lot of music either way I work with music. surrounded by people but still emersed in music, positive vibe... productive , but aligns with my well-being hedonistic way more

I change music but depends on the type of music I am listening to . I listen to the list most liked songs

abstract, eternal visual representation, ungraspable, might not be able to put it into words, I say clears strong idea, I am very convinced, try to verbalise it... it is very difficult. But design ideas is usually easy to visualise, but hen I am doing mathematical things also sometimes to visualise. Came over me ... half wandering, half guided.

It was hard to explain... I don't verbal expression of it. Purely conceptual. Relationship modality of the concept. Purely abstract like math concept can be abstract. There is a visual component to it. I can see the relationships. See these abstract interacting. Digital model has no physical manifestation. You have to visualise an abstraction

What objects you like to interact with during your design process? Paper, and pen, ball ... words and arrows. Arrows makes. Boxing it and making the arrows. Brackets... boxing that is open on the side. Breaking up the page. Swiggle ending this thought and starting a new one. I break up the line.

Can you decode them back no... they help me to think while I am writing style.

If it a mind wandering, than it is just helping to guide my mind. which is anti-mind

How could you describe this interaction?

What practices do you use to gain a better control of your attention?

To what extent you would want to rely on technologies to guide your thinking process during your design process? Would you like technology to help you to navigate your thought process?

Guiding is tricky. Supporting is better. You can call it guidance. Because I am getting inputs and actively. Can you read my mind. How would it interfere with me. I feel like if it nudging me. This is the wrong direction I cannot picture it will be working for me. It presupposes linear path towards the goal. If it gives me literal promt. The cue sis related to the actual meaning of what I am thinking about. I can imagine that working. I can see working, like an Instagram line. The mind-wandering will be influenced by the meaning of the think... that will impact your mind-wandering. That is based on your reading of the thing. Purely experiential. subconsciously affecting.

I do not claim a lot of authorship. Ideas are there to find. They are influenced by environmental factors. Because I get an idea... bird doing something =...Random or intentional cues in that way are the same. Birds and Ai is the same.

What environment do you prefer for your creative work? Hate working at home. Familiar is fine. I need people around me and see people. When I don't feel watched so easy to get distracted. That is stimulating it is okey to be alone.

Problems: attention regulation. (cannot meditate),

How would you like to improve your design process?

Appendix 5: Transcript of the interview with novice

designers, Particpant 3

process?

More distracting, because it deosnt' have to do with the. During the work it is not beneficial. And when I am at home ... it is more reflection and it is beneficial. When I go to the supermarket. How can I solve the problem. When I do actively... when You wake up in the morning, consider this.

I don't want more...I was not able to finish the homewok.. watching out the window enjoying my time.

Procrastination. It happens to me. It distracts me. I want to have also a free time. I try to ignore. Doesn't help if I say I will ignore the problem for a day?

I did a context mapping... I did not do anything. Even it is proposed in the book. I don't have insight yet. My mind is processing. talked with friends. And the next day should think about it. You talked about with other people, first step of reflection.

In the evening I am getting impatient. I should write doen something. I saw all of those scenarious happening again. I am ready to produce the information.

What perspective you have when it is the third day reflection: I have in mind, this happened, I still went back I listened to the conversation again. I could look at it more neutral. Oh yeah... I can write it down. I could start to connect.

I felt I did not have any result. I gave myself time and space to let the thoughts come to me. There will be things and they came to me and I as ready. More positive.

Concerns. Do you have any fears or concerns about your design process?

Fears, insecure is this good or bad. Going in the wrong direction. Not well enough. What helped me is to do 24 hours task. Analysing what makes the most sense. I learned to reflect and conform my decisions. Gut feeling and daydreaming... I need to change something.

Awareness. Do you have some concerns regarding your spontaneous thoughts?

Cannot be aware

What makes you feel certain during your ideation? (tools, brainstorming sessions)

I plan to do this when being in the group. People are supporting the idea. I am planning to have a brainstorming session together. Evaluation sessions. This helps to tell me you are going in the wrong direction. Look outside of the small bubble

What do you do to overcome fixation during your design process? And how do you recognise it? When you are fixated on one type of idea or a process

I recognise when it happens the fixation. The idea was not a solution. This is a way to go. I was not convinced with this idea. This is not a solution yet. I was too fixed, because it was a simple solution. It was not my darling but it was a solution. I always try to see the alternative, why it is the best one. Always have your personal preference in it. If the gut feeling is right.

Some pieces of information I couldn't; order them, I couldn't make the sense. Rushed through the process, you are happy when you have a design. It came from some insight, and it is not well thought of. Choosing alternatives.

When are you certain in what you are doing?

A bit fixated, our darling. Personal goals, at the beginning of the electives we want to try out this tequnique, app but have a physical thing. Our goal we did not find a solution into a way. We did not find it.. we came up we one. Okey it is just an idea. When you are stuck what do you do in behaviours?

I write things down over and over again. Restructure on a different board.

Do you use any tools to guide your thinking processes?

Visual is guiding more. Than verbal.

What objects you like to interact with during your design process? I like people, I need someone to talk to and exchange, getting critical feedback. I am doing this and okey. What okey, tell me what I have to rethink. Show me a different direction.

Voice recording of yourself. I am think what if, what if? Fixation that you still stuck, current state of the design. Try to have.

Do you use some practices to gain a better control of your attention?

I would like to do yoga, I need something to calm me down and get thought together. Speak clearly communication skill. To calm down. You start to think differently.

How would you like to improve your design process?

What behaviours you do when you want to feel more creative?

Do you find Min-Wandering to be beneficial for your design Active distracting, I was lost, I wanted to be creative, I took pictures, my thoughts are on the same path I knew I needed new input. Talking to my housemates, sharing your problems. Or do something completely different. Usually online.

I see technology as someone I could talk to, You see for your project, It wouldn't help. I would accept it, assistant. It would be better. I have a thought. Rejecting your idea.

What environment do you prefer for your creative work? I hate working in the faculty.. to many distractions. The worse place ever. I force myself to come here. I know I have to do stuff, when I believe so. I am terrible to work from home. I hate working on my own. I meet a friend and we really talk about each other project's.

Appendix 5: Transcript of the interview with novice

designers, Participant 4.

Interviewer 0:03

So, would you say how? How is mind-wandering affecting your design process?

Interviewee 0:13

I think one wonders wandering. I mean, sometimes it's just procrastinating. Like, sometimes I, if I don't have any pressure to and go do something else, you know, because then stuff happens do something, mind wandering can just be kind of procrastinating, in the background. Like you think. Yeah, it really helps to kind of and then I do something else or kind of moves me to other step out of it and come back. And yeah, and I think I didn't think thoughts. But I thinkif it's not procrastinating, but like, actually, of it that way before. Actually, I think having the DTM course and it just kind of, I feel like I don't know if this is classified as mind like, the context mapping where they talk about that stuff, help wandering, but I feel like I spend a lot of time in design projects, me think about that, because it's important. like, kind of thinking about possible solutions are possible, like kind of wandering a bit in what direction it can take. Without Unknown 5:46 But I think yeah, I think I was just kind of like working. If you know what I mean. Yeah. Without actually even capture you just Yeah. Staring there. And just just yeah, just thinking. And I think that's nice. Actually, like, I think that helped Unknown 5:51 me a bit because yeah, I really rarely. I don't know, I really rarely I mean, I still noticed that now. Like, okay, what I'm planning to finished something like in a fixed schedule. I find that a bit hard. write my report the last two weeks now, my plan is like, right But it's also because I feel like it's kind of a process of while you every day from this time to decide. But that doesn't work never works. You know, but then you don't want to put in time that's make something you mind wander a bit and reflect on what's like, chill here. I don't know. It just feels like it just feels like Yeah, happening. And then maybe you go somewhere else than you thought in the beginning. Because of those unexpected events even though that's important. So planning the break feels like not or something. Yeah. Yeah, but I don't know if I'm confusing mind working. Yeah, but it's like, I know I should I know I need to wandering then with like, reflection in action, or whatever that's called. Yeah, but I think I like not only working like, rigorously to Interviewer 6:27 finish something like for me, it's really important to kind of step when taking breaks usually or you feel okay, now you kind of feel out and think a bit like, Okay, what happens if I do this? And this auilty? and where can that go? Yeah. And maybe that's that I'm not as structured as some people. But I think it's nice. Yeah, yeah. Unknown 6:35 Yeah, I can feel guilty sometimes.

Interviewer 2:38

So you enjoy this way of working? Would you? Would you say you want to change something in your underlying process that you feel like, you already know, is that something you want to change, but it's hard to change?

Interviewee

If I would change something mind wandering? I guess it's like, I think a lot of times, think that, when I have an idea, just making it will be straightforward. But then you don't really plan the mind wandering or reflect or that you'll find something unexpected. When you start, you know what I mean?

Unknown 3:26 Like,

Unknown 3:28

sometimes in the design process, I'll have an idea like, Okay, I'm gonna make this. But then

I think if I would, like, a lot of times, while making it, something unexpected happens. And then you take another turn, but then that's hard to plan. Yeah, into a design project. And maybe I'm noticing that, especially now in my project is like a research through design project, because

Unknown 3:52

it's like, yeah, like trying to get that into linear, I guess it's, a lot of times you want to put design processes like a linear rational process. But yeah, there can be a lot of like wandering or thoughts or reflection happening. That's hard to put into kind of a linear framework.

Interviewer

So you kind of do it more intuitively. And then you plan?

Interviewee

I guess it's like, when you plan a design process, you don't really put the mind wandering in there, you know? Yeah. But it's also an important part of it. You cannot plan it.

Interviewer

No, what can you do you feel like you can create, you know, when to create environment for it. And you're, you know, when you want to come like wondering,

Interviewee 4:51 like, yeah, manage this?.

Interviewee

Um, I think it's something that well, I mean, I still can tell. I'd become better at it. But I think one thing that I've changed through, like studying design is that I realized, I think now, but more how important it is to kind of take breaks and make dinner

Unknown 6:39

I usually I noticed this during my graduation that

Unknown 6:42

I usually have weeks where I'm like, not really doing that much. But like, trying a little bit here, doing a little bit. They're probably just thinking a lot.

Interviewer 6:56

And then, so for example, when I was building my prototype, I was like, for a week, I was just like, blah, blah, trying to 3d print some things, trying to scrape it something. See what happens. And then after that week, even though I didn't do much, I had a way I had like a pretty clear idea of how I should build my prototype and yeah, so even though it was kind of like I didn't produce much there was a lot of like. I think it's still helped to set a direction

Interviewer 8:23

SO you simulate things in your head. And then next week, kind of like okay, now you have more clear idea?

Interviewee

8.34

Or I try...don't just do it in my head. Or at least what I'm thinking about this week? Yeah, I kind of tried to do a little bit of things like 3d print a type the materials using. Tried to make one of the ideas, tried to see how spray painting work and engage with it a little bit. But then just I don't know, I wasn't doing that much that week. But I felt like I was busy all the time. But I think there was a lot of like, thinking, I don't know. Yeah, and then the next week, I just really built all the like, that was way more like

Unknown 9:11 yeah, so.

Interviewer 9:14

So it's like you've maybe if I can reflect this, like you're just exploring if one frame like you are like, Okay, I've saw one frame and then explore another frame or it still mind-wander within one frame? So like, if you have a problem, like okay, how to communicate this to other people, what they want to actually want to achieve. And then you you see it from different perspectives when you do different things or how is how why why it was helpful?

designers Particpant 4 continuation

Interviewee 9:49

Yeah, I guess it was like. I knew kind of what my prototype had to do and convey but I wasn't sure. How it couldn't build it in a convincing way. And what kind of like material expression it should have? Yeah. So that I. But I had some ideas like I, I knew I wanted to use certain materials and like, glass in tubes and stuff. So then I just tried using that in some scenarios, and then I worked from there., And I also wasn't sure how to use the 3d printers. So that was also like, a process of learning to understand how to, yeah. So that we, yeah.

Interviewer 10:45

Do you feel like you recognize when you are stuck in your design process, you feel like you can recognize moments? Yeah.

Interviewee

10:57

I think I mean, now I'm just thinking about my graduation, but there was a period of stuff that I I knew though stuff. But sometimes it's a bit. It's a bit hard to know, when you're stuck when you're like, close to something. usually, you feel close to discovering something. Yeah. But usually, if I discover something, yeah, it's like, the easiest option. But that's like, in front of you You know what I mean? Ah, at least for my project, like, yeah, it's iust been like.

Interviewee

11.43

are you feel at least in hindsight, you feel like you know it the whole time? Like, it's so obvious. Yeah. But then, while doing it, it's like.

Interviewer

It feels like it was there unconsciously. But now you're most certainly in it. Or, or, or you were even not able to formulate it. Or you could formulate it verbally since the beginning. ?

Interviewee

I couldn't formulate it. But I had like, Yeah, because they didn't know what to do with the prototype. But then, the direction I ended up taking was kind of like, really aligned with the research I did before. So, if I just kind of looked at what I did before, and thought like, Okay, what is the logical step from here? Ah, I feel like, but then it's easy to say in hindsight, but then Yeah.

Interviewer

So you kind of feel like you were missing this reflection moment.

Interviewee 12:58

Yeah. Yeah. I've just like realizing that it doesn't have to be that complicated. And I feel like a lot of times I that's how I get unstuck. I think I think it kind of overcomplicated how things should be and then my way of getting unstuck is just thinking, Okay, what do I have this? What's the most easy way for this? I don't know. Does that make sense? Yeah.

Interviewer 13:26 Yeah

Interviewee 13:28

Like, I wasn't noticing that with writing my thesis. I'm like, are writing my report? Now? At some point, I'm like, Oh, this is so complicated. What should I read here? And then I'm like, oh, yeah, no, these three papers. It's just what I wrote in the beginning. Read them again. Yeah.

Interviewer

13:48

Yeah, we kind of like reduce the complexity. So yeah, like, Okay, this is less important. The essence is this. Yeah.

Interviewer 13:57

What do you do what you feel like is working some behaviours activities to get this?

Interviewee 14:06

To get out of this being stuck. I ask people for help. Like, I talked to a friend, I kind of went through it with her that really helped. And I like the coach meeting, you know, because sometimes you just need someone to see it from another perspective. And then and then maybe they see the line clearer than you or something. And, I also in general, when I look back at my process, it's always helped me to just build something and test it with people or just have some kind of evaluate, like, do some kind of research thing. And even though it's like either it's helped me find things or sometimes it's helped me in

I feel like yeah, if I get stuck too much in the just thinking, it's also not good. So, like, I really have to move and try something. Yeah, that's always helped me, I think when I look back like, but the worst period was the one where I didn't do anything where I was just trying to think my way out of the problem. Ah, so you don't have like, there was one problem, and then you try to find a way out of to rationalize it. Yeah. And then it's not working. It's not working, Yeah, Not for me at least, Yeah, Yeah, For me that the thinking and just reading and making decisions from just reading is harder, right? Yeah. Yeah. I like more of the kind of testing and getting some insights from there. Yeah.

Interviewer 15:50

Yeah. But also like in taking breaks. What do you do that is helpful to when you're like, Okay, today in, like, in the morning, you're stuck. And then what do you do to take a break? An Incubation break

Interviewee

Usually I if I'm sitting at home.

Unknown 16:15

Okay, usually I like productive to one ish. Yeah. And then maybe I'm productive after lunch. But if I'm not I take a go for a run or something. And then I come back. Yeah. Or I do something. The last days at least I've kind of gone for a run or go outside or like, I was with my family last week. Yeah. Like, with my family and then come back. to because I don't know, sometimes you just realize okay, now I'm just staring at the screen. Yeah.Nothing's happening, Yeah.

Unknown 16.59

What do you have some fears in your design process that you are or concerns in your design process that your or at? attitudes that create fear? Yeah, I think it's just

Unknown 17.17

how subjective It is sometimes. For me, it's a bit scary. Because it's, I don't know, with my Yeah, I'm thinking about the graduation again, because it's such a huge topic. So I feel like it's kind of impossible to do to find, like a really objective

Like, I have research data showing kind of this and this, but it's still really, yeah, I guess it's just this fear of it being shit. You know, but then, like, no one telling you it's shit. But it's shit. Or like this imposter syndrome. Yeah. thing.

Interviewer 17:57

Where was it fear about the design process? Yeah. Like about the design process about ideation? Like, are you sometimes afraid of not coming up with ideas? Or then you kind of feel like, okay, I'm not ready to come up on.

Interviewee 18:12

You have any fears about ideation? Or are you? Ah, yeah, I think for ideation, I'm struggling a bit with or I've struggled a bit with, like, when do you have the right frame? To start ID and when you just start. And I think that was also when I was stuck. I was really trying to find like, a frame, you know. But then I couldn't really find one. And then I just kind of started at some point, without really knowing a lot what I was doing, but then it developed a bit from just doing that. Yeah. Yeah.

Interviewer

So, you feel like the frame you started ideating is, is what's the

Appendix 5: Transcript of the interview with novice

designers, Particpant 4 continuation

same frame, as you now know, or it's different.

Interviewee 19:04

When I started it was a bit different. But now it's, it's been kind of consistent. After I adjusted it. Yeah, like after I started, but it's still different. But yeah, yeah.

Interviewer 19.19

Do you use some tools to design your thinking process?

Interviewee 19:27

Yeah, I mean, I use design my thinking process. Okay, I wrote a calendar in my book. Yeah. I really like that. That every time I have a deadline or something, I make a calendar, like by hand. Because then I'm like, yeah, so this was after I pulled myself out of the mud out of the mud. This one was like, Okay, I'm gonna this week did

Unknown 20:00

This this would be this this week have this and this. So have some like, oh, no, you put shields, so you have. Yeah, true. Yeah. So put some like I put some like it this week I have this I have to finish this books with this. We have finished this. The others toolkit. This week I have to do this. Yeah. And then I do that several times. Now I have it for writing

Unknown 20:20 a report

Interviewee 20:22

that helps me just to put some, like, you're here, I had delivered the green light this day.

Interviewee 20:31 The focus group this day.

Interviewee 20:34

For me, that really helps to have some like, things I have to do at some point. Yeah, and but for ideation, yeah, I use, like, I use I draw on my iPad a little bit. But also, just writing, because I think it depends on the project. Because now my project is academic. So, then I feel like I need to write to make like a editor right to think to have like a clear literature grounding and like clear theoretical lines binding it together.

Interviewee 21.17

But for other processes. I don't know, for example, in Busan, you use way more like you make interfaces in figma. And that's a way of thinking because then when you start making interfaces, you realized Yeah, you realize all these things like okay, if you're here and you want to go there, how do you do that? I didn't think about that. Okay, you have to Yeah, so it's like a different

Interviewer 21:41

What do you feel like some like visual way of like, or writing words helps to think better or visual or what helps you better

Interviewee

yeah, for this project, I think writing is helped a lot. Because it Yeah, it has to be grounded in some needs to fill a research gap kinda. Yeah, but but also drawing has helped when I was making the prototype. I started drawing because then I had some like, Okay, I need to do this and this and this. And then I started I think I also did a bit here I don't know it's a bit but then not really great Oh, yeah, me to do this every day. That's nice. For a while I did that with those one year I yeah, here is figuring out the storage container. Yeah. And like how to do that. And then have the Yeah, this drying actually made me make it that way. So then, yeah, drying I think helped a bit, but then for conceptualization and then I was using a 3d modeling software and then there you realize other things like okay, what's the dimensions? Yeah, biggest is like more technical detail. Yeah. Yeah.

Interviewer

Also, how do you how do you like to reflect on your thoughts? On your you reflect with others with yourself? No taking going back

or what do you do? What helps?

Interviewee

I think I like talking to others. Yeah. Sometimes I write I have a diary, but I haven't written it for a while. So yeah, for reflection for myself, I don't know sometimes it's helped me to just write down what I'm thinking or try to get an overview. Yeah, like, helps or not, yeah, it helps. Like there were a few types. This this project where I can't sleep, and I took my iPad and then I drew what I was thinking about and then I could sleep really Yeah.

Unknown 24:24

Yeah, like some of it I like used as a process overview actually, because I was trying to make sense of what I was doing and then kind of drawing it out. Yeah. Yeah, like now I'm also drawing to figure out how to like position how to explain my process, like actually do circles or like starting in a big research area and then going into smaller one and then there Yeah.

Interviewer25.01

Do you like to interact with some objects during your ideation? Or thinking? Or oh, say mind wandering? Or is it like my, my objects you use for mind wandering or objects as you use for ideation?

Interviewee 25:17

Yeah, I think drawing I've used clay before. Yeah. Yeah, I tried to think about that, because I was planning this prototype with like, glass and 3d printing materials. Which is a bit different than what I'm used to working with. And yeah, I think I had this process of like, trying to understand what stuff made from that material could be. So then I was like, yeah, just trying to 3d print something, even though I didn't know if I wanted to do that in the end. Or, like, I bought a lot of glass stuff. Because I wanted to do something with glass. Or, like, tubes, I bought some tubes. Because I knew I'm gonna use tubes. So then what can tubes do?

Interviewer 2526:19

Yeah, so do you feel like interacting with objects also helps you to think about ideas?

Interviewee

Or yeah, sure. Like I never, every time I'm building a prototype, I need to feel like the materials, no, or no, understand what I can do with it. Because if not, I think it's really hard to know what you can do. And actually, I was missing that. Like, at my old university, they have like a wall of different materials you can work with, Oh, yeah. And that was really nice, then you can feel like, okay, I can just do like this. But then cure, there's not that. So like I was also bit afraid of, because I didn't really you don't, it's hard to know exactly what you want to make without understanding what you can do, you know? Yeah. So that I

Interviewee 27:08

think there's also one of the reasons why I ended up with 3d printing and glass because it was like, it fits my fifth my design stuff, but it's also the most accessible. Yeah, like, I can buy glasses, I can 3d print, I think, the threshold for me to start, I don't know, making glass stuff. I was I wanted to shape glass for a period, but then I couldn't really figure out how to do it. Yeah. And then the idea went away from in, like, first I was making a glass, like, have a complicated glass part. But then, as I realized, like, that's a bit I don't know how to make that it shifted more over to using 3d printing. Yeah, so yeah.

Interviewer

But that's interesting.

Yeah, it's really hard to just maybe if you're IPD, and like, really know, the different materials, you can think about exactly what you want to make before you know it. But do you feel like just because it's about you also have a shape and then you move the shape? And then you can think what is kind of like, you can do you think you can get the same idea about what you want to make in 3d if you just start from a blank, you know, thing in 3d modelling software? SolidWorks. No. Yeah. No, because then

designers Particpant 4 continuation

immediately becomes technical. Yeah. Like you. That's first square you make you must think about the size. And that's like, already.

Interviewer 28:41

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designers, Participant 5

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Certain mood is a mood of you notice when you get inspired by stuff. You can look at something and can already start thinking of a problem. When I am looking at bunch of bikes, it doesn't spark anything new. I try to get into What type of ideation. I am starting from scratch , I will try to get into situation where I get a lot of triggers. Like taking a walk. Or go to Pinterest. It has to be right combination of a little bit familiar, but not too familiar. My cognitive load... shouldn't be focused on navigating the space. Do you find Min-Wandering to be beneficial for your design process?

Do you recognise how MW is helping your process? Than it helps to get out of a stream of though. Get out of the view, perspective. What is the mindset when you try to get inspired. I think I am just thinking about the ideation experiment. I had to think about the mode of transportation.

I am now taking a walk and I need the exploration. I look at everything, people are moving. Sometimes I try to force ideas out of object that doesn't seem related. When it doesn't come in one second. What I am doing is I look at the object, object reminds me of something, that riggers. The other thing is giving me an inspiration. My first year I remember, I keep thinking until I find something.

I have found this? What does it mean? When I am able to see the problem in the new perspective, see a new perspective, or makes me see a problem in a new way. This is not something I have explored yet.

Concerns. Do you have any fears or concerns in regards to where your ideas are coming from during your design process?

This phase with ideation where you feel like you have emptied all the possibilities, or maybe you feel there is too much things, no flexibility left. It is really hard to be creative. Get a moment of being stuck.

It is very incontrollable. I don't feel comfortable that I can get out of the Stuckness. I am in the moment of a panic. How long is this going to tak . When I never got out of it. When there is time constrains. Suddenly I have all the time in the world . I don't stress of being stuck. No time pressure to be creative. You cannot rush it. There is no way to become creative or get out of it fast.

Awareness. Do you have some concerns regarding your spontaneous thoughts?

What do you do to overcome fixation during your design process? And how do you recognise it? When you are fixated on one type of idea or a process.

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Do you use some practices to gain a better control of your attention?

No, I have never been able to do it. I cannot go further, I will do something else

Managing the break time:

Makes feel me more relaxed, but I am very easy with taking a break. When it is a time constrain I will still take break. Taking a break erases the chalkboard from unimportant things. I can focus on the important stuff again.

I eat or I cook, during such a break, something focused . I cannot take a walk, because I will automatically think about it again Sometimes it works within one day. But if I am really stuck. Whole day off usually helps. When I was stuck within one day I can find a different.

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What behaviours you do when you want to feel more creative? What environment do you prefer for your creative work?

Places with a lot of background noise and activity. Things I can quickly walk away from to have a walk. I hate the faculty. Far away noise and a relatively new environment.

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I get distracted very easily, that is a general. My mind-wander could go ito a completely unnecessary direction. I get distracted. Do you have a control of MW?

Maybe you can control the environment, but not when it happens. Controlled MW. You want to wander, time-constrain thing. If I want to be unrestricted creatively, wander with my mind. I would try to avoid the wandering. Constrain, maybe not only time, Or when the project is already having a lot of requirements you feel like it is not goanna work

Being creative means mind-wander. If you feel like you have the space to mind-wander. I know this is they are teaching, you have to postpone judgement. You can get to the cool ones,

What makes you attached to the idea, some type of intent in generating the idea, than mind-wandering seems. Some concern that you unaware of. I have a set of requirements that are very hard to explain.

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designers Particpant 4 continuation

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What behaviours you do when you want to feel more creative? What environment do you prefer for your creative work?

Places with a lot of background noise and activity. Things I can quickly walk away from to have a walk. I hate the faculty. Far away noise and a relatively new environment.

Communicating problems: Any time to visualise it is okey. People are speaking a different language. I have troubles communicating with them in general.

Control of MW:

I get distracted very easily, that is a general. My mind-wander could go ito a completely unnecessary direction. I get distracted. Do you have a control of MW?

Maybe you can control the environment, but not when it happens. Controlled MW. You want to wander, time-constrain thing. If I want to be unrestricted creatively, wander with my mind. I would try to avoid the wandering. Constrain, maybe not only time, Or when the project is already having a lot of requirements you feel like it is not goanna work

Being creative means mind-wander. If you feel like you have the space to mind-wander. I know this is they are teaching, you have to postpone judgement. You can get to the cool ones,

What makes you attached to the idea, some type of intent in generating the idea, than mind-wandering seems. Some concern that you unaware of. I have a set of requirements that are very hard to explain.

I was experiencing MW two minutes ago, half talking aha.

thought the whole point you cannot control it. You are not,

You can choose to go further with the thought. You diverge into something else. You do make some judgements within MW. I have to pay attention to.

Do you have problems communicating your ideas:

designers Particpant 6 continuation

(Notes during interview)

Level of awareness: Most of the time I am not aware of the fact that I am mind-wandering, I have mental imageries when walking. Participant mentioned he is recalling experience.

Specific term provokes to think of something else. And aware that is MW during reading.

When you are stuck or fixated in your design process what do you usually do? What helps you to overcome or realise that you have a fixation?

I feel like I am always fixated on smith. Fixation is a good thing, because the more fixated, the more unique. Work fixation is almost obsession, you have to do something in a specific manner, desirable. Beauty is not always desirable. Fixation is like you lack the whole picture, step back, see the whole picture, but you cannot do it sometimes. You look at very specific thing and you have to think of so many ideas. Fixated on not only beauty. Two meanings: appearance -Beautiful. But the other type is conceptual aesthetics. I always want to design that covers different conditions. Covering different criteria, super specific situations

How do you like to ideate?

Someone else is controlling the idea generation. Performative, if you tried to be performative you will not be able to come up with the idea. But if I be motivated to catch attention from people. Requirements, you have an archive in your brain. You know pattern by seeing the archive of design work. If this idea already exist on the market or not.

When you are stuck what do you do?

Waste so much time, but I can come up with something cool. I spent so much time doing nothing. Sitting there and generating idea, and then I can come up with really good idea.

You know when you are stuck. How quickly your brain thinks, and speak, cannot speak. I am in different world, so into discovering the idea. Go to famous designers ideas, look, different perspectives- it is intuitive process, what if you ask question. Rule is something to break.

I keep thinking, but I keep thinking, I cannot stop it. It is toxic it is horrible. Sometimes it is not helpful, I have to come with ideas. It I when I get distracted and cannot focus on what people are saving

Do you engage in incubation activities during your design work? I just walk IN THE ROOM AND and making a circle. Talking with smart people

Do you use any tools to guide your thinking processes?

You never follow the process. You don't sketch, I put it after the design process.

What objects you like to interact with during your design process? I draw scribbles, doodles, Schematic relationship is also not something that I am drawing when I think of ideas. Depends on the phase. When I try to come with biomimicry and I start to draw beak, very abstract shapes and I try to come up with different concepts. I am drawing functionality than experience. Where you like to MW?

Doesn't matter I can do Mind-wandering everywhere.

What practices do you use to gain a better control of your attention?

No

To what extent you would want to rely on technologies to guide your thinking process?

No I don't have technology, Pinterest, Instagram. I am visual I need to see visually

What environment do you prefer for your creative work? Home, anywhere is fine. Sometimes I walk in the street

Problems: attention regulation. (cannot meditate),

RQ4 How could designers better recognise their immediate needs within the design process and address them with a mindwandering experience?

How would you like to improve your design process? I don't want to waste my time, overthinking. I sometimes come up with idea immediately and I sometimes wait to see it is worth it. And I try to come up with different idea. And the first idea is actually good I have to convince myself to go with the first idea. You can just go with first idea.

What behaviours you do to guide your creative thinking? Scrolling Pinterest, Behance, Instagram.

Appendix 5: Transcript of the interview with novice

designers, Participant 7 continuation

Interviewer 0:03

Yeah, so how do you how does mind wandering makes you feel like? Do you feel like you have control over it? Does it help her design process? A lot of questions. Yeah. Okay, so you can do one by one, one by one.

interviewed 0:17 What was the first one?

Interviewer 0:19

Yes. So how? How does my mind wandering makes you feel like

interviewed 0:27

I think I quite like it. I like, especially when I'm aware of it, because I think there is also a big thing that comes into play that my mind wanders sometimes, and I later realize that it has wandered a lot, and that I have to bring myself back. But at times when it's conscious, and I am in control of it, with at least then I enjoy it. And I also enjoy it at times when I feel stuck, or, or anxious, or nervous or something, it provides, like sort of an escape to sort through whatever problems happening right now. So yes.

Interviewer 1:10

And what do you do? Do you recognize these moments when you need to mind wander?

interviewed 1:19

I don't call it mind wander? Because, to me mind wandering, sounds like it is a bit unconscious, like it's happening spontaneously. But from the definition in your survey, it said that it's somethi unrelated to the task at hand. And that is something I do find myself doing quite often. So yeah, there are times when I'm like, Yes, I need to think about something completely different. Because I feel like I'm doing this design project, for example, and I'm not able to find a solution. But the problem may not lie in the design process or the design project, but in some other aspect of my life that I need to go into. And then I start thinking about

Yeah, like I mentioned, I think sometimes it helps when I feel something else. And I think I mean, that is not related to the task stuck. Because also, this is a thing and introspective design that at hand. Yeah, it wouldn't maybe also be mind wandering. But yeah, it's like a deep thinking, diving deep process. also came up quite often is. And I really like this theory that there are a lot of inherent innate knowledge in us. And because of all the knowledge outside of us, we start focusing on the inherent Interviewer 2:21 knowledge, and mind wandering, so it gives me an opportunity to access that innate. So if I, for example, sit in a quiet room with just my notebook, and my pen, and I have no distractions or no But what do you mean? Like it might be not related, but you still, it is helpful other stimuli. The only thing that I can think about are the things or the tortured side of me. Yeah, that is really nice. So when I interviewed 2:30 There was a question in your, in your survey that was like, you feel like when you mind wander, you go from topic to topic. And I think that is what I mean. Like, for example, I'm doing a project. feel stuck, there's something there's something inside of me that helps me break through that. That is one thing. And secondly, I feel like when things get boring, it is also nice to do sort of use as a brainstorming tool almost to how to make myself feel more enthusiastic about it.

And I find it really hard to concentrate on, say one small aspect of it. And maybe it's designing an interview. And then I start thinking, why is that? Why am I having an issue with it? And then it turns out that maybe I haven't eaten in like, two days properly, thinking, why am I not eating? And that sort of just builds sort of like a web of thoughts, where I really tried to go deep down on What's stopping me. And then at some point, it stops becoming, finding the problem, but it starts becoming mind wandering, where I'm just thinking, what I need to do in the morning. So yeah. But it's also interesting, because I've never actively thought of mind wandering as a concept. It's not like, I put down my pen and paper and I start thinking that okay, now I'm going to do some mind wandering. Yeah, that has actually never happened, I think. Yeah.

Interviewer 3:55

You said like you, because you mentioned like, you have conscious and unconscious, mind wandering? Do you feel like most of the times you have control over it? Or most of the times it's uncontrolled.

I like to think that I have control over it most of the times. But I don't know if I can say that with God's hands. Because I feel like oftentimes, My mind wanders, and it comes back to the task, and I barely even realize it. Like, a task that is supposed to that I feel is supposed to take me 15 minutes, I spent an hour doing it. And then why is that? Like, why am I taking that time? Because my mind is I did not realize it. So. Yeah. Also, I think there are some triggers to mind wandering as well. Especially I find if I'm working on the computer, or my phone, like if I'm taking notes on my phone, or if I'm just doing something on these tech products. It's very, very susceptible to mind wandering because on my browser, for example, there's a favourites bar. And then I have like a lot of things going on there. So, for example, one favourite

is like bold.com, or something. Yeah. And I'm working on that project. And I suddenly remember, oh, I need to buy this book that I was thinking about. And then I suddenly go to bold.com. And I start buying. And then yeah, it's. So yeah, I think the trigger is also don't help. So, I try to sometimes and I feel like my mind is wandering subcon. Like unconsciously, I try to minimize the triggers as well. I would just not use my laptop, I would sit with the with the book. And just write instead of typing, and yeah, things like that. put my phone away. Yeah, sit in a quiet place where there is not a lot of distraction.

Interviewer 5:54

Do you feel like you sometimes deliberately do some things or behaviours to that help you to mind wander

interviewed 6:06

I do think so. If you'd like to mind wander, effectively like to make sure that you're getting something out of you need to have a bit of focus, I think, if my attention is going all over the place, then the wandering becomes very chaotic. And I'm just again, it becomes a web of thoughts. And I'm just going from one to another to another do another. I'm not really going deep in one thought, yeah. So what helps me is just mindfulness, and meditation and things like that, which helped me sort of be more aware of what I'm thinking, yeah. And that helps the take more out of the mind wandering process. There are also times when I feel very chaotic in my head, and I'm just not able to focus on concentrate or anything. And at that point, I would just sit down, take deep breaths and try to focus on one thing. And yeah, just consciously focusing on Yeah.

Interviewer 7:19

How is maybe you said it already? How was mind wandering affecting your design process?

interviewed 7:27

Interviewer 8:35

Just think about the work that you have to do

interviewed 8:38

about the task and all the tasks. Yeah, like, for example, yesterday, I was making a presentation for me for my office team. And the presentation was really boring. And we missed like I was just going through like chronologically, whatever I've done, and like really making boring slides. And then I believe that I started mind wandering a little bit thinking that oh, if I, if I show this presentation to my colleagues, they will just be yawning and they will just fall asleep while I'm doing this. So, I need to add some humour in it, I need to make it make it nice. And then I started thinking about the presentations that I've seen that have really captured my attention and what elements they had. And sort of going through that circle. I ended up with a presentation which was not as boring as so I think it really helps in that sense as well. Yeah. But I think it comes back again to being stuck with a problem and it helps you break through it. Maybe that's the only thing

Interviewer 9:36

Yeah. It's like when you feel like you don't know how to approach the task or the task is boring and that's kind of the moments when you feel he wants you to I'm wondering do you at this moment because you could you do a presentation you could just go you know like online and search for like how like how to make presentation funny, but you instead of that you Go into your head.

interviewed 10:01

Yeah. Because like I said, I don't know it's a thing. It's also like

Appendix 5: Transcript of the interview with novice

designers Particpant 7 continuation

from a younger age. Yeah. Because the Internet has always been with me since I remember, like, at least till I was a teenager. Yeah. Any problem that I had, I always Googled it. And then I came to realize that the answers on Google are not the answers that I'm looking for. Yeah. And more often, especially in these design processes, things are like this work stuff. We like most often it's the answers, I already have them. I just need to look inside instead of looking outside. Yeah. So I think it's more of a personal thing as well. Also, I do definitely look or look it up as well, you will judge GPD, for example, and things like that. But I also do enjoy my mind wandering for this purpose.

Interviewer 10:55

Also, some other questions about what tools or techniques you use to guide your thinking process, if you use some, some?

interviewed 11:08

Well, I think whiteboard tools are very nice, like Miro and fixture stuff. Because they're really simple. They're just posted, I don't have to do much, I just have to focus on thinking and I just put everything down. But like I said, I'm a bit scared of digital tools, because they encourage mind wandering that is not nice, unnecessary, or like maybe like non non beneficial mind wandering. So I also really enjoyed doing it manually. Maybe just with a with a notebook in a pen. Yeah. And just jotting everything down. And oftentimes what also helps me is, and I just recently started doing this. Is that, like, for example, you're taking the interview right now? Yeah. And you're noting things down? Yeah. But you're probably noting only the key points down because you can't know everything. So that you're taking some things out of whatever I'm saying. Yeah. But what helps me while I'm mind wandering, is noting down everything that I'm thinking, yeah, and making it like a story because whatever's happening in my head is like an additive thread. It's like a story that's going from point to point to point. And I feel like every time that I've only taken the key points later on when I see it, I don't I don't understand it at all. But if I make it like a story, yeah, it's really nice. And

Interviewer 12:26

how do you do it? Like, wars? You do not taking words or

interviewed 12:31

I did down whatever I'm thinking I would just write it down. Or if it's if I'm being lazy, then I recorded. I never listened back to it, though. It's just I think it has retained the information or. Yeah,

Interviewer 12:51

yeah. So you do it like regularly every day this not like,

interviewed 12:56

oh, only when only when it's when the thoughts are so much that I find it hard to keep track of. Like, if it's really like, I feel like mind wandering also, like different intensities, I think, maybe once a week or something, when the thoughts get really a lot. Yeah, and I do this. Otherwise, it's just on my own.

Interviewer 13:16

And usually, it's like its relation to some complex problem, like a project or is like personal things, or

interviewed 13:25

I think it's everything. Yeah. And I also think everything is connected. Yeah. Because I feel like my mind wandering always stems from a certain trigger. Yeah. Like, for example, I woke up late, and I felt lazy the whole day. Yeah. And in the evening of that day, I'm thinking, why did that happen? And then I start thinking about all the things that have been going on and like, what works from the worksite from my life, say, from personal, friends, relationships, things like that. And then it all sort of comes together and it started sort of becomes like, journaling instead of just mind wandering. Yeah. Yeah. Yeah, but I think I've been talking a lot about mind wandering to sort of solve a problem. But I think there's also a lot of mind wandering, that just generally happens. Like, if you're talking to me and I do not understand what you're saying, or I'm bored or something then my mind was wandering. And that wandering has no purpose whatsoever to me. Just to keep my mind occupied. Yeah, and I think that's a different kind of doesn't have a purpose. Like. Like entertain Exactly. Yeah.

interviewed 14:59

Okay, Wait a minute, an escape from the current task?

Interviewer 15:08

Okay, what makes you? Do you feel confident to ideate on your own or you like to do ideate? Brainstorm in the in the group and on ideas veah

interviewed 15:28

I do like to do it in a group. But I find myself enjoying it on my own as well, I think it really depends on the context of the project. I do it in a group, especially when I feel like I have some biases. And that I can get through them. That happened, actually, I think quite often and getting an objective set of eyes on it make. So maybe, okay, maybe a good one is benefit more better?

Interviewer 16:01

Yeah. But you kind of you can distinguish when you need. Yes, yes. Yeah. And you said also, you're aware of your biases, when you are biased?

interviewed 16:13

When I'm aware of my bias, because I feel like often times you're biased, but you do not know it. Yeah. But I also think bias is not are not inherently bad. Always. Yeah, there is sometimes it helps as well. But you asked. When am I biased?

Interviewer 16:32

Like, if you're, you feel like you have this awareness of that. Okay, I'm actually biased. I'm fixated in some specific way of solving the problem. So maybe I need a group brainstorming. Yeah,

interviewed 16.45

yeah, that happens usually. But sometimes it can also just be if I'm not happy with my ideas. Yeah. Like if I lose some ideas, and I'm like, Okay, this is kind of shit. Yeah. So maybe I need some other insight. Yeah. And I also overtime realize that people think very differently, especially in the three masters that we have. Yeah, I think SPD people think very differently from IPD from DFI. So I think, as an SPD minded person, I think I also really value people from other trains of thought, which is also very nice. So that is also really helpful.

Interviewer 17:26

Yeah, okay. I'll ask some other questions about how do you feel about taking a break during your design process? Do you take like, do you? Like, purposefully take a break?

Interviewed 17:41

Take a break across, like, a vacation or 30 minute break? Oh, like? I purposely take a break, I think yeah. And when I do that, I think I try to have an agenda. I mean, I Yeah, it's not all it doesn't work very often, but I try to have it. So, then I divided by tasks. If I finish this task, I will go for a break, for example. But oftentimes, when it's a big task, I also tend to do that when I'm just a bit saturated with the work. Yeah. In context of mind wandering, I don't know if that is sort of a trigger for breaks. Yeah. I do find that when I'm in a group of like, if I'm sitting with maybe five people and we're all just working on our own tasks. We tend to go for a break when everyone starts sort of talking to each other instead of working maybe like when there's sort of this collective mind wandering happening. We take a break Yeah, but I think yeah, that's it

Interviewer 18:59

yeah. Do you do some like, into you know what incubation is? Do you incubate on the problems that the like, let the problems aside when it's purpose usually incubate on problems? It's like taking a break and letting decide it's kind of again, taking a break, but it can be like, you know, late,

interviewed 19:28

let the problems solve itself.

Interviewer 19:30

Yeah. Okay. That way. Let it rest. Yeah, let it rest. I think in some situations, yes. Do you feel pressured to take it like, because you can take a break, but then feel guilty that you are not working on the process on the project and do you have this or no?

interviewed 19:55

Well, it depends on the kind of break that I'm taking. For example, if I take like If I'm supposed to work eight hours a day, and I take a break for seven hours, I've been guilty. But I think, in general, I don't feel very guilty about small breaks, like coffee breaks or something. I do feel guilty if I have something to do for the day, and I don't end up doing that, because I took a really long break Appendix 5: Transcript of the interview with novice

designers, Participant 7 continuation

for like, no reason. Yeah. Yeah, so if it hinders my work, it's a interviewed 25:32 problem. Yeah. Yeah, that's it.

Interviewer 20:36

You said about fixation? Do you recognize as it biases Do you recognize when you are fixated in specific solution, space, or process, how you organize a process

interviewed 20:53

I try to be. And I also, because of that, I also like to have maybe an objective set of eyes, apart from just me working on it. So maybe a supervisor or a friend who can sort of I can talk to you about this. But oftentimes find that even though I am fixated, I either don't realize it until really late. Or I don't mind it. Because sometimes I think fixation also means that I'm focusing on something that is that could be more important than the other things. But what, to me is very dangerous is when I have fixation That doesn't stem from any evidence. And it can I realize, really, and then I lose a lot of time to projects. That sort of happens. Yeah, and that sucks.

Interviewer 21:56

How do you like I've already kind of said this, how do you like to reflect on your thoughts? You mentioned? Voice Recording. Something else?

interviewed 22:07

Yeah, I think just writing them down is very nice. But there's this concept that I recently got no, like, I knew this concept. But like, my office, like the company that I'm working for has like this name for it. Yeah. And it's called a rubber duck, like rubber ducky, you know, rubber ducky. Yeah. So you know, the rubber ducks. Yeah. They have a rubber duck in the office. Yeah. Just randomly. And I was asking them why they have that. Yeah. And they were like, sometimes you have a lot of thoughts. Yeah. And you want to talk to someone, but you're not looking for a solution. You're just looking for someone to listen to your thoughts. And while talking, you realize what's needed. Yeah. And that's what the rubber duck is for. So you just sort of take that over duck and you talk to it. And it doesn't say anything, it just listens to you. Yeah, then you figured out what you actually need. And for this concept, they were also like, this is just an idea. And you can also just ask one of us to be like, Oh, hey, Richard, can I just rubber duck with you for a moment? And then they're like, Okay, so I know that I just have to listen here. And I don't have to provide a solution. Yeah. So I think that really helps to talk to people where they're just listening. And you mind wander, but you verbalize it. And yeah, that resolves itself. So

Interviewer 23:30

yeah, it's very, very interesting. You talk about this. Yeah. Do you have any objects in your environment that you like to interact during your ideation or thinking process? That's my next question.

interviewed 23:49

Well, the rubber duck is new. I haven't actually talked to it. But I started practicing that more. Yeah, like talking to people, but making sure that they don't start solving the problem for me, like, if I am telling you that, Oh, I feel really fixated, you will, of course, want to be a good friend, and you would like to solve it. And you will be like, Oh, you can do this, this, this and this, but I don't want that. So I need to make it clear. So that is one thing. Another thing is that I just have this this diary, this sort of notebook. That is really nice as well. I like to put my thoughts on the Notes app, but then yeah, again, it's just writing and thinking if there are any other items that I use

Interviewer 24:41

or fidgeting or something like this, in the fidgeting doodling aspects.

interviewed 24:49

what an artists would called doodling on the guitar, then yeah, well. And that also sometimes really helps me. Yeah

Well, often times it's also very simple. If I find myself really going hard with mind wandering, and I noticed that I'm just like, No No, but I mean, I play the guitar and that happens that that is really nice sometimes. Like I think I do sort of the equivalent of stop, you have to come back to the task revisit task is important. Yeah. And sometimes if I have that, that voice in my head very because I would just start playing anything random. And that's also I think, I feel like it's sort of a mind wandering technique as strongly it works. I stopped mind wandering. Yeah. Any other practice, like I said, meditation mostly helps with mindfulness, and recognizing that our mind wandering and maybe helping the mind wandering process. But to stop mind wandering, I think Interviewer 25:22 deadlines really help. I think if I'm working on a task with a strict Okay, we're almost five more minutes. Yeah. What behaviours you deadline, I would be less inclined to get distracted, I would be do when you want to feel more creative? more focused on the task.

When I want to feel more creative or shit? I well, I think experiencing more things, getting out of my comfort zone is really, really nice. It gives me a new perspective. I think when I want to be more creative, the only thing I want is more perspective. So what's blocking me usually is my own limitation, my own thought processes are getting very narrow or getting very limited. So if I talk to more people, or if I do things that I haven't done before, or if I just talk to maybe experts in the field, who know a lot about it, who can tell me a bit more. All of those things sort of helped me expand my knowledge base, and that helps my creative process as well

Interviewer 26:33

And you said to like perspective? Yeah, also like other people perspective? Yes. Yeah. So

interviewed 26:38

not exactly, maybe not exactly a brainstorming session where I asked him for that ideas, but maybe just casual conversations about different things. Yeah, that may not be relevant to the project itself. But it might help me in a project. It's also sort of a question, I think about creative block. Like what happens when I feel blocked creatively, like, I cannot think creatively. And I think for that, I would just sort of take a moment. And I will take a break. Not for 15 minutes, but maybe a longer break. Because I also feel like there's a saturation or a limit. And sometimes we burn out. And I think that's also a time where we're very susceptible to create a blog. And taking a break really helps. And then back to the creative juices flowing. Yeah. Yeah.

Interviewer 27:42

Do you have any fears and concerns regarding your design process?

interviewed 27:50 Regarding my design process, in general,

Interviewer 27:53 in general, or recently,

interviewed 27:55

well, I think I try to do things differently with every project is a bit. And my concerns are always the risks that I take when I do things differently. So for example, there are these proven methods of design that work. But I changed them due to the project's context. And then I'm not doing something that's true when I'm doing something that is being done for the first time, or maybe has been done by someone else, but I don't know about. And that sort of causes some stress, or some issues maybe. Other than that, I am also a bit concerned about fixation, because I do not like it. You know, how we're supposed to diverge, and then converge and diverge and converge. I feel like if you're fixated, you don't diverge, ever. You start with a with an idea. And then you just make that idea. And then that's not encompassing what designers, so they really don't like that either. And another thing, what was the question like, What am I afraid of fears, concerns concern, like one concern, I don't think it would be a fear, but it would be a concern that my vision for the project doesn't align with the other stakeholders. So when I'm when I'm designing, I'm designing it for someone, not for someone, but maybe with someone. And what I think is needed might not be something that they think is needed. That is always a concern, because then we have to find a spot that works for everyone. Yeah,

Interviewer 29:36

yeah. Do you use some practices to gain control of your attention? You said mind meditation. Yeah, that's something else. To restore your attention or get control of your attention.

interviewed 29:58

designers Particpant 9

Unknown 0:00

The I wanted to ask her so in the yeah about your mind wandering. So first it was like this questionnaire was for to understand how i You might wonder a lot or not. But now more questions like about how mind wandering? So the first question is about how mind wandering affects your creativity? Is it helpful or not helpful?

Unknown 0:27

I think it is helpful. But also it depends on like, what part of the creative process I'm in. Like, I don't find it very helpful if I'm in the research phase, or just I'm trying to scope down my problem. And then I start mind wandering, because then I keep seeing things and like, the scope just keeps increasing, because I think this is possible that is possible, and she's just keeps going bigger And that thing is one phase that I want to actually converge and actually get to the project, then it's not good, but then in when I start looking at ideas or design directions or concepts, then I think it's quite nice to think about it and just spread out

Unknown 1:15 think you're on mute?

Unknown 1:18 Is it okay? If I type? Do you hear me typing? That's fine or not? That's okay. That's okay. Okay, so how does mind wandering makes you feel like?

Unknown 1:31

How does the mind on?

Unknown 1:33

Yeah, how? How do you feel like you have control over your mind wandering? Or it's mostly spontaneous? Or it's mostly you? Can vou are aware of it?

Unknown 1:45

I think it's mostly spontaneous. Like, I'm aware of the start of the process at times, because at times, I'm actually just sitting down and saying, Okay, let's think about this, or let's think about something. But where it goes, and how, like where it leads to is, I think, more open ended.

Unknown 2:15

What techniques? Do you use any tools or techniques to guide your thinking process?

Unknown 2:24

Not really, no, I can't think of any particular

Unknown 2:29

like writing taking notes, visual doodling note taking, like also note taking.

Unknown 2:37

I guess, then I guess writing is one way for me to start off. Because even if it's in a creative process, before I actually sketch, I'm more comfortable writing down like some bullet points or ideas, and then taking it ahead from there. Mind Mapping, like if I'm working on my role, or like I have a big sheet of paper, then I don't mind just drawing mind maps and building connections.

Unknown 3:11

Yeah. So more also in visual way, what is connected to what? Yeah. How do you like to ideate, which is a preferable way to RDS for you.

Unknown 3:30

For me, I think I like doing a dump in the beginning. So I can just put down all the thoughts, I have all the possible directions. And I think it's also in terms of quantity. So most times, I challenge myself to come up with say 50 ideas or 40 ideas. And then some of them are obviously going to be crap. But then once I was in front of me, I think I have the confidence that I've covered all or at least most possible directions. And then I can sit and evaluate what is actually worth taking ahead. And what is just adopt?

Unknown 4:08

Yeah, do you like to do it on your own, like to ideate when you kind of you have to come up with original idea you ideate on your own or you you'd like to do brainstorm sessions with other people.

Unknown 4:23

I think at least the first set of ideation I like to do myself. And then I don't mind talking to like friends or having like a brainstorm session. Like for my thesis also, I was thinking like I will do some sort of ideation on my own and have like a brainstorming session. Because then I have it's a more guided process. It's not just an open ended brainstorming like I would like to talk to people at the converging stage and not opening stage. So then it's also more like I can guide them more clearly as well in terms of saying these are the ideas and then we can think within This box

Unknown 5.07

How do you feel about sticking a break during your design? Work on design project? Do you take breaks? Do you not take breaks?

I do I do tend to take breaks. I think initially when I just started studying design and learning design. So I wanted, I would always say I can't take a break, because it will stop my creative flow, and I can't get back in that zone. But then I think over the years, I've learned that it's not very difficult, like I can just take a break, maybe take a walk and come back and get back in that mind space. And a lot of times, it actually helps us like if I go out for a walk and the weather's nice that I can come back with some more energy or maybe some more ideas, and then get back as opposed to just sitting in the same place and thinking about it

Unknown 6:06

What do you do in this? What do you like to do in the breaks to like this and incubation activities?

Unknown 6:16

It's usually maybe talking to someone who's around, maybe my roomate, or either just calling up someone and talking to them for a bit. or going on a walk? I think I'd say doing some like household chores like a mindless, like if I'm just folding clothes or doing laundry. Something that's very unrelated to

Unknown 6:40 this. Yeah.

Unknown 6:44

I think cooking, cooking is also a good one, I think.

Unknown 6:47

Yeah. Do you feel guilty about taking breaks? Or are you sad? You don't feel recently? You feel okay.

Unknown 6:58

Yeah, recently, I've realized, yeah, initially, I used to feel guilty. But now I've realized, like, it's, it's an ongoing process is gonna keep happening. There's no reason for me to stress about how long it takes or how little it takes, like, eventually, it will work out.

Unknown 7:16

Yeah. Do you experience fixation in your design process? And are you able to recognize when you are fixated?

Unknown 7:28

Yeah, I think that is one of the first things I realized in like the first year or second year of my Bachelor's, when and that was a vord, traditional industrial design bachelor's. So I would sketch like a piece of furniture or something, and then I just be very excited about it and be fixated on it. But then, over time, I've realized, I've, I've been more critical about my ideas, then I can, like actually evaluate them in terms of, I have usually a criteria if it's relevant if it's feasible. So there's usually like a criteria check that I do. And I think that also makes, like, I realize that makes my process stronger, in terms of justifying it to somebody like I'm not telling someone, this is my final outcome, because I thought it's nice, because I have objectively checked, compare it to my other ideas, and this is the best one.

Unknown 8:24

Do you feel like you got you use intuition, you use intuition? Like, do you use intuition to kind of like, okay, this trajectory is more like there is no criteria there. But you just feel that this path is more beneficial. Sometimes this happens, or you rather rely on criterias?

Unknown 8:48

No, sometimes that happens, I think, sometimes that happens, and sometimes it's right as well. But then I don't want that to be Appendix 5: Transcript of the interview with novice

designers, Participant 9 continuation

the only reasoning for me to say this is a project like most times, I can't justify it with just intuition. So I feel like there's a sound noise in my head that says, Okay, I need to also look at it from an objective perspective. Either I show it to somebody and see if my intuitions are right, or what people think or just see what else I can do about it.

Unknown 9:28

But also, how do you experience fixation? Like, do you what happens before or what happens during your final stage?

Unknown 9:39

I think I just get very attached to the idea, the concept and I want to take it forward. And I keep telling myself that this is the best possible outcome for the project and for like, it's the most interesting project. The interesting idea for me to take forward and Yeah, I think it usually happens in the design stage in the cons ideation stage when I'm trying to pick concepts to take ahead. And if there's really like, then I just get stuck with it, I think,

Unknown 10:14

yeah, but what kind of what stops it what's helps when it stops? When you stop being fixated with helps.

Unknown 10:23

Thinking about it from a different person's perspective usually helps. So if I say, if I think about what my supervisors will think about the project, or what my client is going to think about that idea, then I get more of an objective, because idea of what it is. But also, I think talking to someone about the ideas helps, because a lot of times, because sometimes they'll just be like, Yeah, this doesn't really make sense. And then you sort of see if it makes sense or not. grounds you a little Yeah.

Unknown 11:05

Have you had fixation is also not only the idea, but the design process, meaning methods or approaches that you keep using and cannot cannot refine the methods cannot change the method?

Unknown 11:21

Yeah, I think so I think the basic design process sort of just remains the same, because that's what I'm comfortable with. That's what I've been working with for a few years. But then the methods I've learned, at least at the TCU, there are a lot of new methods that you can use. And I see the value of that. So I try to use them. But on the top of my head, if I didn't have any of these resources, I think I just go back to the same like, these are resources or methods that I need to reference or look into, to see how it's done or what needs to be done to get hurt as an outcome. But and that on the top of my head, as there's just a very general design process that I keep following.

Unknown 12:08

Ah, but you said ideation Do you idea it's also I will return to ideation do ideate like in, throughout during research activities? And then do a bigger chunk of ideation later? Or is it still like very, like, you don't ideate when you do the collection of data?

Unknown 12:36

I try not to ideate when I do the collection of data, because I think I get carried away. Because for me, that's the most exciting part. So if I if there's one idea that comes to my mind during the research phase, I can note it down somewhere. But then if I start looking at, oh, what could it be? how feasible it is, then I'll just get sucked into that hole. And then I'm just spending hours on ideation before I have anything to ground it on. Yeah. Now let's start looking at maybe existing projects that are similar, or what people have done in the past. And then yeah, chuck in that loop.

Unknown 13:17

Okay. How do you purposefully do incubation in your design? Or in how do you remain in incubation is when you set the problem aside or say Okay, I will, after at this phase of design process, I will take two days break to incubate on whatever.

Unknown 13:49

Yeah, I guess I think sometimes when it gets too much or and I've been working for too long, constantly, then I see the need to take a break and step outside. But it's not something I think I actively do is usually like a forced break and I have to go somewhere when there's like a party that I just have to stop. But I don't think I

Unknown 14:18

consciously take a break. And usually after the break, you feel like you gain new perspective new frame or doesn't you still sometimes you return and sometimes you still feel overwhelmed or stuck.

Unknown 14:36

I think it's a 5050 chance like I think sometimes it really helps and I come back from vacation or something and then I have a lot of new ideas. But also sometimes it's just you get back to the project and you're just in the same place is stuck. And like nothing's really changed

Unknown 15:01

How'd you like to reflect on your thoughts? Reflection?

Unknown 15:11

I guess I just think about it. But I think a lot of my reflection time happens during transport. So if I'm sitting on a train, I don't want to be staring at my phone all the time, because I've obviously going to work and then I'll be sitting on my screen again. And then if I'm just looking, or if I'm sitting on the train for like, two hours, then I think I'm thinking about all of these things and sort of reflecting on my work.

Unknown 15:41 Something, yeah.

Unknown 15.44

Yeah. But otherwise, I don't think there's any incubation time per se.

Unknown 15:53

Do you? How do you like to guide your reflection or like, take notes, or visual notes or voice memos to yourself, or you said, also talk with other people?

Unknown 16:10

I think most times, the reflections just in my head, I don't really put it down anywhere, unless there are some sort of actionable steps that I can take, like if I have an idea. Or if I can say, Oh, maybe I should talk to somebody, or maybe I should look into this particular topic that might help. Then I sort of send myself a message or write it down on my phone. But otherwise, it's usually iust in my head.

Unknown 16:43

Okay, do you introduce? Do you interact with some objects in your environment during your ideation or thinking about complex design problem?

Unknown 17:00

Not really, I think I still like to do it on paper. So I probably have like postdates and like big sheets of paper. But otherwise, I think it's mainly a clear desk.

Unknown 17.21

You have some, like objects like you have this post post scars that you have on the wall, like do you is it like inspiration wall for you? Or something like you kind of like okay, this is my safe space? Or this gives you triggers? What What kind of? Yeah, if I can ask like, what is the like this?

Unknown 17:53

Yeah, maybe I have to formulate it again.

Unknown 17:56

But yeah, I guess that makes sense. In terms of the, like, I know, for a fact, if I'm ideating are thinking of concepts. I don't want to be sitting at the library. Because that's not the environment where I feel like I can come up with new ideas. Like I'd rather be sitting at home or at the IDE faculty. When I think so the environment plays a big role.

Unknown 18:20

So you prefer ideated? Home? Yeah.

Unknown 18:23

either at home or at the faculty. So like, if I go to the library, it's mainly for just like writing work or research work? Not particularly. Just like then here if I met IDE, or if I'm at home, I can put down sheets of paper, I can put down my postage and actually use up the space and do it.

designers Particpant 9 continuation

Unknown 18:45

Use the space on the floor or how would you do

Unknown 18:49 on the table? Usually? Yeah, putting post its

Unknown 19:00

okay. Okay, we're going to the end, what? What do you do, what behaviors to do when you want to feel more creative?

Unknown 19:17

I started making mood boards again, I think that was the thing when I started doing design, and I was very excited after every set just out of every project, I would make a mood board and spend so much time just making the board. But I think the last couple of years projects have been so much more fast paced, and it's not a traditional industrial product design project anymore. It's usually like these abstract complex concepts. And then what am I making a mood board for? It's not like a material extra thing. Where then recently I started getting back into it to just explore like forms or ways of interaction like it's a different approach to mode boards. But it's a good starting point to inspire me to start looking at how people interact with objects, and what that means for my design.

Unknown 20:09

Yeah. So in a way you kind of want to capture some you what, why do you think it works for you like, why the movements working?

Unknown 20:25

I think it's a good starting point to think of how people are interacting with things around them. As opposed to just sitting and thinking of how, like, if I was to think and see how people interact with objects, I would always be stuck in a loop of people interacting with laptops, or people interacting phones, or like just daily objects, but not necessarily like from a design perspective, or nothing creative is going to come out of that thought. So it's easier if I have this one, like, mood board on my laptop, which shows people interacting with weird objects or weird things. Yeah, then it's like, oh, this is also possible, like, explores possibilities.

Unknown 21:10

Yeah. So it's like variety of how body engages with objects. Yeah. Yeah. Gestures, how people build things when they work with senses like smell. Yeah. So then it's all together in one kind of you find references in online images. Yeah. Or you do like yourself photos of environments of your from your life? Or it's mainly on the online images. Yeah, yeah. Yay. And when do you refer to this new board? Individuals, I think

Unknown 21:55

when I'm trying to start ideation, like, obviously, there's one early on brain dump, where I put down all the ideas I've had through the research phase and everything. But then once that's done, increase the variety of ideas or explore directions that I've not thought of, then I look at some sort of reference like this, and see if there's something new that comes up or innovative or interesting that can come up.

Unknown 22:26

Yeah. Ah, do you have any? If I can ask some concerns about your design process? How would you like to improve your design process?

Unknown 22:51

I guess I would like to spend more time in the second half of the design process. Like I think I enjoy research and ideation so much, that most times when I get to the testing or prototyping phase, there's not a lot of time left, and I'm just rushing through it. It is something I would have liked to do more. Like prototype better have a nice prototype tested with more people or get more reactions to it. But most of the times, there's usually a deadline or I'm just yeah, there's no time for me to do that.

Unknown 23:28

Yeah. So you find yourself hard to stop iterating and researching? Yeah. Yeah. What are do you do some practices for your attention control? To do? Like meditation?

Unknown 23:52

No, actually, I have tried meditation in the past and it has not really worked for me. So I gave up on that, but I don't particularly do anything. I started working out recently that sort of helps,

think. Yeah, like, go to the gym. Yeah, come back with better focus and more direction I think. Yeah

Unknown 24:27

Okay, so imagine is also about spaces you said about home? Yeah. So not the public spaces. Yeah, it's also home because Why do you think home is working more than other public spaces?

Unknown 24:47

Because I think it gives me like the freedom to also just get up and walk around and think about things like if I'm, if I want to just like I like walking around and using the space to sit down and Id They're not just sitting on a chair, continuously just writing down all my ideas in one go. And I can take a break here, maybe go get some food, or call someone. Go, yeah, I can do different things, and then get back to it with new ideas, I think.

Unknown 25:21

Yeah. But in a way that's kind of, you know, like walking can also be done in the library. But why do you feel like the library is so restrictive to this behaviors?

Unknown 25:32

I think in the library, that's, I think that's the issue in library. It's more of like a study space where everyone's like, focused and just staring at their screens. And it doesn't really feel like a creative space. But then it on the other end is on the other end of the spectrum, where it's so creative, like if I can get up and walk out. But then there also you start bumping into people, you will keep talking to people, you actually go back, I'm just like, Okay, I would have liked to put down some more ideas. But like, they are probably useful conversations, and you got some ideas from the conversations. But it's a gap. Like I just there's a hindrance in the thought process.

Unknown 26:21

Also, imagine a scenario where technology will be guiding your thought process with some verbal interface or providing you can use to remember of your some memories that can help you to in your ideation, for instance, you're designing like a baby stroller, and then it's kind of like, all the memories about the baby's behavior just popped into your head, or, you know, so what would, or like, I don't know, something related to kids in a way to technology will kill you with some prompts. Would you like to do this to use technology that is then guiding your thoughts in this way to support your creativity?

Unknown 27:09

guess so. Yeah. I think I think the only question would be is, if I'm going to ask this object or artifact for a support, or say, Hey, can you give me some ideas on what kids like? Or what colors kids like? Or what kids want to do? Or is it going to come unprompted? Like on its own, it's going to come? Like, it's like those, I can send you a link. It's like this. What it's like this design brief generators that just keep asking you and your question. And then like, when you don't really have a project in mind,

Unknown 27:56 then you get

Unknown 28:02 second, I can send you one.

Unknown 28:05

Do you use Java GPG? For this purposes? No. Okay, reflect No. But you have you know about this, but you haven't used this one? That's yeah

Unknown 28:21

This I have. Yeah. So they had another one where every time you would open their website, they had a different question that would pop up. Yeah. Okay, interesting.

Unknown 28:36

Yeah. Okay, I think so this all the questions that I wanted to ask, maybe you want to add something that we didn't talk about, but something disappeared into your heads that we wanted to mention.

Unknown 28:51

No, I think. I don't think so. Yeah. It covered. Yeah.

Appendix 5: Transcript of the interview with novice

designers, Participant 8

Unknown 0:13

Yeah. So how does mind wandering feels for you? Do you feel like it's usually you have control over it or it feels not controllable out of control?

Unknown 0:30

Yeah, this is the thing I was thinking. Yeah, because I thought that the mind wandering is not really controllable. But for me, I think maybe this time is very critical timeline because I am doing my graduation project. So I'm a bit more stressful. Other times, so I kind of control my time and then my thoughts every time. So for me, it's more controllable now. And sometimes Yeah, so I don't really mind wandering these days. Yeah, but I do some mind wandering. When I take the train, that's why I was a bit surprised when I filled in the form then. Oh, yeah, actually, I do something by wandering the train. On purpose. Not Yeah, but on purpose, not because of the environment. Or not because of my purpose, but also the environment. Let me do something else. Not focus on my work or you know, other things. Yeah.

Unknown 1:55

Yeah. So do you you consider mind wandering usually as something you enjoy your time in your thoughts? That's how you see mind wandering? Yeah. Is it enjoyable? So new associated with enjoyable like fantasy? Actually, it's

Unknown 2:20

more like yeah, sometimes I do so I do imagine some very ridiculous scenarios in my mind, but also I was more reflecting on just reflecting on more broad worldview, I would say. Yeah, just looking at the the outside when I'm in the train, then I just see the nature and you know, to see the buildings and then just think oh, that's yeah. How I live you know, and then just be remind, just remind myself that this time is very precious. And then I think yeah, that makes it makes me more comfortable always say, or waiting to live my life and then yeah, so think on other stories or other things Yeah

Unknown 3:37

Also, how, how does mind wandering affect your design process? design process?

Unknown 3:49

Actually, I was a bit of a surprised because I cannot really remember that kind of woman's. Because for me, it's more like

Unknown 4.09

when I talk to someone that helps me more, so I'm not sure if it's relevant, but yeah, when I even though the topic is not exactly aligned with my mind design topics, but those additional irrelevant activities make me think differently. For example, also, yesterday I went I joined one event from mediator just had had a chat with us different types of pupils, and then just talk about their projects. And then at some point, I got some like, yeah, questions or ideas regarding In my project, and then that really helped me to outlines my thoughts and then yeah, some other new ideas to approach things. So that helped me

Unknown 5:17

do you use any tools or techniques? How do you prefer to do your ideation? The ideation Yeah, that's very, very, very vague question. But yeah.

Unknown 5:38

okay. I have to remind that memory when I did the AI projects, because that is the most design very

Unknown 6:02 usually I just sit on, on the desk, and then

Unknown 6:09 you have the computer

Unknown 6.11

in front of the computer, but I don't usually look at the computer when I ideating. And then I just wrote write down some other things in my mind. Just write down even though it's just ridiculous.

Unknown 6:28 Make a note, you make notes of your

Unknown 6:31 make notes and sketch as well. Then, at some point, I lost sometimes, you know, yeah, then I draw like very ridiculous thing on my notes. Yeah. And that is not even relevant to my project. You know, sometimes Oh, yeah. Also like, so you sketch sometimes. Yeah. First, like your sketch something because for example, I have to design my suitcase that has to be transformed into a bunny chair. But how a button before I got this idea. You have some idea of the Okay, I need to make some furniture. Was it mostly? Sorry? Furniture? Yeah, I wanted to make the furniture words some other ideas, too. Oh, yeah. So direction was how I could How can I increase the people's feeling of home? Yeah, autonomy in their, in their temporary housing. And then I thought that maybe they if they're doing something very actively, then they make that makes the mind help them feel more autonomous. So that's why okay, then I will make them make some, like their own furniture. Then I was like, Yeah, drawing some other like furniture and other things. And then sometimes I draw some very ridiculous thing. Not even, not even meanings. And then it's totally abstract drawings. I really like some of the like, how can I say unconscious progress on my notes? And yeah, that's just very natural for me to like, yeah, even I'm doing the interview. I have my hands on right now and on my notes, then I just throw something on my on the notes without having any like conscious, you know,

Unknown 8:51

like doodling doodling. Yeah, totally. Yeah. So it's like doodling helps you to think. Yeah. Do you can you make sense of what you were doodling? Is it some like schematic shapes? Or it's still too abstract to kind of have any meaning.

Unknown 9:17

It's too abstract, I think to have meaning. But sometimes. Yeah, sometimes I I wanted to make it more like to be shaped in a way so that I could show some in some ways, but yeah, sometimes it doesn't work. You know, like, when I naturally draw, then it looks really nice. But maybe I thought I thought that maybe it could be better if I draw with the purpose of it. And then I try and then it doesn't work. Yeah. So I let them just go. You Do

Unknown 10:01

you mean like, can you explain again? Could you let go the ideas? The ideas? Yeah.

Unknown 10:09

captures it's not ideas. Yeah, sometimes. Just like, yeah, just doodling results itself looks really fun or interesting. And then I I thought that maybe that's kind of like artwork by side by my my, my son then in the case then I need to refine this drawing. Develop Yeah, yeah develop. So I wanted to try other like the developed drawings with this ideas and then yeah refine this sketches but when I tried it's not working this Yeah, yeah, I was a bit disappointed but it's fine yeah

Unknown 11:08

yeah and also yeah and then like even though the doodling was not relevant while I was just progressing my thoughts that helps me to come up with the idea that Okay, now the furniture can be trimmed back bags or luggage and all I can make it and get destroying drawing. This is how I work. Usually. If I don't have any idea and then it gets stuck, then Bernie I go Yeah, if I cannot find any answers in my mind for myself, then I try to us like to try to have a chat with someone or just go around and see the nature. Yeah, those kinds of things. Yeah, yeah.

Unknown 12:15

What do you use? Something to guide your thinking process?

Unknown 12:21

thinking process guide. Sorry, can

Unknown 12:24

you explain the reflection to us? How do you like to reflect on your thoughts? Ah, how

Unknown 12:31

do I reflect? Um maybe yeah, it's just personally because I'm a Christian so I read I usually read by Yeah, just randomly just turn on the app and then yeah, random choose the yerse or chapters and then read some of the verses and then that provokes me to think of okay, then what what what is now so how I could overcome this maybe like, if I am stuff then I could overcome this stuff ideas and know how I could handle this. Yeah. That helps me

designers Particpant 8 continuation

Unknown 13:25

is there a way also you collect your your thoughts, like you make notes diary, or you voice memos or sketching.

Unknown 13:39

So when I am in the train, I have something in my mind that I wrote I write on the opponent that is very common. Yeah, and then yeah, I think that's all most of things. Yeah. And then yeah, if I like something that I take picture of, yeah. Yeah.

Unknown 14:10

Do you got like, you then have some album in your phone to store something or you just take a picture of this new timeline, then you search it in the you keep a track of it or you just pay take a picture and that's it.

Unknown 14:27

I track the pictures I just collected and then later I might see back but not on purpose. If I like it, or if I like to just memorize we're capture this moment and to say take a picture

Unknown 14:52

so you don't organize it you don't try to organize your photo stream timeline.

Unknown 14:58

I wish I could have firmly. Yeah, actually, that will really help. Because, yeah, I, when I was

Unknown 15:10 very, very, like

Unknown 15:13

the design beginner, I'm yeah, I'm saying that I'm still beginner but you know, start to learn design and you want to learn yourself, you want to learn about yourself, then you have to know about yourself. But I don't know how to do that. So I just tracked my photos before I took a take and then see what I really liked. And then that helps me to align myself that what I really like, and also the clothes types. Yeah, yeah. To say, I take all of the Yeah, I remember that I take I took all of the photos of my clothes. Yeah. And take the patterns out of the clothes and then make some collage of it. Yeah. Yeah, I used it before.

Unknown 16:17

But for inspiration for the project, like a mood board or a it was for my portfolio. So looking for the cover of my

Unknown 16:29

and what am I going to put on my birth for the cover? The most important part? And suddenly I just yeah, see my clothes. Now I don't have those much of it. But still, I like that. I don't use them. Now. But I still have this design collage. Yeah, yeah.

Unknown 16:56

Would you say things that inspire you are more visual? Or which? Which type of? What type of inspiration you

Unknown 17:07 prefer? source of inspiration

Unknown 17:09

for inspiration? Um, yeah,

Unknown 17:16

I think I'm a very visual person, even though I want to be more like, linguistic person. So I think Yeah. Some very, okay. See, you know, like, in one day,

Unknown 17:38 vou have there is a

Unknown 17:39

soft light on on the sky, like on the top, then. Yeah. Yeah. And the mood becomes really very warm and cozy then I am more influenced by those kinds of ambience. Yeah. And the winner? Yeah. Sort of external environments are is really influencing my thinking. I think. Yeah. Yeah.

Unknown 18:15

So it's like, you mentioned also like, so reading a book helps. Reading Bibles helps, but in some way, also some visual experiences and being in the place also helps.

Unknown 18:35

Yeah, yes. I think in different ways. Yeah. So you're not in your, you don't you have your body like physical body. So you have to be somewhere. And so your body needs to be very comfortable. Work. That's why. And mentally, if you want to really progress your brain, then you need to get input from somewhere. Because otherwise you're going to be stopped in your bubbles. And then you can really get out of this bubble. So you need some other stimulus that you have. You can you can get out of it. Yeah, that's what I input. I put my input from the Bible or, you know, literature's I read or just like conversation with so much, then they might have helped me to think differently. So yeah, I think, yeah, that's it. Yeah. Okay.

Unknown 19:46

Don't worry. That's kind of like it feels like I will make you reflect like so text and, like, verbal. When you talk with others. It's more about stickiness. Another perspective, but when and seeing your perspective seeing where you are, but when it is more visual, or experiences, it can be more like mood setting or inspirational. Yeah

Unknown 20:18

So environmental factors will be more like more more subjective and more personal

Unknown 20:26

thoughts development. Yeah. Yeah, exactly. So, yeah, when I write write some thoughts in my from England mind that, that thoughts also from where I am in somewhere? Comfortable?

Unknown 20:46

Yeah. Veah. Okay. Okay, I have some other couple of questions. What do you feel? I think you said about the idea of on your own? Do you prefer date on your own or with other people? Or how does it work for you?

Unknown 21.12

I definitely prefer to idea with other people, with other people. Yeah, with other people. But not from the scratch. So I like to share the ideas first. So first, maybe I would think the idea by myself. But I would rather share these ideas and then discuss with other people, and then develop the ideas that I think that's always better than just working by yourself and then get just to focusing on your theme. Because yeah, two brains are better than one brain, I think.

Unknown 21:57

Yeah. Yeah. How do you feel about taking a break during your design process? Do you take breaks? We don't take breaks?

Unknown 22.07

You know how I'm working. But I don't know. If I am really overwhelmed, and I take, I take a break. Yeah, but if I really focus on something, then I don't really break.

Unknown 22:21

Yeah. Yeah. And I mean, like, focus you have you have a clear goal.

Unknown 22:29

Yeah. So I know what I'm gonna do. And I know how I have to do it. And then, yeah, I need just time to go for it, then I just, I just focus on doing so and then finishing it. But if I'm stuck something, or if Yeah, even though I know the focus, and then the goal, but if it takes it takes too long, and then it makes me feel a bit higher than I take a break.

Unknown 23:03

Yeah, yeah. Do you? Yeah. I think we talked about fixation. Like, are you? How do you experience fixation? And are you able to recognize when you are fixated on some idea? Yeah. Yeah. And how do you experience it? What comes before and how, what happens during the time when

Unknown 23:31

you fixated? I think it's very obvious when you just spend your time without doing anything, but you're supposed to do something, but you're sitting on the desk, but not progressing anymore. Yeah. Yeah. It's just fixated. Yeah, I feel that last week, even though I wanted to work on something and then progress a bit more. But I found that myself, I find myself that I'm in the

Appendix 5: Transcript of the interview with novice

designers, Participant 8

same position and the same timeline. Time is going yeah, like, Yeah, yeah, I do. There is the same thing that I told you before progress is the same. And there's the only thing I'm I was doing when I read the Bible. Yeah, there is the meditation was to change the, the sentences or, you know, the, the research so many research questions, but what am I gonna do, you know, Unknown 29:42 and then I know there's something missing, but I don't know how also, okay, the last have asked me about spaces. Where do you to how to overcome this. Like, very uncertain situations, and then like to be more creative on campus, library and home? Public I don't know how to do it. Yeah. So that's frustrating feelings. Make me feel that okay. This is the time fixation. Yeah, right. You Spaces. need to you need something else. Yes. Yeah, that is very obvious. Transcribed by https://otter.ai For me

Unknown 24:59

Yeah. So what do you think helps? Help since last week?

Unknown 25:12

But although it was not really helping, but I think if you're, if I if, if I'm stuck

Unknown 25:27

I think I should have read some other literature's or, or asking, asking other people's opinions or thoughts. Yeah, yeah.

Unknown 25:47

Yeah. So it's made, maybe more like, thinking of things that you should have done, but haven't done. And then it's also already know, it's kind of like.

Unknown 26:01

I don't know. It doesn't mean that I shouldn't have done it. But

Unknown 26:12

you know, I mean, like, is it the feeling of like, that you? It's like, what is missing? Like, the overview is missing, or the goals are missing? Or why do you think it's was like, I think the

Unknown 26:29

goals are what are missing? Still, I need to make a clear goal of it. Yeah. And yeah, that was one of the critical points of the coach meetings, as well. Yeah. Yeah.

Unknown 26:51

Do the two, do you have any objects in your environment that you like to interact with during your design? Doing ideation? You mean objective environment? Objects? Yeah. Like, or what do you like? Objects? Or what behaviors you'd like to do? I don't know. You have like a I don't know some toy you play or? Yeah, I fidgeting or? I don't know. doing embroidery.

Unknown 27:27

You know, I'm, I play board game. Yeah. Yeah. So I think there will be one or two spending time for eating a very, very briefly. Very what I mean.

Unknown 27:48

eating, eating, they're eating good food. Yeah. Nice. Yeah. Would be here as you do when you want to feel more creative. Sorry. When do you want to when you want to feel more creative? What behaviors do you do?

Unknown 28:24 Hello, yeah, I'm thinking. Okay. The simple, simplest thing I can do is turn on the iPad. And choose the drawing app. And the choice

Unknown 28:48

Yeah, is it related to the project or just like I don't know some like art in art? Art RT?

Unknown 28:55 Yeah, Yeah,

Unknown 29:01

Okay, some last questions. Do you do some practices to to get better with your attention? Or do you mean like mindfulness meditation?

Unknown 29:16 Yeah. But practice you mean?

Unknown 29:21 Like, do vou meditate?

Unknown 29:23

designers. Particpant 11. Participant 10 did not want

to publish full interview

Interviewer 0:00

So how does mind wandering feels? Now we're going to talk about your design process and how mind wandering is influencing design process and is it helpful or not helpful? How do you like mind wander what tools you use to mind wander? So, first how how is my wandering impacting your design process? interviewed 0.25

What I can remember was facilitated maybe like really like it depends on the process like which step of the process I am me brainstorming this already quite mind wandering process I think like just like a free freedom for me to think Yeah, think about some topic which might be super related but still exploring pouring time if there is a really like near near relationship then I can still have a chance to explore that area. So it is really helpful in the beginning

Interviewer 1:06 you like to explore diverge interviewed 1:09 a lot Yeah, yeah, I do Interviewer 1:12 in the first research stage or later. interviewed 1:15

first, I think my first stage I'm linked to get as much as I can really at the beginning and then trying to converse them afterward, but even after converging because normally when we're converging the initial ideas that things are getting superb Fisher superficial and yeah kind of feels too general because there is still a conceptual level. So for example, like the value on converging is Indian links some common like terms we are using the com forward or like, So, as far as the like this kind of like criterias yeah criterias are coming to to extract and to common, then like I feel again, I need more like mind wandering, then like what for example, like what does tangible means then like find something Interviewer 2:15

again, you discover what is tangibility? Yes.

interviewed 2:19

So this whole like, facilitate my mind come

Interviewer 2:24

through this, like interaction qualities or requirements.

interviewed 2:33

And like you'd find mind wandering, like maybe like it is not an active mind wandering, but it was still like the kind of yes thoughts in my mind like some very in my mind and like it is triggered by the other elements around the world. You probably will see from a tangible like, what a potential means like if this kind of question was in my mind then like, I'm Yeah, drag into the mind wondering when I'm touching for example, some unfamiliar stuff like this. Oh, yeah. Yeah.

Interviewer 3:13

So do you it's effortless process you don't really kind of purposefully like have to force it is just your natural way of working now.

interviewed 3:25

For me, I guess like this is about myself, like mind wandering, but sometimes if we want to have it as a one collaborative process play a co creation person Yeah. Then like some effort might be needed to convince others this man let's do it this Interviewer 3:47

okay. Do you feel like you have control over mind your mind wandering and or it's more spontaneous

interviewed 3:54

is like maybe like, they are Rauzan is it the right is the starting point? Yeah, starting point is kind of like out of control. But still like I I have a control to stop it for example, like you got like in your question, there is some really important lecture or the presentation is going that I have to stop to focus on what is

happening at the moment. Interviewer 4:27 Okay. How does mind wandering feels for you? Is it mostly how, how does it feel for you? interviewed 4:38 Just in general, yeah. It feels essential, as a designer, to really like, keep up this explorative spirit instead of just iterate the same ideas, but also at the same time, as I said, like It sometimes happens really spontaneously without the intention so I'm heavy read short is for me to lose my concentration for Unknown 5:11 example it's easy yeah Interviewer 5.19 okay do you use any tools or techniques to guide your thinking process what's what tools and techniques you use Unknown 5:35 processes behaviors interviewed 5:41 So, still like about the mind wandering or like in general can be generally constant like this Interviewer 5:49 you can you can distinguish interviewed 5:55 like it is more like an ethnographic way Unknown 5:59 Yeah interviewed 6:05 and like kind of like from in familiarizing is really Interviewer 6.11 important and how do you do interviewed 6.19 some point I'm trying not to interpret something Unknown 6:22 Ah yeah, because it was signed into interviewed 6:25 creating it. And so, I, I tend to associate with the previous knowledge reviews experience instead of interpreting it trying to understand like, just understand like, what is happening and what does it mean affecting the others Interviewer 6:50 and how do you get to this position in your head? How this perspective how do you get this perspective interviewed 6:57 especially, I is quite recent one like, I mean, like I was unconsciously keep doing it, just to create the creative I hit like just to make a creative ideas, I was unconsciously doing it, but these days now, I'm getting interested in like more than human designs. So, I understand more important than human perspectives, then like, it is important for us to have more humble attitudes not to get

overconfident that we can interpret everything that we can what we can interpret everything interpret everything and to make his sense in a human human perspective, we should like avoid them and, and I try to separate time display them like really like some hidden points or like blind points are revealed once be stopped to interpret, like in a logical way. And then like trying to obtain some other perspective, more often minded way to see the world then

Interviewer 8:13

we're going to What do you mean by logical way? interviewed 8:15

I mean, like, logical ways refer to our human like, yeah, human centered approach. It has to be like this because it happened like this. So we're just kind of

Interviewer 8:28

improving needs human needs. With human needs in mind on Unknown 8:37

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designers, Participant 11 continuation

Mondays incident, Unknown 8:39 yeah. Human Centered needs Yeah, human centered.

Interviewer 8.49

But you said also, so you do defamiliarization also, tell me can you tell me more about what's happening? How do you get what questions you ask yourself and how do you get them

interviewed 9:05

because the formalization while I'm talking, I was thinking, it is also one way for us to avoid this habitual interpreting

Unknown 9:20 interpret habitual interpret routine,

interviewed 9:23

as human VR, but use it to interpret everything as soon as possible as human we as soon as possible to make a kind of logical decision. But like to, to avoid them, the formula familiarizing is important. For example, if you want to examine the entire, like, interaction between the human and the space, for example, then like instead of just going to a room As soon as possible as we normally do, because it's quite human centered way of optimizing the paths of human to get to the needed needed space to accomplish the task instead of that like I'm I sometimes try to stand there I have never stand stand on for example in the middle of the room just interspaces are really at the corner of the room then really I see some other object which was interrupted it was affecting my my interaction with the space and how is it is influencing of all experience

Interviewer 11:01 so, you don't for that you

interviewed 11:09

maybe instead of the from the euro rising maybe like decentering will be more correspondences and

Interviewer 11:26

so, what what happens in your head like you just take away your needs of the how you would normally interact with your mind and where your needs are. So, you kind of put them away and just be there or what happens like you are asking about motivation or like what is happening while you are like getting into this defamiliarization and how to get there

interviewed 12:03

to get there mean it is in the end like initiated from the barrier because like normally we start in a place Yeah, again like logical the gallery like kind of test or like goal to achieve as a design project. Then I feel already like at some point I feel is like, I cannot find any more creative space with this given missile or like keep it in perspective, then like gate then like let's try another stuff maybe I stopped then like I'm trying

Unknown 12:50 defamiliarization

Unknown 12:51 Yeah, the formalization or decentring

Interviewer 12:53 so you use the same context, but just try to kind of have a new concept

interviewed 13:01

but like but the context can be even expanded in this sense because once you're dissenter from the from the previous perspective, then like maybe different journey will be drawn then like maybe the context will be shifted to another physics

Interviewer 13:30

Okay, what do you use to so it's just very interesting that's why I keep asking because say interesting things what other any also like things you guide your now you've talked about because you said there is difference between mind wandering and thinking. So like to guide your mind wandering, you will do something else and for thinking you can always

Unknown 14:04 use a soul next

Unknown 14:06 only. How is

Interviewer 14:13

it what do you use any like note taking visual note taking or verbal note taking or self notes of like voice notes to keep track of your thoughts.

interviewed 14.26

There's what I missing really, is I normally just sink in your site myself and then lose it. So sometimes I'm trying to make a note once I'm like having me like interesting perspective. Got an interest and then like I tried to make a note but yeah, it doesn't feel so suffer intuitive brainy to someone. So you would like to do it more. Yeah, more like in an easy way. Because normally like this kind of mind wandering is also happening while I'm moving for example walking outside then like I feel a bit lazy or like too annoying to suddenly stop like stop the behavior and like pick up my phone and make a note so

Interviewer 15:26

what would you like to do have some way what way would you think is more been like for you to take these kind of nodes of your stream of consciousness? Which with medium

interviewed 15:50

I mean like the easiest way will be the taking a video maybe because then I can record my voice as well and also like recorded what I am seeing but the problem is it is too awkward to hear my voice again afterwards so maybe I wouldn't have listened to it ever never

Interviewer 16.20

do you ever do this kind of like self reporting like voice memos or you don't

interviewed 16:28

maybe I've done once yearly back in the days but I I really hate it. Okay, good. We still have time. Yeah, yeah, I still have time. I was just looking like I still have a memo I have made in here. Like yeah, there is some bullshit but at the moment it was super interesting. Yeah.

Interviewer 16:55

But do you like really sketching or to capture a lot or help you sustain

interviewed 17:03 your sketching sometimes I do. But also it has to be like is

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designers Particpant 11 continuation

only possible in a certain setting like I have to mind wander or brainstorm or this kind of stuff in like in front of the desk like so it is not possible when I'm moving

Interviewer 17:28 yes so not like sketching in the notebook?

interviewed 17:34

I I'm not really use it on the phone you can also note you can also use tables

Interviewer 17:46

what you said about video like are you okay watching yourself your own video how you behave if you like do yourself record of yourself

interviewed 17:55 if I do it then I will just like and project my vision so it will not be a selfie it is more like how I see right now what triggered my

Interviewer 18:08 idea so you'd like to take pictures

interviewed 18:11

in picture but as I said maybe it is kind of like thing is something the triggering moment might not be something stable or might not be enough to take a photo then maybe overtake a video so

Interviewer 18:27 it's not very visually representable in the picture

interviewed 18:31

if so, of course I get fit it's just saying like it's powering like one like scenery then I will take a picture but

Unknown 18:38 yeah

interviewed 18:49 what do you like the idea? How do you like the ideas?

Unknown 18:53 It enjoys?

interviewed 19:13 It tending to make a story.

Unknown 19:16 Story. In the story like how second story

interviewed 19.25

was both storyboard storyboard. It doesn't have to be really like concrete storyboard, but I'm just imagining to keep all the yeah the actors even like including the like, leaving entities for example, like this bottle can be an actor's like discloses can connectors and then like try to imagine like what, what it might say or what it might act for example, like this person will be happy to He lay down over here. If he can move himself then you can like kill, like escape from here.

Interviewer 20:07

It's like more than human design suspected

interviewed 20:11

ya can be but even I before know about for, like really know about the existence of this more than human design approach it was

researchers are saying it is kind of ecological thinking yeah. So, this is helpful also to reveal the interaction like the relationship between the different person and also in the sense now we are designing every every single kind of intelligence on economy themselves, like sensing the events themselves I think this approach is getting more and more sensitive these days when How do you feel about taking a break during your design process all right, break breaks, taking breaks days or breaks, I'm taking breaks every every minute thinking it's really important

too small. So this is required. I don't know I don't want to like advocate my smoking behavior, but still like it really helps me to be honest and also to refresh myself and while I'm going outside like I can see some different stuff then is also helped me to dissenter from the from the middle of the project and see this stuff in a fresh perspective

Interviewer 22.07

Do you Do you experience how do you experience the shape fixation in design? And are you able to recognize when you're fixated on something.

Unknown 22:18 sation it is recommended by how like I feel right.

Unknown 22:29 Now you can feel what does what do you feel

interviewed 22:32

I already kind of feel like it is quite similar what I have thought about like from the previous project, but the harder part is order part is the decision after like after I recognize that there is something what I've done last time Then should I then like stop to take the same like similar approach then really try to go crazy stuff. This is option one, option two will be like even though it seems like similar it might worst to go deeper than maybe there will be a new way to go on Yeah. So this is option two this part is like hard to like better try new stuff or follow the previous Is there something you how long wait

Interviewer 23:31

Is there something that you kind of what actually helps you to overcome fixation What do you think kind of is the moment

interviewed 23:41

session? I mean, like I told you this kind of watch of wanting to in the case of option one is normally happening when I have more time and like the more like still there be budget to go on. Then I can just okay like this one I kind of know that like work yeah, go and probably would work. So then like intentionally I don't like I go to like opposite thing. Option one case like it is like that an option in option two case. If there is no enough time, no enough budget and like I should stick to the post

Interviewer 24:31 area to the domain or scope scope string to the frame frame

interviewed 24:36

frame my two is most probably would work like I should follow it first. Because it seems like at the end of the process, like the IRA know that if I just follow the same theme, but start in the different

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designers, Participant 11 continuation

project. It isn't it might not be the optimized like solution. Then I tried to keep critically assess myself like should be different.

Interviewer 25:02

You mean like fixated in the design process approach? How you was a sequence of your research and design process? Yeah, this Yeah. Yeah. Then you have like a routine, like your things that you do and you're familiar with. And you know, you've worked before.

interviewed 25.19

Yeah. Yeah. So it's more like reflection in action. Yeah. If I have to use the term

Interviewer 25:31

Okay. Some other questions? How do you have any objects that you like to interact in your environment during your ideation or thinking? Objects?

Unknown 25:57 Cigarettes

Interviewer 26:03

I really don't have like a particular opportunity. I prefer to just go wild and try to interact with different stuff as much as possible. Yeah, so like some, I don't know, sketching or you do some hobbies that you kind of like? Like, do you have a hobby? Kind of?

interviewed 26:28

Like walking outside? Yeah, really, that is helpful. And like dream locking. I'm trying to be sensitive than than usual. Maybe like even emotional with the sunlight and shadows on the ground like this? How the shadow looks? Then the sunlight is coming. Yeah.

Interviewer 27:00

What behaviors do you do when you want to feel more creative?

interviewed 27:04

Rockin? Fine, just give me a second like I have a group work for.

Unknown 27:25 You activities like walking is the

interviewed 27:34

I don't know if this really what I'm doing. I don't know if it isn't really like a behavior. But I'm trying to recall like what I've seen from the Netflix series, for example. Yeah. And also talk with people. Talk with people. Are you have you have any concerns regarding your design process that you would like to change it in some way?

Interviewer 28:09

In the process? It is because we have just mentioned about it, and how to capture what I had thought about before, like, luckily, so far, it came somehow. Like at some point, even though I even though I didn't make any note documented properly, because not only came, but maybe like, I cannot even remember that I have thought about it. It could be the case. If you have thought of something that would be useful. Yeah. Yeah.

interviewed 28:51

And also like the thing is the art or the artist, Chris mind, the outcome of the mind wandering is not really based on any evidence, like it is just came up with my intuition. And sometimes we try to make it more academic, like, the need to have

really helpful always to I don't know like some some researchers

Unknown 21:24

because you just do well the size

interviewed 21:28

Interviewer 29:17 a more objective approval,

interviewed 29:20

or like having a academic value, for example. Yeah, then like, we also have to make a connection to the theory or the previous research, blah, blah, blah. So it is quite annoying that there's kind of a counter way. I know that I feel that it is a really cool idea or concept with you like I have to do with just four.

Interviewer 29:45

You can do some processes just for the sake of showing the process. Yeah. Yeah. So you would like to have some way to prove that it's mine this minute. Wondering was a method methodological manual wondering how to

designers Particpant 12

How does MW feels for you? Do you feel like you have control over it?

I like to MW and I enjoy doing. I like to enable it during my day I live on a big street... for a long day of work I like to look out of the window and wandering about life.. what people re doing... it is refreshing for me, after I do it for 15-20 min I feel like a new person. I feel like a new person.

How does it affect your work on the task that you are working on? I feel like it depends whether I want to do the task or I don't want to do the task. is it required, or not for the task. When you want to do something creative? Brainstorming session... I have processed it during drinking coffee. This morning I was chilling on my balcony that's when I let my mind wonder I started processing information from yesterday. this is an example of when I needed it, new perspective on the information. If great. But when I need something systematic and structured, like writing a brief proposal...in the beginning it is a creative task, framing the brief, when It is over it is just requires a lot of working, fixing the grammar. If I get bored It might slow me down, especially if it is a task I am postponing....and I don't want to do Affecting the mood in the positive way + getting insights?

I like to do things that encourage MW, when I am stressed, or I need to take a break, I do meditation. it is a very relaxing experiences, take a break .. look out at home.. take a moment What is a sleep mediation? It helps you fall asleep. you focus on each part of your body.. you focus on one part of the body....the idea is to focus on the whole body.....usually imagine yourself in a safe space...You have to go through a particular set of steps. If I do those episodes, I feel very refreshed when I do it with a nap... and veah...a don't it feels good.

What are those activities that enable. What ... talking a walk with no purpose, thinking. Drinking tea and looking in the window, small walk around the faculty, can give a different perspective, environment [you change your position in the context, and therefore you change the implied concerns. In the head]. How is Min-Wandering affecting your design process?

Do you use any tools or tourniquets (writing, visual, etc) to guide

your thinking processes? (or mind-wandering) Writing..., I have a planner in which I set goals for the month and I reflect on how my month went. There are couple of prompts... I steer away ... so I write down some important insights. if something related comes in my life., I want to go back to it. What went well. I stray a bit away.. to write some important insights, something related come. When things come to my mind. I record. I have a dream journal. If I am in a good relaxed mood I dream. Every time I have a design issue I solve it in my dream. I note things down in the morning if I have dreams.

How do you relate them?

Sometimes it is very concrete. I don't know how to design a chair. I will dream guite concretely of a possible way to design a chair. I hopefully remember and try out the next day. Other times it is a bit more abstract I note it down. It comes down about personal issues than more concrete things. If something bothers me during the day and I have this particular type of a dream, fast paces little inputs coming together, I note it and talk about this with a friend... because I saw something online or I had a conversation. Detangle

I have to be relaxed... it is important to me.... It is guite organic... if I try to force it will not happen usually.

Napping.. also works?

I have to do sleep meditation and grounding myself and relaxing. I will take a nap and think about this. But if I am stressed it will not aoina to work.

What makes you feel certain during your ideation? (tools, brainstorming sessions) Do you feel confident to ideate on your own?

I like to have combination of things.. my own thought's concrete.. Llike to get inputs from other people, to challenge those beliefs. but I also like to have them challenged. But when I need input from other people to challenge those beliefs. I can reframe initial

What environments?

A lot of my ideas are coming in my sleep. I wake up in the middle of then night to note things down. I like to write things down, write and rough type of sketches. But I also like to have something in my hand to fidget. There is a small ball of clay... because it is so malleable.

There are 2 things.. it is a ball I squish it.. I make it a bail again, but sometimes it is random...usually it is an alternation of patterns It changes when I am thinking as well. When I am not conscious's of it... I can vaguely remember the pattern.. it can change the pattern. Oh I have been doing the same motion for a while, let's change a bit., It is something you are unaware. I have been the same motion for a while.

How does it helps your thinking,

It takes some attention from the thoughts in my mind towards my body and it helps me see the important things in my mind more clearly. There could 2-3 different thoughts. But focusing on fidgeting helps to get a picture of what you want and what is relevant or not in your mind and form ideas in the mind.

What form ideas come to you? How do you see things, in the modality

It depends I feel like it depends on a type of design questions that I have.. about interaction a video of somebody doing something. A technical question...I will see parts appear and I would see it in isometric ... levitating things attaching to each other.. Other times it is a bit more abstract, sometimes different frame of thinking bout the object, I am able to relate it to what my initial challenge was.

The way we encounter similar problems before shapes in what modality we think about the problem. (Isometric.... When it is a 3d model)

Frame?

Taking a different perspective on it.. Made to hold laparoscopic tower. Dream in a shape of doctor pushing in the suitcase (action in the context). A mobile kit, like a suitcase. One item that always static in an unpacked form, to a packed form. the most important. How do I out all sort of components to fit all of this in the suitcase. That is a post rationalisation., but when it came it was just a movement of a suitcase.

How do you feel about taking a break during your design process? Depends. D I feel behind.. I feel a guilty.. I don't take a break negative spiral. Sometimes I feel most things happens on breaks are beneficial

Environments

I like silence and privacy.. it sounds weird... maybe someone accessible, but not too close.. hei what do you think about this... and not influene my process or my flow too much.

How do you experience fixation and are you able to recognise it? Do you engage in incubation during your design work? And what do you do to incubate on a problem?

How do you like to reflect on your thoughts?

I like to note things comics, tangible sketches of experiences that I had. They are very rough actually. It I very communicable. How do I get the essence of things in a very simple way. If you have to make something in a comic, there is a little information, if someone looks at it... someone understand what they talk about. Making comes sometimes... make a thought simple and easy.. that it pretty. more that it is a quick glance " I ask myself question.. how do I get to the essence of things?".. They can relate to id if they had similar experiences.. making coming helps to make complex thought very simple and easy, it is like a quick

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designers, Participant 12 continuation

glance of my mind",. If there is one thoughts ... I write poetry a lot.. I revisit quite often.. they can have different meanings. I look back to Poetry, I revisit them quite often... being more abstract they could have different meanings.

Do you think writing poetry helps your design work.. it is more a personal practice.

Do you have any objects in your environment that you like to interact with during your ideation or thinking process?

Sometimes when I want to have a session, let me clean my desk, a mess, just doing that puts me in a good flow. Things I don't need. It is the moment to say "What do I need for today?"

It sounds wear.. there should be someone accessible, but not too close... hey what do you think of this.

Sometimes looking thought random magazines helps , they are not design books but random, more fashion , product design.. ii like to spend some time looking through those books

What behaviours you do when you want to feel more creative? 'I feel like sometimes it is about managing my emotions. I don't feel creativity is not something you can force. I wouldn't force... as much as to make sure that I am in a god state of mind. There is no habbit to trigger creativity, except of putting oneself in the aood mood.

Concerns. Do you have any fears or concerns regarding your design process?

Many time they come in random moments, dreams.. It happens a process of randomness and discovery when you have to communicate it should be more structured. Maybe having more of a tangible method... methods doesn't lead me outside of a current state of mind, as much I would like. When method is being used it puts you in a more systematic frame of mind and that rigidity puts you in a rigid mindset, which is not creative, and creativity comes after a method being used... So, I would like to have a way a way that is a more tangible and easier to communicate.

Not restricting the thought process means creativity. Creativity is allowing your mind to go away from a task. Suddenly the last thing you want to do is to throw away the trash.

That paradox. Least thing you want to do to take off the trash. While you write report.. for graduation, and than suddenly when vou start to have ideas.

Cues in the environment? To help you to think about the project? Would you like to have it??

I would like to have something to have this off the project, now you are not allowed to think about the project. The best things happen when you're not thinking about it.

Do you have problems communicating your ideas?

Imagine a scenario where technology would be guiding your thought process with verbal interface or providing you cues to prime your thinking? To what extent you would you feel comfortable to use this technologies if it would support your creativity?

I would rebel against it. It I since to have someone and something to guide you to3wgrds things, but it would not an able you to look at the things, but look away from those things. If I have been sitting here and it tells me to look back behind. I wouldn't notice the tree, and would notice the surrounding f it. Thing around a tree, that aspect is a particularly helpful, grab attention to 5 other things, that it would otherwise miss. Rebel to think someone tells me to. Think of something.

Your own voice memmos?

Sometimes I would to have it in a more interactive environment. Just explore your mind? You have your thought on 5 different places. when you note things down, phone app, notion ,

- and interactive way. Walking thought your own brain. Facebook is also one of those interesting tools... going back there to 5 years ago. Why I was so preoccupied with this thing 5 years ago. I forget sometimes the things I left.
- Rarely go beck. Memo sis not my favourite way. Maybe in my mind I do it, but not a lot. If it is taking to myself it writing things down
- Nostalgia, memmos of things, for the design process would that be useful?
- In a design process...Everything needs to start from something that is already there, synthetise things in your environment in a such a way.. so you can speed up the process, objects and they are here, but if you were to consider, they can be an inspiration and contribute to your project. Sometimes the time between looking between the object and translate the insight to your deisgn can be very long. How Can I interct with something How I can quickly iterate upon them to quickly change them and
- CahtGPT often, used, Dali once in awhile... I like dali visualise quickly... and you can write a prompt, not coming out ... gives new perspective on

Appendix 5: Transcript of the interview with novice

designers Particpant 13

interviewed 0:00

Yeah, I've got some messages so mostly Yes. Usually, I have like two spaces mind wandering, I will say, and I'm assuming this is what you mean by doing questions, right? So, what first of all is when I'm like, doing something, and then I lose myself in my train of thought, or like, get bored. That's completely not controllable. Like, that's something that just comes up. I either, like, I just lose myself in it. And I. Yeah, and the second one is, for example, when I'm called time, or like, when I'm bored with work, and I'm working, or I actually, just alone, I will put myself headphones and I will put myself in a control mind wander. I do that at least once a day, not by saying like, it's like, a schedule more like adjust to it because I really like it.

Interviewer 1:01

And do you do it every day? You try to do it every day,

interviewed 1:04

but not like, I will not say like, it's like I meditate once a day or try to do it. Like I just when I'm bored. I go to do that very often. It's very natural for me to just go to in that way.

Interviewer 1:16

What is when do you feel like you need to do this what is before

interviewed 1:20

like, it's my meeting. Yeah, right. Well, for example, I'm doing work or I'm with a group of people. So I you know what, I need to take a walk I'll put headphones and mind wander

Interviewer 1:36

Do you feel so what what effect does give to you this? Humans?

interviewed 1:45

fun and excitement?

Interviewer 1:52

Yeah. So how does this affects your design process after this?

interviewed 2:01

There are two things. One of them is like a single mostly most useful one for me will be that I take it as a breather. breather. Yeah. Incubation. Yeah, no more like yeah, like, if I'm working, if I'm designing, I will use this as a way to separate myself for work. So I get excited of coming back from work.

Interviewer 2:25

Yeah, to get excited to get back on

interviewed 2:27

task. So you shouldn't we'll do it through like, I'm working on a project may think of something completely opposite, like something absolutely unrelated to work. And then, but then we're like, I sort of miss work.

Interviewer 2:39

Yeah. So you feel like taking a break allows you to not think about something unrelated, like house problems, or you know,

interviewed 2:49

the other way I use it, but this is like during the work process is I upscale the work situation. Like for example. Yeah, like for example, I'm thinking of a little project, I think of how big it could be a whole dramatic this scenario, this and they sort of like daydream about it, and then it's like alright, let's go back to where it is and see how we can get it. Like I usually like for

example, I think a lot of times product, like a project and then I think of multiple end products and I get excited about it keeps the motivation going

Interviewer 3:24

Do you use any tools or techniques to your side your thinking process thinking process or mind wandering?

interviewed 3:31

No, I used to listen to music whenever I want to like think of not Yeah, they drink.

Interviewer 3.39

Yeah. And do you feel certain about your ideation on your own? Or are you use some like tools brainstorming sessions to do ideation

interviewed 3:52

usually pretty sure what my tools but like when it gets stuck, I would mostly go to do brainstorming. Like that's my trick like I will go to like, I have my own method of doing things which you shouldn't not doesn't imply very not many tools. Yeah, and but whenever I get stuck a brainstorm I collect people to brainstorm about it.

Interviewer 4.12

Yeah. With other people Yeah. When do you feel like you reckon it can recognize when you're stuck? Can you easily recognize it or what's happening

interviewed 4:29

before? No, sometimes I'm not I cannot recognize that this happens to me way too often that I'm just focusing on details instead of doing the main thing. And then it feels like I'm working but I'm actually not. Yeah.

Interviewer 4:45

And what is kind of this moment what happens maybe when you kind of like realized that you were focusing on details, unnecessary

interviewed 4:52

3rd point perspective, someone tells me I couldn't spend 24/7 There was like reflection with others the Yeah, yeah, usually hope luckily, because we're in a very social environment. I talk about my product a lot. And then I realized very easily that I've been doing nothing for like a week

Interviewer 5:17

do you feel what do you how do you usually take your breaks? And how do you feel about do you feel guilty about taking breaks or you've kind of feel fine.

interviewed 5:26

When it's like a really nice short break, during a long period of personal work, I feel like it helps a lot. It keeps me good. But I often more than more often than not just take a little break, and then realize that my break was longer than more working time. Yeah. And that happens way too often.

Interviewer 5:44

Yeah. How do you do you experience fixation? On you say, do you say like fixation and being stuck? We use the same or it's a different? Yeah, you describe fixation.

interviewed 6:03

fixation is when I'm there's one topic that really drags me in. And

Appendix 5: Transcript of the interview with novice

designers, Participant 13 continuation

usually that for me, it's very good. It's very rare for me that I get interviewed 8:28 fixated on something it's not useful. Or usually make it useful. More like other people reflecting on my design

Interviewer 6:16

If that makes any sense. You forced fit there and useful.

interviewed 6.19

Yeah, yeah. And then they get stuck usually is with when it has to do with something unrelated. It's not like I get stuck on something else. It's more like I don't want No, like if because you get stuck, mostly because the project is not moving. And I do other things, just because the brain is not moving, not the other way around. It's not like I'm doing something in the project.

Interviewer 6:51

Do you? Yeah, I asked again about incubation, like, do you understand what is incubation? And do you actively use incubation.

interviewed 7:01

incubation in them? I assume that you're talking about like growing an idea and just let it flow in my head? Like

Interviewer 7:07 sleep or where to shower? Or? Oh, yeah,

interviewed 7:10

I usually help sometimes when I'm like, stuck in a problem. I just, I will say let it rest. Come back to it in another moment. Especially when I'm writing. Like, I cannot express the idea like it's completely over, like, take a break. Or maybe like come back next day.

Interviewer 7:29 So writing is kind of complication in your

interviewed 7:32

Yeah, absolutely. I am such a bad writer. So it doesn't come naturally. Yeah, so when I'm talking is the first thing I will just leave

Interviewer 7:40

Yeah. What are some? Do you have any fears and concerns in your design process that you face?

interviewed 7:50 Yeah, research generally speaking. I'm not the best for details. I'm always concerned of concerns of holes in my logic,

Interviewer 7:59 you you again, um,

interviewed 8:01

I'm not the most new study person and I'm not very organized. So, I can do a whole design process and I will skip a hole or a detail that makes my overall structure very weak

Interviewer 8:16 Okay, and how do you how would you like to reflect on your design process?

interviewed 8:24 Or talking

Interviewer 8:27 comparison with other projects? Interviewer 8:33

other people reflection do you use some like notes taking like visuals or audio kind of self reflection

interviewed 8:42 in for self reflection or for my design process?

Interviewer 8:46

It can say maybe, yeah, I can say about both like okay, for design process, how do you reflect on for yourself? How

interviewed 8:52

On self reflection, nothing at all, they will just describe us better as I can, my probably to someone else. And I'm coax from the feedback out of it. Yeah, and when usually I work with note taking apps for most ABS very often I have like a collection of images in notes on top of it, like let's call it a Myra so in Dutch I use very useful to describe my what I've done on the past week to another person.

Interviewer 9:25

So it's like retrospective reflection on action. Yeah. Yeah. And does overview helps to reflect or like, what helps to reflect having an overview so

interviewed 9:41

yeah, yes, absolutely. Yeah, but more like yeah, like, I guess not necessarily overview but more like pre planning, pre planning, planning. Yeah. Because as a person who doesn't plan too much, when they take the Time to plan, I gotta assume that the veto that planned something in his brain. So when we choose not planning, so it looks like the head is not matching, and probably the vehicle plan had a better overview of the project. So it kind of it's very effortful for you to plan. Yeah. And so, when I think I do it poorly, like, personally have to

Interviewer 10:27

have the objects in your environment that you'd like to interact during your ideation, pen, paper, pen and paper, and some like fidgeting or some

interviewed 10.40 No, no, headphones, headphones

Interviewer 10.49 What do you do for incubation.

interviewed 10:51

And when I mean for paper, I will not mean a note taking, I never write on paper, drawing, doodling or drawing, it's mostly doodling. It's never like, I don't sketch too much about the project I'm doing. I'm just like, I get bored and start like fidget around with it. They do little caricatures or like, make little concepts, stupid stuff, like nothing important.

Interviewer 11:13

Yeah. So that's just kind of like, how do you how do you see it working for you,

interviewed 11:19

it lets my mind, if I have, I usually think about what I'm looking. If I'm doodling. It's like, I let mine go anywhere you wander around. That's why I like instead of like doing quick drawings, I like to

Appendix 5: Transcript of the interview with novice

designers Particpant 13 continuation

make long stupid drawing because I think that I, I can just drop it. And I can continue here.

Interviewer 11:43 Again, I don't.

interviewed 11:44

So for example, if I do a quick drawing, I need to start a new one and a new one request for new idea. But you can have a huge drawing, I can just take on where I left it. So I don't have to think about the drawing at all. But I can give you an example.

Interviewer 11:58 Show me how it's like it's like one piece of paper where you

interviewed 12:06

for example, you can see this drawing coming here. And so in here, you can see there's actually like, line line line line. So when I start drawing, mostly to build, the structure is already built. Yeah, I just go and fill it in. Like if you come like, paintings, I felt the numbers on it. Yeah, like the first thing you want to do is do that. So, the rest of it just like screw around with it.

Interviewer 12:34

Ah, so you kind of knew see you have an image. So, you have one just structure you did it once and then now you just do doing itself like feeling the shades helps to

interviewed 12:43 say no, because I don't think about controlling at all.

Interviewer 12:47 And this is where ideas come or

interviewed 12:50 more like ideas flow

Interviewer 12:56

Flow after being bored off to being fixated. Yeah, for sure. After being bored. Because you mentioned about bored and fixation. It's kind of the same,

interviewed 13:10 more bored than fixated for sure.

Interviewer 13:21

And then you feel like after this God gives to you

interviewed 13:29

a more calm, and especially more like a bit more relaxed and give me more motivation to go back to work. Because for example, if I just let ideas go without like doing something, I feel like I've done nothing. What do you mean, what we do is go with like, for example. Like if I let him go, I might just go back to like, just watching YouTube videos. And there's like a waste of time.

Interviewer 13:55

Okay, so it's kind of like ideas pop in your head about how to change the project or Yeah, and then dueling helps to capture them or to kind of like Okay, forget about them or say segregate what is important. What is not important and what

interviewed 14:08

it's more like to continue with ideas and not deviate or something stupid.

Interviewer 14:13

Ah, yeah, yeah. Thanks so good to keep the scope. Yeah. Okay. Okay, to do what behave? Yeah, I think we kind of talk what behaviors you do as well to make to feel more creative.

interviewed 14:37

And walk like a walk in a room. Yeah. Yeah. I look for references a lot.

Interviewer 14:52 Which platform.

interviewed 14:54

people will be surprised for effectively social media to get users creative Easter beacons some interest

Interviewer 15:05

Do you have? Do you see? Do you do some practices to gain better control with your attention? Like meditation?

interviewed 15:12

Before timer? A timer? Yeah. And put a timer for 45 minutes, or 45 minutes I need to work. Yeah. Or, for example, I kind of like a timer or toggle. Toggle. Yeah, that counts how much I've been working. Yeah. And sort of, it's kind of useless. Because it doesn't really matter. The tariff action of clicking, like, it's like, I'm going to work, you click go, and it starts count. And then just I just like work, work work. And then I stop it. And it's like, working time is over. And so the action of taking it, like gives me like, Well, did I miss running? Right? I cannot just watch the YouTube videos. Yeah. And also, when you do it, you also have to write what's the task you're going to do. So for example, if I write writing, and start counting, I cannot do another thing, because this is the writing time.

Interviewer 16:00 So you set yourself a goal, your goal

interviewed 16:03 in start running.

Interviewer 16:09

Okay. Do you have some? Do you face some problems communicating your ideas? Some ways?

interviewed 16:24

You speak very fast. Also, the last question like imagine a scenario where technology is guiding your thought process with some verbal interface or providing you cues like visual cues to prime your thinking, to what extent do you think you will feel comfortable to use those types of technologies to support a greater interesting? I know, it's, it's a fun, it will be like a fun way of looking at this will be nice to have like because I have a model to do this, right? I have someone who do you let me go, I would just do anything else but to work. So it will be nice to have like a little like, like a teacher or trainer to kind of say like alright, working time so and then it's like up working times over to something else. Maybe with some other type of event because for example, I listen to music while at work. Maybe music to music will change.

Interviewer 17:22

Yeah. What? Because you mentioned like you set the timer. So it will be like imagine like,

interviewed 17:29 vou will be fantastic. Someone will write it for me. Because I

Appendix 5: Transcript of the interview with novice

designers, Participant 13 continuation

foraet.

Interviewer 17:34

But also like because you set the timer, you have the agency, but when somebody in your head tells you to do something, it's also like, you know, it's then it's different. It's like Alex, Alexa is telling you to do this. He knows your use.

interviewed 17:45

But for example, if Alexa tell me to work, it's fine. But Alexa will not tell me what. Yeah, so maybe that's the difference. Yeah. That wouldn't be nice because I if for example, if I forget, nobody will tell me set the timer, and then I can just not work. Ah

Interviewer 18:12

okay. That was really fast. I'm sorry. Yeah, no, it's I'm thinking what I wanted to ask reflection we asked. Yeah. What? Yeah, like mind wandering is just do you feel like you

interviewed 18:43

I couldn't tell you I do. I never thought about mind wandering and design processing the same page. For me mind wandering focus on negative thing. Because it's for me, it's something I can do. 24/7 for pleasure, for inspection. And then but in terms of practical gain, I get nothing out of Yeah. Sometimes not even like pleasure. Sometimes it's just like, I do it out of habit. Yeah, so it's a it wouldn't be nice to have something that can channel it.

Interviewer 19:12

Oh, yeah. What environments do you like to work in? At home or

interviewed 19:17

with other people because they keep so this is a small connection to what your little technology device? I work with people because people will judge me if I'm not working. Yeah.

Interviewer 19.28

Yeah. But also like, so you wonder and then you kind of like, Do you wonder when you are on the street, like noticing something? Do you happen to do that or is just still very, very inside of yourself?

interviewed 19:46 Very, very insightful. Very talk on outside stuff.

Interviewer 19:50

Yeah. So you kind of stimulate yourself with your own kind of associations and yeah, okay. And do you because like okay to kind of like a

Transcribed by https://otter.ai

Appendix 5: Transcript of the interview with novice

designers Particpant 14

Do you find Min-Wandering to be beneficial for your design work? Can you say what do you mean MW. When your thoughts are away from the task. I think it usually is not beneficial, but sometimes it is. If I am working in the moment. But sometimes I am MW to a very different moment. I am not working on designs. That sometimes something... oh maybe I can use it for my design project. Usually it happens not during the design work. What helps., what do you do.

Commuting, biking, on a train.. I will think of something else... I kind of connect this thoughts

Concerns. Do you have some concerns or fears about your design process?

What I like about MW... that you can go really far and imagine the future. I feel safe in my design process. I am predicting a little bit what will happen. I imagine taking a direction. It removes some ambiguity and uncertainty from the design process. What I feel more worried about.. the uncertainty and the fact that I don't know what I am doing going to lead somewhere is this the best thig to do.

What makes you feel certain during your ideation? (tools, brainstorming sessions).

I think I try to make steps so I have clear goals for what I am trying to do, so I know enough and also I know what I need to find.. have in mind the end result, how it should be. I can create ideas that are out of the box. If they respect [stakeholders] my research and my goal., that would relevant.

I think when I am doing research. I start to have some ideas for my concept and it is interesting. I already have some stuff in mind. I try to write down, visualise on small thoughts while doing research. I try to MW and imagine the situation in my head, I imagine different possibilities that can go and I start to play some object of things in the scene and wonder how it would make this change.

You rely on your self?

I really rely on myself a lot, maybe that is not a good thing to do. When it comes to ideating I tend not to talk a lot with other people and don't look up the things that exist. When something is coming outside of me... it is not my ideas.. I will not go for it... I really want to do it on my own.

What do you do to overcome fixation during your design process? And how do you recognise it? When you are fixated on one type of idea or a process

I think not that much. I have ideasInstead of it being a one specific thing, I think more or less I need to have something like this, and the more I think, the more I try to make it more concrete and exclude the elements that will not work and narrow it down to a more specific attributes. In the end when it comes to the final thing it is well thought out and before I did not had a specific thing in mind... so it is still not concrete enough for me to get fixated on it, because it is not [representing] one thing

Do you think more on the context and a frame like VIP process.. and than what specific materials.

I start very abstract, what they would need to think, do or feel. Maybe they should behave this way. Something that encourages them to behave in this way.

Do you recognise that you are fixated in the process:

I create very big challenges. I need to make this behavioural change> I have broad goals in my mind. It is hard to make. Jump to a solution sometimes. I got fixated on a big goal, because it I harder to fulfil this higher level big goal.

Are you able to recognise that you are fixated?

I kind recognise it.. but probably I am not good at recognising on what I am fixated on. Maybe I try to change something, somehow it still doesn't make a difference. So sometimes talking to people helps because I was fixated on something and taking it as a granted. Oh why do you think like this?... I realise than that I was fixated on this.

When you are stuck what do you do? And cannot come up with new ideas?

I try to look at similar situations in different domains and see how people approach this. In behaviours what do you do. I try to change a lot the activity that I am doing. I try to do different things. I try to keep working and don't take a break. Ima a little bit more passive. Read more and learn more of other things because I feel I cannot make anything myself.

Do you take time for incubation?

I think I do .. I take a lot time to let me thought settle before actually creating something. Now I need to do something, and I am usually afraid of this phase, so I want to be sure I know what I should do. I have this knowledge and I can start making the ideation. After I start ideation I start to stress, but not in between the incubation phase. I start to be more stressed when I am in the prototyping phase.

Do you use any tools to guide your thinking processes? I guess I do. But I think I use a lot clustering. I have lot's of insights and ideas. I try to keep them as they are, and later I try to understand how they are linked and try to make a story out of what I am doing .. if it makes sense and it is coherent. And making a story helps to reflect. Making presentations is a part of the design process. I start to iterate a bit more on what I am doing. So making presentations helps me to reflect... it helps to take a step back. After making a presentation I look from the outside of what I am doing and you look at it from a stranger perspective. What objects you like to interact with during your design process? I mean not specifically...Cooking and cleaning .. I am confident and I make them automatically. it feels less stressful ... so my mind is half busy and is less stressed. In a meantime I can think.

My mind is half busy doing something. Do you use some practices to gain a better control of your attention?

I used to do meditation. I want to start again. When I am MW I can use things that I have learned from meditation to make my thoughts are positive

How would you like to improve your design process?

I think I would like to have more imagination ... what will be results of what I am doing , what it will bring and also be less anxious... Sometimes I am so stressed so I cannot think anymore... I cannot do anything I cannot be productive.. I world like to be more relaxed

What behaviours you do when you want to feel more creative? I like public space.. I don't like to be in someone else space . I like spacious places with a lot of air... with big tables, other people around, but not complete silence.

What is about home that is not helping?

If I feel too comfortable I will be a bit layed back. I have to feel some kind of small pressure I need to be cool and be enough for the place where I am ... why I am even doing this...this is stupid. At home I am more responsible for this place... I should clean this... It reminds me for what I have to do at home. I don't have any feeling for public space so it doesn't distract me

What environment do you prefer for your creative work? It is a problem of making a time for something? Would you like to spend more time on working on your attention as a part of design process?

It would be good to make time for mediation Doesn't feel random (My MW) ... Maybe I will not see the results immediately, when you pray it has a really big meaning. I am not religious, but After you pray there is no something like magic happens, but this time really helps you. You feel confident about it. In the time it really helps you.

What do you do to be more mindful?

If I am MW and it is spontaneous... instead of getting back to what I was doing .. I stopped and why I was distracted and what should I change.. maybe something inside is really bothering me. I try to make some time to just thinking. Maybe I don't have to continue MW. Or I really have time and now I can do it more deliberate.

Appendix 6: Lego serious play results of th session

Responses to task of making homogenisation part of the experience



"all under the same sun"





Other participants'

"knowing where to go"



"all equal, but different, seeing unity"



"head in clouds"



preferred to sketch





"splitting identity when being abroad"



"meeting a friend and seeing him changing"



"changing the foreground and context for the infomation"



One of the participants had a mindmap with illustration

Responses to the task of designing mind-wandering supportive activity



Appendix 6: Lego serious play results of th session

"Having random choice of options and being open to different experiences"



"knowing that I have a safe space"



"seeing alternative path"



"variety of experiences, including mind-wandering early in the morning"

Appendix 7: Drawings of participants from cocreation 1+2







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Appendix 7: Drawings of participants from cocreation 1+2, continuation



Appendix 8: Data on the visual perceptionexperiemnt

DMW means deliberate MW, SMW means sponatneous

	Shadows			Particles		Monotonous patter			attern
	DMW	SPMW	tendency	DMW	SPMW	tendency	DMW	SPMW	tendency
7/4/2023 14:59:31	3	4	-1	4	4	0	3	4	-1
7/4/2023 16:06:54	3	3	0	1	4	-3	1	3	-2
7/4/2023 16:10:55	2	3	-1	2	3	-1	3	4	-1
7/4/2023 16:13:33	4	3	1	4	2	2	4	1	3
7/4/2023 16:25:27	1	1	0	4	3	1	3	4	-1
7/4/2023 16:30:08	5	5	0	4	2	2	2	1	1
7/4/2023 16:36:54	2	1	1	1	2	-1	4	4	0
7/4/2023 17:11:50	1	3	-2	2	2	0	2	2	0
7/4/2023 17:37:42	3	2	1	2	3	-1	2	3	-1
7/5/2023 11:26:11	5	5	0	5	5	0	4	4	0
7/5/2023 14:53:53	1	1	0	3	3	0	2	2	0
7/5/2023 15:01:44	4	4	0	1	1	0	1	2	-1
7/5/2023 15:30:40	5	4	1	4	4	0	4	4	0
7/10/2023 11:47:54	4	3	1	4	3	1	3	2	1

Appendix 9: Flipped shadow experiment data

Participant number¤		DMW	SMW	tendency=DMW-SMW frequency¤
	1	2	1	1*
	2	3	2	1*
	3	1	2	-1 ^x
	4	2	2	0*
	5	2	4	-2
	6	1	11	0

Appendix 10: List of questions for intermediate evaluation of the prototypes

Which one of these would you prefer to use as a break from your work? Why? In what scenarios do you imagine using it? What would you change in the products?

Appendix 11: List of questionsfor semi-structured inteview in final evaluation

Can you talk about your first impressions of the product? How would you use it? What would you change in the product? How did it change your perceptions of the environment around you.

Appendix 12: Scales for creative confidence an selfefficacy that were used in the fanal evaluation

Activity 1a. Exploring your (general) creative confidence

For each of the statements, where do you fall in this spectrum? a dot or a cross to mark how much you agree with the statemen	Place ts.
I am creative	
Not true at all	Completely true
I know I can efficiently solve even complicated problems	
Not true at all	Completely true
I trust my creative abilities.	
Not true at all	Completely true
Compared with my friends, I am distinguished by my imagination and ing	enuity.
Not true at all	Completely true
I have proved many times that I can cope with difficult situations.	
n Not true at all	Completely true
I am sure I can deal with problems requiring creative thinking.	
Not true at all	Completely true
I am good at proposing original solutions to problems.	
Not true at all	Completely true

Activity 1a. Exploring your creative self-efficacy (5 min)

You are going to be asked to create solutions for the problem below.

Design a way that allows people to pickup a book from a shelf (e.g., in a library) that is out of their reach, for instance, above their head

But before you start!!! How confident are you that you can come up with a creative way (i.e., original and useful) that you can solve the problem above?

No Confidence

Full Confidence

Activity 1c. Rate your creative self-efficacy (again)

Now that you are done with the activity, measure again your creative confidence in relation to this problem. How confident are you that you managed to come up with creative ideas for the problem?
-0145

Appendix 13: Results of final evaluation. Experimental group, Participant 2



Appendix 13: Results of final evaluation. Experimental group, Participant 4

	and contine confidence		
Activity 1a. Exploring your igen	re do you fall in this spertrum? Plane		
a dot or a cross to mark how mu	ich you agree with the statements.		
I am creative	*		
Stort true at all	Complexity true	Activity 1a. Exploring your creative self-efficacy	
I know I can efficiently solve even compl	icated problems	(5 min)	
Not true at all	Complexity Inve	You are going to be asked to create solutions for the problem below.	
I trust my creative abilities.	*	uesign a way that allows people to pickup a book from a shell (e.g., in a library) that is out of their reach, for instance, above their head	
Not true at all	Complexity true	Put before un stratt	
Compared with my friends, I am disting	uished by my imagination and ingenuity.	How confident are you that you can come up with a creative way	
Not true at all	Complexely your	tive, original and userul that you can some the problem above?	
I have proved many times that I can co	pe with difficult situations.	0 × 100	
Nixtue et al	Completely true	No Confidence Full Confidence	
I am sure I can deal with problems req	uiring creative thinking.		
not true at all	Camplessyme		
I am good at proposing original solutio	ons to problems.		
Not the at all	Complexity true		
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sctivity 1b. Create as many creative ideas (original and useful) a possible for the problem. (20 min for this task)	Design a way that allows people to pickup a book from a shelf (e.g., in a library that is each of their match, for instance, above their head		
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	Activity 1a. Exploring your (general) creative	confidence	
	Enreach of the statements where do you fall in	this spectrum? Place	
	a dot or a cross to mark how much you agree w	with the statements.	
	I am creative		
	Next your at all	Completely true	
	I know I can efficiently solve even complicated problems		
	Not true at all	X	
	Itust my creative abilities		
	in the second democratic second	×	
	NETWORK	Completely true	
	Compared with my friends, I am distinguished by my im	agination and ingenuity.	
	Nettorizat	Complexity true	
	I have proved many times that I can cope with difficult s	ituations.	
	Notice atal	X Consideration	
	I am sure I can deal with problems requiring creative th	inking	
	Section and	X	
		Completely true	
	arm good at proposing original solutions to problems.		
	Notweatal	Completelyaye	
25			
<u> </u>	2	nohultu	5
×	133	met met an	5
returnes	- source concords	Jal astrathad Banst mercen 100 pg 22-	5
Islandor 22	voy otro douto	Jal house low Barnese Der Low Road Dar Samer Der Low Road Part Samer Der Low Part Samer Sam Samer Samer Same	5
yer with De brok	tethens have doing - not othe doing - most state doing - 1 and othe doing -	- furd an opisibar basin proving in the sale in the function of the sale of the sale of the sale and the sale of the sale and sale of the	5

Activity 1c. Rate your creative self-efficacy (again

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Appendix 13: Results of final evaluation. Experimental group, Participant 4

Appendix 13: Results of final evaluation. Experimental group, Participant 3

Activity 1a Exploring your (gen	eral) creative confidence	
For each of the statements where	e do you fall in this spectrum? Place	
a dot or a cross to mark how muc	h you agree with the statements.	
I am creative		
Next true at all	Completely inte	Activity 1a, Exploring your creative self-efficacy
I know I can efficiently solve even complic	ated problems	(5 min)
Not true at all	Completely true	You are going to be asked to create solutions for the problem below.
I trust my creative abilities.		Design a way that allows people to pickup a book from a shelf (e.g.,
Non-true at all	Cominsteine	in a library) that is out of their reach, for instance, above their head
Compared with my friends 1 pm distingu	Isked by an invalentian and languing	But before you start!!!
	sheb by my magnation and ingentity.	How confident are you that you can come up with a creative way (i.e., original and useful) that you can solve the problem above?
NOT Silve at an	Complexity Inve	
I have proved many times that I can cop-	e with difficult situations.	0 × 100
Not true at all	Completely true	No Confidence Full Confidence
l am sure l can deal with problems requ	iring creative thinking.	
Not true at all	Conglesty ove	
I am good at proposing original solution	is to problems.	
Not true at all		
		4
17		1
Activity 1b. Create as many creative ideas (printing) and useful)		
Activity 1b. Create as many creative ideas (original and useful) as possible for the problem. (20 min for this task)	Design a way that allows people to pickup a book from a shelf (e.g., in a library) that is out of their react, for instance, above their head	
Activity 1b. Create as many creative ideas (original and useful) as possible for the problem. (20 min (critis task) Sketch or write down your ideas.	Design a way that allows propile to pickup a book from a shelf (e.g., in a library) that is out of their reach, for instance, above their head	
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Activity 1b. Create as many creative ideas (original and useful) as possible for the problem, (20 min for this task) Sketch or write down your ideas.	Design a way that allows people to pickup a book from a shelf (e.g., in a library) that is out of their reach, for instance, above their head 8: Why Out, who lie, Sinel fi up or discuss	Activity 1c. Rate your creative self-efficacy (again) Now that you are done with the activity or gain
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Activity 16. Create as many creative ideas (original and useful) as possible for the problem. (20 min Grithis task) Sketch or write down your ideas. 1. Elevator in the book shelf. 2. System lijke trach bins that you can actuate with your foot.	Beigna way that allows proper to get up a book from a sharf (e.g., in a library) that is out of the reach, for instance, above their head 8. Unous who is Shelf up or down watthe for the perison the prick the Look. 9. Such har type of thing. You indicate to a watchine which book you would and	Activity 1c. Rate your creative self-efficacy (again) Now that you are done with the activity, measure again your creative confidence in realisments to this problem. How confident are you that you managed to come up with creative teess for the problem?
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Appendix 13: Results of final evaluation. Control group

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Activity 1a. Exploring your creative self-efficacy	The Otherstee
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Activity 1a. Exploring your (general) For each of the statements, where do yo a dot or a cross to mark how much you I know I can ef I trust my creative abilities Compared with my friends, I am I am sure I can I am good at proposing original Not true at all



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More space for your ideas

Appendix 13: Results of final evaluation. Control group

Appendix 13: Results of final evaluation. Control group



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Appendix 13: Results of final evaluation. Control group





Appendix 14: Data from final evaluation

Experimental group

	Creative Confidence (0/100)	Self-efficacy before the task (0/100)	Self-efficacy after the task (0/100)	Trend* for self-efficacy (0/100)	Age	Experince in design**
P1	57,7	46,4	65,4	+19	26	1
Р2	67	48,9	77,8	+28.9	25	2
Р3	56	86,9	100	+13.1	32	7
Р4	84	60,3	61,4	+1.1	25	3
Р5	64,7	56,5	82,7	+26.2	29	3
Р6	65,5	88	67,3	-20.7	25	1
Median of the group	65.1/100	58.4	72.55	+16.05	25,5	2,5

*Trend: self-efficacy after the task minus self-efficacy before the task

**Experience means year of profesional practice in design, including internships and free lance Appendix 14: Data from final evaluation

Control group

	Creative Confidence	Self-efficacy before the task	Self-efficacy after the task	Trend*	Age	Experince in Design
P1	83	87,5	60	-27,5	24	0,5
Р2	79	76	81	+5	25	1
Р3	84	63	73	+10	24	1
Р4	46	54	60	+6	27	4
Р5	54	45,8	54	+8,2	25	2
Р6	72	85	79	-6	25	1
Median of the group	75.5/100	69.5	66.5	+5.5	25	1

*Trend: self-efficacy after the task minus self-efficacy before the task

**Experience means year of profesional practice in design, including internships and free lance

Experimental group Deliberate or spontaneous MW measure

"How your visual perception of your en- vironment was effected because of using the product. (9 point scale)	Ĺ	5	4	9	8	9	Medi- an 6
Relative tendency	7	-1	4	2	2	-5	
Sum of spontaneous mind- wandering score (SMW	12	14	14	12	13	15	
During your mind-wan- dering how often have you felt to be pulled from without your intention	5	5	5	4	4	5	
How often during working on task you have felt like having no control over where your mind wanders	3	4	5	4	5	4	
I found my thoughts wandering sponta- neously during working on a task	4	5	4	4	4	9	
Sum of delib- erate mind- wandering score (DMW)	14	13	18	14	15	10	
I have ex- perienced pleasant fantasies during working on a task	7	4	6	5	7	7	
I allowed my thoughts to wander on purpose during the task	9	4	6	5	6	2	
I en- joyed the moments when I was mind-wan- dering while working on a creative problem	7	5	6	4	5	7	
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Par- tici- pant	1	2	3	4	5	9	

Appendix 14: Data from final evaluation

Control group Deliberate or spontaneous MW measure

"How did you visually your envi- ronment (9 point scale).	1	1	1	4	2	1	Medi- an 1
Tenden - cy=D- MW-SMW	-2	-1	3	0	1	-1	
Sum of sportaneous mind-wan- dering score (SMW)	18	16	13	12	12	17	
	6	5	4	5	4	7	
During your mind-wan- dering how often have you felt to be pulled from pulled from without your intention	6	4	5	4	5	4	
How often How often working on task you have felt like having no control over where your mind wanders	9	L	7	3	3	9	
Sum of deliberate mind-wan- dering score (DMW)	16	15	16	12	13	16	
I have ex- perienced pleasant fantasies during working on a task	5	9	7	4	7	5	
I allowed my thoughts to wander on purpose during the task	5	5	Ĺ	3	9	4	
I en- joyed the moments when I was mind-wan- dering while working on a creative problem	9	7	5	5	3	L	
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Par- tici - pant	1	5	8	4	2	9	

Appendix 15: Attrakdiff

Par- tici- pant	Ex- cluded from evalu- ation	Filled out com- pletely	Editing time (sec.)	human - tech- nical	iso- lating - con- nective	pleas- ant - un- pleas- ant	inven- tive - con- ven- tional	simple - com- plicat- ed	pro- fes- sional - un- pro- fes- sional	ugly - attrac- tive	prac- tical - im- practi- cal	like- able - dis- agree- able	cum- ber- some -	stylish - tacky	pre- dict- able - un- pre- dict- able	cheap - pre- mium	alien- ating - inte- grating	brings me clos- er to people - sep- arates me from people	unpre- sent- able - pre- sent- able	re- jecting - in- viting	un- imag- inative - cre- ative	good - bad	con- fusing - clearly struc- tured	repel- ling - ap- pealing	bold - cau- tious	inno- vative - con- serva- tive	dull - capti- vating	unde- mand- ing - chal- leng- ing	moti- vating - dis- cour- aging	novel - ordi- nary	un- ruly - man- ageable
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3	N	Y	296	5	3	6	6	6	5	6	2	5	3	7	2	5	3	5	7	6	7	5	3	6	5	5	6	5	4	6	6
4	N	Y	151	6	2	6	4	5	4	6	4	6	4	5	3	4	2	2	5	6	6	6	3	6	3	4	7	3	5	6	6
5	N	Y	263	6	2	6	5	6	6	6	3	1	5	4	7	2	4	2	5	6	5	6	4	5	4	5	5	4	6	4	4
6	N	Y	168	2	5	7	5	4	6	7	4	7	6	6	2	6	4	4	7	6	7	6	6	6	4	4	7	4	6	6	4
	N	Y	298	5	3	6	3	3	6	7	5	6	5	6	6	4	4	4	6	6	4	5	6	6	3	4	4	2	5	4	6

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IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project, This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC F&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN. EDIT AND SAVE THIS DOCUMENT

STUDENT DATA & MASTER PROGRAMME

family name initials	Pylypko given name Yuliya	6306	Your master programme (only sel	ect the options that apply to you):
student number	5582350		2 nd non-IDE master:	
street & no.			individual programme:	(give date of approval)
zipcode & city	•		honours programme: Honou	rs Programme Master
country			specialisation / annotation: () Medisi	gn)
phone			Tech.	in Sustainable Design
email			() Entrep	eneurship)

SUPERVISORY TEAM **

** chair	Paul Hekkert	dept. / section:	
** mentor	Dr. Mílene Gonçalves	dept. / section:	
2 nd mentor			
	organisation:		
	city:	country:	
comments (optional)			



TUDelft

0 Second mentor only applies in case the assignment is hosted by an external organisation.

Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.



Procedural Checks - IDE Master Graduation

APPROVAL PROJECT BRIEF To be filled in by the chair of the supervisory team.

chair	Paul Hekkert	date	05	- 03
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CHECK STUDY PROGRESS

The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total:	27	EC
Of which, taking the conditional requirements nto account, can be part of the exam programme	27	EC
List of electives obtained before the third semester without approval of the BoE		

name	Robin den Braber	date	06	s

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- •

 Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)? 	Content: Procedure:	APPROVED APPROVED	NOT APPROVED
 Is the level of the project challenging enough for a MSc IDE graduating student? Is the project expected to be doable within 100 working days/20 weeks ? Does the composition of the supervisory team comply with the regulations and fit the assignment ? 	21 - 03 - 20) <u>23</u> signature	comments
IDE TU Delft - E&SA Department /// Graduation project brid	ef & study overvie	w /// 2018-01 v30	Page 2 of 7
Initials & Name Pylypko	6306	Student number <u>5582350</u>	
Title of Project	e designers		





To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.



Personal Project Brief - IDE Master Graduation

Deliberate mind-wandering for novice designers

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

14 - 02 - 2023 start date

06 - 07 - 2023 end date

INTRODUCTION **

What is mind-wandering?

Mind-wandering is generally understood as "a mental state with contents that are task-unrelated or stimulus-independent" (Christoff et al., 2016). Now, cognitive psychologists and neuroscientists think mind-wandering relies on those cyclic processes; 1) disengaging attention from the perception of the immediate environment (known as perceptual decoupling); 2) self-generation of thought. The contents of mind-wandering arise from episodic memory [the memory of everyday events] and affective processes [activation of mood states]; 3) the capacity to explicitly note the current contents of consciousness (known as meta-awareness) (Schooler et al., 2011).

What are the benefits of mind-wandering for creativity?

Previously deliberate and spontaneous mind-wandering were not separated, which created the perception of mind-wandering as an undesirable act reducing task performance (Seli et al., 2016). Recent research in cognitive psychology proved the benefits of deliberate MW for creativity, precisely incubation and ideation (Barnett & Kaufman, 2020). For instance, mind-wandering during a non-demanding task allows for incubation and therefore improved fluency in unusual uses tasks (Baird et al., 2012), Also, activities that allow mind-wandering increase flexibility (the number of switches between categories) in divergent thinking tasks (Yang, 2022), Deliberate mind-wandering is also affecting creativity non-directly and predicting higher self-judgement of one's past creative achievements (Agnoli et al., 2018). It is worth noting that the positive effects of mind-wandering are mainly linked to deliberate, but not spontaneous mind-wandering in the literature. The factor that differentiates those two types is the ability to act with awareness (one of the aspects of mindfulness). Therefore having control over unconscious thinking is beneficial for the creative process (Agnoli et al., 2018). The framework for how mind-wandering affects performance within one project and forms beliefs about the creative self is illustrated in figure 1.

When mind-wandering is beneficial?

There is a limitation to mind-wandering, Overly engaging in even deliberate MW can decrease creative achievements hampering the benefits of awareness (Agnoli et al., 2018). Therefore, designers should strategise when they want to receive the benefits of deliberate MW for incubation or divergent thinking and acquire a position to adaptively switch between mind-wandering, and other mental states (Gonçalves & Silva, 2023).

How mind-wandering can be stimulated?

Despite the potential benefits for creativity, there is a lack of concrete recipes for simulating deliberate mind-wandering (Gonçalves & Silva, 2023). That leads to a question: what interactions could facilitate the switch between various mental states for the benefit of creativity? I have mapped out activities where designers could encounter or stimulate mind-wandering; 1) habitual repetitive actions: walking, fidgeting; 2) experiences with the shifted perception of self: interpersonal resonance, guided fantasy, meditation; 3) experiences with altered states of consciousness (see figure 2). Some research in relation to embodied metaphors for interoceptive interactions was conducted in the field of HCI (Roquet & Sas, 2011), but it was tested within the context of meditation and not creativity. How mind-wandering can be trained?

Mind-wandering could be improved and turned from spontaneous to deliberate via training meta-awareness using meditation and or habituation of perceptual decoupling experiences. Unlike artists, industrial design engineers have fewer chances to encounter and train their metacognitive capacities (perceptual decoupling and awareness) (Shklovsky, 1917/2004, Thomson et al., 2009). Only a limited number of courses at TU Delft (for instance Introspective design) allow for becoming aware of own mental processes. Therefore, there is a potential for research on what experiences could support deliberateness through the habituation of mind-wandering of novice designers and allow for switching between various mental states within the context of the design process.

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IDE TU Delft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30				
Initials & Name	Pylypko	6306	Student number <u>5582350</u>	
Title of Project	Deliberate mind-wandering for r	novice designers		

Personal Project Brief - IDE Master Graduation

introduction (continued): space for images



DE TU Delft - E8	SA Department /// Graduation project brief	& study
nitials & Name	Pylypko	63
itle of Project	Deliberate mind-wandering for novice	designer

TUDelft

project title



Student number 5582350

Personal Project Brief - IDE Master Graduation



Personal Project Brief - IDE Master Graduation

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30. EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

Deliberate mind-wandering within the daily creative work of a designer will be the focus of the project.

The questions for research questions would guide the Research through Design inquiries:

RQ1 How could novice designers increase the deliberateness of mind–wandering to adaptively switch between their mental states?

RQ2 What type of experiences and corresponding interaction qualities can support deliberate MW within the context of the design process?

RQ3 What embodiment (tool) can support the experience of deliberate MW that is appropriate for novice designers? RQ4 How could designers better recognise their immediate needs within the design process and address them with a mind-wandering experience?

Within the scope of the project, I mainly plan to research individual creativity to test and validate insights, as controlling the impact of mind-wandering interventions for other factors in group creativity might lead to derailing from the RtD nature of the project. The ability to perceptually decouple, which MW relies on may be hindered, for instance, by a lack of trust in the group, which could eliminate otherwise beneficial research trajectories at the first stages. That's why the research will be of primarily focus on individual creativity, with a possibility of revering and applying the insights for group creativity at later stages.

More futuristic scenarios that rely on VR and AR technology I find to be outside of the scope, as the technology is still experienced as overly stimulating (Gong & Georgiev, 2020), which can prevent the self-regulation of attention. Also, insights from VR and AR experience may not directly translate to reality, and vice-versa therefore I have to set some limitations to the possible embodiments.

The findings from the project can be used by the possible stakeholder: TU Delft Teaching Lab.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed but in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for nstance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

With the research, I am to create a dedicated tool (a physical product) that is supporting the deliberate mind-wandering of novice designers. A mind-wandering tool could be embedded in familiar objects within the immediate reach of the designer at work. The product could incorporate tactile or other sensorial feedback to facilitate MW, which will be informed via acquired insights.

One of the requirements for a designed outcome is its appropriateness for becoming a routine for a novice designer. At the same time, the nature of the Research thought Design Methodology makes it more complicated to predict the trajectory of insights that can transform possible direction at the point of the brief writing.

Currently, relatively novel areas for interventions would be related to solutions that create conditions for habitual perceptual decoupling in the context of design work.

Existing solutions for mind-wandering are mainly focused on improving meta-awareness via mind-body connection and are formed as audio/video guidance with a supplementary object that supports observing own bodily sensations (Lindahl et al., 2013, Romans, 2023). Still, they are specifically not adapted for the creative process. Recent inquiries in soma-based design aiming for full-body experience (Höök et al., 2018) suggest that thermal feedback is a good attention guide and experiential metaphor for mind-wandering (Roquet & Sas, 2021). These similar sorts of feedback are used to support meditation, but also it works to decouple [dissociate] from the perception of self for mind-wandering.

Fidgeting tools are another category of physical product that designers involuntarily or voluntarily employ to facilitate mind-wandering and this topic was recently researched at TU Delft (Eichenlaub, 2022).

Therefore, there is still a potential to explore what forms of interactions and experiences with a physical object could support mind-wandering and are more appropriate to use within the design process.

IDE TU Delft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30				
Initials & Name	Pylypko	6306	Student number <u>5582350</u>	
Title of Project	Deliberate mind-wandering for n	ovice designers		

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date <u>14 - 2</u>	2 - 2023							
Dates	15-17.02	20-24	27-03	06-10	13-17	20-24	27-31	03-07
Calendar week	7	8	9	10	11	12	13	1
Project week	1	2	3	4	5	6	7	
Key dates								
Kickoff	14-Feb		1					
Midterm								
Green light								
Graduation								
Project								
Refining the scope								
User's recruitment								
Refining the aims and scope								
Exploration								
Literary research								-
Existing solutions research								
Autoethnography								
Projection								
RtD cycle one								
Evaluating interventions on self								
RtD cycle 2								
Evaluating interventions on users								
Synthesis								
Embodiment in final Intervention								
Final test with users								
Documentation							1	
Lit Research								
Midterm Report)					
Green light form			1					
Final Report								

The project will be based on two methodological approaches: Research thought Design and Introspective Design methods. Since the topic for the research is complex and ubiquitous, the iterative nature of the Research thought Design Process will help to improve a conceptual understanding of the mind-wandering via interventions, which would inform the consequent iterations.

Introspective methods which are widely recognized in experience design research allow using autobiographical and self-reflective methods to obtain valid information, otherwise not accessible with other more "objective" methods (Xue & Desmet, 2019). Introspective methods, like Experience Sampling or auto-ethnography, will be used both by a researcher as a part of a complete member of the user group (novice designer) and the user group itself. Since the subject matter of the project is related to cognition using auto-ethnographic reflections throughout all duration would be a beneficial source of tacit knowledge.

The Research through the Design process will be organized into stages: Analysis (exploration of the existing solutions and theory), Projection (rapid ideation and testing of the findings from designed interventions), and Synthesis (Validation of Insights via a conceptualised intervention). Some of the aspects of the approach are: – Literature research at the beginning of the project to gain an understanding of the juxtaposition of mind-wandering to the creative process and identify opportunities for designed interventions. –The choice of specific methods to validate and measure the effect of mind-wondering on creativity will be considered depending on the quality and nature of the insights gained via research. Self-reports of participants are being recognised as a reliable source for validation of the occurrence of mind-wandering (Barr et al., 2020), and will be used as part of the evaluations. To control the results for general propensity to mind-wander of the individual Daydreaming Frequency could be used (Singer & Antrobus, 1972, as cited in Singer, 1975).

IDE TU Delft - E8	SA Department /// Graduation project brief	& study
Initials & Name	Pylypko	63
Title of Proiect	Deliberate mind-wandering for novice of	designe



6 - 7 - 2023 end date

10-14	17-21	24-28	1-5	8-12	15-19	22-26	29-02	05-09	12-16	19-30	26-30	3-6.07
15	16	18	19	20	21	22	23	24	25	26	27	28
9	10	11	12	13	14	15	16	17	18	19	20	21
								1				
		25-Apr	2 days	off								
				-				08-Jun				
												06-Jul
								-				-
		-									-	-
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overview /// 2018-01 v30

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306 Student number <u>5582350</u>

ers

Personal Project Brief - IDE Master Graduation

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a

TUDelft

Competencies:

This project will serve as proof for two major competencies of introspective design practice and facilitation of creativity. The first one is in line with my previous research on the topic of improving introspection for designers that I have conducted within the Context and Conceptualization course. Also, within the Introspective Design course, I have gained experience on how to guide my introspection, but I did not have a chance to acquire experience on how to guide other people's introspection of their thought processes. I aim to acquire this competency within the project which is a user research skill.

I have been accustomed to and learned a mindset and skill of Research thought Design during the Exploring Interactions course, where I have gained expertise in designing experiences and accounting for the effect of affordances, and interaction qualities on the desired experience. The knowledge and practice for assessing the experience of nuanced emotional feedback I have gained from PUUE and UXAD. Moreover, the experiential qualities of MW are quite inaccessible that's why I will gain a more in-depth understanding of design for human experiences during this project.

During my internship at the creative agency Flatland, I have acquired practical skills and tacit practical knowledge of creative techniques and creative facilitation, establishing a non-judgemental atmosphere and facilitating a flow state in the group for creative problem-solving. Also, during my teaching assistant role for Connected Creativity Minor, I developed an understanding of the theory of creative facilitation, but I would like to gain more practical competencies in designing for the experience of creativity.

When designing embodied tool for mind-wandering I will be able to improve my conceptualising and prototyping skills to evoke a desired experience.

Ambitions

- The premise for this project is my conviction that designers, but also non-designers can reach a deeper knowledge of the world via knowing themselves.

- Working with this abstract non-tangible subject will help me to improve my communication and visual

representation skills, as these are competencies that I understand the importance of, but sometimes set aside.

- I wish to understand my mental processes and with the project aim to make my mind-wandering more deliberate. - This project reflects my ambitions to gain knowledge within the field of Cognitive and Creativity Psychology and

deepen my understanding of the phenomenology of consciousness.

- The project engages with internal interactions that reside within the mind and are non-observable from the perspective of the passerby, therefore it creates an additional challenge for the research.

- I would like to contribute my findings to the knowledge about creativity and practice of Deliberate Creativity.

- I would like to improve my introspective abilities and to introspect and facilitate others' introspection,
- I would like to deepen my skills in the evaluation and measurement of creativity.
- I aim to make creativity vastly available for everyone who is interested.

FINAL COMMENTS

Reference list is added as an Appendix

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nitials & Name	Pylypko	6306	Student number <u>5582350</u>	
itle of Project	Deliberate mind-wandering for	novice designers		



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Figures:

Figure 3: Snooze From "Snooze" 2023 (https://getsnooz. com/products/snooz-white-noise-machine),

Figure 4: Resonate From " Resonate" 2023 (https://www. weresonate.com); Figure 5: Core from "Hyperice" 2023 (https://hyperice.com/core-by-hyperice/),

Figure 6: Ayama From "Yanko Design", 2020 (https:// www.yankodesign.com/2020/10/28/this-award-winningbreathing-assistive-stone-expands-and-contracts-to-guideyour-meditation/)

Figure 7 Somneo Wake-up Animation From "Youtube", (https://www.youtube.com/watch?v=NB4RHJpHeHE),

Figure 8 Soma mat From "The Soma Mat and Breathing Light" by A. Ståhl et al., 2016, Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems. Copyright 2016 ACM Digital Library.

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Figure 14 Examples of self-generated and percpetually unguided in comparison to perceptually coupled thoughts. Image adapted from "The Science of Mind Wandering: Empirically Navigating the Stream of Consciousness," by J. Smallwood & J.W., Schooler, 2015, Annual Review of Psychology, 66, p486-518 (doi.org/10.1146/annurevpsych-010814-015331).

Figure15 Experimental setting for homogenisation (also called unstructured visual/auditory field). Image from "The Ganzfeld experience-A stably inducible altered state of consciousness: Effects of different auditory homogenizations" by T.T., Schmidt & J.C., Prein, 2019, PsyCh Journal, (10.1002/pchj.262).