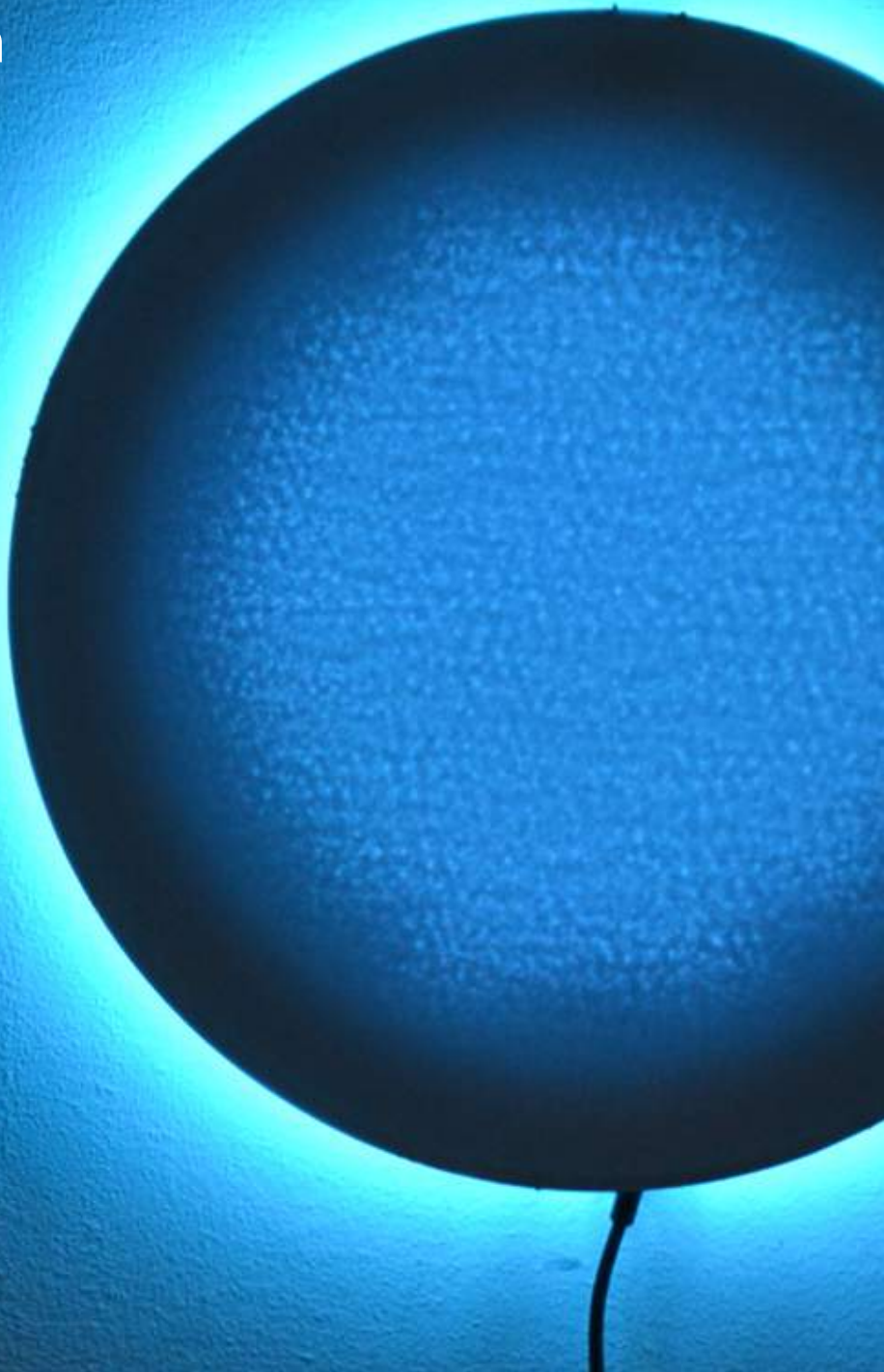
An exploration of light as a supportive medium for meditation



Prana
your luminous meditation assistant

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An exploration of light as a supportive medium for meditation

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Master Thesis

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Mindfulness [. . .] is not at all a 'mystical' state, beyond the ken and reach of the average person. It is, on the contrary, something quite simple and common, and very familiar to us. In its elementary manifestation, known under the term 'attention', it is one of the cardinal functions of consciousness without which there cannot be perception of any object at all."

Nyanaponika Thera (monk)

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This graduation thesis is a work done by myself, but without the support and advice of others I could not have done it. So, before I will dive into the project I would like to express my gratitude towards some people.

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Executive summary

This project is an exploration of light as a supportive medium for meditation. Light is a mysterious phenomenon and the possibilities are endless, which required a broad exploration of various elements and applications of light. With a design driven approach this exploration took many forms. Ranging from finding inspiration, sketching ideas and building prototypes.

However, to be able to steer the creative process towards a valuable end result a deep understanding about the experience, needs and requirements of the user had to be formed. This understanding grew over the course of the project by holding interviews and organising a generative session. Results from these activities resulted in a structured overview of how the meditation ritual someone could be supported.

Research revealed that the user needs help in three areas, the creation of a routine, a formal practice of meditation and the relationship the user has with the ritual. The user is helped by shaping the routine, visualising this routine and by receiving notifications to show it is time to meditate. In terms of practice, the user is supported by getting into the mood of the meditation, through focus support (to avoid being lost in thought too much) and by having a transition between the meditation session and everyday life. Lastly the relationship the user has with the ritual is strengthened by creating a moment of clear awareness during the day. During this intervention the user is able to take a moment out of everyday life and reflect on its state of mind.

Based on the created structure the creative process could be channeled towards a product. With a focus on the interaction and aesthetics it was possible to find a balance between the functionality and appeal of the product. This resulted in Prana, your luminous meditation assistant. A dynamic and interactive wall lamp with a focus on guiding a user in his or her meditation journey.

An evaluation of the product showed its potential to support a user through the meditation journey while providing an aesthetically pleasing experience that immerses you into the mysterious phenomenon of light. The simplicity of the product provides an intuitive interaction, while the complexity of the light effects take you into the moment.

Table of contents

1. *Introduction*

This chapter will serve as an introduction into the graduation project. I will give an introduction into the practice of meditation and how I think light can be beneficial to support this. Finally I will talk about the design driven approach where I will elaborate the steps I took towards finding a suitable application of light to support meditation.

1.1 Meditation

In 2017, after 1,5 years of working very hard for a Dreamteam project I took some time off. I went on a trip to South East Asia for three months, by myself. Only after 2 weeks into the trip I realized how exhausted I was from this project. I actually think I was close to a burn-out back then. Although I thought that I would not be a person to be burned out. But throughout the trip I started to realize that feeling good and feeling healthy is not always a given.

I was walking in the mountains of Annapurna (Himalayas) where the thought of taking better care for myself became stronger. During a hike I was talking to a guy about a Vipassana retreat, which he took part of some weeks before. Two weeks later I found myself at the entrance of a Vipassana retreat centre in Yangon, Myanmar (see figure 1) During this vipassana retreat I was asked to be silent for 10 days, no phone, no music, no snacks, just meditation. During these 10 days in silence I realized the power of meditation and how being silent observing your mind can give you an insight into your own thougths and feelings. The act of observing your experience in a non-judgemental way can be liberating.

I started with meditation before I went on the solo trip. But I never got the hang of it and it was very difficult to create a routine for myself. I used different sources, like Youtube or guided meditation apps, but I never got to the point where my motivation and knowledge about meditation made me do it in a consistent way. Only after taking part in the meditation retreat I realized how meditation could help me to become more grounded and to change my life in a structural way.

One of the reasons why I started this project is because I have developed a deep appreciation towards the meditation practice over the last years. I have seen how meditation has helped me to become a better person, to myself and to the world, and I want to share this powerful ritual with others. I know how difficult it can be to meditate and to create a ritual out of it, I also know how troubling thoughts, a racing mind and focus issues can make it difficult and less appealing to maintain a solid practice, but I know that for myself, it is 100% worth the effort, because it let's me live a happier life. This does not mean that meditating is easy for me, it will continue to take effort, but this effort will pay you back.

Figure 1 - Meditation hall in retreat Yangon

1.1.1 What is meditation?

Meditation is a training for your brain. According to the National (US) Center for Complementary and Integrative Health(NCCIH), meditation can be seen as a set of tools that aim to encourage an increased state of awareness and focussed attention, as well as a consciousness changing practice that has proven to be beneficial for psychological wellbeing.

Manuello, et al. (2016) found that the concepts of mindfulness and consciousness are intertwined. A bidimensional model describes the structure of consciousness. Consciousness is made up by the contents on the one hand, which consist of both external and internal awareness, and the level of arousal, which can range from coma to full alertness (also called wakefulness). External awareness contains everything we perceive through our senses, while internal awareness describes the thoughts which are independent of specific external stimuli. A visualisation of this bidimensional model can be found in figure 2 on the below.

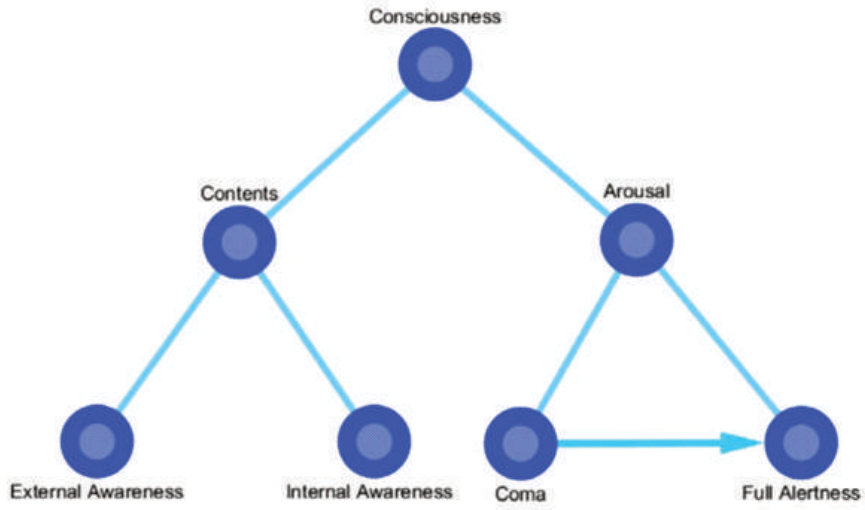

Figure 2 - Bi-dimensional model of consciousness

There are various ways to practice meditation, but they all share the fundamental aspect of "sati", a Pali word translated into English as "mindfulness"

- Awasthi (2012)

Mindfulness is this state of mind as the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment to moment.

- Jon Kabat-Zinn (2003)

1.1.2 Types of meditation

There are different ways to practice meditation, an overview of the most widespread techniques and principles is presented. Depending on the type of meditation that is practiced the meditator experiences a different effect.

Loving kindness (LK)
Loving kindness meditation, also called metta, is a type of meditation in which the meditator actively tries to stimulate feelings of love and compassion. The meditator will start to develop feelings of love and compassion for him/herself, gradually increasing to everyone and everything. By replacing negative associations with positive ones the meditator can change their perception of self and of the world around them (Lippelt, 2014).

Focussed attention (FA)
Focussed attention meditation is a meditation practice where the meditator voluntarily focusses on a specific object in a sustained fashion. This type of meditation can include various focus points, both physical and sensorial. Physical like pain, posture or the moving of the chest from breathing. Sensorial input, like hearing or seeing can also be used as a focus point.

In FA meditation the meditator trains his/her ability to sustain focus, but besides this sustained focus the meditator is thought to develop a threefold skill: A monitoring system that keeps an eye out for distraction without destabilizing the focus, the skill to disengage from a distracting object without further involvement and lastly the ability to redirect focus solely to the chosen object (Slagter, 2011).

Open presence
Open presence meditation, also called open awareness or non-dual meditation, is characterised by the meditator's non-reactive nature while constantly monitoring experience moment by moment, without focussing on the elements specifically and letting everything appear by itself. Lutz, et al (2007) describes OP meditation as inducing a phenomenal experience where the intentional structure involving the duality of object and subject is diminished, meaning that the meditator intentionally realises the non-dual nature of reality, seeing everything as the same.

According to Fucci, et al. (2014) open presence meditation aims to undo harmful cognitive and affective patterns through the realisation of their transient and constructed nature. OP styles of meditation are said to create a state of relaxed lucidity, with an increased salient and clear experience of perceptual phenomena.

1.2.3 The benefits of meditation

The practice of meditation can have a significant impact on your life, it has been researched increasingly and proves mental, physical and physiological benefits.

Physiological benefits
According to research from various parties mentioned by Sharma (2015) a collection of health benefits associated with the practice of meditation are confirmed. These findings include stress reduction, decreased anxiety and depression, reduction in pain (both physical and psychological), improved memory and increased efficiency. There are also many physiological benefits mentioned such as reduced blood pressure, heart rate, decreased metabolism, breathing patterns and oxygen utilization.

Emotional benefit
Meditation is said to influence the emotional processing of both positive and negative stimuli. The amygdala plays a prominent role in the processing of emotional stimuli. In work from Desbordes, et al. (2012) previous studies are mentioned which showed that meditation can decrease the amygdala activation. This means that a person in a meditative state will have a decreased emotional reaction to negative or positive triggers, for both expert and beginner meditators. Desbordes, et al (2012) found a longitudinal decrease in the amygdala response for meditators that took part in a 8 week mindful-attention meditation training. These findings suggest that meditation can cause enduring changes in mental function, meaning that the things learned can be transferred to non-meditative states.

Meditation is a mind and body practice that has a long history of use for increasing calmness and physical relaxation, improving psychological balance, coping with illness, and enhancing overall health and well-being. Mind and body practices focus on the interactions among the brain, mind, body, and behavior (NCCIH, 2016).

Process specific learning
Learning is often specific, trained to do a certain task or to react to a specific stimuli. However, systematic mental training, such as meditation, can induce a different kind of learning. This learning is called process-specific learning. The focus of enhancing core cognitive processes, as well as some generic characteristics of meditation may be responsible for this process specific learning. This kind of learning does not only improve the trained task, but transfers to new tasks and domains (Slagter, 2011). This process specific learning means that the person will be able to adapt to new problems and challenges more easily, possibly leading to a more relaxed life.

1.1.3 The power of breath

One of the elements on the basis of meditation, and yogic practices, is the breath. Focussing on the breath can bring a sense of bodily and mental clarity as well as a sense of relaxation. Once applied properly the breath is very powerful. The breath is always present, so if used in the right way, you will have a powerful tool at hand.

Slow breathing

One of the ways to use the breath for relaxation purposes is slow breathing. Slow breathing techniques, which describes a respiration rate of 6 breaths/ minute, has been proven to have psychophysiological benefits. A systematic review by Zaccaro, et al. (2018) shows that the effects of slow breathing techniques cover autonomic and central nervous systems as well as the psychological status. Psychological or behavioural outputs related to the physiological changes during slow breathing are: increased comfort, relaxation, pleasantness, vigour and alertness besides a reduced symptoms of arousal, anxiety, depression, anger and confusion.

Train awareness

Being aware of once breath can bring physical and mental awareness. Therefore bringing the awareness to the breath can be helpful in reflecting about ones state of mind, providing an option for action. If this awareness is trained over a sustained period of time this can grow the consciousness of ones body and mind.

1.2 Meditation and light

Light is something mysterious and pure, it connects us to the world by making the world visible, but it also defines a big part of our physiological functions, making it an important element for our health. Light is something that is hard to explain or define, but it is very powerful. Powerful to communicate messages or meaning, but also to set the mood for a certain event. Unconsciously light can tell you something, something that is difficult to explain in words or feelings.

From my own experience many people are not open towards meditation. Meditation is seen as a practice that is related to Eastern culture or spirituality, but in fact meditation is a practice that is very natural and simple in its core.

I think this position towards meditation has to do with the fact that people don't know what the practice entails, not knowing how to practice meditation. Besides, meditation can be experienced as challenging because sitting down to meditate with a constantly wandering mind can be confronting and irritating.

Especially when someone is starting with the practice of meditation it can feel like you are going nowhere and are lost in the process of meditation.

I think light can be beneficial to support someone in and around meditation for the following reasons:

Provide guidance with light
Because people can feel lost in the process of meditation I think light can be beneficial. Light is able to convey a message which can provide guidance throughout the process.

Make meditation more appealing
I think light can be used to support an open attitude towards meditation. By making meditation more appealing, the user can feel encouraged to practice meditation. Additionally, light can be used to prime someone for a meditation session by providing the right environment to start a session.

Light can bring you into the moment
Light has immersive qualities that can be harvested. If light is applied in the right way it can grab your attention and bring you into the moment. Grabbing your attention can bring a sense of relaxation and peace of mind.

1.2.1 Perception based lighting

Conventionally light has been described with a quantitative approach, solely looking at readability and visibility. This does not fit to the approach of the project, as qualitative qualities of light are not included. The approach I have chosen is called the qualitative or perception based lighting design. This approach is based on the framework Richard Kelly (1952) came up with. He describes light based on the spatial qualities, resembling both the optical and perceptual description of light. Kelly's framework, of which a lighting plan can be constructed, consists of three spatially defined types: Ambient luminescence, Focal glow and Brilliance (figure 3,4 & 5). Descriptions of the types of light are derived from the Erco Handbook of lighting design (Ganslandt & Hoffmann, 1992).

Ambient
Ambient light provides general illumination, making people and objects visible, providing orientation and activity. This lighting type is most related to the quantitative lighting design, but its purpose is not to produce blanket illumination, it functions as a base layer of the total lighting plan.

Focal Glow
Focal glow, also called focus, is the second form of light described by Kelly. This type of light is given the task of actively helping to convey information. Areas that are brightly lit automatically draw our attention. This feature can thus be used to steer focus and to nudge certain behaviour (e.g. entrances of buildings are often lit up so people are automatically attracted by it). This type of light gives certain control over the flow of information.

Brilliance
The third form of light, brilliance, came from the insight that light can not just be used to convey information, but it can represent information in itself. Brilliance can add life and ambiance to an environment. Brilliance can both describe the light source as well as the lit up area, it is also called texture light.

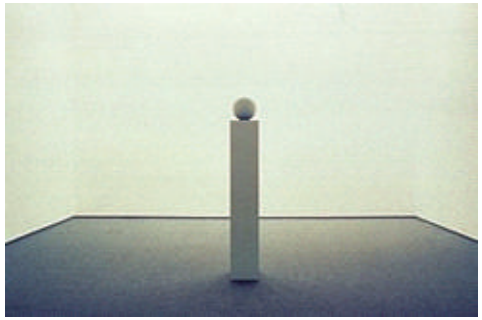
Figure 3 - Example of ambient lighting

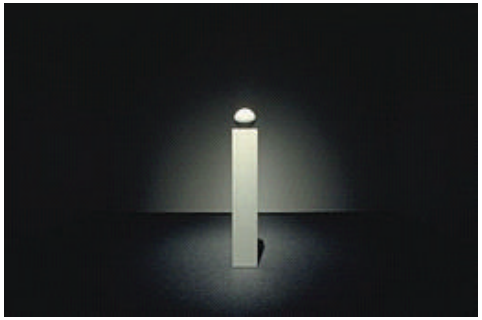
Figure 4 - Example of focussed lighting

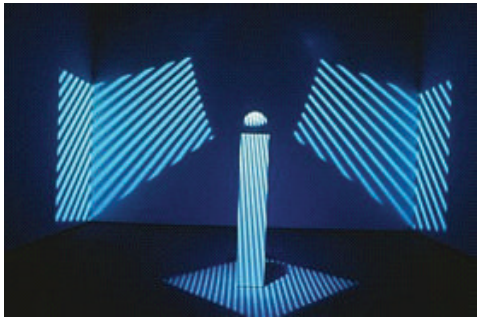
Figure 5 - Example of brilliance lighting

1.2.2 Emotion, appearance and atmosphere

Light is powerful when it comes to setting a certain mood or changing people's perception of a space. But the characteristics and properties of light don't have the same meaning for everyone. One example of this is colour, in specific the psychology of colour. Information on colour psychology, and colour therapy, has been growing over the years. Articles in mass media or a variety of web pages often focus on colour and its psychological, biological and behavioural effects, but should be taken with a grain of salt. O,Connor (2009) stated that empirical evidence or any evidence at all is rarely cited, and when it is cited it is outdated or inappropriately generalized. Although work in colour psychology seems applicable and interesting to apply in the project it should be viewed with healthy scepticism. The psychological effects of colour range widely across cultures, gender and even individuals, therefore there is no clear guideline on how to use the various colours.

In the Handbook of experimental phenomenology, by Albertazzi (2013), a lot of attention went into the visual perception of shape, space and appearance. Visual appearances are naturally shaped with meaning because of the qualitative characteristics of the visual appearance and their relation to the subject. Light is a visual appearance and when designing an artificial agent with light it is important to understand the subjective experience you want to design for and to play with it.

Desired atmosphere

The information presented on this page basically shows that you cannot just choose a specific colour or a combination of light beams to generate the preferred effect in the viewer. In order to design a light with a specific effect you need to understand the context you are designing for. When the context is understood I can define the atmosphere. Light is a very subjective experience and this may vary between individuals, therefore I need to understand what the needs are for the atmosphere.

1.3 Project's objective and approach

The goal of this project, as stated in the project brief, was to explore light as a supportive medium for meditation. Research into meditation and light gave direction to objective I gave myself in the project but to be able to find a suitable solution of light in meditation I need to dive a bit deeper. This part of the chapter will describe how I did this.

Design driven approach
Because light is such a complex phenomenon, a broad exploration is necessary to see possible applications of light that are feasible within the context. Therefore a design driven approach is chosen, to give emphasis to the explorative nature of the project.

Atmosphere and appearance
A way to find a suitable application of light can be seen in the appearance & atmosphere circle. This circle, see figure 6, as presented by Pont, S.C. (2019) shows a circular process that shifts between the technological and spatial qualities of light and the physiological effects in the human. This shows there needs to be a constant iteration between these elements to find the optimal solution.

Understanding the user and their practice
Before I can understand what type of light effects will be feasible with meditation I need to dive into the mind of the user. I need to understand the difficulties and distractions people have during around meditation, as well as the motivations and organisation behind the practice.

Emotionally loaded
Besides the more functional look at the requirements of the light I need to take a look into the emotional needs of the user regarding meditation.

Interactions
Meditation is a dynamic process and requires a dynamic view on the practice and the integration of the practice in ones life as meditation cannot be seen as separate from the other activities in life. The interaction with the artefact should fit to the dynamic nature of the ritual.

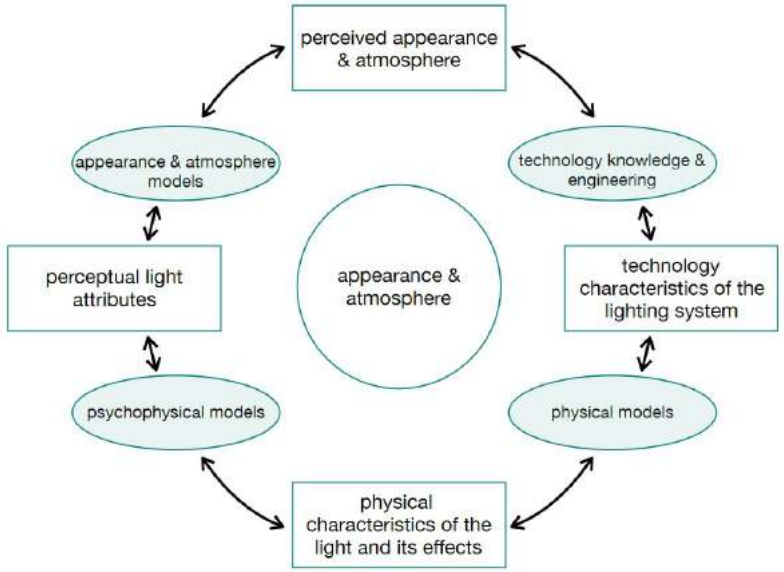

Figure 6 - Appearance & atmosphere circle

To clarify the approach taken in this project you can take a look at the visual in figure 7. This visual shows how the begin of the project, consisting of the user and literature research and light explorations, was parallel in nature. Once the concept vision and requirements were set up the final concept could be designed which was embodied in a final prototype. This final concept was tested and finally recommendations were made for the improvement of the concept.

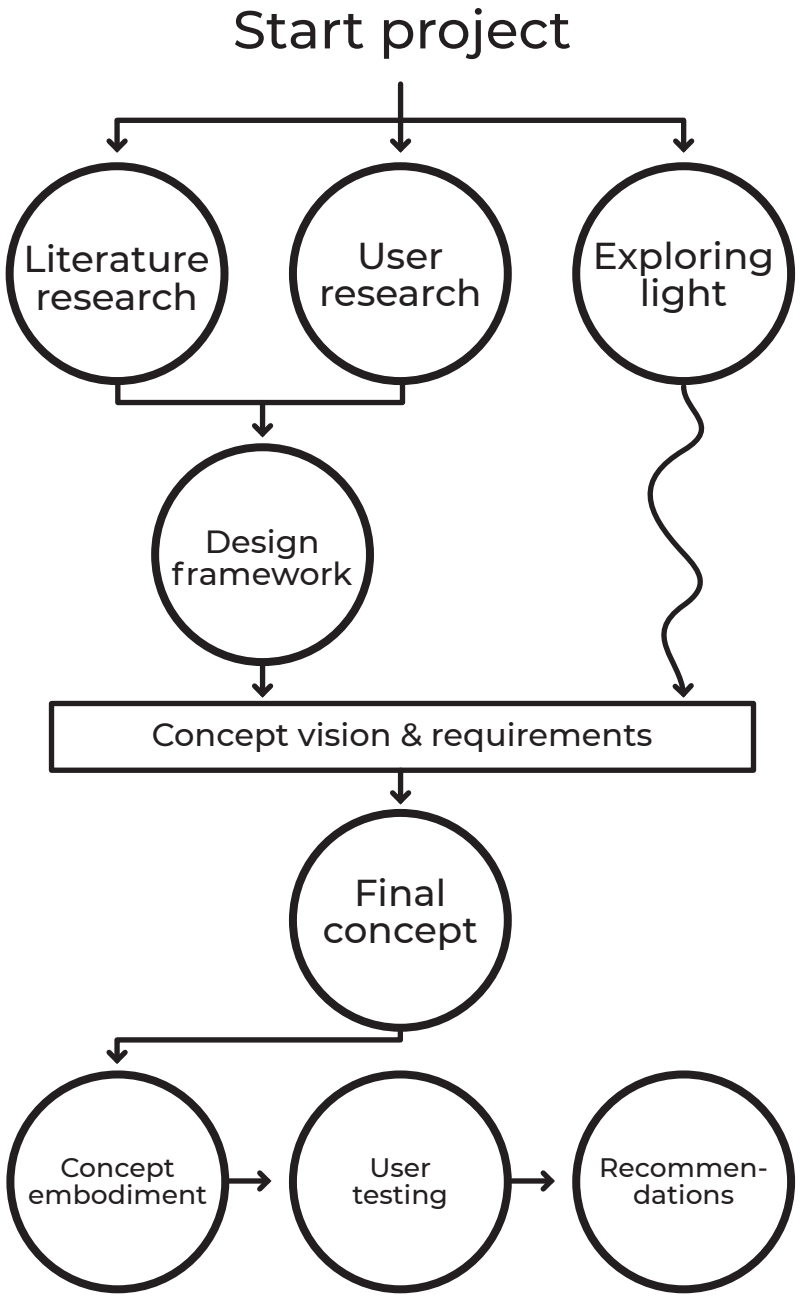

Figure 7 - Approach of the project

2. *Experience of Meditation*

Before I can start designing a light that supports someone in his/her meditation I need to understand the experience people have around their meditation ritual. To investigate the experience around meditation I have performed qualitative interviews and lead a creative session.

The interviews provided me with insights of the different ways people meditated, the difficulties they had around meditation and what possible applications of light in their experience were possible.

The creative sessions gave me a deeper insight into the flow and experiential qualities that appear during a meditation session. In addition the creative session provided me with inspiration about possible applications of light in a conceptualised manner.

The insights from this chapter were concluded into a framework. This framework creates an overview of the areas in which I can suppor people in their meditation ritual.

2.1 Interviewing meditators

Whenever I talk to people about meditation I realize that there are differences between both the experience as well as the preferences of a meditation session. Often people tend to apply a type of meditation that is familiar to them, for me this is nothing different. So instead of trying to imagine how people would prefer to be supported in their meditation it is important that I understand these differences between people and their meditation.

In total 12 interviews were held with people that meditate. Both inexperienced as well as longer-term meditators were interviewed. The participants were mostly in their twenties and one participant was 61 years old. The interviews were held both online (through Zoom) as well as in person and took about 30 to 60 minutes.

The topics that were discussed ranged from the way people set up their meditation, the motivation behind meditating and questions regarding distraction and possible light applications. The data from the interviews was recorded both in a interview template (Word document) as well as through an audio file (for later reference). The full interview template can be found in appendix 2.

Analysis

To analyse the data of the interviews I went through the templates and selected the most interesting elements. These elements were then written on Post-It notes. All of the post it notes were then placed on a desk in order to have an overview of the collected data. See figure 8 for an impression of the amount of data collected.

Later the Post-it notes were clustered in themes. This made it possible to see certain patterns in the behaviour of the meditators as well as important aspects or inspiration that were more or less generelizable. The findings from this analysis can be found on the next page.

Figure 8 - Desk filled with post its for analysis of the interview

2.1.1 Findings interviews

In total eight clusters were formed. From these eight clusters the most valuable findings are presented on this page.

Meditation is very personal and preferences differ between the types of meditation practiced as well as how an individual wants to be supported in their meditation.

Guided meditation is appreciated as it provides guidance and insight into the practice and serves as a motivation to keep practicing.

The physical presence of a meditation related product or the easy accessibility to a meditation session can help to **motivate** to start a meditation session.

Integrating meditation into your everyday life is difficult, **supporting the habit formation** can help to build a routine. This can be done through visualising the habit, practice reminders or motivation through information providing.

Sound distracted the most during meditation besides ruminating, while vision was not clearly visible by many.

Having **the right atmosphere** can have various benefits and can be created in different ways, amoungst others:

- A calming environment can invite you to be mindful, think of a sunset, possibly with calming sounds.
- Purity of experience, with minimal distractions, solely focussing on the internal experience.
- A stimulation that helps you to stay focused during a meditation session. This can be done through different senses.

Various ways of using **light** in meditation was proposed:

- Setting the scene for a meditation session
- Guided light to help you focus, to calm down or to support switching between two types of meditation.
- Providing direct feedback through bio-data, reflecting your current state of being.
- Light nudging you into meditation (e.g. a light pointing at your meditation spot.

2.2 Generative session

While talking to people about meditation I realized that there are many different preferences and activities that shape someones meditation ritual. This is no surprise for me, but it confirms the fact that we are all very different, physically, mentally and emotionally. The fact that meditation is experienced so differently between people confirms this. In order to design something that supports a person in their meditation it is important to see the differences between people, but the similarities are essential as well.

To understand better how people experience meditation I have held a creative session with five meditators. Interviews give away valuable information, but this session I wanted to be more explorative and expressive as meditation can be a very personal and emotional experience. I believe that through creative expression you can come closer to your feelings and emotions regarding an experience.

The generative session was based on the contextmapping structure as described by Visser, et al. (2005). Their work states that contextmapping can be used by researchers and designers to gain deeper insight into the needs and dreams of prospective users of new products. An overview of the three stages of the generative session can be found in figure 9

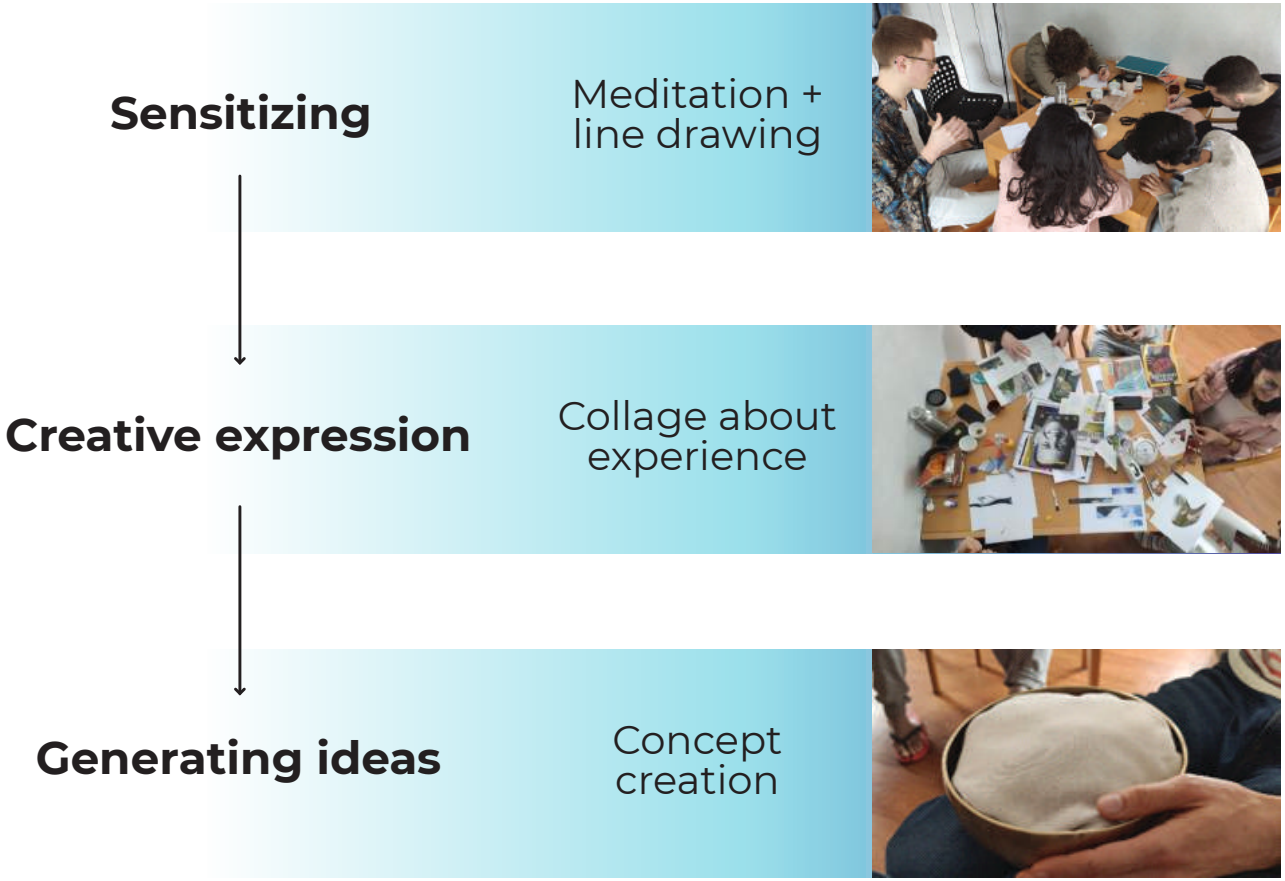

Figure 9 - Process of the generative session

2.2.1 Results of the generative session

The generative session resulted in some interesting insights. Both in terms of insight into the mind of the meditator as well as inspiration for the concept development phase. Besides the functional elements the session lead to beautiful drawings and collages of each of the participants, see figure 12.

The line drawing and the collage helped me to gain insight into the mind of the meditator. Showing the changing experience over the duration of the meditation as well as a peak into the challenges experienced during the meditation.

However the conceptualising activity was more difficult for the participants as possible directions were not defined which did not gave any focus for the participants. After some guidance by providing possible concept directions the participants were able to come up with two valuable concepts.

In Appendix 3 you can find an elaborate explanation of the developed concepts as well as an overview of the six created line drawings and the collages.

Conclusion

The generative session showed me that the product should have value besides solely supporting meditation, an example of this is the added sensory experience of the product. Another example of this added value can be found in personalisation. In one of the concepts, see figure 11, this personalisation is achieved through a natural product, that has a unique pattern, which makes the product personal as it is the only existing product with this exact pattern.

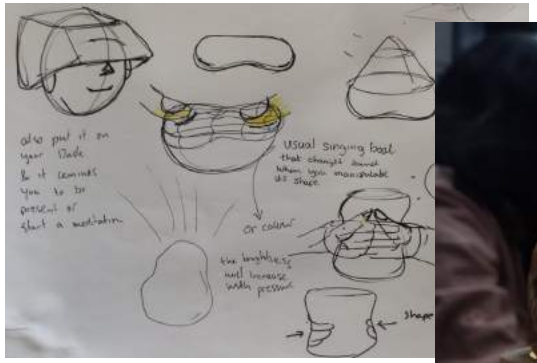

Figure 10 - Sketches made during the idea generating phase

Figure 11 - Personalised meditation stone

Figure 12 - Line drawing and collage

2.3 Conclusion: structured overview

To conclude this chapter I will to present a framework that gives an overview of ways I can have an influence on the experience people have around meditation. In stead of solely focussing on the experience during a meditation session, this framework takes a larger scope and takes into account the ritual of meditation. In stead of seeing meditation as something separate from your life, I tried to see how meditation is / can be entangled in your life.

Supporting someone in their meditation journey can be done in a couple of ways. Figure 13 shows how the meditation ritual can be supported in three ways:

- **Routine support**
  Helping to shape a routine, notifying when it is time to meditate or visualising the current routine can help to build a routine out of the meditation practice.

- **The practice of meditation**
  To support a meditation session a transition into the practice can help to get into the mood, as well as a sort of closing session back to everyday life can help to conclude the session. While during meditation support to stay focussed can improve the quality of the session.

- **Connection meditation to everyday life**
  By triggering a clear moment of awareness that is outside of a defined meditation session a meditator can be supported to integrate meditation into everyday life.

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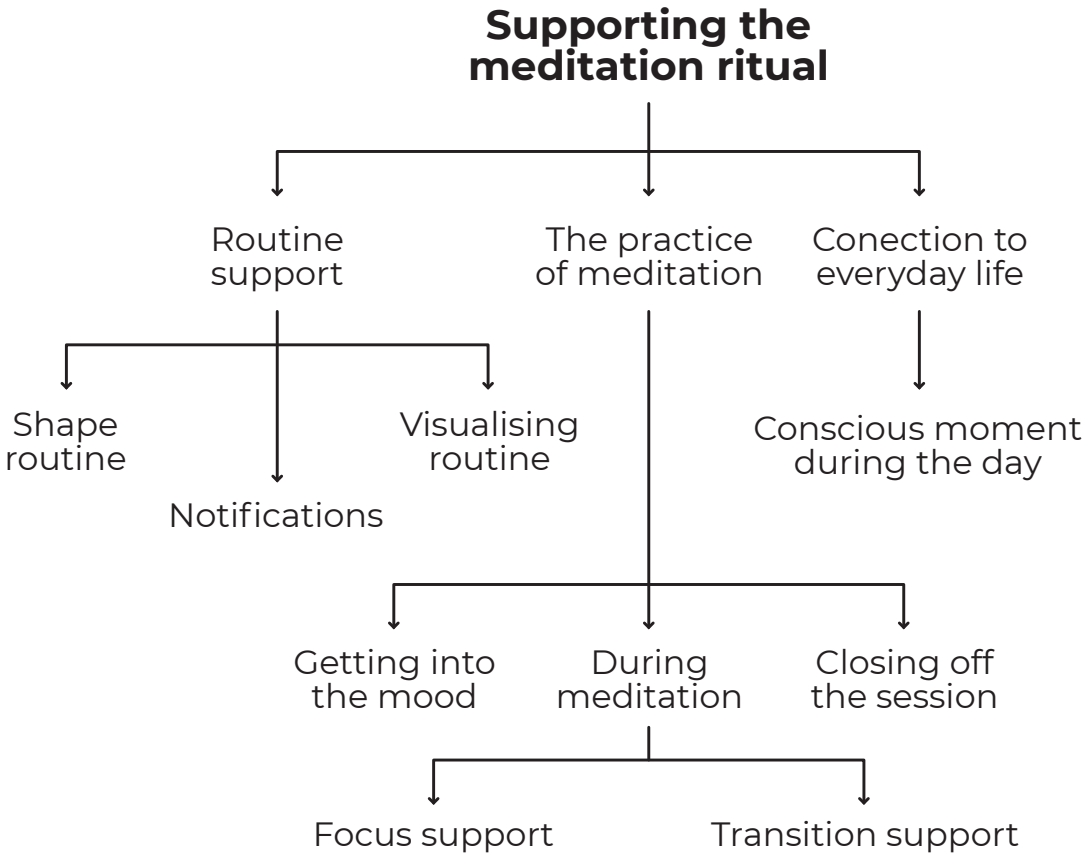


Figure 13 - Structured overview of meditation ritual support

Simple and personal
Besides the ways to support the meditation ritual, the product should fit to the meditation ritual. Therefore the interaction with the device should be simple and because meditators have such personal preferences the user should be able to personalise the experience of the product.

Easy accessibility
Starting a meditation is often the biggest hurdle of the practice. Once the meditation is initiated and the person is sitting down then it is not an issue to finish the session. Therefore it is crucial that meditation becomes easy accessible. Important is to look into the interaction to initiate a session as this is the first impresssion of the process.

"Every facet, every department of your mind, is to be programmed by you. And unless you assume your rightful responsibility, and begin to program your own mind, the world will program it for you."

Jack Kornfield, The Roots of Buddhist Psychology

3. *Role of technology*

Light is the medium that I am gonna use, but this light is emitted and controlled by a product. Meditation is a super personal and sensitive topic, therefore the role of the technology has to be critically defined.

Interactive technology is playing a significant role in our lives, with current technologies the products are becoming smarter and smarter. I want to make use of this technology, to make something that supports the user in his/her needs while fitting to the practice of meditation. So how can I support the user by designing an interactive product.

3.1 Companion technology

Technology is playing an increasing role in our lives and as technology behind interactive products is improving this opens up possibilities of interaction with these products. Products can take up a certain behaviour that is similar to human behaviour, this means that the relationship we have with these products also changes. In this chapter I will elaborate this relationship. The products described are called companions, this describes the way the product plays a role in your life, it becomes a companion, a friend.

Interactive artefacts are becoming more and more intertwined in our daily lives. In order to benefit from these artefacts it is important that they assume the right role in our life and contribute to our wellbeing. Work from Niess, J. and Wozniak, P.W. (2020) proposes the term companion technology as a metaphor for the interaction with the artefacts that evokes empathy in the user. Humans can experience not just a bond with another person, they can also experience a bond or relationship with a product. An essential element of a satisfactory relationship with someone or a product is empathy.

In order to be able to define the role of the technology we must understand how a companion technology can be shaped. The interactive product will assume a role, this role can be seen as a character. A companion technology is build up of four characteristics: pragmatic, hedonic, eudaimonic and empathetic. Then the question arises, how can we shape these characteristics?

Figure 14 - Streetart about empathy

3.1.1 Product characteristics

Hassenzahl (2003) and Mekler and Hornbaek (2016) have stated three product characteristics that shape the products' character which can have emotional consequences of the user (e.g. joy).

Pragmatic

Instrumental product quality that encompasses aspects like utility, usability, efficiency and usefulness.

Hedonic

Non-instrumental product characteristics that encompass aspects such as aesthetic appeal, fun stimulation and joy.

Eudaimonic

Qualities that are characterised through striving towards personal growth, a focus on self-development and personal goals.

3.1.2 Empathetic qualities

The work from Wozniak and Niess (2020) extends on the work of Hassenzahl (2003) and Mekler & Hornbaek (2016). They introduce the empathetic experience of a product to the already defined qualities mentioned by Hassenzahl, Mekler and Hornbaek.

Important to mention about the work from Wozniak and Niess is their focus on the felt experience of the companion technology. They don't focus on the functionality or technological characteristics. Their focus lays in the social aspects of the interactive artefacts.

Four concepts are defined, which are synthesized from philosophical work, that help to identify empathetic qualities in technology. These qualities are complementary to the already mentioned pragmatic, hedonic and eudaimonic qualities. On the right you see these four concepts.

Minded

the artefact can be achieved empathetically if a companion technology produces a sense of wonder because of the need of users to understand its mind.

Feeling experience

Being part of the feeling experience of the technology. Meaning that the user is expecting the technology to act upon the feeling experience (object-oriented and sense-oriented) of both the user and the technology.

Reflective

The technology is able to reflect about the user's behaviour. This can lead to the user learning about him/herself.

Social significance

The technology needs to be perceived as significant. As the technology is integrated in the everyday life of the user, the user intentionally ascribes meaning to the actions of the object and gives significance to these actions.

3.2 What role will the technology play?

The role of the technology will play a crucial role in how succesful the product will be in reaching its goal. I think the role of companion technology will be very suitable for supporting meditation because this is a sensitive topic. I think that if the technology takes on an empathetic role towards the user that this can make the user be more open towards the challenges to come. To facilitate this role I want to design a consumer product as I think this is the way to have an influence on the behaviour and experience of the user. However the product should be experienced as accesible and supportive to facilitate the necessary support in the user's meditation ritual.

Functional
The product needs to be pragmatic. There are some clear needs from the user's side that need to be adressed that can be fulfilled through functional aspects of the product.

Appealing
Besides practical the product needs to have hedonic qualities. Being aesthetically pleasing not just for the sake of beauty, but also to create interest in the mind of the user towards the ritual of meditation.

Personal growth
That the product should support personal growth through eudaimonic qualities is no surprise. Supporting the user to grow as a person is eventually the goal of meditation. But the product should support the journey of the individual. Therefore it plays a socially significant role.

Communicating to the user
The device has to give the user a sense of being minded. The product should trigger a sense of wonder in the user's mind so the user is involved in the product.

Unconsciously reflecting on the practice
The device should let the user relfect on the practice of meditation. Important here is that this reflection should feel open-minded and not forced towards the user, because this will have a counteractive effect as the user can feel judged.

Connecting to the users needs
The user is expecting that the device will be fitting to his or her feeling experience. Meaning that the device is adapted to the users needs and wishes.

4. *Exploring the light*

Like I said earlier, in order to find a suitable way of applying light I need to explore light. In this chapter I will dive into the various ways I have explored the light. From ideation, to inspiration, towards making the light (prototyping).

Through the process I learned a lot about the possibilities of light. A breakthrough in the project happened when I let go of my focus on functionality and started to feel the artist that was present in myself.

4.1 How did I explore the light?

The possibilities of light are endless. During the course of the project I have used various methods to explore the possibilities of light. Digital iteration as well as ideation on paper gave direction to the ideas I had about light. To further fuel the ideas I had in mind I tried to open up myself to the beautiful art and light concepts that are already developed. In this chapter I aim to provide you with a glimpse of how I saw the light through an iterative process and the light and artworks that inspired my project.

Ideating and concept development
During the creative processs of ideating and concept development I have used different tools. These tools ranged from sketching on paper to a digital sketching on my computer. The focus of this creative process was on functional as well as aesthetic elements.

Inspiration
To fuel the creative process a lot of inspiration was sought through various sources (like Pinterest and Youtube). Playing with lights or light affecting objects helped to shape my fantasy about light. Another inspiration was James Turrell, a designer with an interesting view and usage of light, who stuck with me throughout the project.

Prototyping
A big aspect of the project were the prototype explorations. These explorations helped me to find relevant applications of light and to be even more inspired about the possibilities and beaty of this mysterious phenomenon.

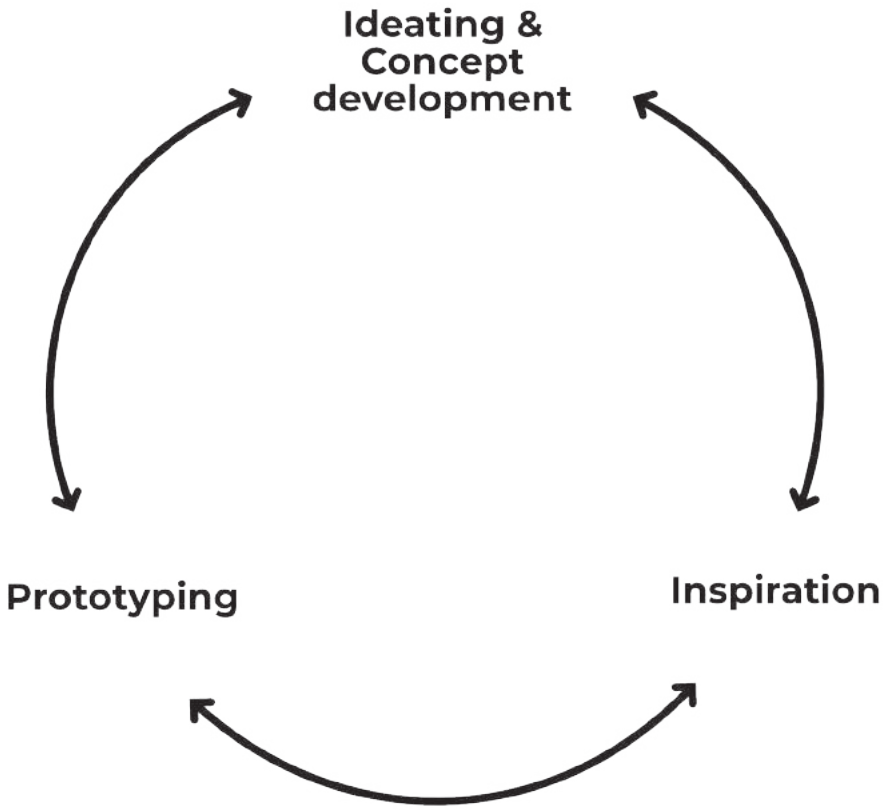


Figure 15 - The circular creative process of this project

4.2 Ideation & concept development

From the beginning of the project possible directions and applications of light have been explored. A notebook was used to dump the widespread ideas of possible applications of light. To add a sense of how the lights would look colour pencils were used. This added a sense of liveliness to the sketches and supported the imagination to the drawings.

In the first half of the project there was no clear focus on what the lights were going to look like. All ideas that popped up were dumped on the paper to facilitate an open mind towards the possibilities. Later, when the direction was more defined the ideas were more focussed on specific light effects and the interactions with the designed artefact.

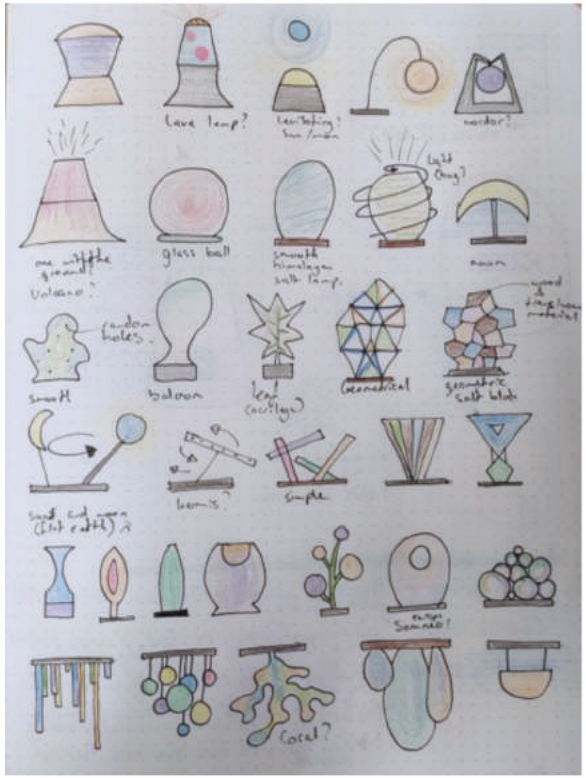


Figure 16 - Sketches of different lamps

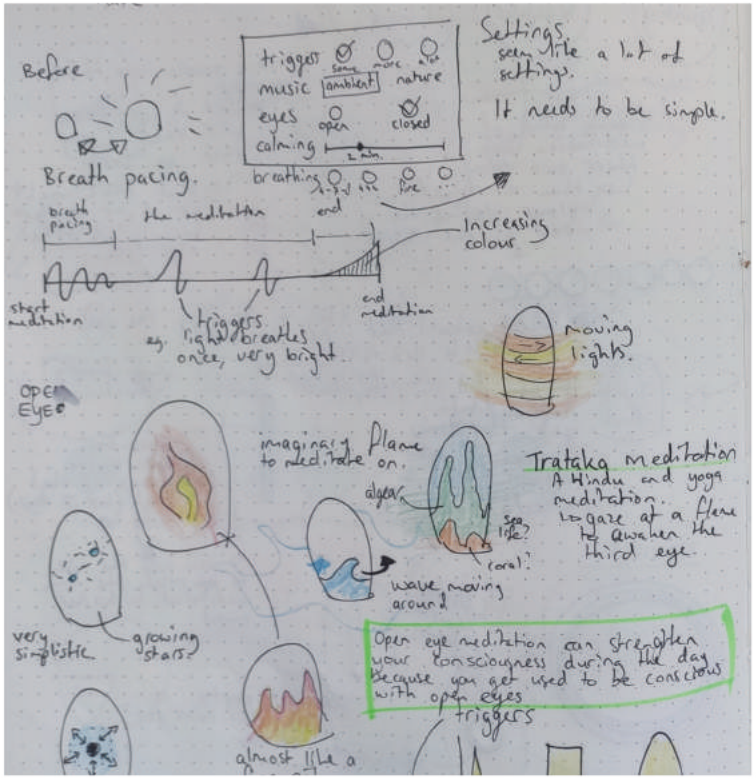


Figure 17 - Sketches of possible lights during meditation

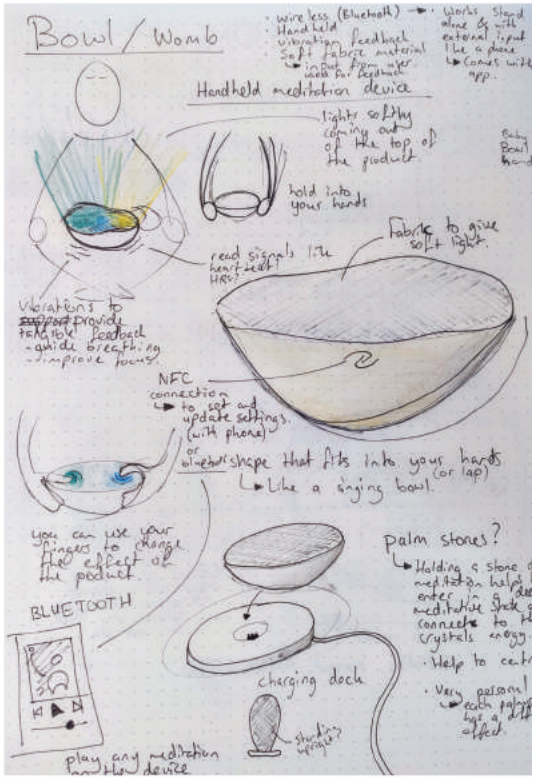


Figure 18 - Sketch of a handheld device concept

Turning point

A turning point in the ideation process came when I decided that to stress the inner artist. Before this turning point the focus of the sketches was mostly focussed on the functional aspects of the ideas, while from the turning point on I started to draw ideas from my feeling. This resulted in much more sensitive and abstract creations. This abstract view fueled the creation of a more immersive concept that lead to the final design.

Figure 19 - Abstract drawing of light screen

Figure 20 - Abstract drawings of natural scenes

Figure 21 - Abstract drawing

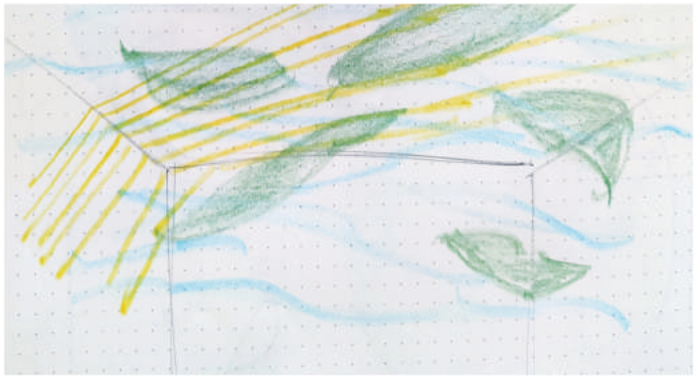


Figure 22 - Drawing op light projections

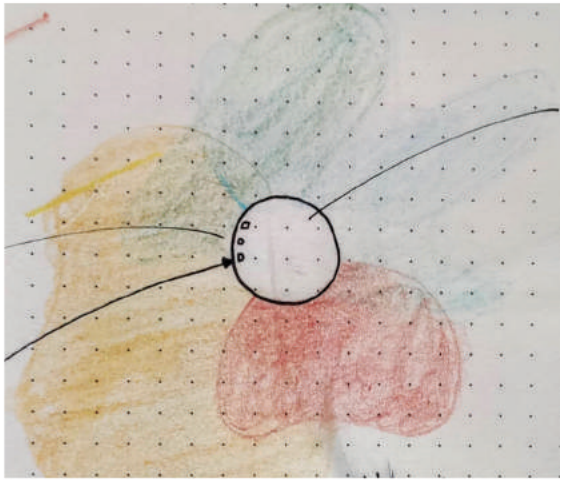


Figure 23 - First drawing that lead to the final concept

4.2.1 Digital ideation

Besides the physical drawing a lot of creative thinkering was spent in a digital environment. Using Affinity Designer (similar to Illustrator) gave the me the freedom to play with colour mixing, easily using patterns and gradients and playing with opacity of objects.

Another benefit of working with this program was that the iterative process got boosted, because if an illustration is already made it is easy to copy it and to make adjustmets. Therefore the development of the idea gets boosted tremendously.

Figure 24 till 26 show some of the ideas that were worked out in the program. On the next page you see two examples of the development of the ideas, showing the creative development of the concepts.

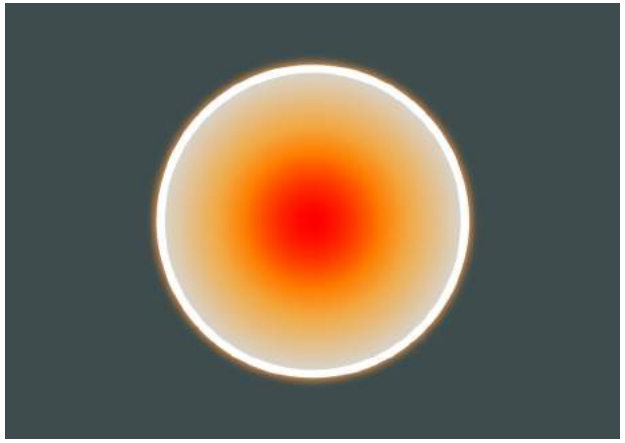


Figure 24 - Digital illustration of a blurred lamp

Figure 25 - Digital illustration of a lamp showing “NOW”

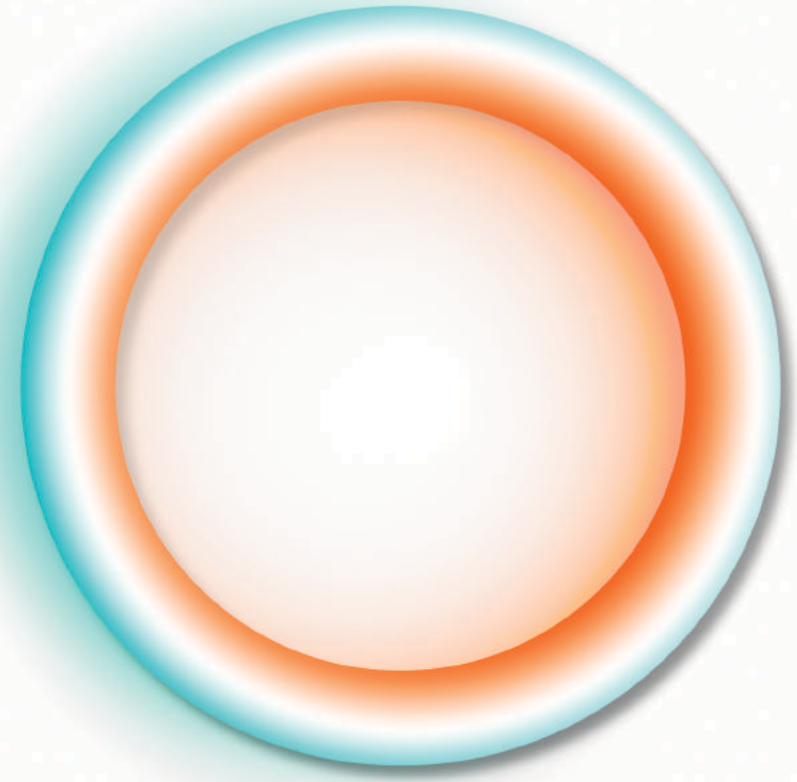


Figure 26 - Digital illustration of circular lamp artwork

Figure 27 - Process of digital iterative thinkering

Figure 28 - Process of digital iterative thinkering

4.3 Getting inspired

Pinterest is full of inspiring images and videos. Throughout the course of the project images and videos have been gathered from a wide range of artists and designers. An overview of the inspirations can be found on the next page in figure 30.

A collection of digital artworks, real life lamps, projections and light installations were gathered. A theme that often came back is that the light or colour in the images creates a sense of depth, a sort of void is created. During the prototyping phase (see chapter 6) a concept was made that represented this same sense of depth or void. This void effect stayed with me over the course of the project.

James Turrell

A big inspiration for me was James Turrell. James Turrell is an artist from the United States who works a lot with lighting installations. Nowadays he often uses daylight but he used to works a lot with artificial light and light projections. The often sculptural and geometric shapes create a sense of depth and deform perspective. I think the light installations from James Turrell often have an immersive effect which can be experienced as meditative. Figure 29 shows one of the works of James, called Breathing lights.

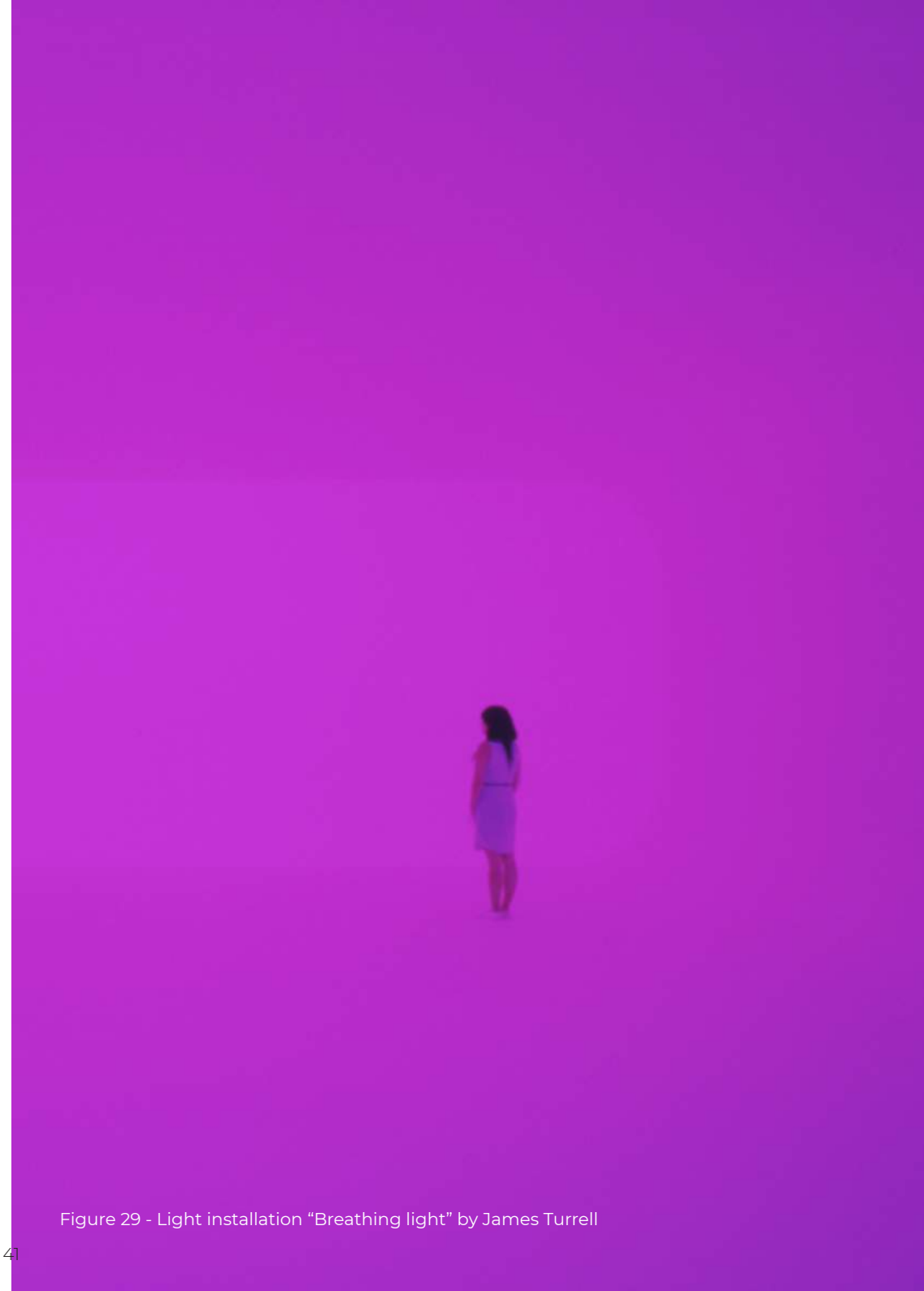


Figure 29 - Light installation “Breathing light” by James Turrell

Hypno Ho - VJ LOOP DOWNLOAD

Neb Motion

69

concentric by rob zinn for marset

Syd

James Turrell | Artsy

Sonneman 2694 Abstract Panels...

Build with Ferguson

What to See at L.A.'s WestEdge Design Fair

Fluid Gradient Wind Creative Square Font Poster

gradient discovered by ☆ on We Heart It

Nachhall – Plakatausstellung

Lichtzeichnungen II - Data Driven Art at its Best | Studio...

FFFFOUND! on We Heart It

Image about tumblr in Wallpaper by LightningKpop

"Dit moet ik gewoon...

Suitta

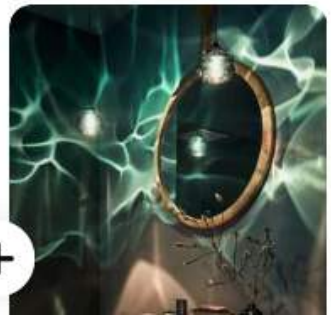
Systems of Romance

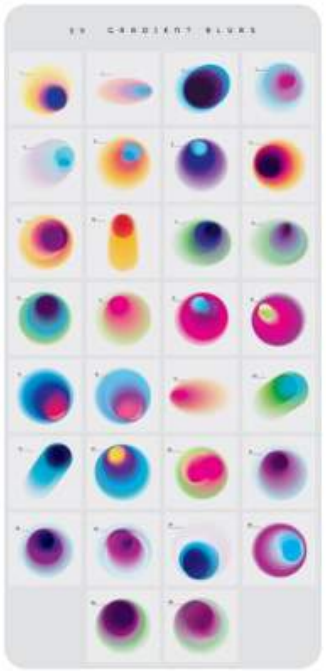
Spin — MUBI

Beta LED Wall / Ceiling Light by Leucos | LEU-0005331

Aperture

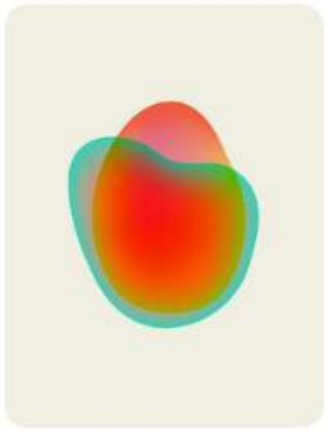
LED Japanese design gentle ripple droplet Water pattern...





iPhone Wallpaper by YTECHB

YTECHB

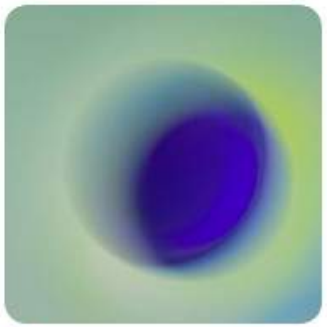


OHHH

Poster Lobster - Apparel M...

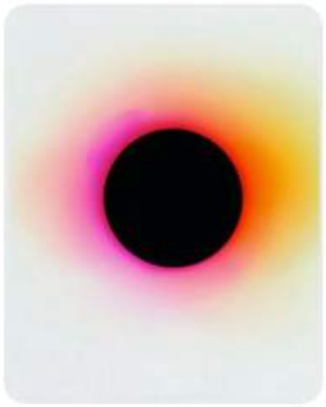
Rob and Nick Carter...

Ibrahim Mohammed



on Twitter

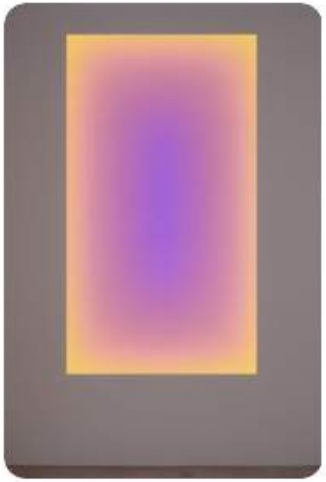
Showcase of Creative Designs Made with Vibrant Gradients



this isn't happiness.

Daan Spanjers : Atmosphere

Sonneman A Way of Light



Pace Gallery | James Turrell

Torsten Lindsø Andersen's redesign of Jack Kerouac's back...

Figure 30 - Screenshot of collected inspirations on Pinterest

4.4 Seeing the light

At the initiation of the project, while setting up the project brief, I decided that I wanted to work with a hands on approach. I wanted to get my hands dirty. I think this mindset is necessary when you are working with light, because it is hard to imagine how the light will turn out in real life. Especially when the light has a dynamic character, because how this light will interact with its surroundings is hard to visualise. In this subchapter I will show lights, both prototypes I made as well as lights that I have discovered by accident.

First prototyping phase

Through a variety of means I have explored light. At the start of the project this exploration was note focussed on a particular effect. Explored effects were a.o. projections, refracting of light and structured light. By using a variety in materials (fabric, glass, cardboard, translucent paper and plastic) it was possible to create divergent ideas. See figure 31 for an impression of these prototypes.

Most prototypes have a biophilic touch to them, which means that elements of the prototypes similarities to natural occuring light effects. These effects are mostly experienced as immersive and relaxing. I chose this direction because I thought it would fit to the subject of the project, meditation.

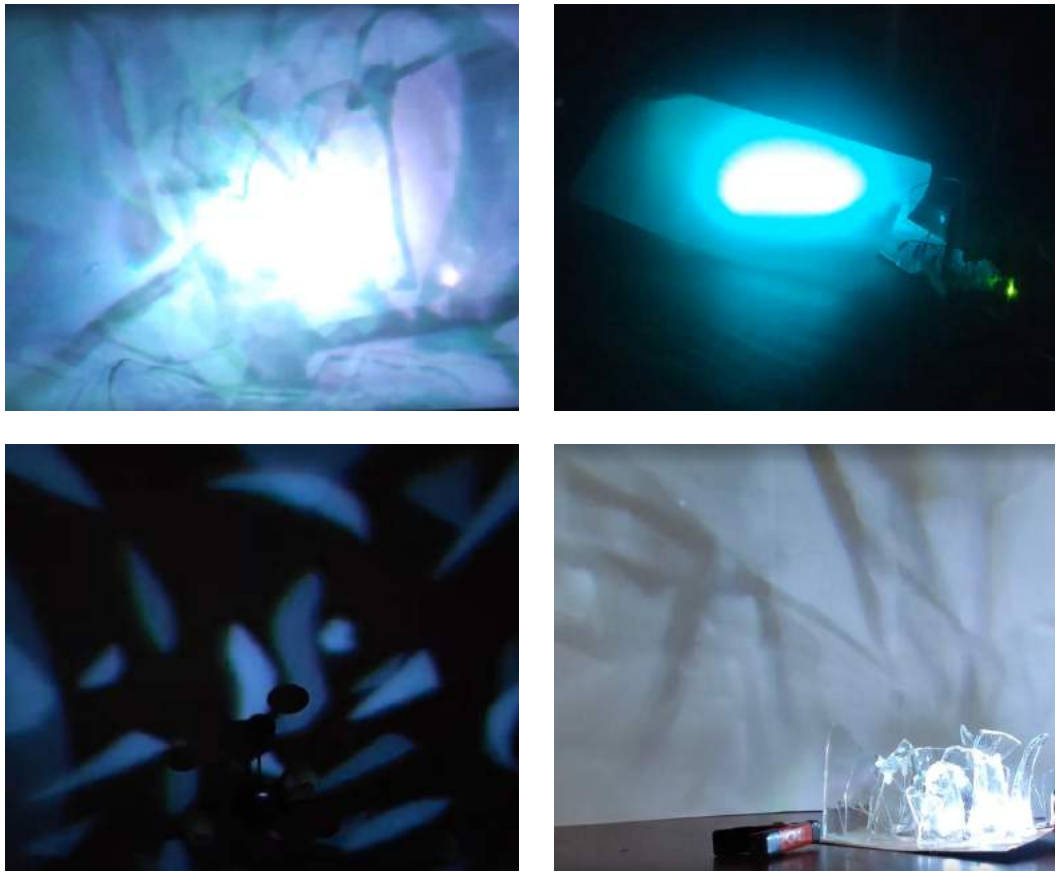


Figure 31 - Collection of initial prototypes

Second prototyping phase

In the second prototyping phase I have tested a lot with structure and light diffusers. I ordered a couple of sample packs of acrylic diffusers (figure 33 & 35) and composite plates (figure 34) from Pyrasied.

Using a setup from cardboard, see figure 32, I was able to combine multiple diffusers with a LED strip below to create different light patterns. It was during playing with this prototype that I realized that I could create a light projection on an acrylic sheet when light shines through a structure diffuser. With the different sample packs I was able to create a wide variety of light projections which made it possible to find a suitable one for the project.

Originally these light diffusers and structure diffusers are used for other purposes, but combining the powers of both shows the potential of creating mesmerizing effects with light.

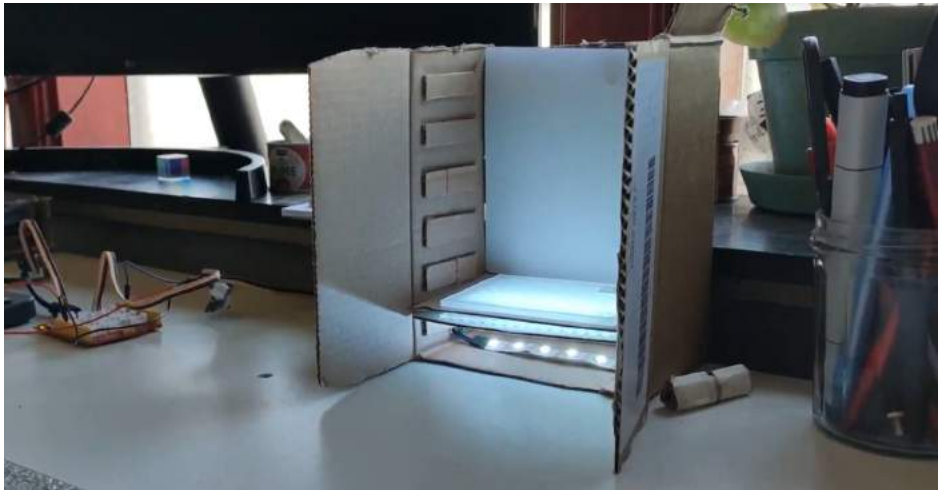


Figure 32 - Setup to test the different light and structure diffusers

Figure 33 - Part of the light and structure diffusers that were tested

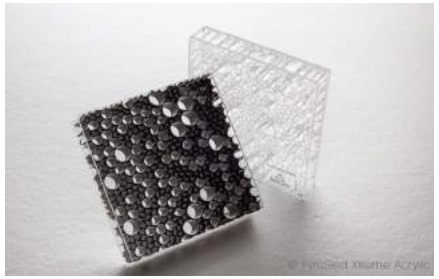


Figure 34 - Bencore compisite plate

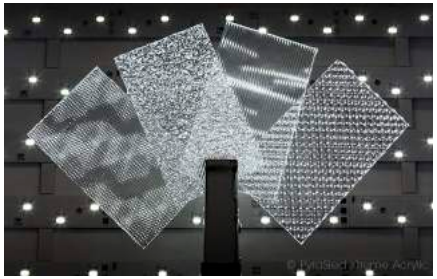


Figure 35 - Pyrasied structure diffusers

Figure 36 - Composite plate in use

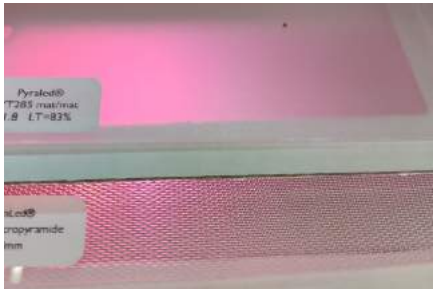


Figure 37 - Structure diffuser in use (1)

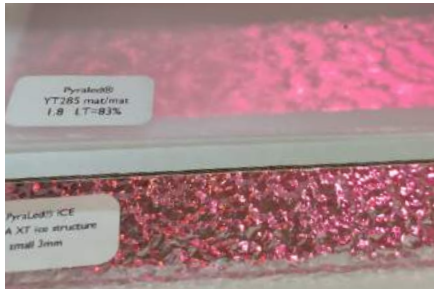


Figure 38 - Structure diffuser in use (2)

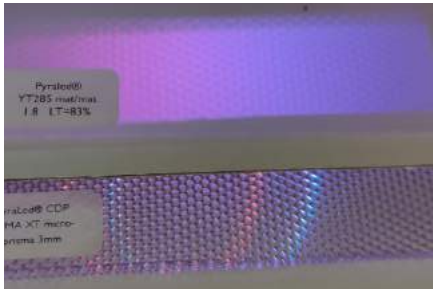


Figure 39 - Structure diffuser in use (3)

Third prototyping phase
During the third phase of prototyping an idea that arose during ideation was build into a prototype, see figure 40 and 41. This prototype was fairly simple, but the effect was strong. I felt like this was an effect I was looking for, because it had the a quality that I felt suited meditation.

A breathing pattern, in terms of brightness, was programmed onto the LED strip. The circle of cardboard felt like a void, like the circle disappeared whenever the brightness went down to zero.

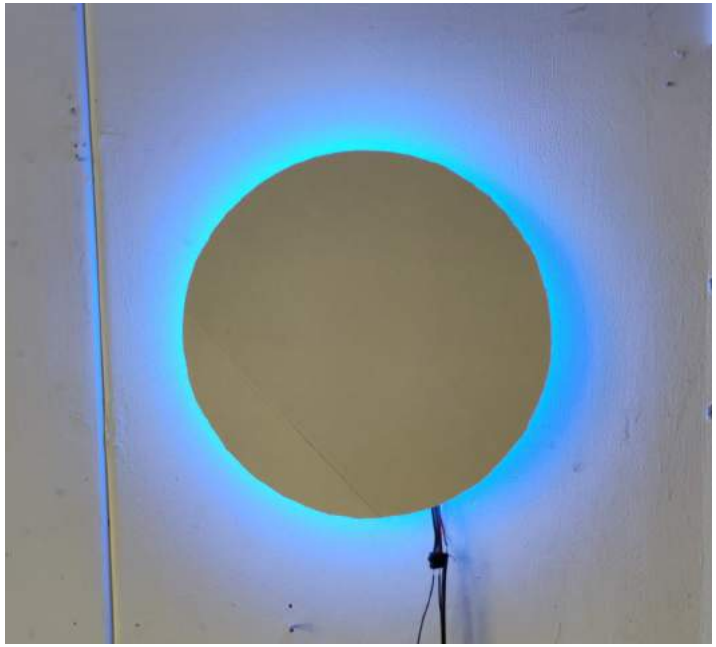


Figure 40 - “Void” effect prototype

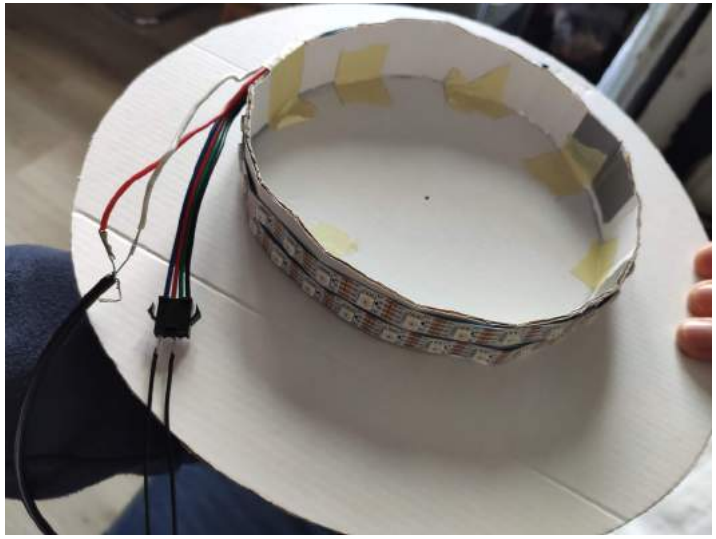


Figure 41 - “Void” effect prototype from the back

“Design can be art.
Design can be aesthetics.

Design is so simple, that’s why
it is so complicated.”

- Paul Rand

Figure 42 - Photo I took of a lake in Peru

5. *Concept vision & requirements*

To give myself some direction for the development of the final concept I have created a vision with requirements. With this vision in mind I aim to give myself a clear view on what I want to achieve, so the end product will be more in line with my own expectations and the outcome of the research and explorations.

5.1 Concept vision

Based on the research into the user, the practice of meditation and the role of technology besides the explorations and inspirations into light I was able to come up with a vision of where I want this project to go. This vision encompasses a view on the desired effect and interaction between the meditator and the product that is designed. I want to find a balance between functionality and wow-effect, as I think the product will work best when not just the functionalities are designed in line with the functional needs of the user but the user is also attracted by the aesthetics of the device.

The vision, which can be read on the page on the right, is the result of a deep dive into the topic of my graduation project. Before the embodiment of the final concept could be realized this concept vision should be supported with requirements. These requirements could be used to finetune the interactions, the effects and the aesthetics of the device.

Requirements
On the next page you can read more about the defined requirements. The requirements are split into categories to give you a clear overview of the necessary elements of the concept.

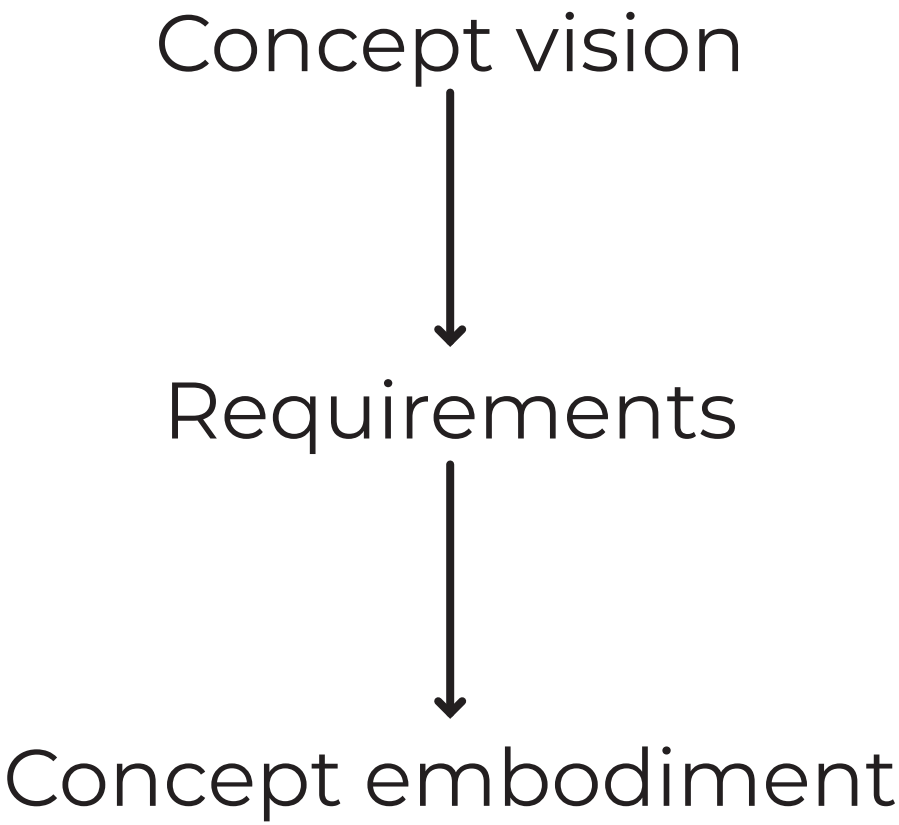


Figure 43 - Process from concept vision to concept embodiment

Design goal

I want to design a product that supports the user's meditation ritual through an immersive and supportive experience, using the mesmerizing qualities of light.

Figure 44 - Artwork by James Turrell called "Tunnel pieces"

5.2 Requirements

Interaction

Personalisable
The experience with the light should be personalisable to make the interaction with the device as appealing as possible. Preferences between users regarding a meditation session vary as well as preferences in colour

Less is more
The interaction with the device, in terms of the input given by the user, should be simple and appealing because this will make it more appealing for the user to initiate interaction.

Easy accessibility to meditation
The boundary to start a meditation session should be kept as low as possible to make the initiation of a meditation practice easy accessible. The initiation of the meditation session is often the hardest part of the practice, especially for people that did not make a habit out of the practice.

Meditation practice

Clear guidance
The user should feel supported throughout the process of the meditation practice, this support will be given through three different phases.

- Getting into the mood
  The user should be helped at the beginning of the meditation session to get comfortable. Once the user is in a more relaxed state, both mentally and physically, he or she is prepared for the session to come.

- Focus support
  To prevent the user to be lost in thought during a meditation session focus support needs to be present. Providing a trigger that helps to bring back focus will help the user to realise that he/she is distracted and eventually lead to a better insight into the wandering mind.

- Transition to everyday life
  To prevent rushing back into everyday activities and thoughts the user needs to have a transitional moment between the practice and everyday life. Therefore a relaxing and meditative transition will help to bridge the gap.

Connection to the ritual

According to Sam Harris, as mentioned in his Waking Up app, meditation is often seen as separate from your life. Realizing that the formal sessions of practice are connected to your everyday activities can result in a greater awareness of your own mind, making it possible to stop being lead by your thoughts.

Take a moment
In order to strengthen the relationship between your life and the meditation practice the user should be supported to take a moment of clear awareness during the day outside of the planned meditation practice.

Supportive lights

Easily understandable
The lights designed to support the meditation ritual should be easily understandable as this is the way the device communicates to the user. A better understanding of the lights will then reinforce the practice and improve the likability of the product.

The functional lights should support the various functions of the device to make it as easy as possible to execute the task at hand.

Immersive / mesmerising light effects
The light effects should have an immersive and mesmerising effect on the user. Besides the purely functional lights this will help the user to be involved in the meditation practice and will add to the relaxing and meditative qualities of the product.

6 *Final design*

In this chapter you will find the final design, called Prana. An interactive wall light is the result of the research, prototype explorations and creative thinking that was done throughout the project.

“Prana is a Sanskrit term that means life force, energy or vitality. It is the universal sea of energy that infuses and vitalizes all matter. Prana is also used to refer to the breath. Every physical breath brings a corresponding movement of prana through the body. The link between breath and the flow of prana is central to many of the techniques of meditation. By controlling the breath, which is easily felt, you can influence the flow of prana, which is much more subtle and difficult to feel.”

- Sarah McLean, McLean meditation institute

6.1 Prana: your luminous meditation assistant

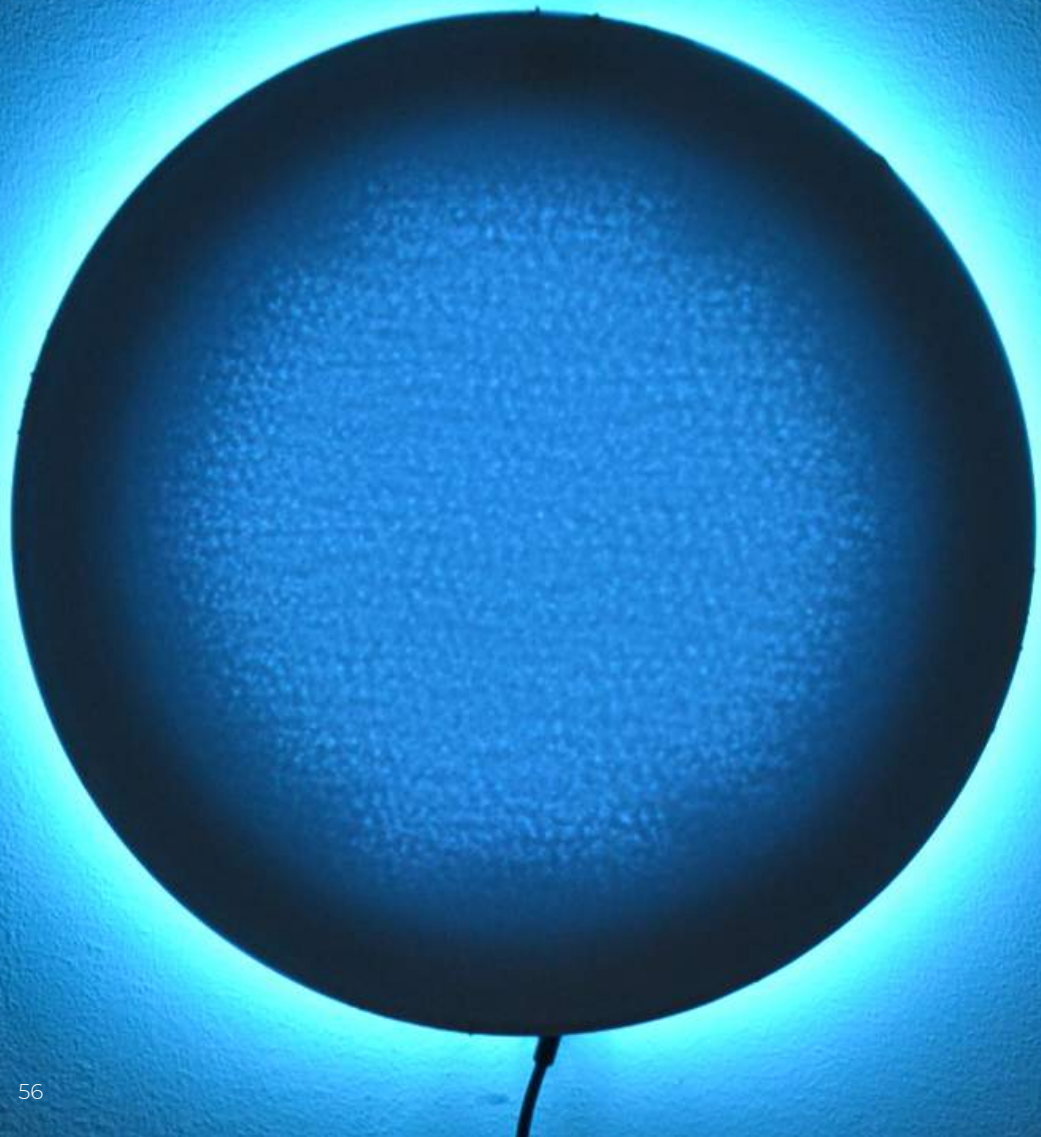
Welcome to Prana, your luminous meditation assistant. This device is designed to help you throughout your meditation journey by making it accessible and appealing and by guiding you through the process of your meditation practice.

Prana uses light as the main source of input to communicate to the user. The wall light is able to fill up the room with an ambient lighting as well as a beautiful mesmerizing light pattern on the front of the device.

The wall light is designed to be your personal guide in your meditation journey. By lowering the amount of steps to start a meditation session, through an intuitive interaction, and a clearly defined program to support you during a meditation session you will not be lost in the process.

Besides the functional aspects does Prana also speak to the senses. The calming and immersive light effects will immerse you into the process of meditation and will take you into the moment.

The following pages will dive into the features and interaction of the device.

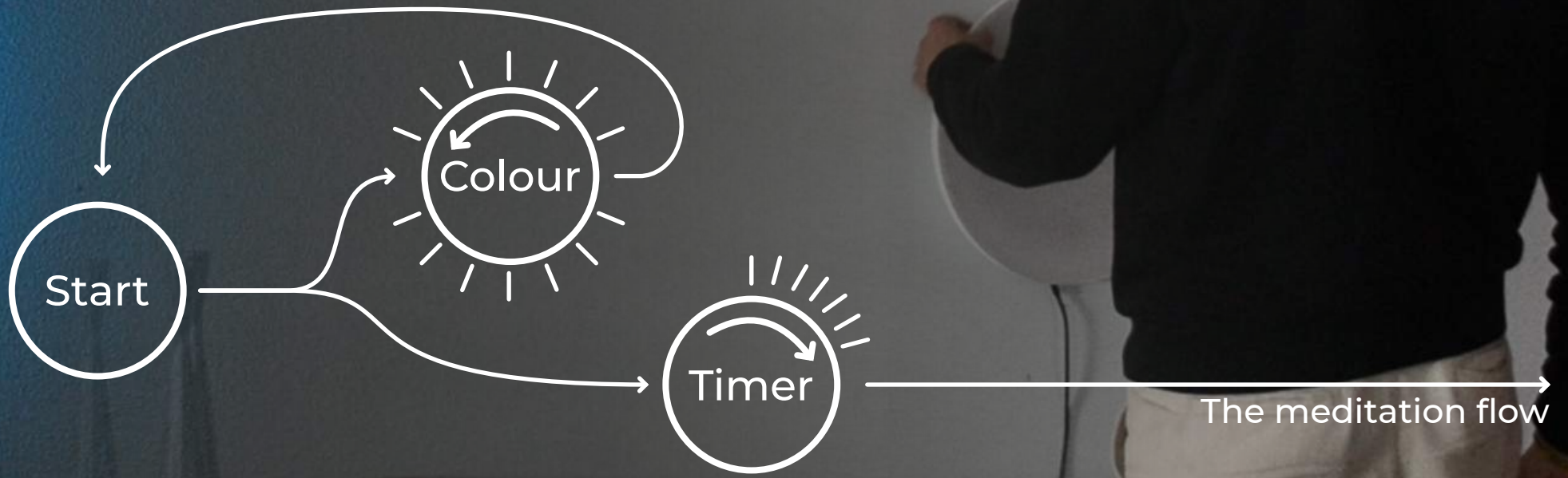


6.1.1 Set colour and meditation time

The first point of contact allows the user to do two things. Setting the standard colour of the device and setting a meditation timer to start a meditation session.

Setting the standard colour
To set the colour you turn the device to the right. While turning Prana will smoothly roll through the different colours and fills up the wall with this colour. Once you found your preferred colour you press the device and your colour is saved. You will go back to the start point.

Setting the meditation time
To set the meditation time you twist the device to the right. A light will appear, projected on the wall, resembling the time you will put for the meditation session. A fully lit up circle resembles one hour of meditation. After setting the preferred time you press the device which will initiate the next phase, the meditation practice.

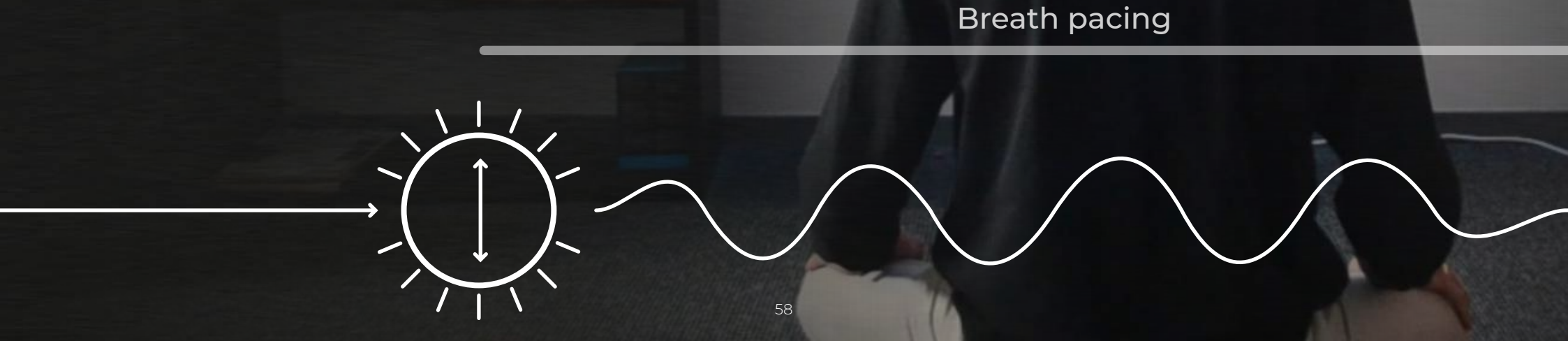


6.1.2 The meditation flow

Once the meditation flow is initiated by the user Prana will go through three different modes. Breath pacing, focus trigger and light show.

Breath pacing
The breath pacing mode is intended to calm the meditator down, both physically and mentally, at the beginning of the meditation session.

The breath pacing mode will take around 90 seconds, during these 90 seconds the breath of the user is slowed down, from 10 to 6 breaths a minute. According to Zaccaro, et al.(2018) a longer exhalation than the inhalation tends to increase relaxation. The respiration rate will change from 5 seconds/breath (2 sec in, 3 sec out) to 10 seconds/breath (4 sec in, 6 sec out).



Focus triggers
Losing your attention during a meditation is an often aspect of meditation, it is the nature of our mind. To support a meditator during the meditation session, focus triggers are used to prevent the user to be lost in thought.

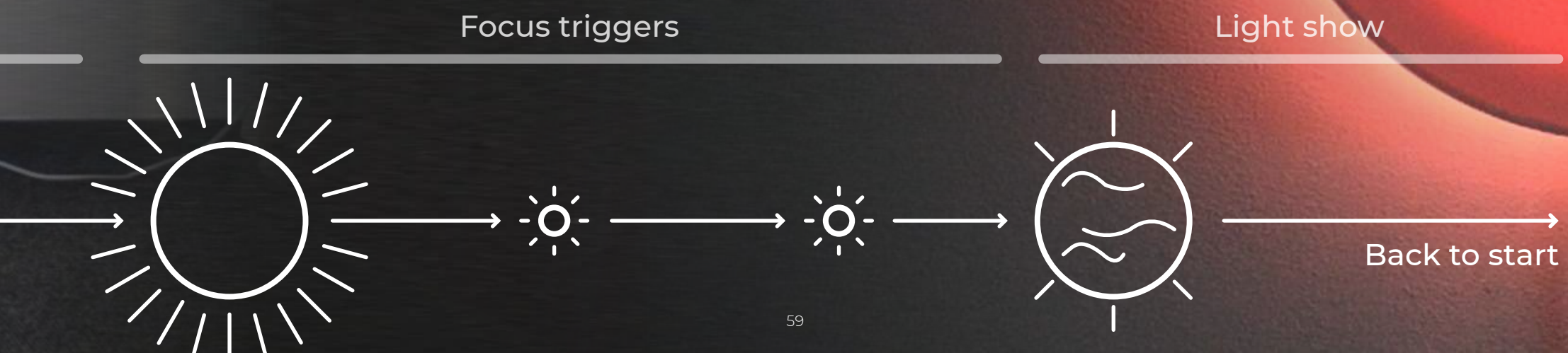
The focus trigger phase is the longest phase of the meditation session. The total time of the meditation session minus 150 seconds, for the breath pacing and light show.

This phase is initiated, and ended, with a clear signal of light and sound. The whole light, both inside and outside, will light up and a singing bowl sound will be played. The colour of the start and end signal will be the chosen colour.A focus trigger consists of a similar sound and light signal, but is clearly different. This light effect is a bit brighter and is designed to catch the attention of the meditator.

Light show
After the end signal of the focus trigger played the light show is initiated. The light show is meant as a transition between the meditation session and everyday life by providing an immersive and hypnotic light effect. This light effect will play on both the outside and the inside of the light.

A wide range of colours can be chosen, with an inspiration from natural occuring colour schemes, as people are naturally attracted to these colour schemes.

This mode will last 60 seconds.



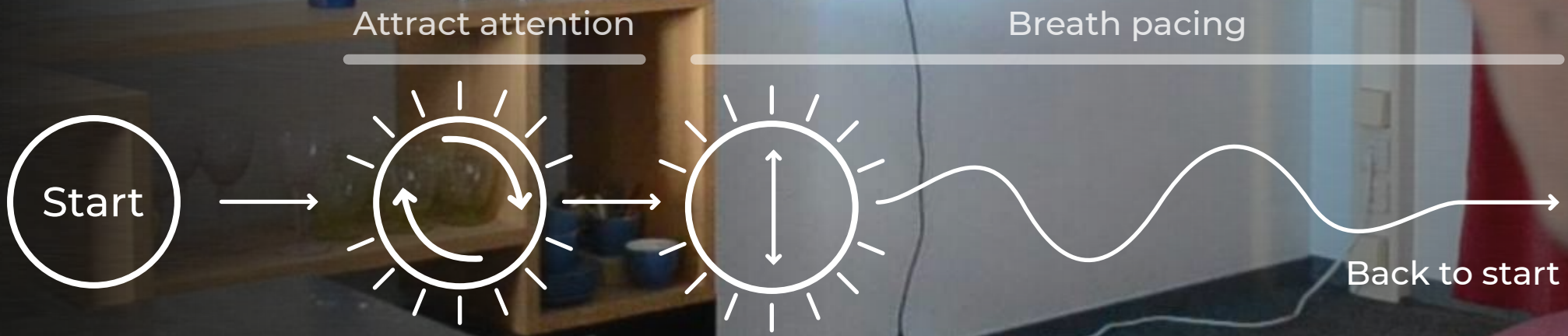
6.1.3 Take a moment

The moment mode is an autonomous function executed by Prana when the user is present in the room. This will be measured by a presence sensor.

The moment mode is intende to strengthen the relationship of the user with the meditation ritual by providing the option for the user to take a conscious moment during the day, outside of a formal meditation session.

Prana will attract the user's attention by quickly moving a light around itself twice. Then a short breath pacing sequence is initiated for a length of 5 breaths. This allows the user to breathe consciously, taking a moment by paying attention to the physical sensation of breathing, possibly also reflecting on the state of mind.

This mode will take less then a minute in total, making the activity non intrusive, but useful to grow awareness.

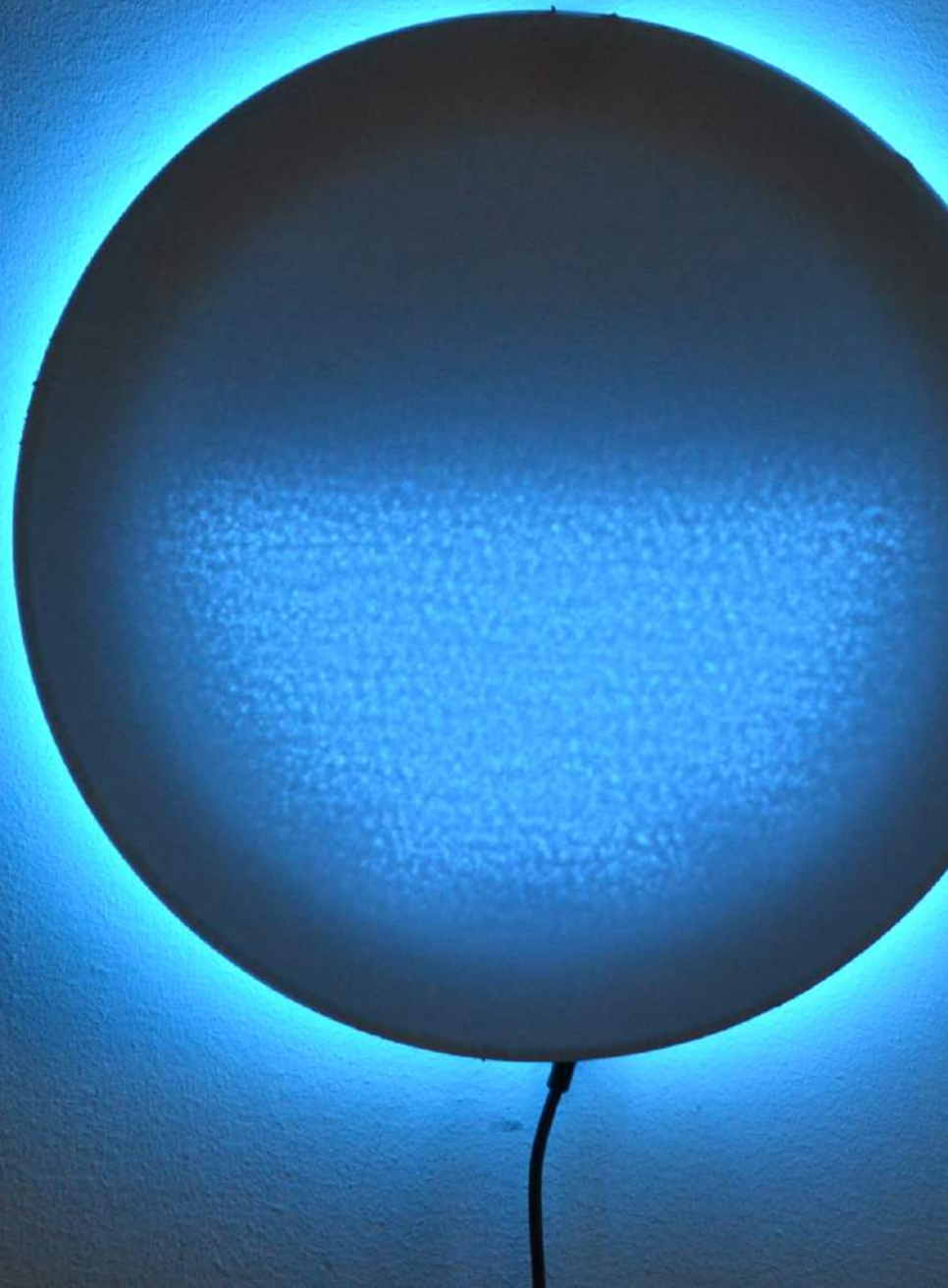


6.2 The lights

Guiding lights
The lights of Prana are designed to guide the user through the process. A clear example of this is the Breath pacing mode, where the inside of the light grows vertically over time, while the outside light grows in terms of brightness. Different parts of the light, depending on the function, are used to convey a message or to create an immersive effect of the lights.

Ambient, focussed and brilliance light
The lights of Prana create ambient, focussed and brilliant light effect. A strong ambient lighting effect is created by lighting up the outside lights, which creates a void looking effect on the wall, leaving a darker spot where the light is positioned. While the inside, with its brilliance qualities, creates an immesive effect as the different patterns of light mix into one another.

Both the inside and outside lights can be focussed lights, by lighting up only a part of the LEDs that are present. Through this focussed lighting a message can be conveyed, for example the time that is shown on the outside when initiating a meditation or the state of the breath during the Breath pacing phase.



6.3 Extensive control

As I noticed during the researching phase people have various preferences when it comes to meditation. It is very important that someone is able to change the experience of Prana, because when the experience bothers the user this might lead to the user not using the device and thus not meditating. To provide the necessary controls for the user an application can be downloaded. Without the application Prana still functions, but the experience cannot be personalised (besides the standard colour of the light).

Inside the application the user is able to control a couple of functionalities, some examples are given below.

The speed of paced breathing

The frequency, brightness and loudness of the focus triggers

Creation of colour schemes and transitions for the light show

The amount of moments that can be triggered during the day

Routine building and notifications

One feature that I want to highlight is the Routine feature. With this feature the user is able to define a routine by setting timed reminders. These timed reminders will help the user the user to maintain a habit with consistent practice if required. This feature is not included into the standard product, because differences between peoples meditation times make it impossible to find a universal setting.

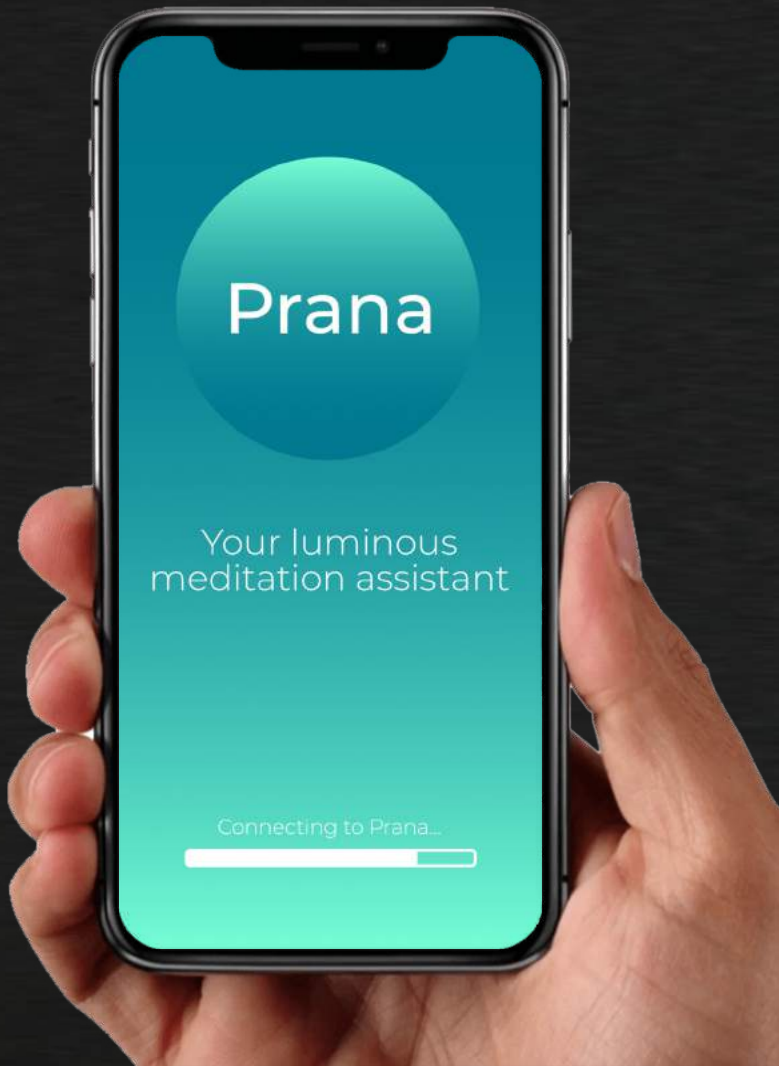


Figure 45 - Homescreen of the Prana application

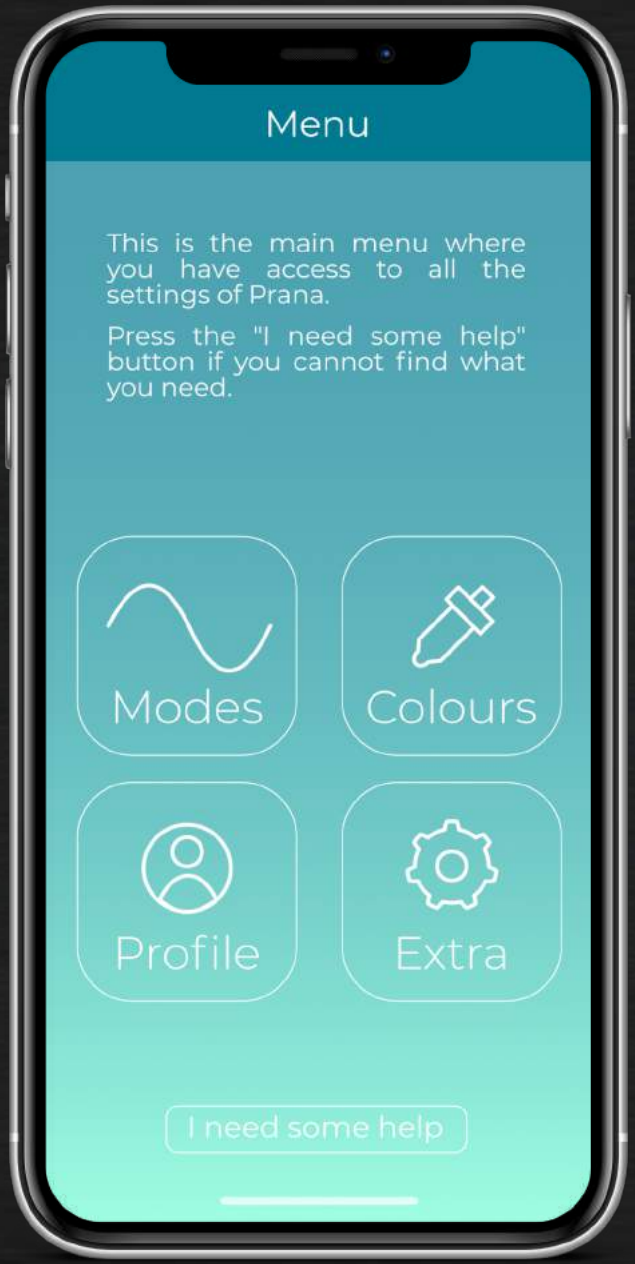


Figure 46 - First menu in the app

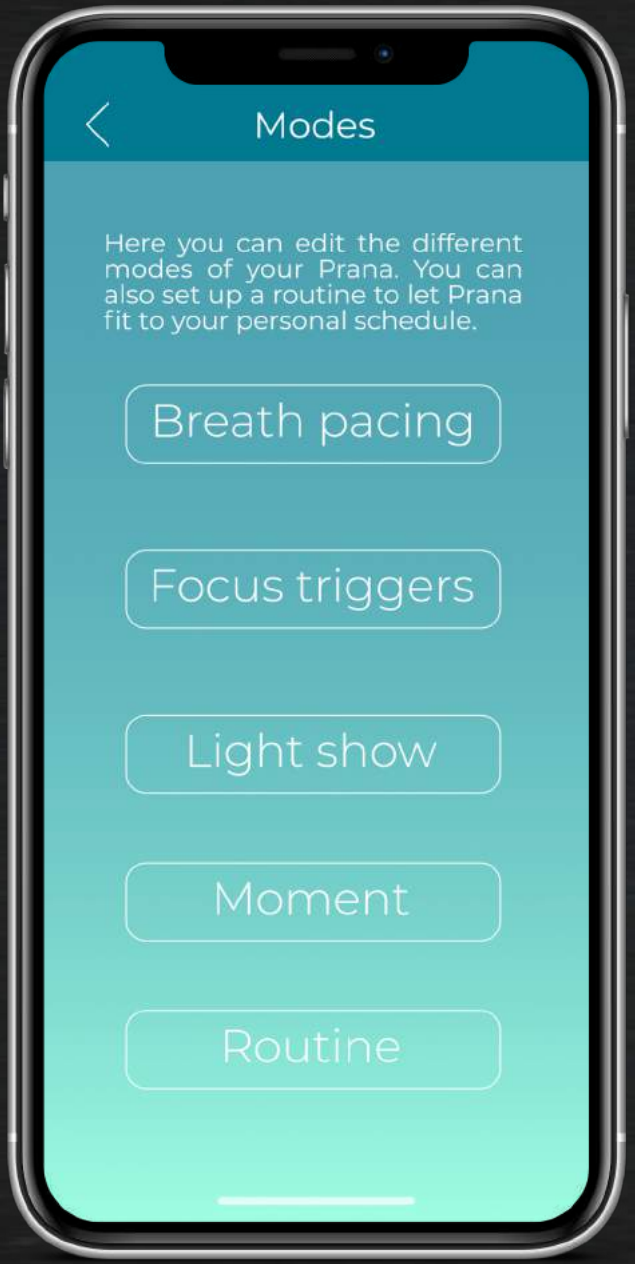


Figure 47 - Different modes in the application

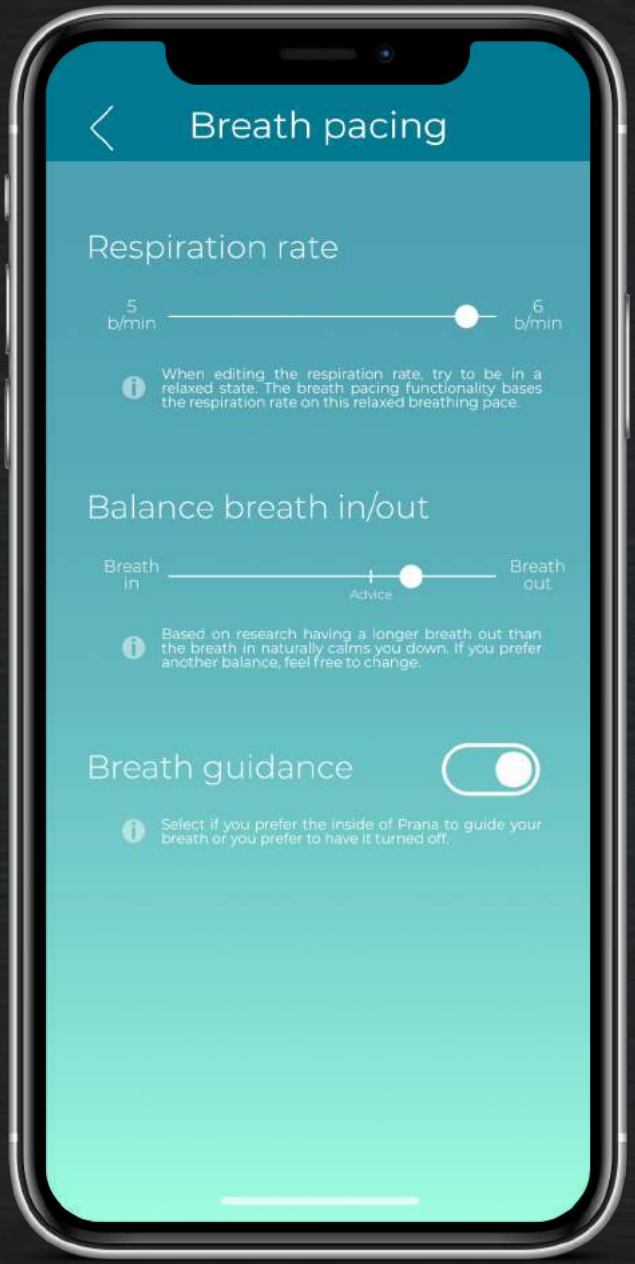


Figure 48 - Breath pacing options

6.4 User manual

Prana is designed to be simple and intuitive, but to avoid that the user will be lost in the usage with the device I have designed a user manual. This user manual provides an explanation of the interactions and effects of the device, supported by visuals. By adding the user manual to the experience of the device I aim to improve the overall satisfaction and understanding of the product.

In figure 49 you find an impression of the user manual. This user manual contains an explanation of the different modes of the device so the user knows what to expect from the device.

Because the device is a stand alone product it comes with a physical manual. For more elaborate information the user can use the application. In the application a video can be played that explains the usage of the device in a dynamic way.

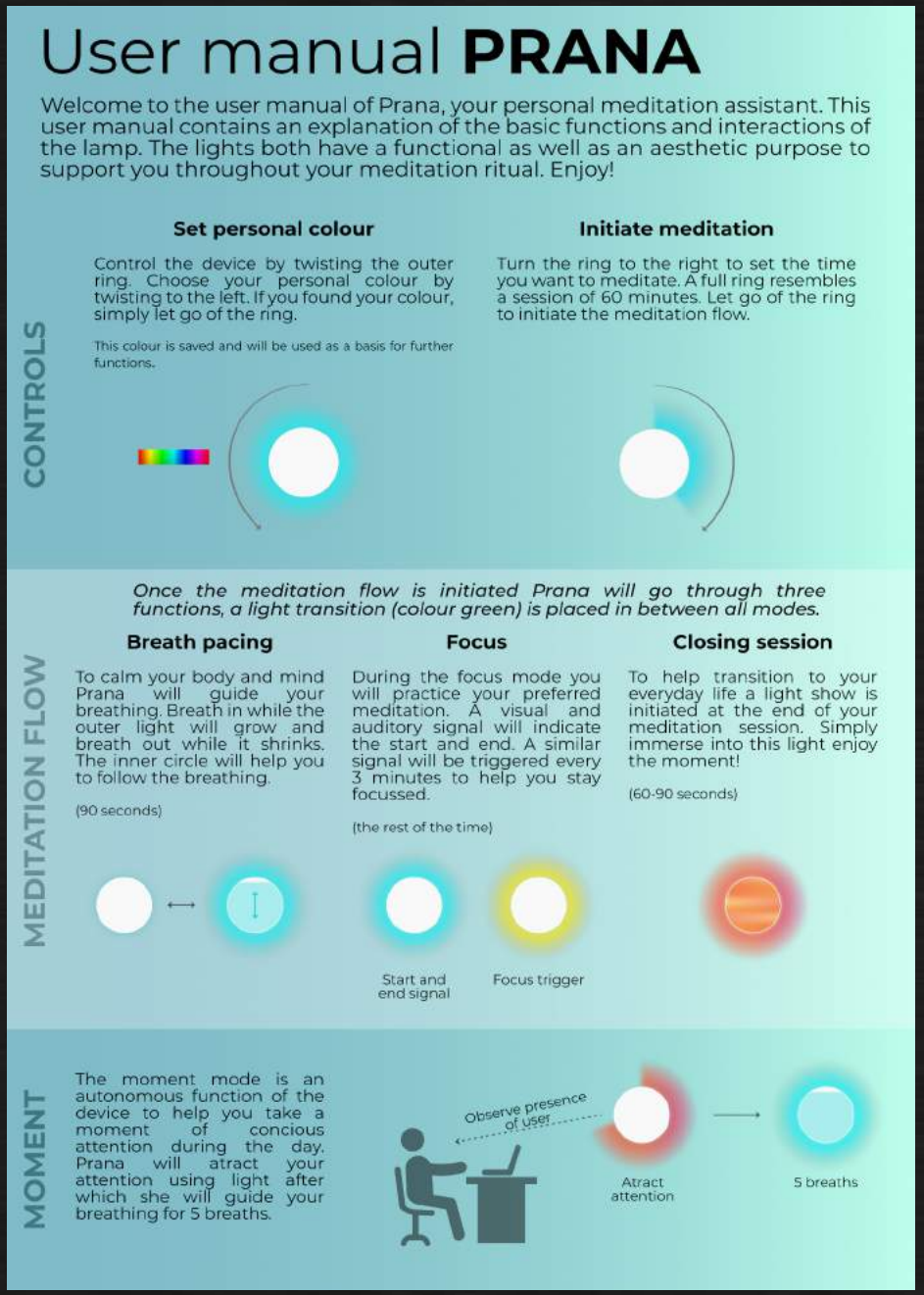
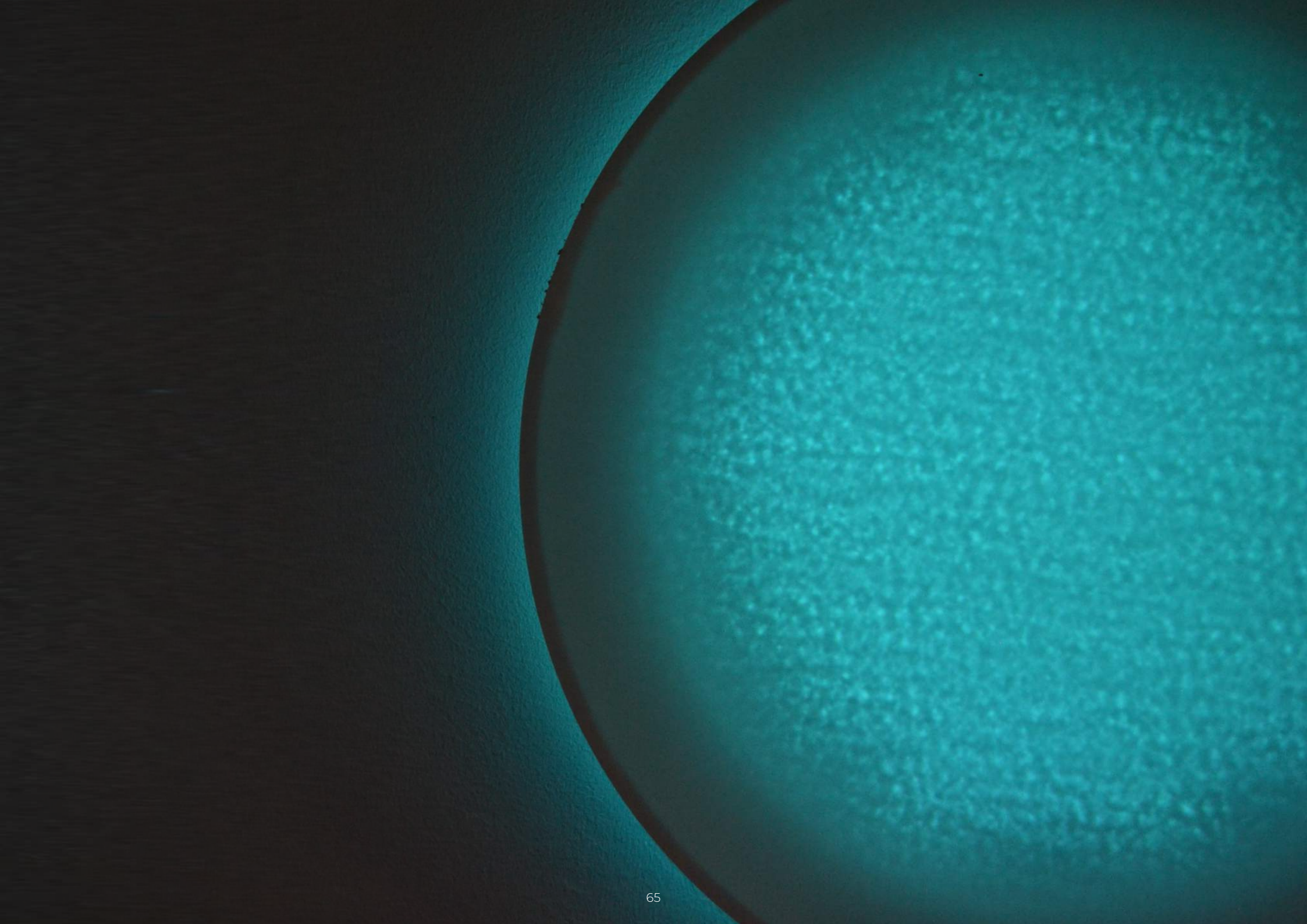


Figure 49 - User manual of Prana



7. *Concept embodiment*

The final prototyping phase was focussed on the creation of the final concept. This phase consisted of some short iterative cycles in which parts of the prototype were developed. This made it possible to choose crucial elements like size, placement of elements, selection of materials, etc. Finally a complete prototype was build that represented the final concept. Some elements of the final concept were left behind (turning the device to set colour and time) due to time reasons. These features were wizard of ozzed to facilitate the experience of the prototype to be as similar as possible for the participants.

A significant part of the prototyping consisted of programming the system and lighting effects of Prana. This will however not be discussed in this report.

7.1 Defining light diffusers

After trying many different structure diffusers from Pyrasied. The decisions was made to choose the PyraLed® XT ICE structuur 3mm, which can be seen in figure 52, which is an extruded acrylic. This structure diffuser was chosen as it has the most resemblance with naturally ocurring patterns.

On top of the structure diffuser is placed a light diffuser, also an acrylic sheet material from Pyrasied, to create the pattern of the inside of the lamp. This matte acrylic is used to project the refractured light beams, so from the outside you only see the light pattern.

Finetuning the pattern
To find the perfect combination of light and structure diffusers the bottomright setup was used. Placing different matte acrylic sheets on top of the structure diffusers, see figure 50, gave slightly different patterns.

The decision was made to go with the PyraLed® YT275. This light diffuser is chosen because it has a high light transmission rate (81%) so little light is lost. The thin dimension (1.8mm) of the acrylic sheet creates a mix of sharp and slightly vague pattern from the structure diffuser. Finally the matte finishing of the acrylic provided a smooth surface finish, required for the aesthetics of the final concept.

Figure 51 - Chosen struture diffuser


Figure 52 - Test setup for light diffusers

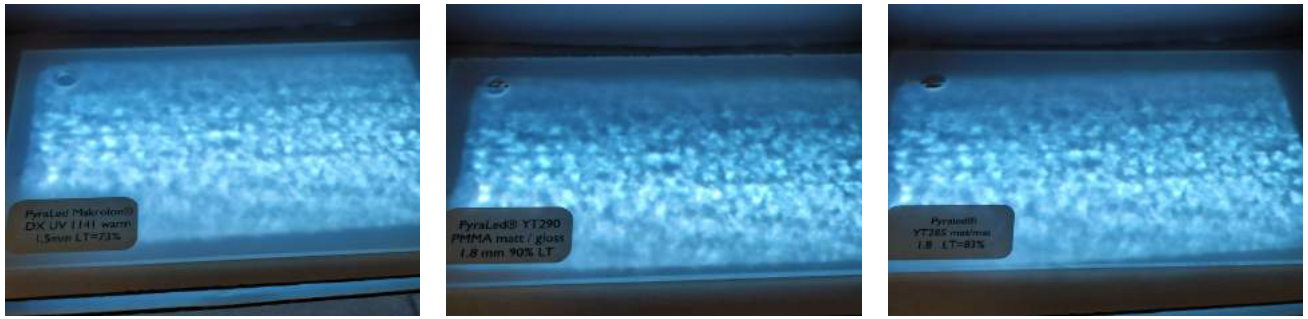


Figure 50 - Three tests of different light diffusers

7.2 Physical model

To define the final dimensions of the physical model a mockup was built from wooden parts which are lasercut. With wooden pieces of 5 mm in thickness the dimensions could be determined, because it was easy to add or take out a wooden ring whenever the model required this.

Points of attention
After the acrylic sheets were lasercut the mockup was assembled to test the combination of materials with an LED light below. I came acros three points of improvement of the prototype.

- The light did not reach to the far edge of the prototype. Whereas I wished to fill the inside of the product with the patterns of light.
- The inside was clearly visible, showing the difference in depth of the model, while I wanted to have the inside of the model appear as smooth as possible.
- The ring supporting the matte acrylic sheet seems too thick and it too visible in the prototype. To have a more sleek product this needs to be adressed.

The points mentioned above have been resolved, how these points are adressed will be elaborated later in this chapter.

Figure 55 - model with light diffuser on top

Figure 53 - Model with lasercut wooden parts

Figure 54 - Sideview of model with lasercut wooden parts

7.2.1 Iteration model

A second version of the mockup was build. This time the lasercut wooden elements were iterated for the following reasons.

Lights reaching further to the side
To make sure the light reaches further to the side of the model the wooden circles were cut in sizes that had a difference of 5mm. This difference created a stairs effect, leaving more space for the light to reach to the sides, see figure 57.

However after testing I was not satisfied with the result. Therefore I decided to sand down the stairs, leaving another 5mm extra space for the light to reach to the sides. This result can be seen in 7.4.

Thin edge
Comparing the two models built a clear distinction can be seen in terms of the support for the matte acrylic sheet. The 5 mm taken from this edge makes a big difference aesthetically. Therefore I decided to continue with this model.

Figure 56 - The two models

Figure 57 - Stair effect of the second model

7.3 Electronics

Without electronics the product would not be the same. The product contains two groups of LED lights. One ring on the outside of the model, as can be seen in figure 61, and another set of LEDs that will create the pattern on the inside of the lamp. For both lights the WS2813 LED strip which has individually adressable LEDs.

Outer ring

For the lights on the outer ring I have used a LED strip with 90 LEDs/meter. This slightly higher density of provides more light and a better blend of the lights on the wall.

Inside matrix

To create the inside light effect I have custom built a LED matrix from pieces of LED strip. 60 LEDs/meter was used as the lights mixed properly with this amount of lights. By testing the spacing of the lights (figure 58) the spacing between the LED strips was defined. After the spacing was defined the matrix could be built.

Controlling the lights

To control the LED strips I used an arduino based microcontroller. Initially I started with the Seeeduino Lotus, but for dimension purposes of the final prototype I used an Arduino Nano.

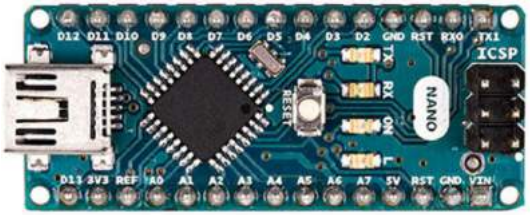


Figure 62 - Arduino Nano

Figure 61 - Outside LED strip

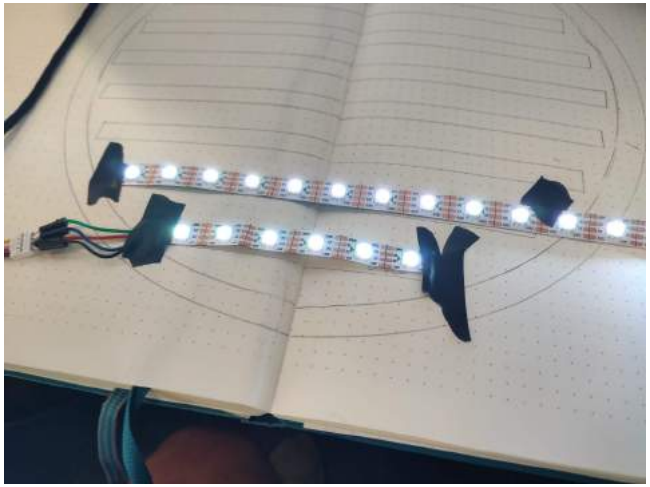


Figure 58 - Defining space between LED strips

Figure 59 - Light effect of spacing

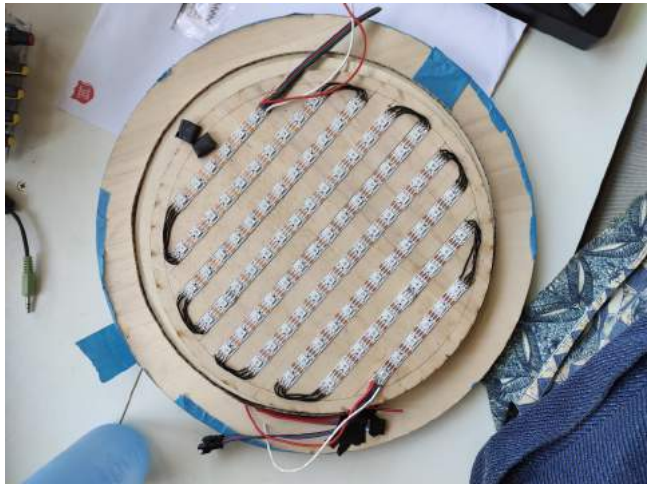


Figure 60 - Custom built LED matrix

7.4 Finishing of the model

To give provide the look and feel of a finished product I finished the model in a couple of ways.

Sanding the edges
To let the light reach further to the end of the model the “stairs” were sanded down. These stairs were the result fo the lasercutting and by sanding down the light had another 5 mm space to move outward.

Painting the model
To give the model a finshed look and feel the model was spraypainted white using a super opaque paint that has a matte finish. This paint job gave the model a finished look on the outside, but as important gave the inside a more coherent fihish that does show less depth.


Figure 63 - Final model with LED matrix


Figure 64 - Final model structure diffuser


Figure 65 - Final model light diffuser

Covering cables and suspension

Some of the wiring had to be guided on the outside of the prototype. To make sure this wiring stayed on the right place and did not reduce the aesthetics of the prototype I designed a cable covering an suspension system in Solidworks, see figure 67. This suspension system is used to assemle the final elements to each other, provides cable management and functions as a suspension system to hang the prototype on the wall.

Figure 67 - Cable management and suspension system

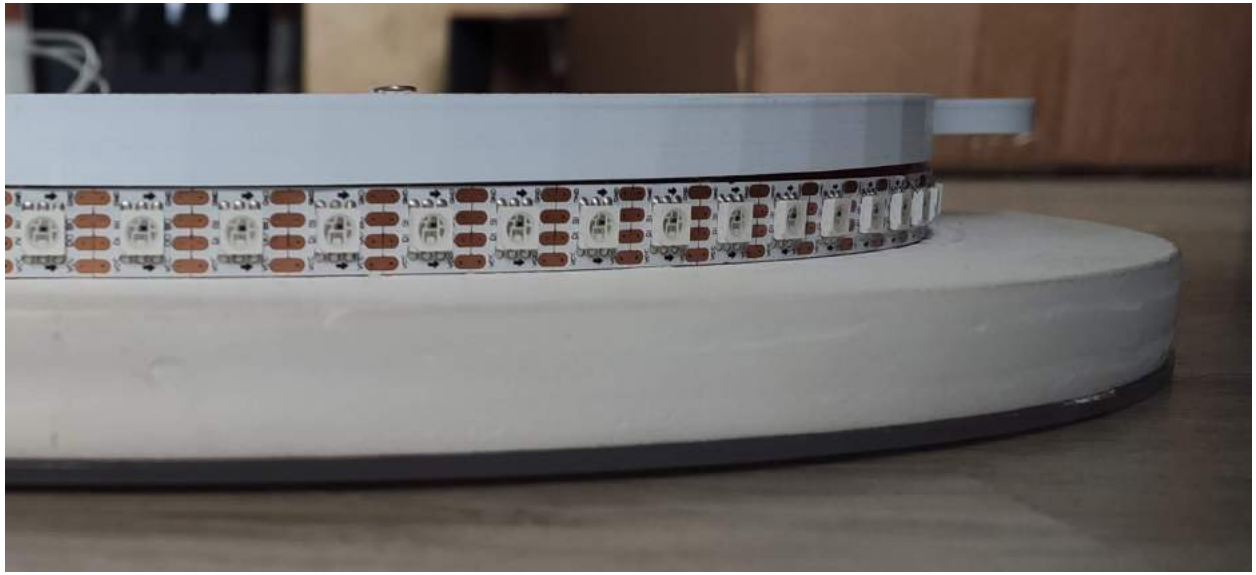


Figure 66 - Outside LED strip with cable management

Figure 68 - Complete prototype with suspension system

8. *Evaluation & recommendations*

To find out whether Prana meets the needs and wishes of the users how the device is experienced a user test is carried out. This user test has a qualitative character and dives into the functionalities, experience and aesthetics of the device. As the intended usage of the device is the home environment the setup is shaped to this environment to have most valuable test results.

In total 8 users participated in the test and resulted in some improvements points that are fairly easy to implement.

8.1 Test setup

To get the most reliable results from the user tests I wanted to test in an environment that represented an atmosphere in which Prana would be used, a home. Therefore I have chosen the Comfort lab (figure 70) and Multisense lab (figure 69) at the faculty of Industrial Design Engineering. Two tests were performed in my room, because two close friends were able to test my prototype.

The rooms were set up to support the meditation session and to add to the experience of a home. The prototype was hanging on the wall, with a meditation pillow in front of the product. A table was set where the introduction and the interview were held.

Tests
The total user took about 30 - 60 minutes, this included the introduction, user test and interview. During the user test both the product and a user manual were tested. The physical interaction and different flows of the product are tested.

Collecting insights
To collect insigts a document was set up with interview questions. The interview dove into the experience of the participant regarding the usability, aesthetics, likability of physical model and lights and into the effects of the device.

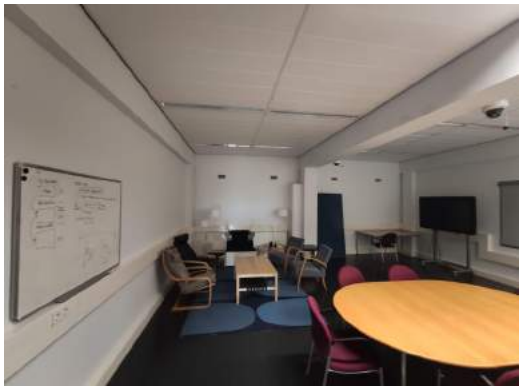


Figure 69 - Multisense lab

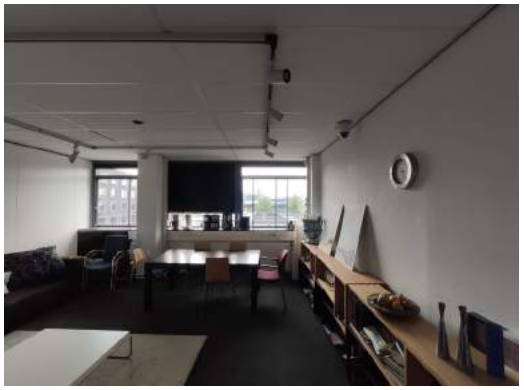


Figure 70 - Comfort lab

Introduction
Welcome
Explanation test
Consent form

→

User test
User manual
Physical interaction
Meditation flow
Moment mode

→

Interview
First thoughts
In depth questions:
User manual, Interaction, aeshtetics, light effects, understandability, relaxation

8.1.1 Participants & limitations test

In total 8 users tested the prototype, of which 6 users were meditators or had done meditation multiple times. All participants were between the age of 24 and 30 years old and were still studying.

Limitations
The results of the test were promising but there were some limitations, they are stated below.

- All participants were industrial design students, this could have influenced the way they look at the interaction with the device, possibly making it easier for the participants to understand the behaviour of the device.

- The test only looked into the interaction with the device for a short period of time, one hour, and could not facilitate understanding about the long term effects of the device.

- The device was tested with two participants that were not into meditation. This made some parts of the product interaction confusing and resulted in a less positive experience.
  However, testing with non meditators gave me the insight that Prana is not suitable for non-meditators as they lack the basic understanding of the practice, unless guidance throughout the meditation process becomes part of the experience.

Recommendations
My recommendation would be to test the product in a home environment for a longer period of time. This will provide better insight into the experience and whether the product helps with the integration of meditation into the life of the user.


Figure 71 - Participant testing at home environment

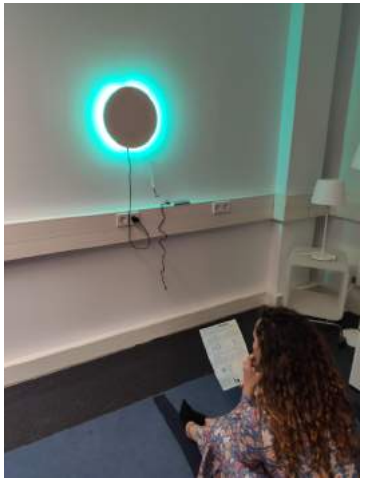


Figure 72 - Participant testing in the lab

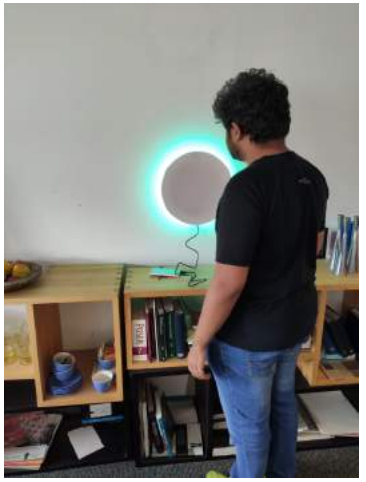


Figure 73 - Participant testing in the lab

8.2 Test results

The user test was succesful in providing insight into the experience of people about interacting with Prana. Insights were gathered about functionality, appeal and effectiveness. This resulted in a good insight into the positive and negative elements of the device. A lot of small improvements were found as well as more rigorous changes (especially the use manual).

In general people were enthusiastic about the experience with the device and understood its functionalities and effects. However, some light effects require some tweaking to make the experience more understandable or smooth. The user manual was a good addition and provided the necessary information but needed an iteration to be more appealing to the user.

An important takeaway is the need for personalisation. The user should be able to tweak effects in order to improve the satisfaction and attraction to the device.

User manual
The user manual was generally clear, adding clarity to the experience, but should be made more visual to convey the message properly. The physical design could use some iteration, for example foldable, as this would improve the experience.

Physical interaction (timer & colour)
The interaction, as imagined from the intende interaction on the manual, is mentioned as intuitive and understandable by the participants. The tangibility of the interaction is valued positive.

The users expected that Prana helps to lower the boundary to meditate, by reducing the steps to start and by making it more appealing, but this needs to be validated in another test setup preferably over a longer period.

Meditation flow
Breath pacing
The breath pacing was easy to understand and follow because of the guidance from the light, especially because of the light on the inside going up and down.

However there were differences in breathing speed between participants, therefore the speed felt out of sync. This shows the importance of an adjustable speed for the breathing pace.

The breath pacing had a calming effect on the participants.

Focus triggers
The initial trigger of the focus trigger mode, the start signal, was seen as pleasant. However the focus triggers in between were experienced as slightly annoying as the singing bowl sound was too high pitched.

The frequence of the triggers was too high, every minute there was a trigger, which felt rather distracting and did not support the practice.

There was some confusion regarding the focus triggers as some participants thought this was the end signal. This shows the start/end trigger and the in between triggers need to be clearly identifiable from one another.

Light show
The light show was much appreciated by the participants. The colour pallette used was experienced as pleasing, people found similarities to a sunset.

There was a slight flickering in the light, due to the code that was written to programm the lights. This flickering was mentioned to take the smoothness out of the light effect and should be taken out in the future.

Transitions
The transitions between the different phases were seen as rather distracting and did not add to the experience of the meditation flow. The colouring and specific light patterns did not fit to the meditation flow. In the future some of these transitions will be taken out as these effects will not add clarity to the flow. Making the overall experience a bit more focussed on solely the different phases, with minimal transitions and with a pause between the different modes.

Moment
The moment mode started with a light effect to catch attention of the user. This light effect did not fit to the overall experience of the device, according to the participants. Using the selected colour will probably connect this mode to the other effects.

If the device is not hanging in the peripheral view the user will probably not see the effect, especially during the day. This requires a stimulus that is better noticable. Adding sound to the attraction could help to catch the attention of the user.

Some particpants mentioned that if they are in a flow of working, they probably won't like to get out of their flow by looking at the light and breathing with the device. This takes away the power of the effect. This again shows the potential of the extensive control, as a user can set a timeframe in which the effect can take place, making the device more adjusted to the user.

9. *Conclusions & reflections*

Finally, at the end of the report I will present my conclusions about the project. I will talk about the research, the explorations and the prototyping that lead to the final product Prana. Then I will talk about the evaluation of the concept ending with a conclusion about my overall thoughts about the project.

The start of the project seems to be so far away. Starting the project with an idea, a feeling that light can be used to support meditation. I had the idea that there were certain struggles from people related to meditation that could be resolved by applying light in the right way. Researching meditation gave me insight into the practice, but lacked the view of the experience of the meditator. To understand the needs and wishes of the meditator I had to dive into the mind of the user. After I analysed and structured this research I was able shape a vision. With this vision in mind I was able to guide my creative process towards a clear purpose.

The creative process was a non linear process. During the project I applied various methods to guide my creative thoughts. From sketching, to prototyping, programming and looking for inspiration I was able to come up with a light effect that I felt suited to the project, and most importantly to the core of meditation.

I enjoyed the project a lot, even though there were some moments where I felt completely lost in the process. I knew that these moments would be a part of the creative process, but this did not make it any easier. Giving myself the space to be stuck in the process took away the pressure and made me think differently to tackle the issue. Sometimes I would let go of my project during the day because it did not make sense to keep working and then late at night I would have this urge to work on the project that sometimes resulted in a crucial insight into my project.

I think the result of the project, Prana, is a well thought through product that has potential to help people in their meditation journey. It might not be a product for everyone as there are widely different preferences when it comes to meditation. In my opinion the aesthetics of the device fit to the meditation ritual and can add value to ones life, not just around the meditation ritual, but also as an appealing wall light that can elevate you with its mesmerizing light patterns.

The evaluation of Prana showed promising results regarding the functionality, appeal and addition to ones quality of life. However, to make sure the product will have a smooth integration in the life of the user it is important to test the product over a longer period in a real home environment, by real users.

The market of meditation is growing, and will continue to do so over the coming few years. This means there is a lot of potential for the product to be implemented into the market. Especially as the design does not solely focus on functionality, but the aesthetics of the device are similarly important. However for the time being I will let the project rest, maybe to pick it up later. Who knows Prana will light up your room and your day in the future.

10. *References*

Awasthi, B. (2012). Issues and perspectives in meditation research: In search for a definition. Frontiers in Psychology, 3, 613.

Clarke, T. C., Barnes, P. M., Black, L. I., Stussman, B. J., & Nahin, R. L. (2018). Use of Yoga, Meditation, and Chiropractors Among U.S. Adults Aged 18 and Over. NCHS data brief, (325), 1–8.

Desbordes, G., Negi, L. T., Pace, T. W., Wallace, B. A., Raison, C. L., & Schwartz, E. L. (2012). Effects of mindful-attention and compassion meditation training on amygdala response to emotional stimuli in an ordinary, non-meditative state. Frontiers in human neuroscience, 6, 292.

Ganslandt, R., & Hoffmann, H. (1992). Handbook of lighting design.

Harris, S. (Date unknown). Discover your mind. Wakingup.com

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. Clinical Psychology: Science and Practice, 10(2), 144–156.

Kelly R. 1952. Lighting as an integral part of architecture. Coll. Art J. 12:24–30

Lippelt, D. P., Hommel, B., & Colzato, L. S. (2014). Focused attention, open monitoring and loving kindness meditation: effects on attention, conflict monitoring, and creativity–A review. Frontiers in psychology, 5, 1083.

Lomas, T., Cartwright, T., Edginton, T., & Ridge, D. (2014). A qualitative summary of experiential challenges associated with meditation practice. Mindfulness, 2014, 1-13.

Lutz, A., Dunne, J.D., Davidson, R.J., 2007. Meditation and the neuroscience of consciousness. Camb. Handb. Conscious 499–555.

Manuello, J., Vercelli, U., Nani, A., Costa, T., & Cauda, F. (2016). Mindfulness

meditation and consciousness: An integrative neuroscientific perspective. Consciousness and cognition, 40, 67-78.

McLean, S. (Date unknown). Glossary of yoga & meditation terms. Mcleanmeditation.com

National Center for Complementary and Integrative Health website. Meditation: in depth. nccih.nih.gov/health/meditation-in-depth. Updated: April, 2016

Niess, J., & Woźniak, P. W. (2020, October). Embracing Companion Technologies. In Proceedings of the 11th Nordic Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society (pp. 1-11).

Pyrasied. (Date unknown). Structuurdiffusers en foliën. Pyrasied.nl

Sharma, H. (2015). Meditation: Process and effects. Ayu ;36:233-7.

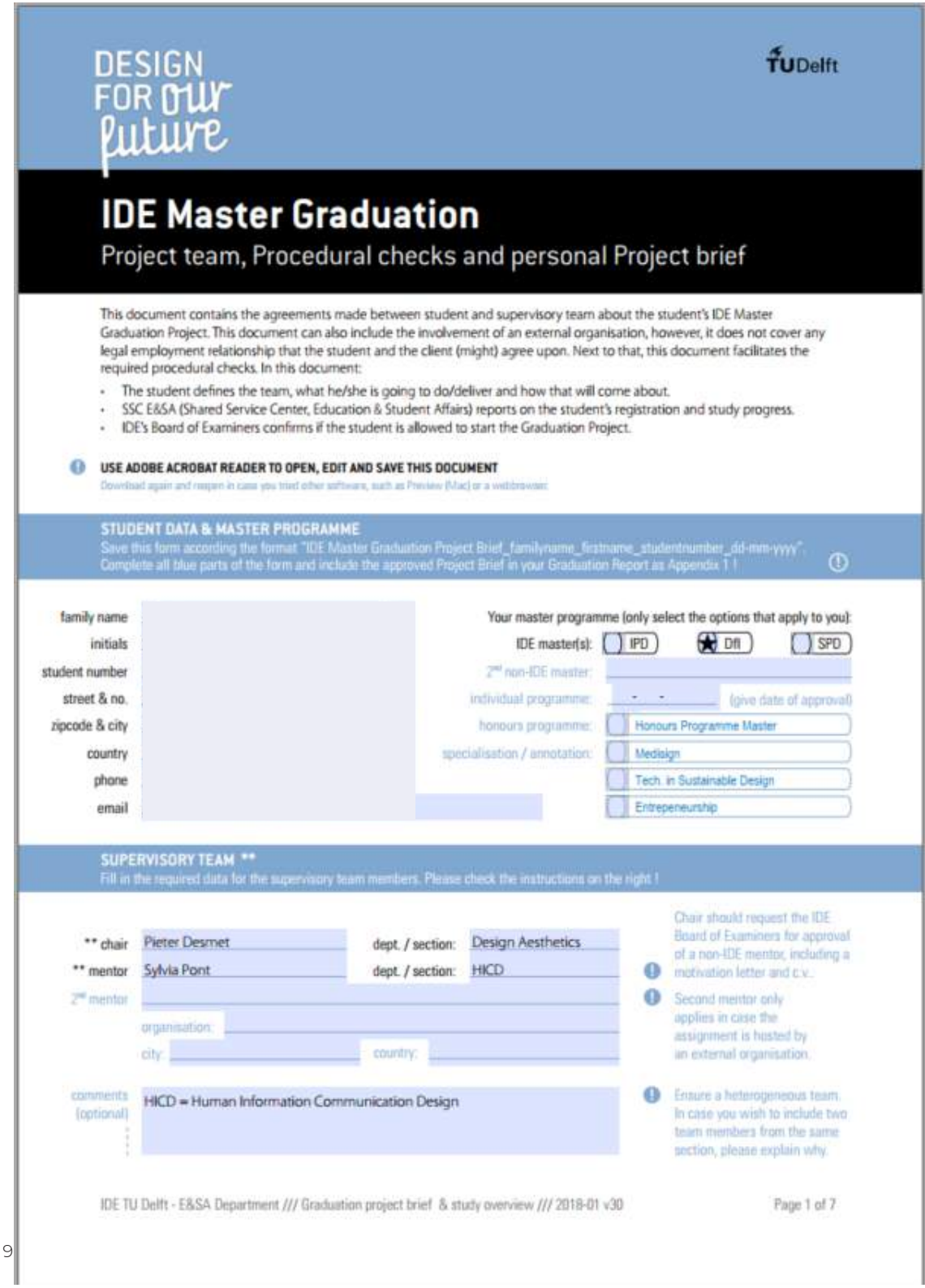
Slagter, H. A., Davidson, R. J., & Lutz, A. (2011). Mental training as a tool in the neuroscientific study of brain and cognitive plasticity. Frontiers in human neuroscience, 5, 17.

Visser, F. S., Stappers, P. J., Van der Lugt, R., & Sanders, E. B. (2005). Contextmapping: experiences from practice. CoDesign, 1(2), 119-149.

Zaccaro, A., Piarulli, A., Laurino, M., Garbella, E., Menicucci, D., Neri, B., & Gemignani, A. (2018). How breath-control can change your life: a systematic review on psycho-physiological correlates of slow breathing. Frontiers in human neuroscience, 12, 353.

Appendix

1. Project brief



DESIGN FOR our future

TU Delft

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 E&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

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

family name
initials
student number
street & no.
zipcode & city
country
phone
email

Your master programme (only select the options that apply to you):

IDE master(s): IPD | Dfl | SPD

2nd non-IDE master:

individual programme: - - (give date of approval)

honours programme: Honours Programme Master

specialisation / annotation: Medisign
Tech. in Sustainable Design
Entrepeneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair: Pieter Desmet — dept. / section: Design Aesthetics

** mentor: Sylvia Pont — dept. / section: HKCD

2nd mentor

organisation

city: — country:

comments (optional): HKCD = Human Information Communication Design

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

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.

IDE TU Delft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30

Page 1 of 7

Procedural Checks - IDE Master Graduation

TU Delft

APPROVAL PROJECT BRIEF
To be filled in by the chair of the supervisory team.

chair Pieter Desmet date 08 - 02 - 2021 signature Digitally signed by Pieter Desmet Date: 2021.02.08 18:17:08 +01'00'

CHECK STUDY PROGRESS
To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 30 EC
Of which, taking the conditional requirements into account, can be part of the exam programme 30 EC
List of electives obtained before the third semester without approval of the BoE

★ YES all 1st year master courses passed
NO missing 1st year master courses are:

name J. J. de Bruin date 10 - 02 - 2021 signature J. J. de Bruin, SPA Digitally signed by J. J. de Bruin, SPA Date: 2021.02.10 10:31:05 +01'00'

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)?
- 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 ?

Content: ★ APPROVED NOT APPROVED
Procedure: ★ APPROVED NOT APPROVED
comments

name Monique van Morgen date 16 - 02 - 2021 signature

Personal Project Brief - IDE Master Graduation

TU Delft

Exploration of light as a supportive medium for and around meditation — project title

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.

start date 08 - 02 - 2021 12 - 07 - 2021 end date

INTRODUCTION **
Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

The project will focus on using light to support someone in and around the meditation process. According to a report of NCHS [1] meditation is the fastest growing health trend in the US, and will continue to grow. One of the reasons for this grow is that we live in a fast paced world where a lot of different elements (work, personal relations, technology, social media) demand our attention, this constant stimulation and request for attention takes it's toll on our mental wellbeing. Especially at the moment of the Covid-19 pandemic, where we are confronted more with ourselves, we realize that our mental state determines for a big part our mental and emotional wellbeing.

Meditation has been increasingly researched and proves mental, physical and physiological benefits. [2] Meditation can have a significant effects on how people perceive and process the world around them and can alter their emotion regulation[3]. Findings in other [4] research suggest that the effects of meditation training on emotional processing might transfer to non-meditative states. This indicates meditation can result in enduring changes in mental function.

Meditation is often seen as something vague and spiritual, a habit that is connected to Eastern religion. The concept itself can be hard to grasp, because it is not something concrete you can hold in your hands. I think this is where I can have impact. By using light as a medium to make meditation more tangible. Using light to create a dynamic environment that can be applied in meditation. On the other hand I think light can be used to guide people in their behaviour and their emotional state and can thus also be used to motivate people to start meditating, but can also be applied to trigger a moment of meditative awareness to strengthen the link between the practice of meditation and everyday life at random moments during the day. The target group for this project will be people that are already practicing meditation, both long-term and short-term meditators, living in the Netherlands and above the age of 18.

As lighting will be the primary source of stimulation, I want to work on this element in a constructive manner. Through the project I will reflect on the appearance and atmosphere of the light, using the framework of Richard Kelly (see figure 1) and will continuously iterate on this in relation to the desired interaction, emotions and needs of the user, and the environmental factors.

(1) Clarke, T. C., Barnes, P. M., Black, L. I., Stussman, B. J., & Nahin, R. L. (2018). Use of Yoga, Meditation, and Chiropractors Among U.S. Adults Aged 18 and Over. NCHS data brief, (325), 1–8.
(2) Sharma, H. (2015). Meditation: Process and effects. Ayu ;36:233-7.
(3) Lippelt, D. P., Hommel, B., & Colzato, L. S. (2014). Focused attention, open monitoring and loving kindness meditation: effects on attention, conflict monitoring, and creativity–A review. Frontiers in psychology, 5, 1083.
(4) Desbordes, G., Negi, L. T., Pace, T. W., Wallace, B. A., Raison, C. L., & Schwartz, E. L. (2012). Effects of mindful-attention and compassion meditation training on amygdala response to emotional stimuli in an ordinary, non-meditative state. Frontiers in human neuroscience, 6, 292.

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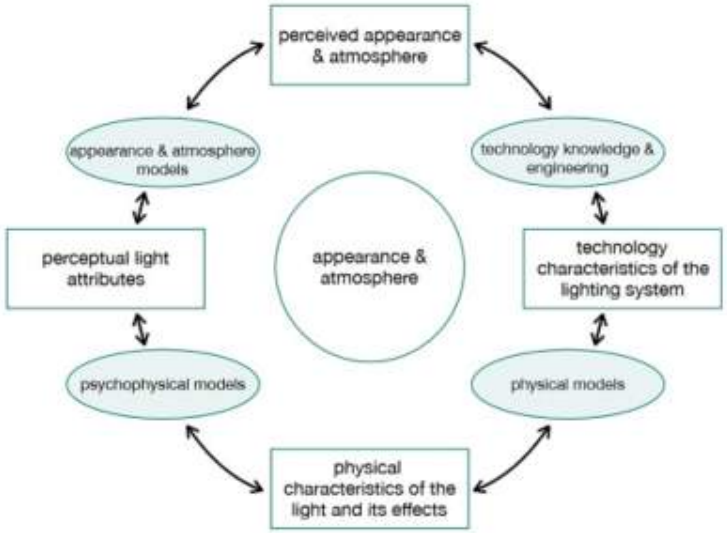


image / figure 1: Richard Kelly - Lighting framework

TO PLACE YOUR IMAGE IN THIS AREA:
- **SAVE THIS DOCUMENT TO YOUR COMPUTER AND OPEN IT IN ADOBE READER**
- **CLICK AREA TO PLACE IMAGE / FIGURE**

PLEASE NOTE:
- **IMAGE WILL SCALE TO FIT AUTOMATICALLY**
- **NATIVE IMAGE RATIO IS 16:10**
- **IF YOU EXPERIENCE PROBLEMS IN UPLOADING, COVERT IMAGE TO PDF AND TRY AGAIN**

image / figure 2:

Personal Project Brief - IDE Master Graduation

TUDelft

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.

Meditation is a broad concept and the effect meditation has depends on the kind of meditation that is practiced. Currently the three most researched types of meditation are: Focussed attention meditation (FAM), Open monitoring meditation (OMM) and Loving-kindness meditation (LKM).[3] The type of meditation that is most suitable and most preferred for a person will vary and, depending on the type of meditation chosen, this will influence the kind of effect that is experienced.

Besides the benefits of meditation, some problems regarding meditation have been adressed.[5] These problems ranged from difficulties learning and practicing meditation, hard time managing troubling thoughts, and even worse implications like an increase of suicidal thoughts. Therefore it is crucial for the project to investigate these problems and to see how they can be avoided as much as possible.

As meditation is so different for everyone, different types of meditation and individual experiences, it is key that I gather a lot of feedback from the users to find a suitable direction in the project and to make a product that works for as many as possible users. This will require short iterative phases, so I can quickly adapt to the received feedback.

(5) Lomas, T., Cartwright, T., Edginton, T., & Ridge, D. (2014). A qualitative summary of experiential challenges associated with meditation practice. Mindfulness, 2014, 1-13.

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 out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: 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.

I am going to investigate the underlying principles of meditation and light after which I will design, with short iteration steps, a product that uses lighting as a primary source for improving the meditation experience and the connection of meditation to everyday life.

In this project I will investigate the scientific side of meditation and lighting, looking into the perceptual, cognitive, emotional and environmental factors. With this knowledge a product will be designed that uses lighting as the primary source of stimulation, to improve the activity of meditation as well as the integration of meditation in everyday life.

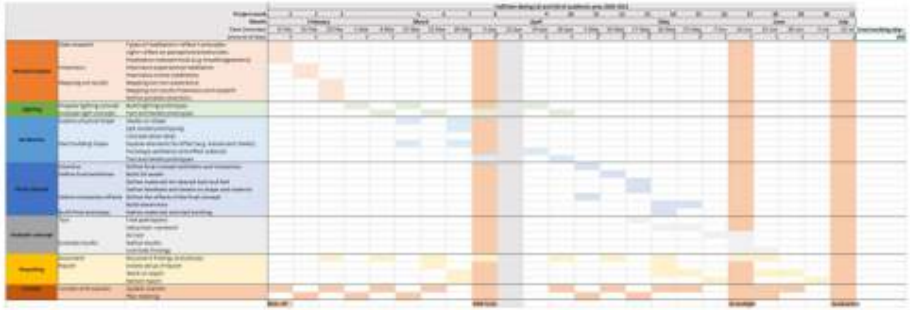
A big part of the project I will be exploring through prototyping with both physical as well as electronic prototypes. Based on the insights from the research phase I will start exploring various lighting effects (and possibly other elements) and gather feedback through short iteration phases. The insights will shape a desired interaction which will form the basis for the the functionalities and the aesthetics of the product.

In this project I aim to design a product that uses light to guide people in and around their meditative process. What this product is going to be or going to look like will emerge during the project. Light will be used as a starting point with the possibility of including more senses to stimulate. A lot of attention needs to be on experimental prototyping and the evaluating of these prototypes, in order to find the right interaction between user and product.

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 8 - 2 - 2021 12 - 7 - 2021 end date



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 specific tool and/or methodology, ... Stick to no more than five ambitions.

During my master Design for Interaction I have learned to analyse and understand the target user. This often resulted in a long analysis phase with extensive research, interviews and observations. I want to use this knowledge in my graduation project, but I want to focus more on the physical and electronical prototyping of the product. Comparable with the Interactive Technology Design course I want to start exploring the users needs and wishes using quick prototypes and iterate with user evaluation to generate a final concept.
A big part of the project I want to focus on final prototyping of the product and I want to deliver a product that is finalized. This means that there will be a lot of prototyping and testing of different materials and shapes. This kind of prototyping is something I have learned more in ZEN design, but I want to improve my skill in that area.
In the elective Design for Emotion I have learned how to design for and evaluate on the emotions of a user. I want to use this knowledge and insights for my graduation because I think the emotional respons of the users will be of great impact on the success of my project.

My personal motivation in designing is that I want to create a solution that improves peoples lives in a structural way. A solution that improve the user's overall wellbeing. I found this improvement for myself in meditation, a ritual I have applied in my own life for a couple of years. Meditation is something that I always found hard to apply and hard to find the motivation or guidance for to apply in the right way. But when I created a habit of meditation and found a usable guidance (Waking Up app from Sam Harris), meditation proved it's benefit for me, and I think it can provide the same benefits for a lot of people. It gave me more control over my thoughts, emotions and physical being. It helps me to deal with for example stress and anxiety in a way I have never felt before. I think that through making meditation more applicable and tangible I can help people to find their connection to themselves and want to use light to create a better connection and appliance of meditation in people's everyday life.

Knowledge I want to expand and apply in the project
- Understanding about the different kinds of meditation, the principles behind them and how to apply this knowledge in a tangible way.
- Understanding about lighting and its effect on emotions, perception and

The skills I want to use that I own
- User and context understanding
- Designing with the emotion, perception and experience of the user
- Prototyping skills - Research through design

Skills I want to grow (That I did not master)
- Prototyping of a complete complex product
- Programming of the product
- Doings short iteration phases in prototyping and gathering feedback to build upon
- Managing a long project with short iterative phases and to make in-time decisions ensure a finalized product.
- Writing in a structured manner to communicate better what I want to say.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

2. Interview questions

Opmerkingen

Product-gebruiker interactie
Vragen over of de gebruiker Prana begrijpt, de lichteffecten en de interacties.

User manual
Is de user manual duidelijk?

Interacties
Is het apparaat intuïtief te gebruiken?
1 2 3 4 5 (= erg intuitief, kleine leercurve)

Lichteffecten
Begreep je de manier waarop het apparaat met je communiceert? Transitie, ademen, focussen, lichtshow?
1 2 3 4 5 (= erg intuitief, kleine leercurve)

Motivatie
Denk je dat dit apparaat je helpt om vaker te mediteren? Zo ja, waarom?

Zou Prana binnen jouw meditatieritueel passen? Waarom wel/niet?

Zou het meditatie laagdrempelig maken voor jou?

Personalisatie
Heb je het gevoel dat je controle hebt over het apparaat?

Esthetisch
Vragen over de esthetiek van Prana, zowel de lichteffecten als het fysieke ontwerp.

Prana en meditatie
Vind je Prana passen bij meditatie? Zo ja, waarom?
1 2 3 4 5 (= Ja, zeker)

Fysieke ontwerp
Vind je het ontwerp aantrekkelijk?
1 2 3 4 5 (= Ja, zeker)

Lichteffecten
Vind je de lichteffecten aantrekkelijk?
1 2 3 4 5 (= Ja, zeker)

Pasten de lichten bij de verschillende functies? Waarom wel/niet?

Functioneel
Vragen of het apparaat werkt? Welke effecten heeft Prana? Werken de functies?

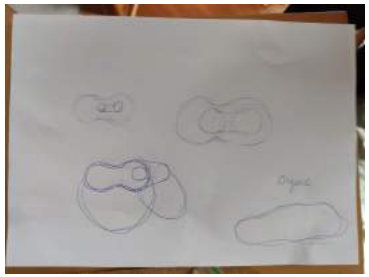
Kalmerend
Heeft Prana een kalmerende werking op je?
1 2 3 4 5 (= erg kalmerend)

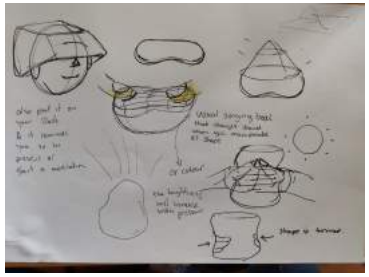
Focus
Helpt het apparaat je om te focussen?
1 2 3 4 5 (= Ja heel erg)

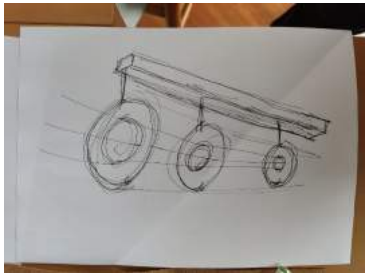
Moment
Trekt het lichteffect van moment genoeg je aandacht?

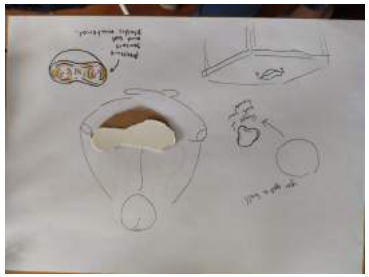
Denk je dat de moment modus je helpt om meditatie meer in je leven te integreren?

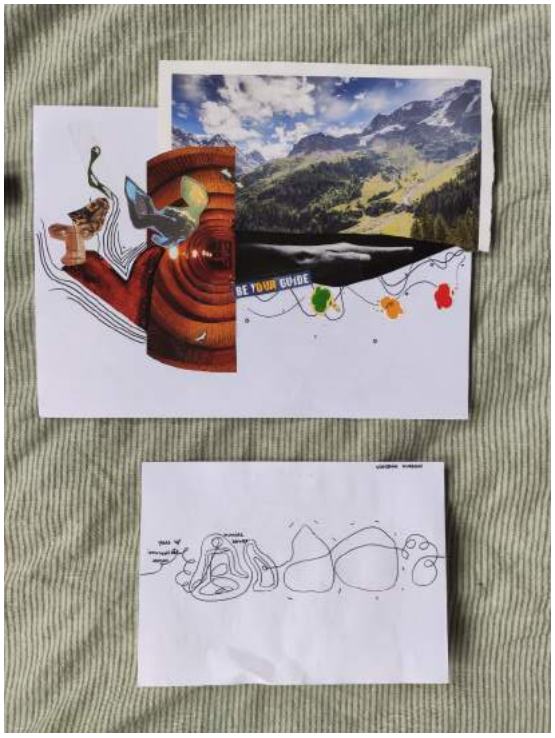
3. Outcomes generative session







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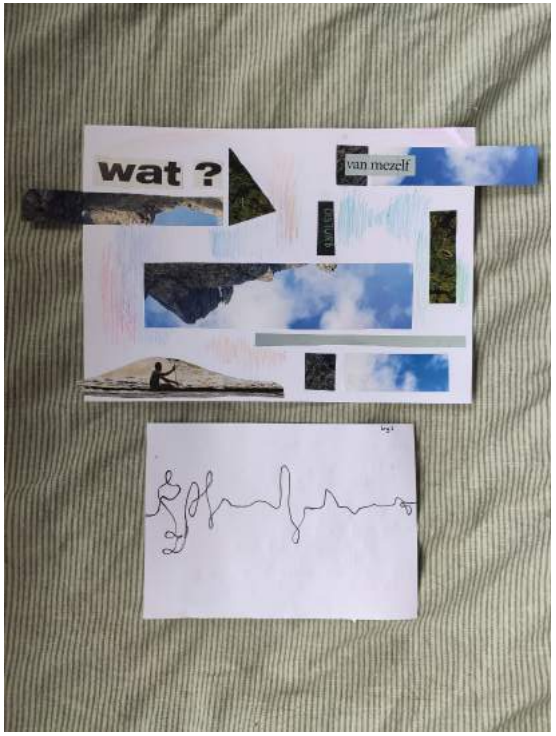
wat ?
van mezelf


Light up your day