Master thesis

BOOSTING CONFIDENCE IN TEAMWORK THROUGH EMBODIED EMOTION

Hannah van de Ree

Design for Interaction
Faculty of Industrial Design Engineering
Delft University of Technology

TU Delft Delft University of Technology

Self-confidence in teamwork through embodied emotion
A design intervention to enhance students' sense of self-confidence during brainstorming sessions.

Master thesis
Design for Interaction
Faculty of Industrial Design Engineering
Delft University of Technology

Author
Hannah van de Ree

Supervisory team
Chair | Prof.dr.ir. P.M.A. Desmet
Delft University of Technology
Faculty of Industrial Design Engineering
HCD

Mentor | Dr. G. Huisman
Delft University of Technology
Faculty of Industrial Design Engineering
HCD

July, 2025

PREFACE

Dear Reader,

I am proud to present my final project for my Masters, Design for Interaction, which investigates the role of self-confidence in teamwork experiences of Industrial Design Engineering (IDE) students. It explores a way to use embodied emotion to evoke a feeling of reassurance and ease in moments of insecurity to create an environment in which students are encouraged to grow into their full potential.

This project offered me the exciting and challenging opportunity to immerse myself in various topics I am passionate about, most of all designing for a positive impact on emotional wellbeing. Being someone with a personal interest in positive design and having struggled with self-confidence for a big part of my life, this topic felt very dear to me. I am very grateful to all the people who provided me with their invaluable support to embark on this learning journey.

First of all, I would like to thank my team of supervisors, Pieter and Gijs, for their inspiring feedback and support throughout the whole project. Our meetings were always opportunities to sharpen my critical thinking, and left me with inspiration and motivation for the next steps, helping grow both my project and me as a designer.

Also, a big thanks to all my peers who were part of the process in one way or another, whether they participated in my research or evaluation sessions, or offered me their listening ear and view on my ideas. A special thanks to Gayathri, with whom I was able to organise an inspiring creative research session in the User Research phase.
You all have made this project truly meaningful, and I absolutely couldn't have done it without you.

This thesis has been a challenging but very rewarding experience and I hope can contribute to the ongoing efforts of positive design for emotional well-being.

With heartfelt gratitude,

Hannah van de Ree

EXECUTIVE SUMMARY

This report presents the process, findings and outcomes of the project titled "Boosting self-confidence in teamwork through embodied emotion", conducted as part of the Master's degree in Industrial Design Engineering at TU Delft. It describes the design process that led to a design intervention that fosters a sense of calm and reassurance during moments of insecurity during team brainstorming sessions of Industrial Design Engineering (IDE) students. Enabling and supporting the individual in the team to feel welcome and at ease, improving their emotional well-being by providing them with a moment of rest in a passive state to reduce their anxiety levels via self-soothing, so they feel confident again to switch to an active state.

Background and motivation

Teamwork is a big part of society, and teams are seen as essential to effective collaboration at work and in educational environments. Effective teamwork is dependent on a variety of factors, one of which is the interplay of emotions. Self-confidence is an emotion that can benefit the individual by making them feel secure and at ease, believing in themselves and their abilities.

Circumstances and factors such as team dynamics can cause a student to experience moments of insecurity. This project aims to understand the needs, difficulties, and overall experiences of Industrial Design Engineering (IDE) students with moments of insecurity during teamwork activities. Taking the theory of embodied emotion as inspiration, the goal of the project was to design an intervention that could boost their feeling of self-confidence through tactile sensations in such moments.

Research approach

The project started off with a comprehensive literature review to understand the role of self-confidence in design teams, defining the subjective experiences and behavioural expressions that make up self-confidence. A clear gap in concreteness was discovered, highlighting the need for insights about the experiences of the target group.

Key findings

Through a series of qualitative research activities with the target group, it was discovered that moments of insecurity occurred mainly during brainstorming sessions, when students felt unheard or undervalued. This caused them to switch to a negatively connotated, passive participation state in which they begin to lose passion for the project, following others without expressing their own opinions, while feeling tense and uncomfortable. In contrast to self-confidence, which was described as feeling calm and in control, not being afraid to take up space, both with their input as well as with their body language.

Design goal and process

Based on the research findings, the following design goal was formulated:
To enable and support the individual in the team to feel welcome and at ease, improving their emotional wellbeing by providing them with a moment of rest in a passive state to reduce their anxiety levels via self-soothing, so they feel confident again to switch to an active state.

Designing a playful tool that provides them with a way of self-soothing, offers a subtle way to embrace these moments of retreat, while simultaneously encouraging them to switch back to an active state whenever they feel ready.
Through an iterative process of ideation, tactile exploration and evaluation, the concept of a chair was developed. The final design aspires to normalise moments of calm, providing the user with sensory comfort through a playful interaction that evokes a feeling of safety and reassurance. In this way, an object that is always present as a physical support can now also function as a mental support in times of insecurity.

Conclusions and future recommendations

A final evaluation showed that the design successfully evoked sensory comfort through playful interactions, with associations with safety and relaxation. However, further refinement is needed to enhance its effectiveness in portraying encouragement for an active state and not only a passive one.

Overall, this thesis aims to provide valuable insights into the experiences, needs and values of IDE students concerning self-confidence and teamwork, and the potential of a design intervention to tackle a part of the discovered issues. Aspiring to contribute to the well-being of students in teamwork environments, and normalise moments of rest in a passive state. By using a playful, calming tool to ultimately enhance their brainstorming experiences, the sense of self-confidence in teamwork of individuals is enhanced by embodied emotion.

Table of Contents

1.

Chapter 1

INTRODUCTION

This Chapter sets the stage by presenting an overview of the project topic, target group, the approach, purpose and aim. It will touch upon the reason for starting this project and the initial project goal and focus, which will be further explored in Chapters 3 and 4.

1. INTRODUCTION

Teamwork is a fundamental part of our lives. It is present in our jobs, our families, friend groups, sports; wherever two or more people are working together towards a common goal. Teams are essential to effective collaboration and play a great role in work and educational environments (Ayoko & Pekerti, 2008; Huang & Lajoie, 2024).
However, good teamwork does not always come naturally. "*It is a synergistic process that relies upon all team members to contribute and participate in order to promote and nurture a positive, effective team environment*" (Luca & Tarricone, 2001).

While there are 'visible skills' contributing to good teamwork, such as technical skills or for example time management, teamwork is also dependent on 'invisible skills'. These invisible skills, such as communication and managing one's emotions, contribute to the social interplay of different personalities working together towards a common goal (Luca & Tarricone, 2001).
Emotions, like self-confidence or insecurity, unfold naturally during collaborative interactions and influence team dynamics and individual experiences. Self-confidence is one of the social emotions necessary for cooperation (Barbalet, 1996) and it can help encourage one to take risks, take matters into own hands and believe in oneself and one's abilities (Barbalet, 1996; Messaoud, 2022)
The purpose of this project is to explore the role self-confidence plays in the lives of Industrial Design Engineering (IDE) students, and investigate how the lack of this emotion plays in their academic activities that involve teamwork.
It will take inspiration from the theory of embodied emotion (Price & Harmon-Jones, 2015), researching how bodily manipulations could alter emotional and motivational responses, and how this could help with emotional regulation.

This target group is specifically relevant as their studies largely involve group projects and teamwork assignments. As young designers, group projects are places full of potential to explore what it means to them to be a designer. It can be an environment where different minds and personalities come together to build something great. Each with their own strengths, abilities and perspectives, building onto each other, achieving what no person can do alone.
However, different ways of thinking can lead to friction and misunderstandings, or, on the other hand, avoiding discussion altogether can lead to unbalanced team dynamics. Some voices might be louder than others, expressed opinions can lead to unintended hurt, causing people to disappear into the background, keeping still to avoid further hurt. This passive attitude could prevent them from cultivating their qualities in a place so critical to their development, where they shouldn't be afraid to make mistakes, because that is how they will grow (Rocca, 2009).

In this project, a comprehensive approach is taken, combining both empirical and theoretical research methods. To start, a literature study is conducted to establish a theoretical foundation. Complemented by active involvement of the target group through Contextmapping via generative research (Visser et al., 2005). Additionally, the project is moved forward by a research through design approach, designing and developing rough models and prototypes to gain insights and generate new knowledge (Stappers & Giaccardi, 2014).

With this thesis project, I hope to shed light on how and what causes students to experience a lack of self-confidence during teamwork. The aim is to understand what it means to them to feel self-confident and what they truly value and need in moments of insecurity.
Through research, this project aims to make a tool to enable and support the individual in the team to feel welcome and at ease, improving their emotional wellbeing by boosting their feelings of self-confidence in moments of insecurity to unlock their full potential and help them grow into the designer they aspire to be.

2.

Chapter 2

BACKGROUND

In this chapter, a comprehensive literature review is presented, exploring various concepts around confidence, such as the importance and role of confidence in teamwork, the different kinds of confidence, and sensations, feelings, and behaviours related to self-confidence.
This was done with the goal to build a solid foundation for this project, to gain a deeper understanding of self-confidence and its role in our lives.

2. BACKGROUND

The literature review was driven by several key questions aimed at understanding the emotion self-confidence and its role in teamwork. These questions were formulated to guide the research and form a solid foundation for the project:

Research questions:

- *What is the role of self-confidence in teamwork, and why is it important?*
- *How does science define confidence?*
- *What feelings, sensations and behaviours define self-confidence?*
- *How can the principle of embodied emotion be used to boost confidence?*
- *What experiments with embodied emotion en confidence have been done?*

To gain a deeper understanding of self-confidence and its role in functioning in a design team, the research started with the investigation of existing literature on the topic: Self-confidence in teamwork. First, by investigating the role it plays in the quality and experience of teamwork, followed by an exploration of the definition of 'emotion'. Continuing with the examination of the the psychological and psychological aspects of the emotion 'self-confidence', characterizing the related feelings, sensations and bodily behaviours that play a role in the experience of self-confidence. Concluding with a brief look at embodied emotion and how it might play a role in the development of the intervention emerging from this design project.

2.1 ROLE OF CONFIDENCE IN TEAMWORK

Teamwork is a big part of society. Teams are seen as essential to effective collaboration at work and in educational environments (Ayoko & Pekerti, 2008; Huang & Lajoie, 2024) and are used in many areas of daily life. For students, it is often a big part of their studies, therefore it is important that they feel comfortable to fully participate so that they can learn necessary skills for their future careers (Rocca, 2009).

2.1.1 FACTORS INFLUENCING TEAMWORK

There are multiple factors contributing to good teamwork, ranging from visible to invisible. Visible skills include amongst others technical skills like programming, or more generic skills, like time management and problem solving. Invisible skills include team skills like communication and managing one's emotions (Luca & Tarricone, 2001). Teamwork is after all a social interplay of different personalities working together towards a common goal. Each person with their own strengths and abilities, as well as emotions. This exchange of ideas and skills happening during teamwork is "*influenced by the interplay of emotions, be they positive or negative, that naturally unfold during collaborative interactions*" (Huang & Latoie, 2024).

2.1.2 A SOCIAL EMOTION

One of these emotions is the feeling of confidence (Barbalet, 1993). It can be defined as "*a feeling of security about yourself or your abilities as well as an acceptance of negative feelings such as fear, anxiety or insecurity towards certain situations or people*" (Messaoud, 2022). Barbalet (1996) called it one of the three social emotions necessary for "*the social processes of agency, cooperation and organization*". It encourages one to take risks, take matters into own hands and believe in oneself and one's abilities (Barbalet, 1996; Messaoud, 2022) In other words, confidence has a great impact on the effectiveness of teamwork. However, many factors can cause people not to feel this way during these kinds of social activities.

2.1.3 STATE OR TRAIT

As Revele & Scherer (n.d.) explain in their paper, emotions are related to personality. They describe personality as "*the coherent patterning of affect, behavior, cognition, and desires (goals) over time and space*" and emotion "*an integration of feeling, action, appraisal and wants at a particular time and location*". Using an analogy to describe this relation, personality can be seen as the climate and emotion as the weather. One is what can be expected, because of what is normally present throughout time and space, while the other is what can be observed at any particular moment.
This means that there are people who generally have a lot of self-confidence in their daily lives (as a trait), and people who have less, but, but that all of them still can feel a lack of confidence in certain circumstances (as a state) (Figure 1). It is therefore important to clarify that this project focuses on those moments in which an individual experiences a state of insecurity, to design an intervention that helps them regain a feeling of self-confidence.

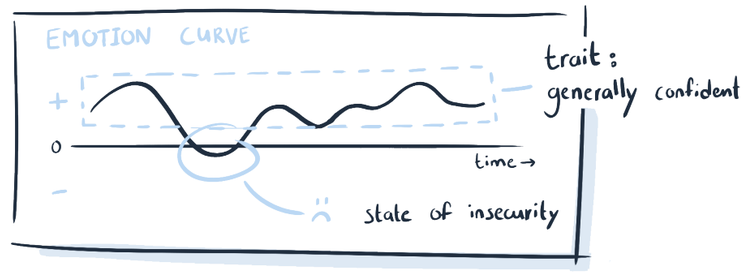


Figure 1: Differences between state and trait

2.2 WHAT IS CONFIDENCE?

2.2.1 DIFFERENT COMPONENTS OF CONFIDENCE

To design this intervention, aspects of the emotion were analysed to explore what defines confidence. Barbalet (1993) explains how emotions often consist of the following components: "*a subjective component of feelings, a physiological component of arousal or bodily sensation and an impulsive or motor component of expressive gesture*" (Barbalet, 1993).
He discusses specifically self-confidence, which he categorises as a confidence in oneself which indicates a willingness to act. According to Barbalet (1993) the tone and content of self-confidence is experienced subjectively as well as expressed behaviourally. "*Those who feel confident are likely also to report bodily sensations of muscular control, deep and even breathing and other sensations of well-being*" (Barbalet, 1993).

Next to self-confidence, there are related subcategories of the overall emotion confidence, such as self-esteem and self-efficacy (Bandura, 1977; Barbalet, 1993; Messaoud, 2022). There are varying definitions of those concepts, sometimes used interchangeably, but self-esteem is overall described as how people feel about themselves and how they view their self-worth and value (Messaoud, 2022, Winch & Rosenberg, 1965), while self-esteem is described as an individual's beliefs about their capacity to handle future situations (Bandura, 1977). This future-orientation is where it slightly differs from self-confidence. Self-confidence is generally described as a belief and trust in oneself and one's capabilities (Messaoud, 2022; APA Dictionary of Psychology, n.d.) and is therefore more present-focused based on previous experiences. Next to having confidence in one-self, one can also have confidence in others, meaning that they have and trust in the other and the other's capabilities ("Confidence," 2025).
As mentioned before, this project mostly focusses on designing an intervention aimed to boost feelings of confidence in one-self in a state of feeling insecure. Therefore, mainly aspects of the concepts of self-confidence and self-esteem will be explored in this literature review.

Feelings of self-confidence

- **Acceptance and recognition**
  This confidence in one-self and the willingness to act, is grounded in 'evidence' or 'knowledge' one has about one's own capabilities. In other words, Barbalet (1993) argues that the more one is sure one has the abilities to succeed in a goal, the more one is confident in oneself. This 'evidence' and 'knowledge' is according to him, gathered by receiving acceptance and recognition from peers. The more one has received this, the more likely one will be inclined to engage in future interactions.
  These characteristics are also captured by the theories of Collins (1981) and Scheff (1988). Collins (1981) talks about 'emotional energy' and how this is generated when they receive acceptance in a relation which will manifest in confidence accompanied by feelings of warmth and enthusiasm. Scheff (1988) talks about being rewarded with pleasant emotions such as "*pride and fellow feeling*". Barbalet (1993) sees pride in this case as a form of self-confidence. Rejection, on the other hand, can lead to shame, embarrassment and humiliation (Barbalet, 1993).

- **Trust and security**
  These theories are confirmed by Murray and Lesser (2006), who mention that self-confidence is even more boosted when one receives social approval when achieving a challenge. They define confidence as having 'firm trust' that something will go well. Not being afraid that something will fail, but being sure that it will turn out good. They see self-confidence as a subcomponent of general confidence and characterise it as something that comes from a sense of belonging and safety, while having trust that one has the right skills to belong. They further illustrate this by arguing how people on the autism spectrum often fear getting things wrong, which can lead them to not feeling confident because they do not trust their own skills. Murray and Lesser (2006) reason that overcoming challenges can therefore heighten self-confidence: "*Every challenge met successfully is a boost to self-confidence and a live lived successfully*." Especially if those successes also earn social approval (Murray and Lesser, 2006).

> ***Something that comes from from a sense of belonging and safety***
>
> - Murray & Lesser (2006)

Additionally, Messaoud (2022) confirms this social aspect as well by saying: "*Self esteem can be developed through positive experiences in life, such as being praised by others or receiving compliments from family members*". He argues that self-confident people have trust in themself and their abilities, and adds that they can also accept negative feelings evoked by mistakes, failures and shortcomings. A feeling of security knowing that those do not diminish their values and abilities. According to Messaoud (2022) this feeling of security can grow through positive experiences such as receiving praise or compliments from relatives. As well as through good habits like a healthy diet or regular exercise. In essence a general wellbeing of one's mind and body.

Bodily behaviour

- **Posture**
  There are multiple factors of body language that can indicate whether someone feels self-confident and at ease, starting with posture. Self-confidence is shown when people sit and move in an upright position with their chest expanded and head held high (Kuhnke, 2016; Briñol et al., 2009; Nair et al., 2014). In contrast to a slumped position, which suggest a lack of interest or anxiety (Kuhnke, 2016; Briñol et al., 2009; Nair et al., 2014). Crossed arms also indicate detachment while an open posture show that one values what is being said (Kuhnke, 2016) .

- **Eye contact and facial expressions**
  Next to posture, other aspects of body language also play a role in confidence. Averted eyes and little eye contact are according to Kuhnke (2016) signs of discomfort, while speaking with a calm smile and around 65% eye-contact let others believe that one is in control of their environments. This also shows that they are willing to listen and take an interest in what the other is saying. Other behaviours that show a lack of confidence and ease are as stated by Kuhnke (2016): "*frowning, tense lips and chewing on objects such as lips and fingers*."

- **Gestures**
  Calmness is also important in one's gestures. Kuhnke mentions that people who show that they are confident appear to be in control of their movements by keeping them simple and clear, no higher than the shoulders. They are "*fluid, open and slow*" which "*suggest receptiveness and affability*" (Kuhnke, 2016). Bartalet (1993) confirms this by mentioning that "*those who feel confident are likely also to report bodily sensations of muscular control, deep and even breathing and other sensations of well-being*."

Breathing exercises can be used to reduce anxiety and achieve a relaxed state (Ihunwo, 2023). While shallow and rapid breathing are signs of negative states (Kuhnke, 2016) and can lead to more anxiety and tension (Ihunwo, 2023).

Some of these characteristics are shown in Figure 2.

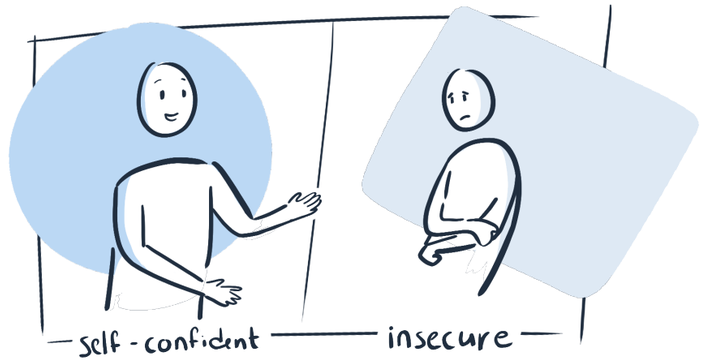


Figure 2: Differences between confident and insecure bodily behaviour.

2.3 EMBODIED EMOTION

As we now can conclude, emotions are noticeable in our bodies both mentally as well as physically. There are multiple theories about how emotions arise. Some say that cognitive responses are caused through perceptions of changes in bodily sensations, like rapid breathing and sweating, such as the James-Lange theory (James, 1894). Others argue on the other hand, that the emotion and the physical response are not dependent upon the other, but occur simultaneously, as is argued in the Cannon-Bard theory (Cannon, 1927).

What most agree on, is that emotion is an interplay of cognitive processes and bodily sensations. After comparing multiple theories in their studies, Kleinginna & Kleinginna (1981) came to the following definition: "*Emotion is a complex set of interactions among subjective and objective factors, mediated by neural~hormonal systems, which can (a) give rise to affective experiences such as feelings of arousal, pleasure/displeasure; (b) generate cognitive processes such as emotionally relevant perceptual effects, appraisals, labeling processes; (c) activate widespread physiological adjustments to the arousing conditions; and (d) lead to behavior that is often, but not always, expressive, goaldirected, and adaptive*."

Or as Barbalet (1993) describes it: "*a subjective component of feelings, a physiological component of arousal or bodily sensation and an impulsive or motor component of expressive gesture*".

There have been studies on the concept, using the priciple of embodied emotion, researching how bodily manipulations can alter emotional and motivational responses (Price, & Harmon-Jones, 2015). This indicates that if bodily sensations and behaviour were to be manipulated to simulate sensations related to certain emotions, such as confidence, this could contribute to regulating these emotions which prove to be beneficial to effective teamwork. In other words, instead of feeling a bodily sensation because of feeling confident, feeling confident because of a simulated bodily sensation.

An example of this, are the multiple studies investigating the relationship between posture and self-confidence, such as the one from Briñol et al. (2009). They asked people to write down positive and negative aspects about themselves in both a confident (which they describe as "*back erect with chest pushing out*") and a doubtful posture ("*slouched forward with back curved*"). The results showed that when students wrote positive aspects in a confident posture, they rated themselves more highly then when they did in a doubtful posture (Briñol et al., 2009).

Similarly, Cuddy et al. (2015) agrue that adopting a confident pose prior to a job interview results in a higher rating in hireability and "*boosted feelings of power, confidence, self-esteem, risk tolerance, mood, action orientation, pain tolerance, testosterone, and reduced feelings of fear and levels of cortisol (i.e. stress)*" (Cuddy et al., 2015).
Comparable effects have been found on seated positions. Nair et al. (2014) found that participants in an upright seated position showed much more positive results in stress and emotional responses, such as a better mood and higher self-esteem. They concluded that adopting such a posture can help individuals boost their confidence and be more resilient to stress.

However, it is important to note that there has been some debate mainly about the study of Cuddy et al. (2015), questioning it's trustworthiness and replicability (Loncar, 2021; Chivo, 2016). These studies (Briñol et al., 2009; Cuddy et al., 2015; Nair et al., 2014) do support the observation that people who feel self-confident often have an upright, open posture at that moment, but it is not a proven fact that adopting such a posture also causes the person to automatically feel more confident.

This idea that emotions are not solely in the head, but more of a holistic experience, a combination of body and mind, formed the starting ground of this project. It sparked my interest to investigate the possibility of designing an intervention that would make use of the principle of embodied emotion to provide IDE students with a boost of self-confidence during teamwork.

2.4 CONCLUSION AND PROJECT IMPLICATIONS

It has shown that self-confidence consists of subjective experiences combined with behavioural expressions. These subjective experiences include feelings of security and safety, acceptance which leads to trust (in one-self), and relaxation, which are accompanied by physical behaviours such as adapting an upright, open posture, eye contact with calm and friendly facial expressions, and calm, fluid and open gestures combined with deep and even breathing.

These findings helped form guidelines to focus on when exploring how an intervention can contribute to evoking a state of self-confidence, by building on the found behavioural and experiential characteristics:

- *Providing safety and security*
  Use characteristics of what makes people feel safe and secure in an intervention. This could for example mean simulating a comforting hug with temperature and pressure. When these feelings are heightened, the user might feel more at ease to participate in group work settings.

- *Providing acceptance and trust (in oneself)*
  Develop an intervention that will give the user a rewarding feeling to simulate the praise of others. Research found that acceptance of others helps people to feel more confident to participate (Barbalet, 1993; Collins, 1981; Scheff, 1988).

- *Providing ease and relaxation*
  Use characteristics of what makes people feel at ease and relaxed. An example of this could be simulating breathing exercises. It could also mean to investigate what contributes to making calm and fluid gestures.

- *Providing an upright, open posture*
  This could mean designing an intervention that holds a body in such a position, like a brace.

However, these findings are still considerably vague. There seems to be very little research done on what concrete bodily sensations and behaviour define self-confidence. Even the definitions of the different kinds of confidence, like self-esteem and self-confidence, are used interchangeably and sometimes overlap greatly. Therefore, I believe it is important to investigate experiences of the target group, to find out concrete, real-life examples of what self-confidence means to them and how it affects them in their daily lives. This will help me define a specific design goal and context to target the time available for the project.

3.

Chapter 3

USER RESEARCH

This chapter goes into detail about the research methods and activities involving the target group, with the aim to deepen the insights gained from the literature review. It discusses the methodology, participants details, and key themes identified from the sessions, helping in further defining the scope of the project, as will be explained in the next chapter.

3. USER RESEARCH

Examining what has already been found by science through a literature review gave an overview of the psychology behind confidence, its role and importance in daily life and its related subjective experiences combined with physical behaviours.
However, missing concrete examples and information about how (a lack of) self-confidence affects IDE students during teamwork activities led to the formulation of several research questions. These helped guide my research about sensations, feelings and behaviours related to self-confidence, as well as give me concrete examples of situations that affect IDE students' self-confidence.

3.1 RESEARCH QUESTIONS

- *How do IDE students experience (a lack of) self-confidence during teamwork?*
- *What causes them to experience (a lack of) self-confidence during teamwork?*
- *How does this affect their mental state and behaviour during these kinds of activities?*
- *How can a design intervention support IDE students in times when they would want to feel self-confident but are unable to?*

Using qualitative research methods, investigating this set of questions, I hoped to build a more concrete and deeper understanding of the experiences of IDE students with (a lack of) self-confidence during teamwork activities. This research functioned to support the development of design interventions aiming to provide IDE students with a boost of self-confidence to improve their overall well-being.

3.2 METHODOLOGY

The total user research consisted of a generative research session and a creative research session, of which the test plans can be found in Appendix A.
The generative research session was held to gain deeper insight into the experiences IDE students have with (a lack of) self-confidence in teamwork environments. This session was founded on the guidelines for generative research provided by Sanders & Stappers (2012). Meaning that the exercises were built around the 'path of expression'. This method relies on what Sanders and Stappers (2012) call 'say', 'do', and 'make' exercises. These function as tools to access the participants' latent needs, values, and thoughts, and to get a clearer understanding of the experiences of the participants by gathering qualitative data.

The creative session was organised with the help of a peer doing a project on a similar topic. The main purpose of this session for this project was to observe students' behaviour in a teamwork context. This was done by asking them to do a teamwork task and having a discussion afterwards to compare students' experiences of teamwork quality.

For both sessions, participants were asked to sign an informed consent form (see Appendix B). Participation was voluntary, and no compensation was offered. Data was gathered through audio recordings and photos with the consent of the participants, in order to be transcribed and analysed in a later stage. Each session had a duration of around 1.5 - 2 hours.

Generative research session

5 participants (4F, 1M)
± 1,5 hours

Creative research session

9 participants
± 1,5 hours

3.3 PARTICIPANTS

To create an intimate, inviting atmosphere that encouraged open-hearted conversations, the generative research session was held in two rounds with small groups. One with two students and a second one with three (Table 1). For the creative research session, there were three groups three students each (Table 2). The participants were recruited through online and offline channels, making use of convenience sampling. There was no overlap in participants of the Generative research session and the Creative research session. They only participated in one session or the other.

Table 1: Overview of participants Generative research session:

	Participant ID	Age	Gender	Year of study
Group 1	G1	25	Female	3rd year of Masters
	G2	25	Male	2nd year of Masters
Group 2	G3	22	Female	2nd year of Masters
	G4	26	Female	2nd year of Masters
	G5	25	Female	2nd year of Masters

Table 2: Overview of participants Creative research session:
(note: some data was not provided by some of the participants)

	Participant ID	Age	Gender	Year of study
Round 1	C1	26	Female	2nd year of Masters
	C2	24	Male	2nd year of Masters
	C3	-	Female	Bachelors
Round 2	C4	23	Female	1st year of Masters
	C5	23	Male	Graduated
	C6	25	Female	2nd year of Masters
Round 3	C7	26	Female	2nd year of Masters
	C8	-	Male	2nd year of Masters
	C9	-	Male	2nd year of Masters

3.4 GENERATIVE RESEARCH SESSION

3.4.1 SENSITIZING

The path of expression (Sanders & Stappers, 2012) encourages starting with an activity that asks the participants to observe and document their current activities around the topic of the study. That is why a sensitising booklet was created in which the participants were asked to reflect on a recent teamwork activity, identify what kind of team worker they usually are, and rate activities concerning teamwork to show how confident they normally feel during those (Figure 3). This did not necessarily have the aim to provide data, but more to trigger the participants to start reflecting on their feelings during group work. By reflecting beforehand, they can give more detailed, thought-through answers which will allow the conversation to go beyond superficiality.
The template of the sensitizing booklet with the results from the participants can be found in Appendix C.

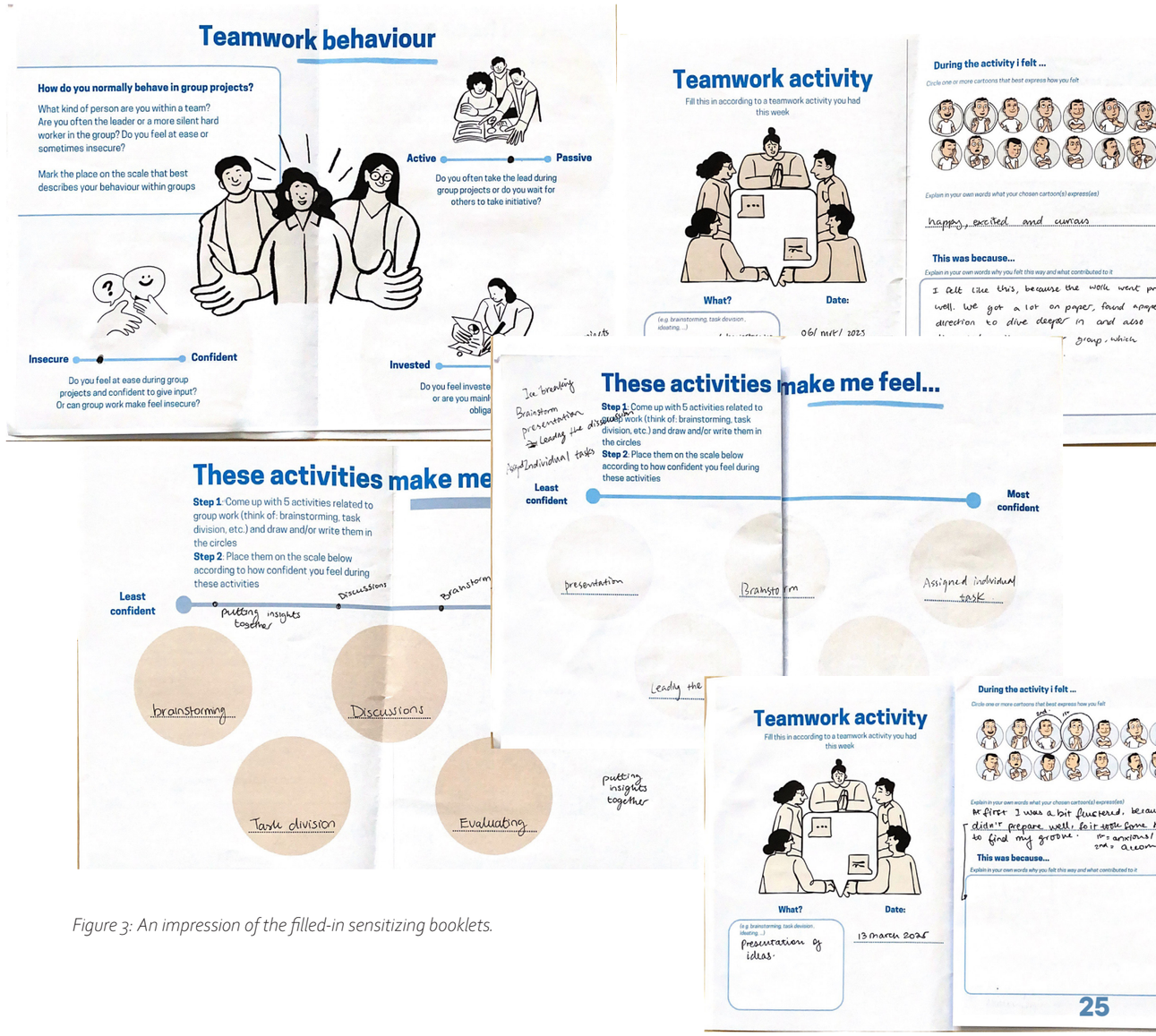


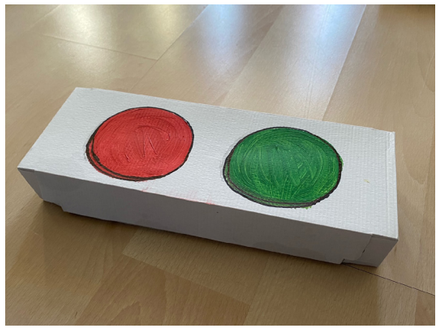
Figure 3: An impression of the filled-in sensitizing booklets.

3.4.2 ACTIVITIES

The session started with an icebreaker to provide the participants with a space in which they felt comfortable enough to share their honest opinions and experiences. The activities following the icebreaker are explained in Table 3.
To support their expressions in the exercises, a toolbox with triggersets was provided (Figure 4). This toolbox contained a variety of pictures and words; varying content, abstraction and aesthetics in line with the guidelines from Sanders & Stappers (2012). The triggersets and other templates used can be found in Appendix D.

For Activity 2, as mentioned in Table 3, a series of props were used. These props were meant to spark ideas about what qualities in teamwork scenarios contribute to students' feeling of insecurity or self-confidence.
Each prop represented a tool that could hypothetically be introduced in a teamwork activity, to either improve or disrupt the situation.The props were made based on an initial idea generation, but they were not presented as solutions for or causes of the problem, but it was left to the participants to interpret their possible use.
The goal wasn't to test whether a tool was "good" or "bad", but to see which qualities in these tools triggered insecurity or self-confidence, giving deeper insight into values and needs of the target group.

Figure 4: Participants doing activity 3 of the Generative research session using a triggerset.



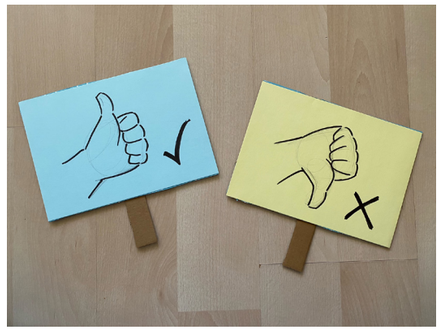
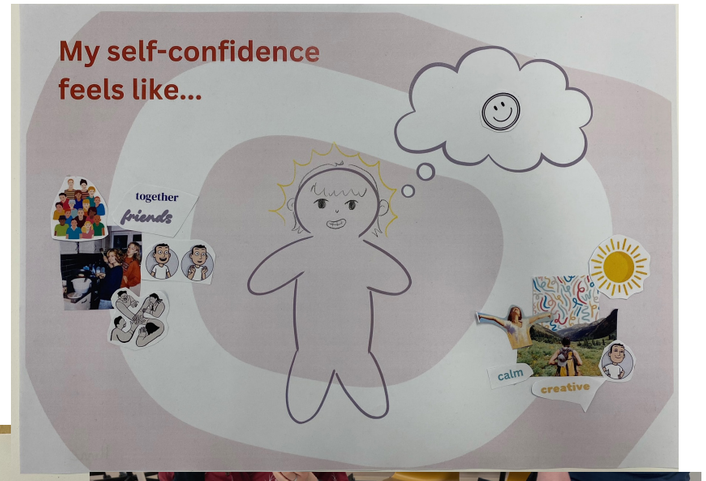
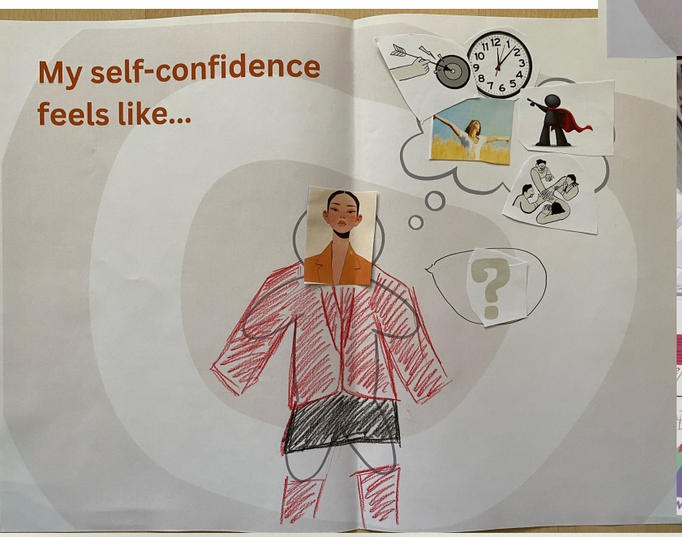


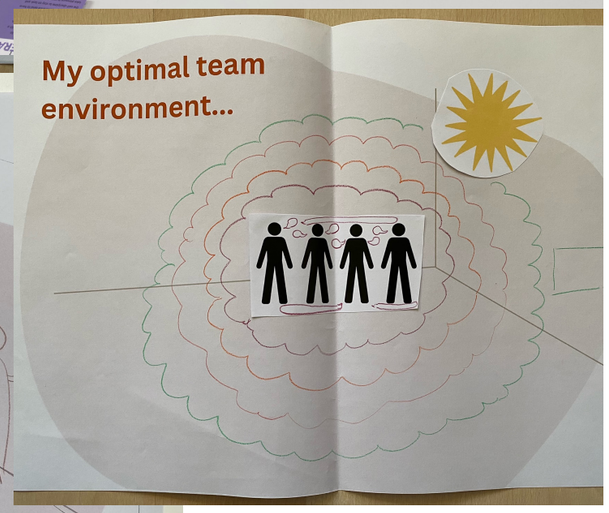
Table 3: Overview of activites done in the Generative Research session.

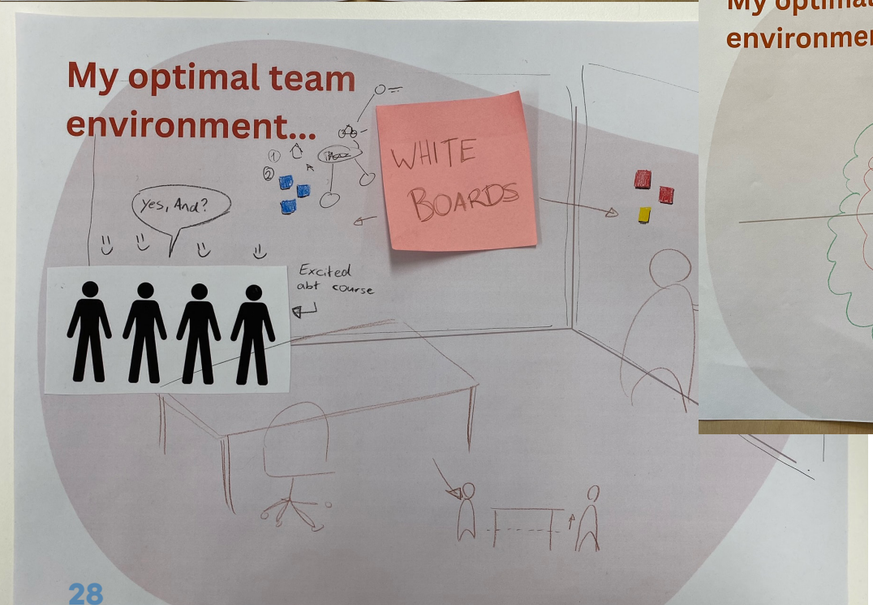
	Method	**Goal**	**Outcome**
Activity 1.1 - Defining self-confidence	Students are encouraged to visualize their 'definitions' of the emotion 'self-confidence' by making a collage and drawing themselves describe how they experience this emotion. This challenges them to "*recall memories from earlier experiences using a 'make' exercise*" (Sanders & Stappers, 2012).	1. Understand how IDE students view and experience self-confidence. 2. Allow them to express their thoughts and feelings on the basis of collages - reaching more tacit and latent knowledge.	Collages of students' representations of self-confidence.
Activity 1.2 - Bridge activity	Students are asked to write down 2 teamwork situations in which they felt like they lacked this feeling of self-confidence.	1. Understand which aspects in situations cause students to feel a lack of self-confidence	List of concrete situations in which IDE students can feel a lack of self-confidence
Activity 2 - Bodystorming worst environment	Students will be asked to bodystorm about factors that contribute to feeling insecure/a lack of self-confidence during teamwork activities using prompts and props. These props (see previous page) were made inspired by an initial idea generation.	1. Observe insecure and self-confident behaviour. 2. Discover the influencing factors of teamwork interactions that contribute to or shape the experience in any way. 3. Discover what qualities of the props benefit or disadvantage self-confidence.	Video of played out teamwork scenarios. Qualities of props that benefit or disadvantage feelings of self-confidence.
Activity 3 - Optimal teamwork environment	Students are asked to create a representation of their view on their optimal teamwork environment that would help them feel most confident by making a collage and drawing themselves describing how they experience this emotion.	1. Understand the needs and aspirations of students for teamwork environments. 2. Allow them to express their thoughts and feelings on the basis of collages - reaching more tacit and latent knowledge.	Collages of representations of ideal team work environments.

The activities used in the generative session resulted in a rich set of qualitive data (observations, generated materials from the creative sessions, and interview transcripts. It allowed the user to share their views and their experiences with the topics, through interesting and valuable personal stories. The pictures on this page show an impression of the generated materials. More detailed results can be found in Appendix D.









3.5 CREATIVE RESEARCH SESSION

The creative research session was done in three rounds of different groups, simulating a teamwork task to compare students' experiences of teamwork quality and observe their behaviour in context. Each group was tasked with a slightly different approach; the first one was focused on starting the task by creating a shared group identity (Figure 5), the second focused on getting in touch and expressing each one's individual needs (Figure 6), and lastly, the third one without any additions, functioned as the control group (Figure 7). A more detailed description of the session plan can be found in Appendix A.
The goal was to understand the practical challenges a student might face that lead to a lack of self-confidence. Combining this with the knowledge gathered through the generative research session would paint a completer picture of student's crucial to design an intervention that plays into their needs and challenges.

During the session, the main focus was to observe the influence of team dynamics:
- Challenges encountered by students in team dynamics.
- The influence of team dynamics on individual behaviour and feelings.
- Ways students deal with conflict and discussions and how those affect their behaviour in the team.

Figure 5.: Group 1 writing down their team identity goal.

Figure 6: Group 2 writiing down their individual needs to perform at their best in a team.

Figure 7: Group 3 with no additions, immediatly started with the brainstorming task.

3.6 SYNTHESIS

The generative research session and the creative research session were analysed with different aims. The generative session was at the beginning of the project, held to help scope the design challenge, whereas the creative session was later in the process and was more used as inspiration for the chosen context.
The generative session was transcribed and analysed through thematic analysis (Braun & Clarke, 2006). The creative session served to complement the discovered themes and was analysed based on the observation notes from the session.
The transcripts were reviewed, and relevant segments of the text were labelled with a topic to be later clustered into overarching topics. Those clusters were then analysed to find connections and recurring patterns between them and define the overarching themes, making it possible to extract key findings.
The detailed synthesis can be found in Appendix E.

3.6.1 THEMES

Theme 1: Calm and in control

When IDE students feel motivated and accepted within a group, they feel most self-confident. They feel in control of their mind and their body, feeling at ease, expressing themselves with calm gestures and having a clear mindset on what to do and how to achieve any challenges ahead.

> *"And when I'm insecure, my hands move a lot. I guess I'm like: "it could be this, it could be that, it could be whatever". But when I'm more confident. My hand gestures are more structured as well."* - participant G4

> *"I feel very on target; I see that, okay, this is my mission. I need to achieve it."* - participant G4

> *"Really such an aura of; I'm the boss."* - participant G2

Calm in their mind, active on the outside:

> *"but that's more of calm in my head. But if I'm very confident, I can actually be very enthusiastic of; 'let's go, I'm going to do it like this'."* - participant G1

They have a clear idea on what needs to be achieved and have faith in their own abilities to complete it.

> *"If you are doing group work, you know yourself. You're strong at the things you're discussing"* - participant G1

Theme 2: Not afraid to take up space (literally)

This is also reflected in their behaviour. When the participants described how they behave when they feel most self-confident, they often mentioned that they felt free in their movements, not afraid to take up space by using calm gestures to engage others in the conversation.

> *"More like actually coming into people's personal space in a way. But in that way, I'm also engaging them, I think. But I think you can only do that if you're really confident about what you're saying."* - participant G3

> *"If I were very confident, I would also be very much like, oh, that looks good. I am now standing at the whiteboard 'Okay and how about this'."* - participant G1

Feeling this freedom of expressing yourself without fear of judgement, but rather being passionate and motivated that they wanted to engage others with this way of behaving. This has a lot of contrast to their description of their behaviour when they felt insecure. When feeling insecure, they often make themselves small and either hide behind their laptop or stay quiet and hidden in the background.

> *"For me, if I'm feeling not confident, insecure, then I'm definitely having a hunch. And my hands are in front of me [under the table]. And I'm just like this, so very small."* - participant G4

> *"I will distance myself physically a bit also by just looking at my laptop and not really being engaged in the conversation."* - participant G3

When they do use gestures to explain themselves, they are much more unstructured and frantic.

Theme 3: Not afraid to take up space (figuratively)

Next to literally taking up space, being present in the discussions happening during teamwork was also experienced more figuratively.
Self-confidence was described as asking a lot of questions and actively engaging in the discussions.

> *"I drew this little speech bubble because I think when I'm really confident, then I ask a lot of questions, like why is that, or why are we doing like this? When I'm not so confident, I probably won't ask any questions."* - participant G4

> *"And when I'm confident, I also tend to ask more questions and want to work together more and motivate each other to come up with better ideas."* - participant G3

Their self-confidence is grounded in the belief that they have valuable input and are a valid member of the team:

> *"That I'm really solid on the ground. That I'm really just not a pushover or anything. I think I'm allowed to be there. That's how I stand."*- participant G2

When they feel insecure, it is the other way around. They are afraid that their input is not valuable enough and that the other has no time for them or does not see them as equally important to share their views:

> *"if I'm not prepared, or even if I prepared, I would close off at some point, because I would feel like someone would judge me if I ask a stupid question. And they'd be like, oh, you don't even know this. Like, we can't waste time. I'm afraid of taking space and time, just so that someone can explain to me what's going on, where I feel like I should already know it, to contribute something of value."* - participant G4

> *"I was quiet, not because I didn't care, but because I wasn't sure it would matter"* - Participant from Group 3 of the creative session

Taking up space might look like something they are only allowed to do if their input is truly valuable. Creating a barrier to speak their mind and throwing in some half-formed thoughts, believing that all input should be perfect. It might create an unhealthy imbalance where an insecure person perceives people with a louder voice as more 'worthy' to make decisions. This could lead to keeping quiet and following orders with as little resistance as possible, trying to fit in and not look stupid.

This behaviour could be explained by the needs defined by Desmet & Fokkinga in their booklet '13 Fundamental Psychological Needs' (2020). In this booklet, they argue that there are thirteen fundamental needs that are universal, which help us function and contribute to our well-being.
"*We can only fully develop and flourish if all our basic needs are satisfied (at least to some degree), and none can be neglected without significant negative consequences. Needs are also a strong direct source of meaning and pleasure (and displeasure): events and activities that fulfil our needs are both meaningful and pleasurable*" (Desmet & Fokkinga, 2020)
In this situation, the need for conformity and social harmony (subneeds part of the fundamental need Community), seem to suppress the fundamental needs Autonomy and Stimulation, causing students to feel insecure.

Interestingly, this also works the other way around. Two of the participants mentioned that they sometimes feel insecure that they dominated the discussions too much and that other people might feel threatened or neglected.

> *"That I then sometimes worry myself that I can be like that, that I don't realise, for example, that I'm thundering over other people, or that I then think of: 'oh have I given them enough space to express an opinion?'."* - participant G1

> *"[as answer to when they feel insecure] ..if I feel like I am too judgmental or ask a lot of questions to my teammates or give a lot of tasks to my teammates."* - Participant G3

Overall, it seems to be about a fear of being judged and disliked. Either because they are afraid that their input is not good or valuable enough, hindering them from speaking during a brainstorming session. Or, being afraid that their input was too dominant, resulting in feeling insecure after a brainstorming session.

Theme 4: Need for feeling included

The imbalance of perceived value seems to be related to friction during brainstorming sessions. Brainstorming is a method created with the aim of generating many ideas leading to good quality concepts. One of the most important 'rules' of brainstorming is that the overall mindset should be to postpone judgment (Van Boeijen et al., 2020). However, in practice, group dynamics and human nature cause judgment nonetheless.

> *"Every brainstorming idea I pitched to the group was rejected, just without very much consideration, so to speak, and then I noticed that I did really slowly start to provide less and less input in that group"* - participant G2

> *"Then, when everyone starts chipping in, I'm really like, what am I doing here, so to speak. Like, 'ooh they hate me'."* - participant G2

> *"...that is in a group discussion, there is no room for my views, my ideas are immediately shot down." - participant* G1

Having their ideas being actively ignored and judged, may give the impression that they are failing to achieve conformity and social harmony, making them feel excluded. To try to resolve this, they might suppress their individual expressions because it does not feel safe to show them and focus only on doing what the group seems to want.

> *"I'll just listen and we'll do your thing."* - participant G2

Theme 5: Welcoming, open and motivating team environment

This is also seen in the way participants described their ideal team environments. All 5 participants of the generative research mentioned that having team members who are positive and motivating, who build onto your ideas instead of breaking them down, was essential to feeling self-confident during group work.

> *"Yes, just positive people. Who indeed really have such a yes-and [mentality]. And who also just enjoy doing the job"* - Participant G2

Having this supporting environment, where people feel accepted and where there is room for honesty because there is trust, creates room for mistakes and 'wild cards'. It causes people to feel more free in expressing their thoughts, because they are less afraid to be cast out by the group.
When this trust is lacking, people will hold back their opinions, worrying that it might hurt others.

> *"That they might judge your personality based on the feedback you give and they cannot distinguish that feedback is separate from your personality."* - participant G4

> *"That you are afraid that others will not like you or think you are working in an annoying way, instead of just enjoying working together."* - participant G1

Theme 6: No room for failure

Having a very formal environment causes too much pressure, since input is perceived as a finished thought. There seems to be no room left for experimentation and throwing half-formed ideas on the table.
As soon as there is too much pressure on it (by having to stand when explaining, for example), it feels too official, raising the barrier to contribute. It feels like it has to be perfect, and if it is not, then it is failing and unworthy of the time of others.
While study projects are places where it is known that students are allowed to fail, so it will help them learn and grow in their knowledge, in practice, failing in groups can lead to a lack of self-confidence.

> *"I just have this in my head that when we asked to repeat it you can fail once but you can't fail twice. Like the third time it's just like then you're gonna look very stupid to ask it, ask to repeat again."* - participant G4

This was also seen during the creative session, where group 1 was asked to do an activity called 'illegal brainstorming'. The goal of this activity is to say as many wrong and unconventional ways to achieve a goal, so no answer would be wrong. Still, the participants were very hesitant to share their ideas, afraid of them being 'too illegal', which was also impacted by comments like "*whoa that's dark*" (participant group 1), from other participants.

Next to fear of individual failing, there is also a reluctance to point out friction happening in a team. Pointing out that a group's dynamic is not working, feels like putting a 'failure' label on it.

> *"...Then it actually became very much in that way that you just said of, 'oh, is it obviously going to go wrong now? Oh, should we reflect on that group now?'"* - participant G1

> *"but when you really need it, again it's hard to bring it up [a method to resolve team problems], because then you officially feel like: 'Okay, apparently things are so bad right now with our group that we need this'."* - participant G1

This is also made more difficult, as people are afraid to be seen as the 'boogeyman', and do not want to put the spotlight on themselves as the person who thinks it is not good enough.

> *"Because then the group also suddenly starts thinking: 'Oh you so didn't think you got positive impact from the result'."* - participant G2

3.7 CONCLUSION AND PROJECT IMPLICATIONS

These themes discovered through the synthesis, helped me deepen the conclusions drawn from the literature review. They show how those earlier conclusions are connected to each other in more concrete scenarios.

1] Safety and security
Feelings of safety and security are largely dependent on levels of fear of judgment from other team members. The higher these levels are, the less self-confident students feel:

- There is a strong need to have an informal environment to give input that is not immediately perceived as a finished thought. As soon as there is too much pressure on it (by having to stand when explaining, for example,) it feels too official, raising the barrier to contribute. It feels like it has to be perfect, and if it is not, then it is failing and unworthy of the time of others. Fear of judgement limits students in their participation. **Creating an informal environment where it is clear to everyone that these are just ideas and thought experiments**, and nothing is fixed, lowers the threshold and creates more space for the exchange of ideas.
- The officialness of expressing concerns only during an evaluation every so many months, and not wanting to be the person who points out the sore spot, highlights the need for an informal way to communicate frictions in team dynamics. **Bringing attention/raising awareness to a problem without calling attention to oneself** and becoming the odd one out, could be a low barrier, accessible way to solve friction without pointing fingers and fear of judgement.
- When the opinions and ideas of students are neglected, it results in them losing passion for a project and causes them to switch to a passive, following state. This highlights the need for **a safe environment in which they feel supported and accepted by their team members**.

This last one also falls under the following aspect:

2] Acceptance and trust (in oneself)
Feeling accepted into the group can help people to feel more trust in themselves, making them confident to participate:

- Students in a more quiet, passive state feel a barrier to contribute, but want to feel heard. The other way around, students who are actively present sometimes feel insecure, worrying that they are overshadowing other teammembers. This highlights that the **inclusivity of all personalities** is valued by both quieter and louder students and is essential to foster a team environment in which every student feels comfortable to contribute.
- If they are **not restricted within their expressions but rather supported**, they are enabled to express their individual strengths more freely. Having control over their own actions.

3] Ease and relaxation
Self-confidence through feelings of safety and acceptance leads students to feel at ease and in control of their challenges:

- When they feel most self-confident, they feel free to express themselves however they want and try to engage others in their thoughts. **Their mind and body language are calm, and they feel in control of the challenges ahead.** When they feel insecure, students tend to disappear into the background, feeling tense and uneasy, trying to distract themselves by doing something else. (typing behind laptop, fidgeting with fingers or pens).

These sensations are interdependent on the following aspect:

4] Upright, open posture
Through the user research, I realized that this not only applies literally, but figuratively as well. Self-confidence is experienced as being comfortable to take up space, either with gestures or with vocal input, and it is also enlarged when teammembers have a welcoming, constructive attitude.

- Students see a motivational and positive group of people that strive to build onto each other's ideas as the ideal for a teamwork group. By focusing on **constructive communication and mutual support**, students feel like a valuable part of the team and feel self-confident to perform to the best of their ability. This approach will not only address immediate issues, but also build trusting relations for throughout the whole project.

Next to these aspects, I also discovered an additional one that was not touched upon in the reviewed literature.

5] Valuable part of the group
This one is partly related to 'acceptance and trust', in the sense that it describes a way that makes students feel like a less accepted member of the group, but it is more about feeling worthy. Not only being accepted in the group, but also being considered valuable enough to be listened to by their group members and seen as equally important as everyone else.

- Sometimes an imbalance of perceived worth arises. Students might start to see another teammember as more important, because of the way they behave (rushing, seeming to have more knowledge). This causes them to diminish their own skills and switch from an active to a passive state.To allow them to switch back to an active state, they are in need of **a way to reinstate this perceived self-worth**. Supporting them to feel able to actively contribute again.

After analyzing all the insights from the user research and literature review, it is evident that there are several areas that need to be addressed to help individuals feel self-confident during teamwork. However, given the project timeline and context, it is not feasible to focus on all the above identified implications. Therefore I chose to formulate three possible design directions, that each cover a part of the aspects described above, which will be described in the next chapter.

It is also crucial to specify the scope I want to focus on, since teamwork encompasses many different activities and situations.The synthesis made me realize that a lot of the discussed aspects came back in one specific teamwork activity: namely brainstorming. Brainstorming sessions can be situations were students have to be vulnerable, by sharing their thoughts and opinions in an environment that is heavily influenced by team dynamics. Eventhough brainstorming is supposed to be a method where judgment of ideas is postponed to the end of the session, talking to and observing the participants made me realise that that often does not happen. This can lead to the environment making the student feel unsafe, not accepted and therefore not relaxed, causing them to shut down and switch to a passive, insecure state.
That is why I decided to choose brainstorming sessions as the context of this project, which leads us to the next chapter.

4.

Chapter 4

SCOPING

Building on the themes and implications from the user research and the insights gathered through the literature review, this chapter dives into the process of defining the problem statement and three possible design directions. It explains the rationale of chosen design direction, and discusses the first round of idea generation and additional inspiration that led to the formulation of the design vision.

4. SCOPING

4.1 CHOSEN CONTEXT AND SCOPE

4.1.1 CONTEXT

The user research showed that a lot of the moments where students felt like they lacked a feeling of self-confidence happened during brainstorming sessions. It showed that various reasons, such as neglection of ideas or the feeling of not being liked by the group, can cause an individual to switch from an active, participating state, to a passive, withdrawn state. Hindering their individual strengths from coming into their own (see Figure 8).

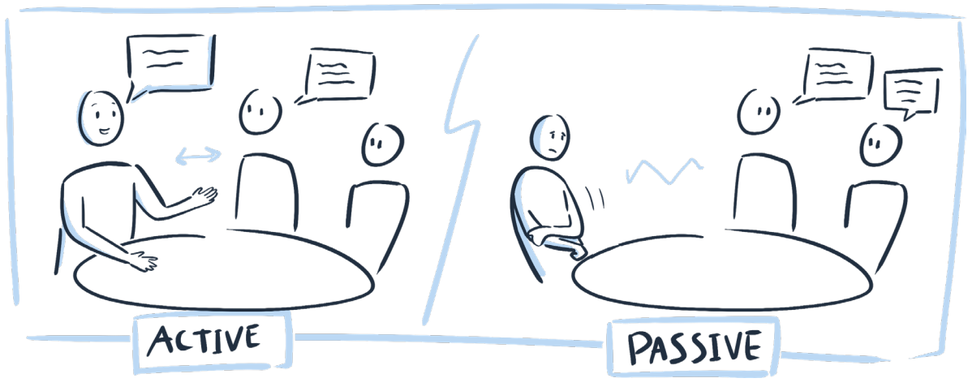


Figure 8: The different states: active and passive.

Therefore, this design project will specifically focus on designing an intervention that is meant to be used in brainstorming sessions.

4.1.2 SCOPE

As mentioned before in Chapter 2, due to time constraints, the project will center around designing an intervention that will have an influence on the emotional state of the target group, and not the emotional trait. As arose from the research, durable self-confidence can only come over time and cannot be replaced. Therefore, this design project will not aim to provide the user with a long-lasting skill of self-confidence. Instead, this project will focus on providing the user with a momentary reassurance in their insecure moments, based on the values discovered through the literature and user research. Aiming to provide a feeling of safety, calmness and control, in a situation that feels harmful and out of their control.

Additionally, I believe that the power of teamwork is that it fosters an environment where people come together, sharing knowledge and effort, each with their own strengths and abilities.

Many inspiring projects have been done about the improvement of team dynamics trying to solve or prevent these moments causing friction. This project, however, will take the individual team member as the focus and aims to provide them with a tool to be used in such a moment. It takes the principle of embodied emotion as a starting point and focuses on having a positive effect on the feelings of individual, to encourage them and help them harness their full potential.

4.2 DESIGN DIRECTION

4.2.1 3 POSSIBLE DESIGN DIRECTIONS

Combining the insights from the research sessions and the literature review with an initial idea generation, it is evident that there are several areas that could be addressed with a design intervention to enhance teamwork experiences. However, given the project timeline and context, it is not feasible to focus on all the identified implications. Therefore, the implications were grouped based on their topics to form possible design directions to choose from and specify the scope of this project.
Three directions arose: designing for an opportunity to reduce anxiety levels through self-soothing, designing for a safe-feeling brainstorm atmosphere, and for a safe space that promotes reflection and awareness.
Those directions and their reasonings are explained below. More extensive reasonings can be found in Appendix F.

DIRECTION 1: To build an opportunity to self-soothe and reduce anxiety levels when a team member feels insecure during brainstorming sessions.

This approach aims to provide individuals comfort through tactile sensation to lower their anxiety levels during insecure moments, boosting their self-confidence to continue contributing to the team.

Reasoning

A lot of the reasons found for losing self-confidence were related to the environment or behaviour of other students that made an individual feel afraid of possible harm if they continued providing input.

> *"Now we are going to have another discussion about my thing and now everyone is still going to find that my thing is no good"* - Participant G2

Resulting in e.g. tense body language, fidgeting with pens, and feelings of anxiety. Self-soothing has proven to work as a way to relieve stress and create a calm mental state, feeling safe and at ease (Mok et al., 2019; Uvnäs-Moberg et al., 2015).
An intervention could provide an opportunity for self-soothing so that people can take a break from the chaos, regain control of their thoughts and be reminded that they too are valuable. To then give them new energy to actively participate again.
This builds on the Fundamental need 'Comfort', which shows that people have a need for a mental state of calm or tranquillity. And also draws on the Fundamental need 'Recognition', by reminding the user that they are valued and cherished for who they are. While also drawing inspiration from the Fundamental need 'Autonomy', by providing users with a tool that allows them to regain control over their thoughts and actions, *"rather than feeling that external conditions and other people determine your actions"* (Desmet & Fokkinga, 2020).

DIRECTION 2: To build a tool that supports the target group to give input in a brainstorming session in a safe and low-threshold way, aiming to let everyone's voice being heard and valued.

This approach aims to support individuals who are reluctant to actively bring input because they fear their ideas being neglected and diminished. The aim is to provide a safe way for equal contribution in the team so that the individual's strengths are valued and can benefit the project. Constructive communication and mutual support, ensuring no hurt from judgment.

Reasoning

The user research showed that individuals can lose passion for a project and feel like they are no longer a valuable member of the team or at least not treated like it, when their input in discussions and brainstorming sessions is ignored or diminished.

> *"Every brainstorming idea I pitched to the group was just rejected every time, without very much consideration, and then I noticed that I did slowly start to provide less and less input in that group."* - Participant G2

Next to that, individuals can also start to feel insecure, because they are afraid they are overshadowing others, leaving no room for their opinions.
Whereas the thing that often makes them most confident during teamwork is listening to everyone and building it together.

> *"And when I'm confident, I also tend to ask more questions and want to work together more and motivate each other to come up with better ideas."* - Participant G3

> *[About when they feel most self-confident in a teamwork setting:]*
> *"When I don't have to worry about overshadowing other people and we really build it together, so to speak."* - Participant G1

Though the thought behind brainstorming is that it is an opportunity to generate a lot of ideas without initial judgment, in practice, this judgment very much happens due to social interplay. The challenge of this direction would be to design something that does provide this safe, relaxed space where every member has equal participation, by reducing the fear of judgment.

DESIGN DIRECTION 3: To build a conversation starter that allows for a low-threshold way to talk about the problem, promoting a safe space for reflection and awareness.

This approach aims to foster constructive communication and mutual support in a group where an individual loses the motivation for active participation. Fostering an approachable conversation without pointing fingers and fear of judgment.

Reasoning

From the generative sessions, it became clear that students find it difficult to address the situation that makes them feel insecure, because they are afraid they will be viewed as the bogeyman in the group. Afraid that the group dynamics will be even more negatively influenced by it.

> *"And also within-group [feedback], because you cooperate with each other for a long time, you know a little bit more, and if you say something not very good to them, maybe it's a little bit awkward in the future."* - Participant G5

Next to that, taking action about something that made them feel insecure makes it feel official. As if it is a big problem, instead of just something that happens. Not wanting to make it too official, because taking action mentally puts a 'failure' stamp on the team.

> *"But when you really need it, again it's hard to bring it up, because then you officially feel like: 'Okay, apparently our group is going so badly now that we need this'."*
> - Participant G1

So there is clearly a need for a moment of reflection on the problem, but in a way that does not feel like blaming other people and labelling the current way of working together as some kind of failure. With this direction, therefore, the goal is also to have a conversation starter that can provide such an approachable, safe-feeling reflection without making the team consider themselves a failure.

4.2.2 CHOSEN DESIGN DIRECTION

The choice of direction was made mainly based on discussions within the project team and the discovered needs of the target group, combined with an initial idea generation. This idea generation was done to deepen the understanding of the possibilities of these directions and to inform the next step of the process; concept ideation, the details of which can be found in Appendix G.
Several factors were considered, such as the potential value and positive impact of the ideas, the level of ability to use the principle of embodied emotion, as well as personal interest.
In the end, the chosen direction was Direction 1:

To build an opportunity to self-soothe and reduce anxiety levels when a team member feels insecure during brainstorming sessions.

This direction was deemed to have the most potential value and the most opportunities to integrate embodied emotion in a meaningful and interesting way.

4.3 DESIGN VISION

Reflecting on the outcomes of the user research and discussing them with peers, made me realise that not feeling self-confident can become a big thing in one's head, leading them to spiral into negative thoughts, to overthink and question their skills and value as a designer. Feeling insecure can start to seem like a bigger problem than it has to be. Especially since the user research made clear that almost everyone has these moments of doubt.

> *"Then, when everyone starts to critique [my input], I'm really like: 'what am I doing here', so to speak. Like: 'ooh they hate me, ha ha'."* - Participant G2

Therefore, my vision for this intervention is to design something that will normalise taking a moment to step back in such a situation, but moreover, normalise having these moments of insecurity. The intervention will not aim to be a medical or therapeutic device for people with genuine mental health issues, but more of a light-hearted, playful way to put their uncertainty into perspective.
I believe it has the potential to reduce the negative connotations people have with switching to a passive state, making it more nuanced. After all, it is not a final withdrawal, but a moment of rest and reflection. Recharging yourself in a moment of passive participation, still being present and part of the team, to then actively engage vocally again.

4.4 CONCLUSION

4.4.1 DESIGN GOAL

To enable and support the individual in the team to feel welcome and at ease, improving their emotional wellbeing by providing them with a moment of rest in a passive state to reduce their anxiety levels via self-soothing, so they feel confident again to switch to an active state.

Choosing Direction 1 means that I will focus on the following aspects found through the synthesis of Chapter 3. The intervention should provide:

1] Safety and security
by:
- Creating an informal environment that lowers the barrier to contribute and creates more space to play.
- Providing the user with a safe environment in which they feel supported and reassured.

2] Acceptance and trust (in oneself)
by:
- Facilitating both the active and passive states to promote inclusivity of all personalities.
- Supporting their expressions, helping them have control over their own actions.

3] Ease and relaxation
by:
- Providing them with a tool to calm and relax their mind and body to feel at ease and in control of the challenges ahead.

4] An upright, open posture
by:
- Encouraging the user to take up space, literally and figuratively.

5] Being a valuable part of the group
by :
- Providing the user with a way to reinstate their self-worth, reminding them that they are of equal worth as the rest of their team members.

4.4.2 DESIGN VISION STATEMENT

In order to boost a sense of self-confidence during moments in brainstorming where an individual experiences a feeling of insecurity, the design intervention should create playful, light-hearted opportunities for a moment of calm (relaxation, safety, etc.) and control.

4.4.3 DESIRED INTERACTION

Current interaction: Switching from active to passive state, doubting own value and ability, losing passion for the project, and enlarging detachment from the group.

Desired interaction: Switching from active to passive state, taking a moment of calm to recharge through a feeling of safety and security, when recharged and ready to participate self-confidently again, switching back to active state.

The current and desired interactions are visualised in Figure 9.

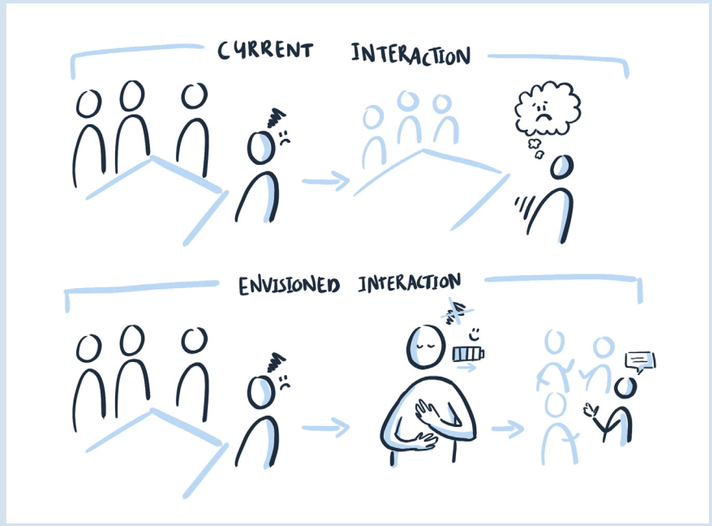


Figure 9: Visualisation of the current and desired interaction

5.

Chapter 5

IDEATION

This chapter will present the process of ideation leading to the final design of this project. This phase aimed to explore the possibilities of using self-soothing in a light-hearted way to boost the user's feeling of self-confidence. The chapter covers the iterative development process of three potential concept direction through testing with quick and rough models leading to the final concept direction and design.

5. IDEATION

5.1 THE SIGNIFICANCE OF SELF-SOOTHING

Through the user and desk research it became clear that self-confidence is experienced as feeling at ease, calm and in control. It brings a general feeling of well-being and freedom, while moments when individuals experienced a lack of self-confidence were described as tense, nervous and withdrawn.

Self-soothing has been investigated as a way to reduce anxiety levels through sensory stimulation (Mok et al., 2019; Uvnäs-Moberg et al., 2015). A study done by Mok et al. (2019), explored how the feeling of 'soothe' and self-soothing are understood and experienced in everyday life, through a series of interviews as part of their ongoing research: Project Soothe. They found a connection between physical sensations and both individual's understanding and experiences of the feeling of soothe.
"*They are represented to play a fundamental role in offering participants' a sense of emotional relief, comfort, and warmth, which are then understood as soothe*" (Mok et al., 2019).

Uvnäs-Moberg et al. (2015) argue that this is because tactile interactions "*which represent different kinds of relationships with other living beings*" are accompanied by the release of oxytocin as a results of the activation of sensory nerves.
These principles have already been used in existing tools such as weighted blankets, the Somnox sleep pillow and the 'Hands of love' gloves, aimed to comfort patients with mimiced human touch during COVID-19 times (Karaman et al., 2024; Saunt, 2021) (respectively Figure 10, 11 and 12).

These inventions illustrate how embodied emotion, affecting emotion through sensory comfort, can play a role in a concept that allows the user to take a moment of calm and reassurance in a moment of insecurity.

Figure 10: Weighted blanket.
From Self.com, by M. Griggs & K. Kellogg, 2022 (https://www.self.com/gallery/best-weighted-

Figure 11: Somnox sleep pillow.
From Somnox.com, n.d. (https://start.somnox.com/bestellen)

Figure 12: 'Hands of love' glove.
From Dailymail.co.uk, by R. Saunt, 2021 (https://www.dailymail.co.uk/news/article-9475903/Covid-patients-comforted-fake-hand-filled-warm-water.html)

However, as mentioned in the Design Vision in Chapter 4.3, it is important that this is accompanied by a playful, light-hearted feeling. The interaction with the intervention should not result in an emphasis on on the lack of self-confidence, making it seem like a shortcoming of the individual, which could cause them to feel even worse about themselves and their abilities. After all, it is not the goal to design a therapeutic device for people with genuine mental health issues, and the intervention should not lead the user to start considering themselves part of that target group.

Instead, the aim of the intervention is to provide an interaction that normalizes these moments of rest in a brainstorming session, while still being an active, valued member of the team. A playful interaction that puts the user's insecurity into perspective and helping them feel reassured about their abilities and value as person and as a designer.

5.2 FIRST GENERATIVE PHASE

Building onto the idea generation done for the formulation of the design directions explained in Chapter 4, new idea generations were combined with explorations of interactions with textures, shapes and other tactile elements to develop more concrete concept directions

5.2.1 TACTILE EXPLORATION

To explore what tactile sensations would work best to evoke sensory comfort and feelings of safety, calm and reassurance, multiple rounds tactile explorations were done. Testing the effects of different kinds of materials, with different kids of qualities such as textures and firmness, or temperatures and fluidity. I did this to see what instinctual interactions these would evoke and how those would affect imy emotions. Some pictures of these explorations are shown below.

The explorations of the possibilities of tactile interactions and sensations and their effects, led to the following insights:

- A soft, warm pressure on the belly area feels comforting and reassuring. This could be because it reminds of a pet on your lap or a hug from a loved one.
- Material that gives feedback, like a pillow veering back or the moveable texture on fabric makes it feel more like an interaction, then a pattern that is fixed. The interaction makes it feel like the other thing is actively comforting, because it reacts to the touch of the user.
- Next to that, when the texture reacts too unpredictable, it can feel like it wants to escape and do its own thing instead of soothe.
- Touching a texture that is hidden, e.g. in the inside of a vest, feels secretive, like something you do not want others to notice.
- Holding something soft and/or warm close to your torso or face, feels more comforting than any other place on the body, such as arms or feet. This might because this is were the vital organs are located, so creating a barrier to protect those could evoke feelings linked to safety.

5.2.2 RESULTING IDEAS

Some examples of the ideas that flowed from those findings are briefly explained below.

- **Table with integrated 'calm'-spots**
  An intervention visible and available for everyone in the team to use when they feel insecure and overwhelmed. The spot in the table feels soft and warms when a hand is placed on top of it (Figure 13). Because of this simple action, the choice to take a moment of rest has a low-threshold, but is still visible to the team. Making it a more normal part of the process to which the rest of the group could choose to adapt their discussion or are at least made aware that the individual is taking a small recharging break and will therefore be less present in the discussion, but still actively participating.

Figure 13: Envisioned interaction with the calm-spots.

- **Soothing back cushion**
  This cushion has two settings: one for an active state and one for a passive state. In the active state, it ensures the user with an active, upright posture. Having, almost literal, the user's back. When the individual wants to take a moment of rest, they can put it in the passive setting, which causes the pillow to expand and loose it's stiffness to feel more like a soft embrace surrounding the user's torso (Figure 14). Possible additions to heighten the soothing feeling, could be a heating element or a massage function. Having two settings makes the choice of either taking a step back, or stepping back in the game more present. Making them aware that they can step back into it any time they feel ready and that both states are an option in the process.

Figure 14: Envisioned interaction with the back cushion.

- **Tactile stimulation brainstorm toolbox**
  Taking inspiration from the second design direction in Chapter 4, this idea brings tactile stimulation into the process of brainstorming. The toolbox consists of a variety of shapes representing different elements of a brainstorming session (Figure 15). There could be a shape specially for wildcards and one for constructive contributions to the idea, and so on. The shape specifically for self-soothing could be soft and round, to use in a moment of reflection. Again making all these components natural parts of the process instead of stigmatizing them. It could help make the individual feel less insecure, because they can show, to others but also themselves, that they are still actively part of the process eventhough they switched to a passive state.

Figure 15: Envisioned interaction with the tactile toolbox.

- **Soothing clothing item**
  Putting on a clothing item, specially designed to encourage you in insecure moments, can feel like putting on a piece of armor. Instead of being dependent on the environment, the user now has a tool to gain back control over their feelings. This idea was inspired by the principle of enclothed cognition,which refers to "*the systematic influence that clothes have on the wearer's psychological processes*" (Adam & Galinsky, 2012; Lindeman et al., 2023). The clothing item could combine an empowering symbolic meaning with the sooting effects of tactile sensations and provide the user with a boost of self-confidence (Figure 16).

Figure 16: Envisioned interaction with the cloting item.

Looking at the ideas and comparing them to the insights from the research, the main qualities that should be in the concepts are as follows:

- Using the intervention should not be seen as something negative, making people reluctant to use it because they fear the possible reactions and thoughts of others. Instead, it should normalize moments of insecurity and taking a step back to regain calm.
- It should provide the user with a low-threshold way to take a moment of calm without attracting unwanted attention.
- It should be a playful action, to keep things light-hearted.
- It should provide the user with a way to take back control over their feelings.

One of the aspects I found most interesting about these ideas, was that most of them are available to use for the whole team. Instead of making it a tool that only people who struggle with insecurity use, it becomes a standard part of the process. I think we should not treat insecure moments as moments of failing, but as an opportunity to step back and recharge for a second, and as something that everyone experiences from time to time. If everyone uses the intervention in one way or another, it might also reduce the shame of needing reassurance and stimulate the use of the intervention.

5.2.3 CONCEPT DIRECTIONS

Taking into account these reflections on the generated ideas, 3 more concrete concept directions were formulated:

1. Power suit 2.0

Looking good while feeling good

This direction is a playful take on the existing concept of a powersuit. A power suit can be defined as a piece of clothing, often a blazer, that people, specifically women, wear when they want to feel empowered.
In the 80s, the power suit was marketed in America as a way to balance out professional inequality. The book *Women: Dress for Success* from John T. Molloy, is a classic example on how clothing was seen as a way to set career women up for success (Entwistle, 2013).
While it is highly debatable that simply suiting up can magically solve the wage gap and all other gender inequalities in the workplace. Clothing can most certainly have an effect on how we feel. It can be used to express parts of our identity, our likes and interests and status (Hester & Hehman, 2023), but next to that, it can influence how we behave. This principle is called 'enclothed cognition' (Adam & Galinsky, 2012).

This concept direction takes the symbolic meaning of the power suit and the principle of enclothed cognition and combines it to create a personal ritual for someone to feel empowered and recharged when they switch from an active to a passive state due to insecurity in a brainstorming session. It's a playful take on having a little emergency kit to get you through this feeling.
The goal is to make the user feel prepared and in control by being supplied with a number op steps to complete to give themselves a boost. Having a personal ritual allowing them to calm down, but also put their insecurity into perspective. This concept takes inspiration from the grounding method (Shukla, 2020), by redirecting the individuals focus to feeling comforting sensations on their body and completing some simple, rewarding steps, taking back control over their thoughts and feelings.
The first step is to turn on a band that gently tightens around the waist and provides light, warm pressure, playing into embodied emotion by simulating a secure, safe bodily sensation. The second step is to reward themselves with some emotional support chocolate. Lastly, when the individual feels recharged enough to get back at it, they can activate a cushion that will provide them with back support and an upright posture. Allowing them to feel active and ready to participate (Figure 17).

The Powersuit 2.0 empowers the individual by supporting them to look good on the outside and have guidance to feel like they can be in control again of their thoughts and feelings.

Figure 17: Envisioned interaction with the Power suit 2.0

2. The Stool That Meets Your Moods

A playful interaction with your emotions

This idea is a modular series of chairs that can be adapted to the needs of the user. This concept is meant as a playful interaction for the individual with their needs. A translation of their feelings into physical support.
The modular range consists of different chair frames and seat tops that can be combined into stools that provide the user with different seating experiences. Those different experiences are aimed at different emotional states. They will provide the user with an experience that is meant as to support them and make them feel and perform at their best in that state.

Since this project is focussed on self-confidence, the design will consist of one chair frame and a seat top that stimulate self-confident, active behaviour, and one frame and a top that provide a more comforting, secure feeling during passive behaviour. Those can then be combined to both allow for various degrees of activeness and passiveness, as well as creates a playful experience assembling and disassembling the stools (Figure 18). This series of stools aims to make both states a normal part of the teamwork project in a light-hearted, playful way. The assembly resembles building blocks, like Legos or puzzle pieces.

It allows the individual to curate a stool catered to their needs as well it allows to see what combination their peers make. Making emotions and needs visible to everyone.
It also can be used as a way for the individual to recognise their needs and provide them with a physical tool to take control of it. This physical aspect takes inspiration from embodied emotion, but also works as an example of the counter-movement against digitalisation in the (learning) world. Where we as kids used to experience and get to know the world through all of our senses, our present-day world seems to be reduced to 2D. There is a growing presence of screens and apps all around us and this concept allows us to play once again with physical material.

Figure 18: Envisioned interaction with the Stool that Meets your Moods.

3. The Chair That Cares

A warm embrace in times of insecurity

This concept direction is to design a chair with a built-in cushion that can inflate to simulate the feeling of a hug to provide bodily comfort to the user in times of insecurity (Figure 19).
The light pressure of the soft, heating pillow will bring the body in a state of relaxation, soothing the anxiety levels of the user. It is a private experience in which the individual can seek some consolation/comfort on request without having to actually having to ask another person to hug them. The idea that the chair is alive and now functions not only as a literal, physical support but also as a figurative, mental support, makes for a funny take on self-soothing methods. There will always be someone having your back in group discussions. Providing the user with a hugging sensation while still allowing them to have control over the activation, ensures that the concept makes them feel safe and at ease while still feeling in control of the situation.

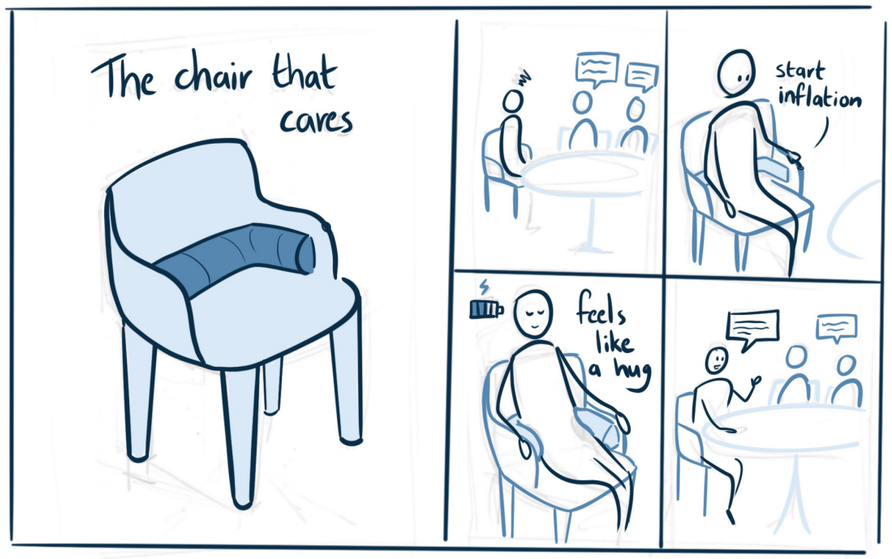


Figure 19: Envisioned interaction with the Chair that Cares.

5.2.4 CHOOSING A CONCEPT DIRECTION

Through discussions with the design team and the target group, and a PMI (Plus, Minus, Interesting) evaluation, which can be found in Appendix H, I decided to continue with a combination of the second and third direction, and taking into account the strength of a symbolic meaning like the one used in the first concept direction.

The conclusions from the discussions and considerations were as follows:

Concept 1 feels too much like a secret intervention that you keep hidden from your teammates, out of shame almost, because you don't want to show that you are insecure.

Concept 2, on the other hand, is much more open. It is still a personal interaction focused on the individual's feelings, but because it is visible to others and visible to the individual when others use it, it becomes more normalised and insecure moments become a more normal part of the process.
However, it does have a high threshold to use it. Despite the interaction of putting it together being very playful, it does take a lot of effort for when you feel momentarily uncertain in a brainstorming process. To then completely change your chair is a lot of work so the barrier to actually doing it is most likely too high. Which might make the user feel even more insecure and uncomfortable because they cannot execute what they actually need.

Both concepts 2 and 3 can be 'activated' at the moment of uncertainty. Concept 1, on the other hand, must be put on beforehand. When getting dressed in the morning, the user must have already thought about whether there is a chance they might feel insecure that day. Since the chairs are already on location, these concepts do not need to take this into account. However, the aforementioned threshold with concept 2 may be so great that at the beginning of the meeting people may adjust their chairs, but not afterwards. This negates the whole idea of adjusting to your needs at that moment.

Concept 3 seems to offer a good middle ground for this. It has a much lower threshold and can therefore be activated at any time. But it is still a somewhat secretive act and less open as concept 2. That's not necessarily wrong, but I believe that precisely the openness, that they see others using it too, ensures that uncertainty is more normalised in the process.

Therefore, the right choice seems to combine the strengths of concepts 2 and 3 to eliminate their weaknesses.
Concept 1's strength is its use of the concept of a powersuit, making the message more clear. This is something that can also be used when further defining the concept for the chosen direction.

5.2.5 IMPLICATIONS

Taken those gained insights in mind, it made me realise how important it is that the intervention should both be visible for the whole group as well as have a low barrier to use. Normalizing insecurity during brainstorming means that the interaction with the intervention should not facilitate feelings of secrecy, because this might strengthen the belief that feeling insecure is something you would want to hide. Having this tool out in the open, will, in my opinion make the individual aware that it is okay to feel this way. Seeing others use it, could help the individual feel more comfortable in using it too, realising that seeking comfort is natural and not something to be ashamed of.

However, this visibility should be balanced out with a low barrier. If using the intervention is too big of a step, or puts too much of a spotlight on the user, they might refrain from interacting with it altogether. It might become too much of a conscious step that emphasizes the insecure feelings, making the user feel worse about themselves. Thinking back on the reasons participants mentioned in the user research for not being eager to use group reflection methods:

> *"...but when you really need it, again it's hard to bring it up [a method to resolve team problems], because then you officially feel like: 'Okay, apparently things are so bad right now with our group that we need this'."*- participant G1

This could lead to no one using it and, therefore, not inspiring others to use it. So it is important to keep this balance between visivility and a low barrier to mind for the next phase of ideation.

5.3 SECOND GENERATIVE PHASE

5.3.1 REVISED CONCEPT DIRECTION

Bringing the strong qualities of the chosen directions together into a single, revised concept direction led to the following concept idea (Figures 20 & 21):

Figure 20: Visualisation of the revised concept direction

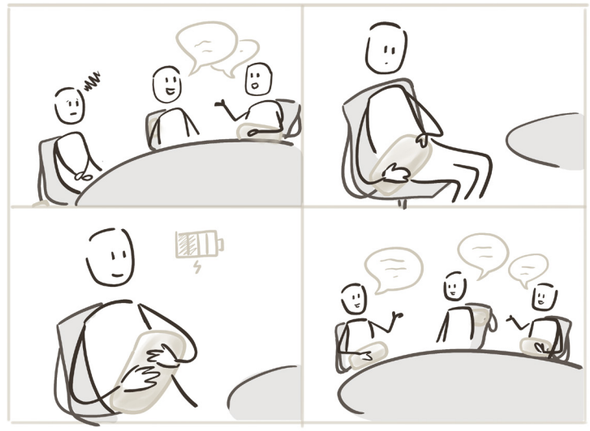


Figure 21: Visualisation of the envisioned interaction

This is a chair with movable, soft arm rests, designed to provide the user with multiple ways of usage they can choose based on their needs of that moment (as is shown in Figure 22 on the next page). The armrest can be put in front of the user on their lap, providing a soft, warm, reassuring pressure, or they can hold/cuddle in their arms, evoking feelings of comfort and safety. Since they are filled with little, soft balls, the cushion also allows for self-soothing by stroking it, drumming on it or rubbing it between their fingers. When the user wants to take on a more active state, they can put the cushion(s) behind their back so they function as a support for an open, active posture, or lower in their back when they feel the need for a calming relaxation.

This flexibility and mobility of the soft, round, almost plush-like arm rest, make for a playful interaction while accommodating their needs in that moment. The arm rests are light and round, making them feel friendly to interact with as opposed to heavy ones, where I experienced that it might feel like the object is working against the user, not 'wanting' to be picked up.

It is not supposed to provide a shelter from the outside world, such as a cocoon does, but to provide them with a support tool in the midst of the chaos, such as a warm winter jacket in a cold winter night. Not a place to hide from reality, but a tool to help them thrive in the situation.
From the results of the generative research session, it became clear that in moments of insecurity, the individual often feels disconnected from their team, retreating in their own thoughts and feelings. This can cause the insecurity to seem larger and more problematic than it has to be. Providing a possibility to hide, cocoon-like, would make them feel even more disconnected with their peers. Instead, I believe it is important to still provide them with a way to take a step back, but to do this in a way that they feel still connected with

the rest of the team. Not something that you use to run from the situation, but something that you use to function in situation. With this concept, they still feel present, but can take a moment to self-soothe without feeling even more disconnected from the rest.

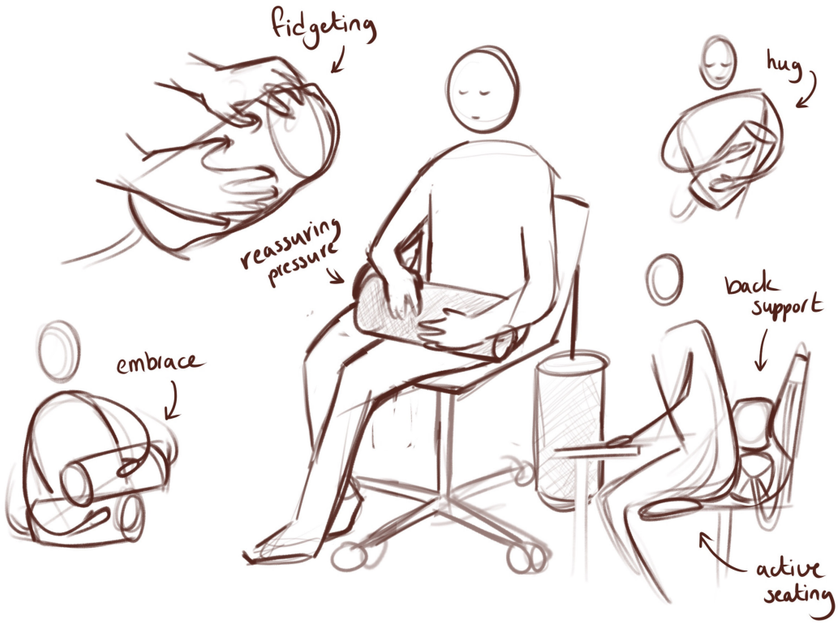


Figure 22: Visualisation of envisioned interactions with the movable armrests.

Since everyone uses the same chair, it becomes a normal part of the process, not something to be ashamed of. Seeing others use it, could help in normalizing it as well. Potentially, it could make the environment feel less formal and therefore lower the bar for participation, making people feel more at ease and self-confident to participate. Additionally, making these moments of stepping back a normalized part of the process can help remind more vocally present members that it is okay to take a step back, creating space for the less vocally present ones.

This intervention uses the effect of materials and the interaction with them, to provide the user with a calming and comforting experience resembling the experience when feeling self-confident, and gives them full control on using the intervention as they see fit. Either for comfort and feelings of safety, or as a support for their backs providing them with an active, upright posture.

5.3.2 EVALUATION OF THE INTERACTION

To move from the concept direction to a concrete concept, an evaluation test of a rough model exploring the interaction was done (Figure 23).
The goal of this test was to confirm the intended effect of the combination of the materials and interaction and to distillate what qualities had the most effect to use as a foundation for the next iteration.

participants

3 IDE students (2F, 1M)

time

45 minutes

activity

Brainstorming assignment + interview

Figure 23: Photo taken from the evaluation session

Rough model

The rough model was made of two round pillows, filled with micro polystyrene beads, attached with bands to a cover that could be slid over the backrest of a chair to keep it in place (shown in Figures 24 & 25). The important qualities of the model that were taken into consideration to evaluate were:

- shape and size of the armrests
- fabric and filling of the armrests
- moveability of the armrest (attached with flexible straps instead of fixed armrests)

Figure 24 & 25: Model used for the interaction evaluation

Procedure

The evaluation went as follows: A group of three IDE students were asked to participate in a simulated brainstorm session. At the start, it was explained to them how the final prototype was envisioned to help them get a better understanding of the end product, but not yet what the intention of the concept was, to prevent biases.

They were presented with a fake scenario and given 15 minutes to brainstorm about it together. While doing this, two of the participants sat on a chair with the rough model and were asked to explore the model to see how they would think they would use it in brainstorming sessions. Due to time constraints, only two rough models were made, so halfway, the participants were asked to switch seats so all had a chance to interact with the model.

Beforehand, participants were asked to sign an informed consent form (see Appendix B). Participation was voluntary, and no compensation was offered. Data was gathered through audio and video recordings, and photos, with the consent of the participants to be transcribed and analysed afterwards. The duration of the sessions was around 45 minutes.

After the simulated brainstorming, the participants were asked to fill in three templates to evaluate their interaction with the model, which were then used to guide a concluding interview. These templates were taken and slightly adapted from the Ma2E4 Toolkit made for the experiential characterisation of materials (Camere & Karana, 2018), and can be found in Appendix I.

Key Takeaways

After analysing the gathered data (see Appendix J), the following key takeaways arose:

Qualities of the model evoke…
feelings of calmness and comfort:
- Material is soft and cosy, causing a calming effect
  - Reminiscent of a pillow, inviting to rest on.
- Little balls inside make it feel like a stressball
  - The urge to of squeeze/pinch: wanting to grab the filling
  - Helps with keeping focus if the hands are busy (mainly when listening)
- Shape and material evoke an urge to hug:
  - Because it's reminiscent of a pillow; soft and big
  - Hugging and squeezing works calming and could ease feelings of anxiety

feelings of informality:
- Juxtaposition: something reminding of a cosy and chill atmosphere, in a formal environment
  - Armrests looking like cushions reminds of the informal, cozy ambience of a bed or couch.
- This relaxed ambience could lead to less stress about the quality of ideas and encourage play and trying things out, instead of worrying about ideas being good enough to express.
- Exploring how to use the cushions evoked feelings of *curiosity* (participant 2 & 3) and *playfulness* (participant 1)

Additional user values discovered:
- *A balance between professionalism and informality*: One of the participants noted how they appreciated the juxtaposition of an informal element in an environment that felt very formal. They explained how they value professionalism in a team, finding it important to work well together as a team to come up with a good end result. As is in line with the findings of the earlier generative session, which showed that most students value having a team full of positive, supporting members eager to work together towards a high-quality end result. The results also showed that having this formal environment can also work against this goal. It can raise the fear of failure and heighten the barrier to contribute. The juxtaposition that is caused by the design intervention could subconsciously lower this bar and could encourage the team to work more playfully. However, it is important that it should not become too informal, because that would clash with the level of professionalism students aspire to attain in their work.

- *Focus*: This informality, however, should not turn into distraction. While the interaction with the armrests was noted to work well as a way to keep focus, one of the participants noted that the filling of the cushions caused noise during squeezing, which could work counterproductive. Such noticeable noise could attract unwanted attention and distract the other members trying to focus. Therefore, further exploration can be done to create a filling that is both tactile stimulating and non-disruptive to others.

5.3.3 CONCRETISING THE CONCEPT

This interaction with this novel, playful type of armrests, formed the starting point of the conceptualisation. Although the armrests are the focal point of the design, the whole chair is meant to reinforce the conveyance of the message. Choices about the materialization, such as the shape, colour and fabric of the chair, are important aspects that complete the experience and contribute to the end goal.

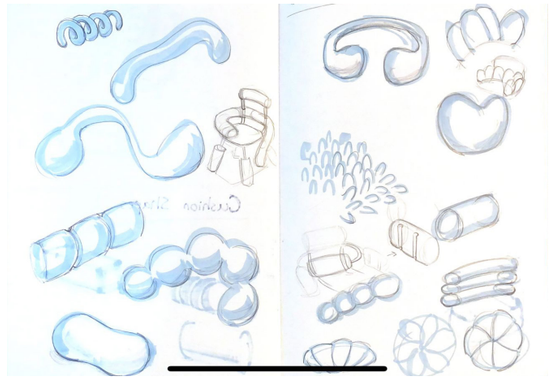
To complete the design of the chair, first multiple explorations with sketches, form studies, materials and prototyping of separate components of the chair were done. Both at scale and true to size, to compare the overall perception with the actual experience. A collection of sketches and collages made during those explorations can be found in Appendix K.
Decisions made were based on the knowledge gathered throughout the process and discussions with the target group.

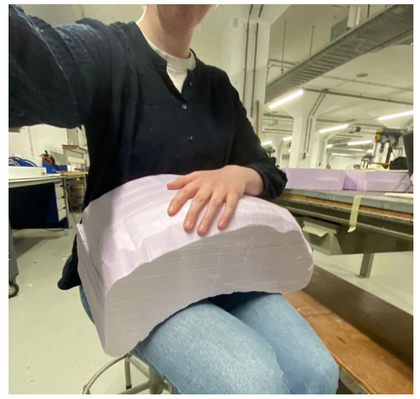
Important to note is that due to time constraints, the decision was made to focus mainly on the top half of the chair and not its base. For the base, a regular frame with wheels was chosen, since this provides the user with the most freedom of movement, as was discovered to be important in the user research, as well as feel steady enough to facilitate moments of calm.

Summary of considerations:

- **Material**: The most fitting material should be soft to touch, but differ from materials that easily hold on to dirt, such as plush or velours. Materials like (faux) leather, by contrast, feel too distant and cold, not resembling the aimed cosiness. Therefore, a middle ground was found in a fabric that resembles the material of a beanbag, but a little softer. This feels easy to clean (and is water-repellent), but still soft enough that it invites to be touched and embraced.

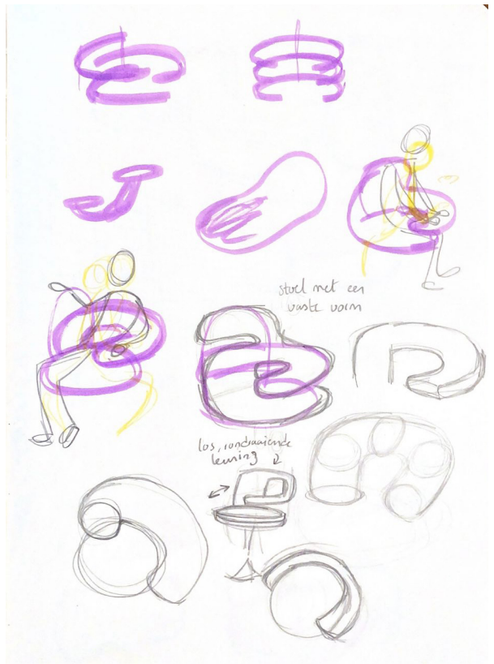
- **Shape of the moveable armrests**: Multiple shapes of cushions were made and tested to see which ones had the most calming and playful effect. In the end, the long round shape used in the interaction evaluation felt most like a kind, supporting figure. In contrast, e.g. the one shown in the middle of the picture below, which was only comfortable in some ways of holding and felt too stubborn in others, while the other moulded more to the body of the user, like a hug. To keep the balance between professionalism and informality mentioned in 5.3.2 in mind, the shape was changed from round to a rounded square, to keep the softness but make them appear a bit less informal. Plus, having one side being shorter than the other allows the user to either use them as a blanket-like rest on their lap horizontally, or as an elevated arm rest vertically.

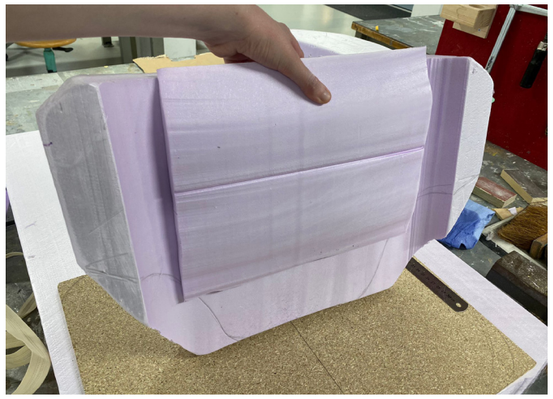




- **Shape of the sitting area:** The sitting area should provide enough freedom of movement to allow and encourage users to take up their space in brainstorming sessions, as was defined as a behaviour linked to self-confidence. Additionally, it should feel like a safe place for the user to feel reassured when switching to a passive state.

- **Shape of the backrest:** The backrest should evoke associations with both active participation as well as moments of rest. A long shape would remind to much of gaming chairs or ergonomic chairs made for long sits, while this chair is meant for shorter, active brainstorming sessions. Having a shorter backrest makes it look more dynamic. However, to also appear like a place to rest, the sides of the shape fold around the body as an embrace. Not too much though, to not make it appear like a restriction of movement: something 'holding the user in this passive state', but to feel more like an invite to take a moment of calm. The overall shape of the backrest resembles an upside down triangle, or a trapezium. This is because it makes it look more like an active, confident shape, than if it would be the other way around making it look more lazy.





5.3.4 FIRST VERSION CONCEPT

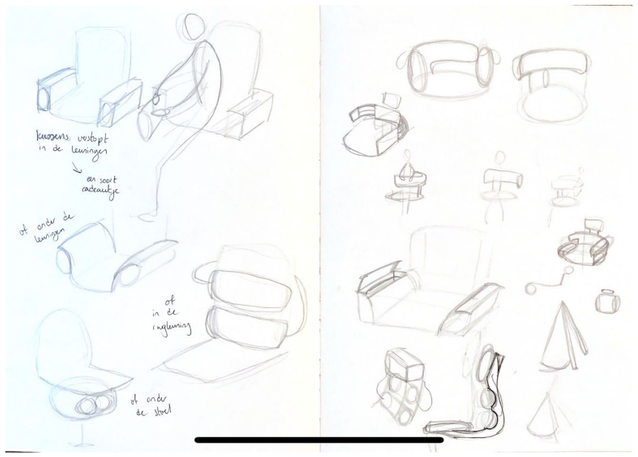
These explorations led to the first version of the concept (Figure 26):

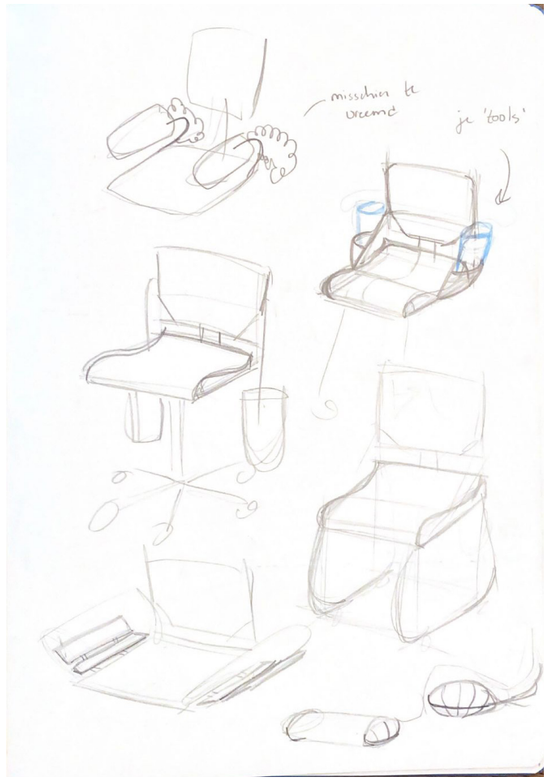
Figure 26: First version of the concept

It already contained the feeling of embrace, however it still looked too much like a normal chair with fixed armrest cushions, which could lead to users not being inspired to use the armrests in they way they were meant. Next to that, the bowl-shaped seating area mainly accommodate for the passive state, while the chair should also provide the user with a support to get back into the active state when they feel ready.

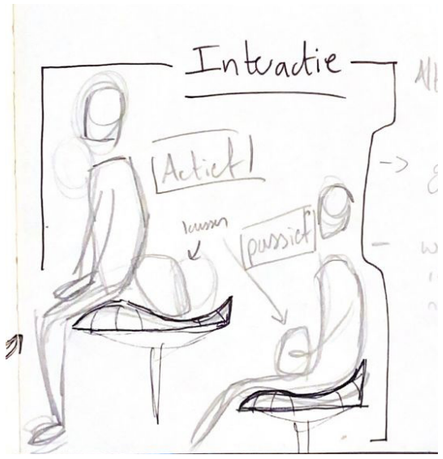
This led to the following additional aspects to consider:

- **Placement of the movable armrests**: To invite the user into interacting with the armrest, the placement and type of attachment was critical. It should be clear that they are meant to be picked up, and used and placed wherever the user wants according to their needs: e.g. as a cushion on their lap for feelings of safety or as a rest for their arm during active participation. This entailed that they should not appear to be fixed in place or that the action of taking them out of their place to use seems too much effort hindering the individual in using them.





- **Sitting posture:** To encourage both the active and passive state, the chair should facilitate different ways of seating for both states. A more unrestricted in movement, actively sitting seating option for the active state, and a more secure, relaxing seating option for the passive state. These could be achieved through combining the effects of the shapes of the backrest and the sitting area.



5.3.5 ITERATED VERSION CONCEPT

This improved version of the concept takes the positive points of the first one and elevates the design to one that is better aligned with the design goal and vision (Figure 27).
The sitting area now encourages both states: When switching to a passive state, the user can sit back into the bowl-shaped wooden part of the chair. This part is made to enhance the feeling of security provided by using the moveable armrests and the slightly surrounding shape of the backrest, making it feel like the chair is welcoming the user into its embrace.

The front part of the seating area is a soft cushion meant to support the active state. When recharged, the user can 'step back into the game' by moving to the front part, having a more active posture and more freedom of movement. Using embodied emotion by encouraging the user to actively come forward, supporting the 'coming into people's space' aspect of self-confidence found through the user research. It is therefore important that moving between the front and back part is not too much of a hassle, so this step does not become a barrier, hindering the user from switching between states.

Figure 27: Iterated version of the concept

The user themselves is given control of which support they need at that moment by choosing to either sit back or on the front, and using the armrest cushion in whatever way they see fit.
After several rounds of exploration and discussions with the target group, the armrests seemed most fitting dangling on the sides. In this way, they are in movement with the user, reminding them that they do not have a fixed place and inviting them to pick them up to use. Almost as a symbolic message that their participation state also does not have to be fixed. This sweeping, dynamic movement also sparks more playfulness than if they were fixed in place, resembling toy-like interactions such as a swing.
The user could, for example, lay the armrest cushions on their lap or hand them in their arms in the passive state, in which the armrests provide them with a soft, reassuring pressure, like a friendly, playful barrier against the outside world. Or, they could use them as a way to focus when they are listening to and reflecting on what is being said, having an outlet for their nervous fidgeting that feels soft and welcoming. Lastly, they could lay them behind them as an extra support in the back in either a passive or active state (Figure 28).

Having a room full of these playful chairs and seeing team members use them in different ways could lower the pressure of performing and remind users that it is okay to take a moment of calm when they need it. That it does not diminish their value as a team member when they feel insecure and that they are very much still an active part of the group.

Figure 28: Envisioned interactions with the chair.

6.

Chapter 6

FINAL DESIGN

This chapter will explain how all the important insights gathered through the research and design process came together in the final design. It will explain the reasoning behind the design choices that make up the concept, as well as show how these were incorporated in the final prototype.
Lastly, it will go into detail about the evaluation method and results, to conclude with a critical reflection on the final concept, with recommendations for improvement and future work.

6. FINAL DESIGN

6.1 FINAL DESIGN - The Serenity Seat

Figure 29: Visualisation of the final concept design, The Serenity Seat.

6.1.1 GOAL AND OBJECTIVES

The primary goal of The Serenity Seat (Figure 29) is to enable and support the individual in the team to feel welcome and at ease, improving their emotional wellbeing by providing them with a moment of rest in a passive state to reduce their anxiety levels via self-soothing, so they feel confident again to switch to an active state.

The objectives include:

- Providing them with a tool to calm and relax their mind and body to feel at ease and in control of the challenges ahead.
- Facilitating both the active and passive state to promote inclusivity of all personalities, as well as the normalization of all participation states.
- Supporting their expressions, helping them have control over their own actions.
- The passive state should feel like a safe, informal environment in which they feel supported and reassured.
- Balancing visibility and low threshold to use: Providing a tool that is inviting to use and does not evoke feelings of shame.
- Balancing informality and professionalism: Facilitating both a way to focus and work productively, as well as lowering the pressure to perform through lightheartedness.

6.1.2 ELEMENTS OF THE FINAL DESIGN

Wooden base

I chose to make the back-seating part out of wood, because it is a material that reminds me of strength and reliability, as well as calm. Especially since it has a light colour and it has a curved shape, combined with straight edges, it looks calming and friendly, while still looking professional and reliable. I experimented with round edges, but those did not give the design the clean, strong look I was going for. While the previous version of the concept (and the prototype, showcased later in this chapter) had a narrower wooden part to seamlessly integrate with the narrower part of the backrest, I decided to make the wooden part wider. In this way, it encompasses the back and seating cushions as an embrace, and it makes the sitting experience feel safer when in the passive sitting position. When it was narrower, it slightly felt like one could fall off the chair, which counteracted the intended safe feeling.
For the thickness of the base it was important to find a balance between sturdiness and elegance. The sturdiness could contribute to the feeling of safety, however, it could also look too heavy and bulky, making it look lazy and clumsy.
The research made me realise that there is a certain elegance about self-confidence, having flowy and controlled gestures. Which is why I believe that a slimmer base is more fitting to the design. Especially since it is also a relatively short chair, having a thicker base would easily make it too bulky.

Backrest

The backrest of the chair is shaped like an embrace, inviting the user to sit back and switch to a passive state when needed. As if to say: "It's okay, I'm here for you." It resembles an upside-down triangle and trapezium, which are seen as strong shapes, to evoke the association with safety. It is inspired by the stereotypical images of self-confidence (see Figure 30), which are more top-heavy, in contrast to stereotypical images of insecurity, which are more down-heavy.

The backrest is tilted slightly, so the user sits in a more relaxed, leaned back position when in the passive state, to contribute to the feeling of ease. I made the choice to make the cushion slightly more tilted then the wooden frame to which it's attached, because I believe that having a somewhat more upright wooden base makes the chair looks more stable and therefore feel more safer to lean back on. That is also why it is a fixed backrest. A lot of chair designs have a back that tilts backwards when you lean against it, but not knowing how far it tilts can make for an uncertain, unstable experience.
Having a cushion that is already tilted, still provides that relaxed posture while also feeling like a safe, solid rest to lean on.

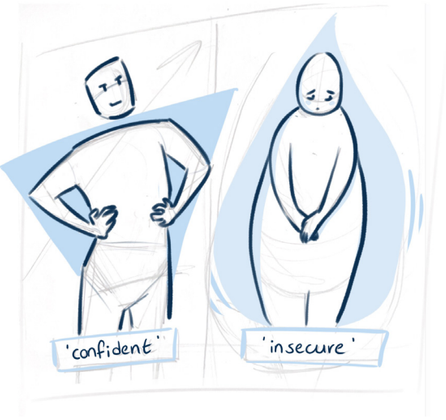


Figure 30: stereotypical shapes associated with confidence and insecurity.

The cushion reaches to just under the user's arms, because this is supposed to resemble a hug meant to lift someone up, just as this chair is meant to lift the user up in moments of insecurity.

Seating area

The seating area consists of two parts: the wooden base and the front-seating cushion (Figure 31). The front cushion is designed to encourage the user to switch back to an active state by enabling an active sitting posture, while still providing comfort through a soft cushion that invites to sit on.

Taking a mental step back from the brainstorming for a moment of calm is then facilitated by moving you body to the back of the chair, the wooden bowl-shaped part. Eventhough it might seem counterintuitive that this part, that is meant to feel comforting, does not have a soft surface, but a hard, wooden one. This was deliberately chosen, because it was meant to feel like a solid, safe foundation. Sitting on a cushion can feel a bit unstable, while the part of the chair meant to accommodate the passive state, should feel safe and dependable. The wood is still soft to touch, but does not have this factor of instability. Next to that, the two parts are also made of different materials so it would be more clear that they have two different functions.

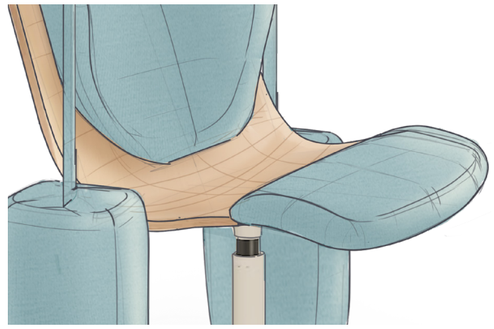


Figure 31: Close-up of the seating area

Wheelbase

As mentioned before, considering the timeline of the project, I chose to focus on the top half of a chair and not the base. However, I did do some explorations about the kind of base I believe is most fitting for the design goal. In the end, I decided to go with a standard wheelbase, because it allows for freedom of movement for the user, but gives them more control and a feeling of stability than for example a round base.
Based on the conclusion made in Chapter 4, that the intervention should support their expressions, helping them have control over their own actions.

Armrest cushions

Lastly, the the focal point of the design, the movable armrests dangling on the side. The armrests are filled with a mixture of stuffing material and microgranulate beads (Figure 32). The stuffing is meant to give a firm, but soft pressure when embraced and the beads are there to encourage fidgeting.
The fabric used for the armrests, as well as for the back rest and seating cushion, is soft to touch and feels (easy to) clean so it invited to be touched and embraced. As the context is set in a public space with several people using the same chair in a day, a fabric that feels like it absorbs minimal dirt was chosen so that people do not feel resistant to touching it.

The cushions are shaped like rounded rectangles, with one side wider then the other so it invites different uses such as a blanket-like rest on their lap horizontally, or as an elevated arm rest vertically. Making them more squared instead of completely round was done to keep the balance between professionalism and informality.
They are attached to the backrest with thin straps that maximise their mobility as extensions of the embrace shape of the cushion, to heighten the experience of reassurance when the user wraps them around themselves.

Figure 32: Filling of the armrest cushions

(Images from: https://arico.ca/en/products/refill-arico and: https://www.terschellinger.com/navulpak-comforta.html)

6.1.3 ENVISIONED INTERACTION

Through a storyboard (Figure 33), this section explains the envisioned interaction with the chair.

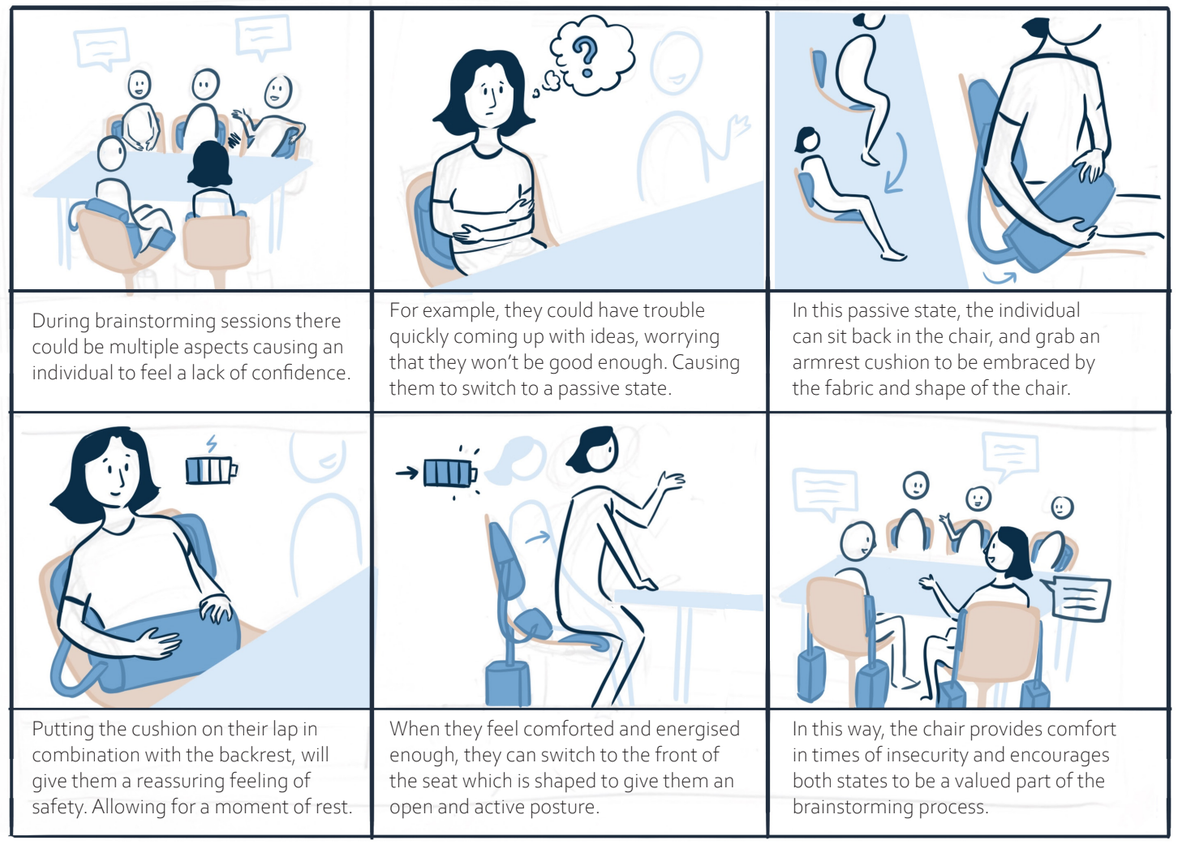


Figure 33: Storyboard of the envisioned interaction in a moment of insecurity.

6.1.4 FINAL PROTOTYPE

To evaluate the final design and make a proof of concept, I developed a prototype that covered the most important aspects of the final concept.

It has a wooden frame screwed to a store-bought wheel base, to which the backrest cushion and front-seating cushion are attached. As can be seen in Figure 34, the back-seating wooden part is curved to facilitate a feeling of embrace in combination with the curved backrest. The seating cushions are shaped out of foam, covered with a layer of fiberfill and plush fabric, enclothed with the soft, blue fabric made out of 100% polyester, to contribute to a comfortable seating experience.
The armrest cushions are made out of the same blue fabric and filled with a combination of polyester stuffing material and microgranulate beads. Some photo's of how the prototype was built can be found in Appendix L.

Figure 34: The final prototype.

6.2 EVALUATION FINAL DESIGN

The main objective of this design project is to boost students' feelings of self-confidence during insecure moments in brainstorming sessions. To achieve this, it is important to enable the individual in the team to feel welcome and at ease, improving their emotional wellbeing by providing them with a moment of calm in a passive state to reduce their anxiety levels via self-soothing, so they feel confident again to switch to an active state.

To evaluate the effectiveness of the chair design, the following design aspects have been tested:

1. Emotions and associations evoked by interacting with the chair
- Does the combination of the material, filling, and shape of the cushions have a calming and reassuring effect, evoking a sense of security?
- Are the pillows used in different ways that create different experiences?
  - On the lap: Does it give a reassuring pressure, a layer of 'protection'?
  - In arms: Will it be used like an embrace, and does it give a safe, reassuring feeling?
  - To fidget with: Does squeezing the cushions create a nice fidget feeling that helps keep attention? Does the combination of balls and cushion filling on the inside give a good balance of firmness to hug and stimulation to fidget?
  - Behind their back: Will they be used in this way for extra support when the user wants to sit in the active position?
- Is the fabric of the arm pillows soft enough while feeling clean enough to invite hugging?

2. Effect of the evoked emotions and associations
- Does having this moment of rest help them to feel more self-confident when they reenter an active state?

Next to these aspects, which had the main focus, there were a few additional ones, less crucial to the design, that were covered briefly in the evaluation:

Seating positions
- Are the two seating options (rear and front) self-explanatory in use, and do they give 2 different experiences?
  - In the back: does it provide a sense of embrace through backrest and use of arm cushions, and therefore security (a kind of safe haven in uncertainty)?
  - In front: active attitude, does it facilitate active participation in brainstorming, coming into people's space?

Interaction with the armcushions
- Does the sweeping, dynamic movement of the armrest cushions spark more playfulness than if they were fixed in place, resembling toy-like interactions such as a swing?
- Do users not feel shame (and an increasing feeling of insecurity) using the prototype?
  - Does having the armrests dangling on the side provide a low barrier and invite the user to interact with them?
  - When everyone uses such a chair, does it normalise momentarily retreating and fidgeting to concentrate or to self-soothe?

These aspects were formulated on the basis of the assumptions made during the development of the final concept.

6.2.1 METHOD AND TOOLS

The final design was evaluated by conducting two sessions with each three IDE students (Figure 35). In these sessions, the participants were given a brief introduction about what was expected from them, explaining that they were invited to evaluate the experience with a new chair designed for brainstorming sessions for IDE students. Starting with a brainstorming exercise during which they would use the chair, followed by some initial questions about their experience and filling in a questionnaire, and concluding with a group interview.

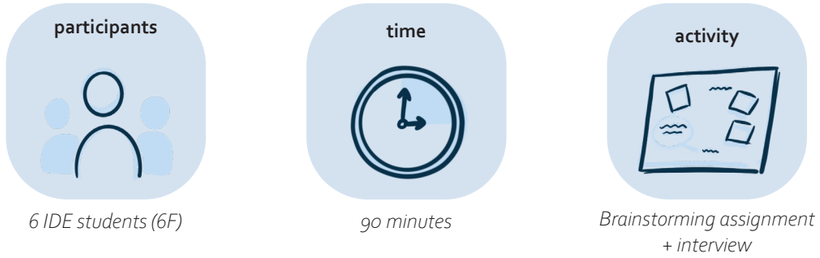
It is important to note that participants were not told in advance what the intended interactions and emotions, and associations were, so as not to lead them in their expectations and opinions. They were instead encouraged to use the chair in whatever way they saw them using it in similar contexts. This was done to see if the intended interactions were self-explanatory and if they would elicit the aimed emotions. The only thing most of them knew, was that the chair was related to the topic of self-confidence. However, some of them had a bit more insider information than others, having discussed (some aspects of) the concept with them. Three of the participants were part of the generative research session in the User Research phase, and one of those three also participated in the evaluation of the Ideation phase. The other three only knew the topic.

Figure 35: Photo taken during the first evaluation session.

After this introduction, they were invited to try the prototype out to get a first impression and get accustomed to it. It is, after all, a prototype, which could cause participants to feel unsafe or extra cautious not to break it, influencing their experience in a negative way.

This was followed by the explanation of the brainstorming task. The participants were asked to do a 30-minute brainstorm session for a fictional design assignment, in which two of them would be sitting on a standard chair and one of them on the prototype, switching every 10 minutes so everyone could try out the concept. In this way, every participant got to experience the chair in context and be able to compare it to the experience with a standard chair. During this exercise, video recordings were made and observations were written down.

After these 30 minutes, they were asked to share their initial thoughts about their experience with the concept chair. Followed by a questionnaire which can be found in Appendix M and concluded with a semi-structured group interview. Questions covered their general experience, their envisioned use, and the associations and emotions it evoked.



6 IDE students (6F) | *90 minutes* | *Brainstorming assignment + interview*

6.2.2 RESULTS OF THE EVALUATION

The evaluation sessions with the participants led to some interesting insights and observations. First, the results concerning the evoked emotions and associations will be discussed. It will be explained how the participants experienced the chair and what kind of impact it had on them. How the analysis was done, can be found in Appendix N.

Emotions and associations evoked by interacting with the chair

The association that was mentioned the most by far was cozy, accompanied by related terms such as 'calm' and 'comfort(able)'. 5 out of 6 of the participants chose 'cosy' as one of the three associations they were asked to write down. The remaining one wrote 'comfort', and on top of that, 2 out of those 5 also put 'calm' next to 'cosy'. They explained to me that the backrest and seating cushions felt like a hugging sensation, and that this was heightened by putting the armrest cushions around them (Figure 36):

> *"It is soft to sit on, it really hugs you in. The extra [armrest] cushions also make it cosy because you are surrounded with the material."* - Participant E6

Figure 36: Participant surrounded by the cushions

This interaction with the armrests of putting one on their lap or surrounding themselves with the two of them seemed to come naturally. When asked about this, they mentioned that especially the combination of the soft fabric with the big, pillowy shape invited them to hug the armrests and put them close to their body.
"Because they are fun and soft. So I want to embrace them. Like a baby." - Participant E4.

This makes for an interesting insight, since most of them only knew that the concept was designed around the topic of self-confidence, and did not know this was the intended interaction.
One of the participants even mentioned that this reminded them of getting a hug from their mom. They explained that this was mainly because of the softness and roundness of the shapes of all the cushions, which evoked the association 'feminine'. Combining this with being surrounded by the softness made them think of hugging their mother.

Overall, the words 'calm' and 'relaxed' were often used when explaining the feelings that were evoked by interacting with the chair. This calming sensation was also brought up by two participants, relating it to being an outlet for nervous fidgeting (Figure 37).

> *"You feel it goes back when you compress it. So then you want to do that. It's like a stress ball."* - Participant E4

Figure 37: Participant squeezing the cushion

For another participant, the fabric was reminiscent of a yoga cushion. They explained that because yoga always makes them feel very calm, this made them think of that, thus enlarging their calming feelings. One of the participants of this same group even put the two cushions on top of each other in front of them, hugging them with their arms and laying their head on top of the pile (see Figure 38).

Figure 38: Resting their head on the cushions

The association that was mentioned second most was 'playful' or 'toy-like'. The reason most often mentioned for this was the diverse interactions with the armrest cushions (see Figure 39).

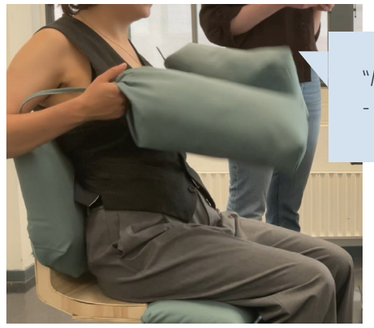


Figure 39: Participant swinging the cushions around

> *"It felt like it was a toy, to explore, to play with."* - Participant E2

The participants noted that they felt curious to try out different ways of using them, and having them dangle beside the chair made it easy to swing them back when they did not feel like they needed them anymore. Next to this, this dangling added to the playfulness when the user was moving the chair, as one person noted: *"And also I kept on moving and then the things would move along with it. I don't know. Yeah, you can sort of play with the cushions and like do a pillow fight."* - Participant E6

Something very interesting happened after the interview. We had a more casual talk, and two of the people started a boxing game, where one was holding up one of the cushions and the other was playfully hitting it with their fists (see Figure 40). Saying that this would be a fun break activity. Another spontaneous action that happened during that talk was that one of the two was swinging them around (see Figure 39). These kinds of spontaneous interactions make it even more plausible that the design is perceived as playful.

Figure 40: Participants doing a playful boxing game at the end on the interview

Effect of the evoked emotions and associations

These evoked emotions and associations had both positive as well as negative effects. While multiple participants expressed their expectations that such a chair would make the environment less formal, some also expressed their concerns that it might be too informal. They explained how it felt strange to use them, for example, as is portrayed in Figure 38 on the previous page, and that they would expect to do these kinds of interactions more likely when they would do relaxing activities such as reading a book or watching tv.

> *"Then I do feel like comfortable and safe, but I would definitely... Yeah, it's just so... I feel not active. I feel like it's very like... too comfortable to be like in the task."* - Participant E3

> *"But also in brainstorming, I just really want to be active. So like in a different setting, it does invite me to do like, that's the first thing I did. It's really nice to lay like this, lie like this. But it just felt weird to do it while writing. This doesn't feel comfortable. And maybe it's because this, like what you said, you want it in a different setting and this is too professional maybe for you to sit like."* - Participant E3

This makes it clear that they perceive the chair as a tool that can be used to evoke calming and relaxing sensations, but that the current design does not communicate well enough how the chair can also facilitate an active state. Making the design feel somewhat out of place to them. While the seating cushion on the front of the chair was meant to support the user in an active state, virtually none, except for one, of the participants sat all the way to the front. Instead, they just leaned forward in the chair. When asked about it, they explained that they had assumed the front-seating cushion was there for ergonomic reasons, making it even more comfortable to sit on the wooden bowl-shaped part of the chair. Additionally, what I observed is that there is not really one active seating position. At different moments, some people leaned forward and others leaned back (see Figure 41 and 42). Sitting on the front-seating cushion of the chair, therefore, might not be intuitive for everyone, making its purpose unclear.

Figure 41: Active position: leaning forward

Figure 42: Active position: leaning backward

It could be that people don't need additional support when they are in an active state. I believe that the most important thing is that the design does not hinder them from switching from passive to active. One of the main goals of the design is to help the individual feel self-confident to switch back to an active state, so the chair should encourage this and not make it even more difficult. However, it is not necessarily crucial to give them support in the active state, as long as it's clear that the design also encourages an active state and not solely a passive one.

The evoked feelings of calm and informality had positive effects as well. Next to making the user feel safe and secure, the armrests also proved to be a tool for fidgeting without shame. When two participants mentioned that they could see themselves using the armrest cushions as an outlet for nervous fidgeting, one of them noted that they already do that by playing with their clothes, but that using the cushions felt less stigmatised (Figure 43):

> *"Yeah, because if you are like figeting, like playing with your clothes, maybe other people can feel that you are nervous. But if you are playing this, maybe you are nervous but they cannot tell."* - Participant E5

Figure 43: Person fidgeting with the cushion

From this, we could conclude that it is plausible that the user does not feel put into a negative spotlight when using the chair in a calming way to reduce their anxiety levels, making it an accessible tool to deal with insecurity without feeling shame for using it.
It could be that the evoked association of 'playfulness' contributes to this. Since participants perceived exploring the movability of the armrest cushions as playful, using them during the session might evoke positive feelings rather than negative feelings, such as embarrassment.

What also seemed to impact their levels of perceived playfulness was being the one whose turn it was to try the chair. Multiple participants expressed their excitement about being the one to try out the chair. This could, of course, be because it's something new and interesting and therefore evokes curiosity, but it does give the impression that their initial association with the product is positive.

Additionally, another thing that was noted was that the playfulness could have an impact on the environment, making it less formal and businesslike (see Figure 44), which could reduce the fear of failure and therefore help users feel more self-confident.

> *"Very comfortable. Makes the setting less formal, changes the environment vibe."* - Participant E5

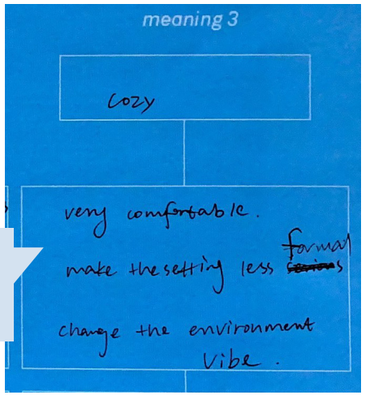


Figure 44: Answer on the questionnaire about the associations evoked by the interaction with the armrests

6.2.3 LIMITATIONS OF THE EVALUATION

It is important to note some limitations that could have influenced the results from the evaluation:
Firstly, due to time and budget constraints, it was only possible to make one prototype. Part of the concept is that everyone uses a chair with the same design, because I believe this will contribute greatly to normalising moments of calm. Now, only one participant at a time could interact with it. This is also what participants in the first session mentioned as the reason for feeling guilty of using a tool for relaxation.

Additionally, the prototype was tested over a relatively short period of time, during a controlled brainstorming session. Normally, group projects have all kinds of brainstorming sessions, depending on e.g. subject, time, and stage of the project, which makes it possible that the design is more suitable for one or the other.
Next to that, the emotional experience of an individual during a brainstorming session is also heavily influenced by team dynamics. Those dynamics can either enlarge or decrease the need for moments of calm. This dynamic is dependent on various factors such as personalities, the number of team members, or even the time of day.
This timeframe does not cover all those different kinds of brainstorming and team dynamics, and it may not reflect the possible long-term effects and potential benefits or drawbacks of using the chair.

In terms of team dynamics, the groups participating in the sessions consisted of only three people, all women, which is relatively small for a team, making it easier for people to give input and feel heard. In addition, some also knew each other to a greater or lesser extent, which may also have an effect on this. The lack of being able to give input and feel heard was found to be a big factor in moments of uncertainty. So it is likely that the setting was not representative of the targeted context of the design. On the other hand, being aware of being observed and being part of prototype testing could cause nerves in the participants, wanting to provide me with a good evaluation. That could have still led to insecure moments.

Being aware of being observed and being part of prototype testing, as well as being study peers of mine, means that completely genuine behaviour free of biases cannot be guaranteed. After all, the participants feel obliged to interact with the prototypes in ways they might not otherwise have done on their own, and be more aware of the presence of the design.
Multiple participants expressed their excitement about being the one whose turn it was to try the chair.
This could influence the perceived playfulness of the design, which might decrease over time due to people getting used to the chair.
This, combined with the awareness of the presence of the prototype, means that it cannot be guaranteed that the experience of the design will remain playful in the longer run.

7.

Chapter 7

CONCLUSIONS

This chapter will round off this thesis by providing the key insights and main takeaways from the literature study and user research. It gives a summary of the development of the intervention and its possible impact. Additionally, it offers recommendations for future research and development and concludes with a personal reflection on the project.

7. CONCLUSIONS

7.1 CONCLUSIONS

This project explored ways to enhance students' sense of self-confidence during brainstorming sessions, taking inspiration from the principle of embodied emotion. Through a process involving literature review, user research, and exploring through rough models and prototyping, this project has developed an intervention aimed at enabling and supporting the individual in the team to feel welcome and at ease, improving their emotional wellbeing by providing them with a moment of rest in a passive state to reduce their anxiety levels via self-soothing, so they feel confident again to switch to an active state.

The findings from the literature research showed how emotions play a role in the effectiveness of teamwork. Specifically self-confidence, which encourages one to take risks, take matters into one's own hands and believe in oneself and one's abilities. It explained how self-confidence consists of subjective experiences combined with behavioural expressions. Experiences which include feelings of security and safety, acceptance which leads to trust (in oneself), and relaxation, often accompanied by physical behaviours such as adopting an upright, open posture, eye contact with calm and friendly facial expressions, and calm, fluid and open gestures combined with deep and even breathing.

The theoretical research provides a deeper understanding of the topic of self-confidence, its related feelings, sensations and behaviours, as well as a brief overview of embodied emotion and how it could be used to boost feelings of self-confidence. However, it lacked concrete situations that contribute to self-confidence or a lack thereof. So, to gain a more personal and target group-specific perspective on feeling self-confident and the role of it in groupwork projects of IDE students, a series of qualitative research activities were executed involving the target group.

We discovered how IDE students perceive and experience self-confidence, providing a variety of concrete factors that either benefit or reduce their feeling of self-confidence. Brainstorming turned out to be one of the main teamwork activities during which the neglection or criticisation of ideas could cause students to switch from a self-confident, active state to an insecure, passive state. Self-confident behaviour was described as feeling calm and in control, not being afraid to take up space, both with their input as well as their bodies. Contrastingly, insecure behaviour tended to manifest in closing off, following others without expressing their own views, feeling tense and uneasy, feeling less worthy and less valued than others.
During this insecurity, students appeared to feel a lack of safety and support from their team members, dealing with an increased amount of fear of their judgment. These feelings can start to overwhelm them, causing them to spiral into negative thoughts, making the problem bigger than it has to be, as one of the most important insights was that almost everyone deals with these feelings from time to time. Contributing to the design goal, realising that the intervention should provide a light-hearted tool to normalise these moments of retreat into a passive state, making it a more visible part of the design process.

Through multiple rounds of ideation, the exploration of tactile interactions and evaluation sessions involving the target group, the final concept direction resulted in the design of a chair. A playful chair meant to facilitate a moment of calm, using soft, movable armrests, using tactile interactions to evoke feelings of safety and security when wrapped around and put on the user's lap. The armrest functions as a tool that gives the user a way to self-soothe while having the control to use it in any way they see fit, recharging their feeling of self-confidence. The design is meant to normalise and destigmatise a passive state of participation, allowing for a moment to recharge while making clear that it is not a permanent retreat. Encouraging the user to have a moment of calm while simultaneously motivating them to switch back to an active state whenever they feel ready. Encapsulated in a playful design, with dangly armrests resembling toy-like boxing bags, contrasting the hard, unyielding, standard armrests of chairs.

The evaluation of the design took place in a semi-realistic context with the target group. The results make it plausible that the design succeeds in facilitating a playful interaction that evokes feelings of safety, calm and relaxation. However, the current design does not yet portray clearly enough that it also encourages an active participation state, making it feel somewhat out of place in a context where students wish to actively participate. This provides an important starting point for future development.

Overall, this thesis provides valuable insights into the experiences, needs and values of IDE students concerning self-confidence and teamwork, and the potential of a design intervention to tackle a part of the discovered issues.
This work aspires to contribute to the well-being of students in teamwork environments, normalising moments of rest in a passive state, by providing them with a playful tool to relax, recharge and encourage them to step back into the game, to ultimately enhance their brainstorming experiences.
Moving forward, the conclusions drawn from the final evaluation can be taken into account as a foundation for further exploration and refinement of design interventions, boosting individuals' feelings of self-confidence in teamwork through embodied emotion.

7.2 RECOMMENDATIONS

In the coming section, some recommendations will be presented that aim to guide future research and concept development to address the multifaceted challenges of boosting feelings of self-confidence during brainstorming sessions.

- **Facilitating the passive and active state**
  As the results of the evaluation showed, some participants were somewhat confused about the usage of the chair. It was clear to them how it would be used for comfort and a moment of calm and relaxation, but they could not recognise how it would assist them in an active state. So, for future development, it would be advisable to explore how the design can be adapted to ensure it is clearer that the chair encourages both a passive and active state, normalising both. It is not yet clear whether the target group also needs support in an active state, but it was found that it should at least be clear that the design also encourages switching to an active state, making the design fit better into the environment.

- **Band adjustments**
  Another possible adjustment to the design that arose, was the width of the bands attaching the armrest cushions to the backrest. Multiple people expressed their concern that they were afraid that they were going to rip them by accident, causing them to interact more carefully with the cushions. This could have had an influence on the evoked emotions and associations.
  Next to that, it is advisable to investigate the ideal length of the bands. On the prototype, they were on the shorter side, resulting in not everyone being able to comfortably wrap the cushions around their bodies. It should be kept in mind, however, that they do not become too long and cause the cushion to touch the ground. This could evoke negative emotions, making them appear dirty and less inviting to touch.

- **Ecofriendly materials**
  This was not the focus of this project, but considering the state of the environment, exploring the best suitable, sustainable materials to use for the chair, is an important aspect that still needs attention.

- **Usability in different contexts**
  For practical reasons and personal preference, IDE students and their groupwork projects were chosen as the context of this project. However, teamwork is widely used in studies and business settings

where similar issues likely arise. Therefore, it would be interesting to explore in what ways this design intervention could be implemented in different contexts. Such as at companies that value creativity highly, where, for example, a special room could be set up especially for creative sessions. Where the chair could serve as a reminder that brainstorming is a playful activity where mistakes can be made, and people can also withdraw for a moment for reflection.
Or even at companies where this does not happen very often yet, to serve as a low threshold by contributing to a safe-feeling environment to participate in such a session.

- **A space targeted at brainstorming**
  Another possible context of use could be in a space furnished specifically for playful brainstorming sessions. The chair could function as one of the aspects contributing to an environment that is meant to make people feel at ease and encourage them to think playfully during brainstorming. This could be one or multiple rooms at IDE that students and others can book when they purposely want to have a more playful, creative brainstorming session. Booking this room makes using these chairs even more of a conscious choice that can help increase the normality of taking moments of calm.

- **A different version of the concept**
  Instead of a complete chair, it could be financially interesting to look into a version of the chair that is only the backrest with the attached armrests. This also gives more freedom in applications of use. It could be standardly attached to chairs or only put on them when a brainstorming session takes place, and taken off when a more serious meeting is taking place, making it possibly more fitting for business settings. Again, this makes it more of a conscious decision that moments of calm and a more playful, informal atmosphere are encouraged in a session.
  However, as mentioned in the first recommendation, it remains important to consider how the message of encouragement to switch to an active state, and not just the passive state, can be made more clear.

- **Staying playful**
  The results of the evaluation suggested that being the one whose turn it was to try the chair seemed to enhance the playful experience with the chair and how special they found it. Therefore, it could be beneficial to investigate whether the playful associations stay or decrease in the longer run. If they decrease, e.g. because they have lost their novelty, the two recommendations explained above could be ways to extend the playful experience. It could be that if the chairs are only used in certain events, it makes the usage feel more special, and the playfulness may be prolonged.

7.3 PERSONAL REFLECTION

This project has provided me with the opportunity to explore various topics of my interests, from psychology to user-centric design, and even designing and building a piece of furniture. It allowed me to dive into a topic that has been a struggle for me in the past and sometimes presently still. Self-confidence has never come naturally to me, and it has not helped my struggles when it often seemed to be presented as the solution for everything. "Just be confident and everything will turn out fine." In media, it is often presented as a quick fix or a simple switch, while in real life it is often not that simple. This project is not a long-term solution to "cure" insecurity; you would need a much longer timespan for that, but moreover, it is not meant as a cure. Through conversations with my friends and peers involved in the research, I realised that insecurity is a normal part of our lives and should not be framed as a shortcoming or lack of skill. Therefore, I hope that this thesis not only presents new insights into the needs and values of IDE students during teamwork, but also functions as an inspiration to young designers, encouraging them to embrace these insecure moments and become resilient individuals, building each other up.

By tackling this subject through a user-centred process, I was able to put into practice and grow the knowledge and skills I had gained in various courses of my studies, and learn how to develop into an independent designer. It was an opportunity to combine designing for emotion and interactions with physical, material explorations. Making a physical tool in an increasingly digitalised field of work.
I believe I am now more confident to tackle complex problems and am more comfortable in coming up with strategies to overcome barriers when I get stuck. Overall, I have learned throughout my studies how much of a joy teamwork can be when you work with a group of people who make you feel heard and safe. While my project aimed to contribute to that last feeling, there are many more opportunities for design to have a positive impact on human experiences and emotional well-being, and I am excited to see what the future may bring.

Although this project and I as a designer naturally still have opportunities to improve and grow, for now, I am grateful for the amazing and inspiring years I've had as a student at the TU Delft, and to close this chapter of my education.

REFERENCES

Adam, H., & Galinsky, A. D. (2012). Enclothed cognition. *Journal of experimental social psychology, 48*(4), 918-925. https://doi.org/10.1016/j.jesp.2012.02.008

APA Dictionary of Psychology. (n.d.). https://dictionary.apa.org/self-confidence)

Ayoko, O. B., & Pekerti, A. A. (2008). The mediating and moderating effects of conflict and communication openness on workplace trust. *International Journal Of Conflict Management, 19*(4), 297–318. https://doi.org/10.1108/10444060810909275

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Barbalet, J. M. (1993). Confidence: time and emotion in the sociology of action. *Journal for the Theory of Social Behaviour, 23*(3), 229-247.

Barbalet, J. M. (1996). Social emotions: confidence, trust and loyalty. *International journal of sociology and social policy, 16*(9/10), 75-96.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Briñol, P., Petty, R. E., & Wagner, B. (2009). Body posture effects on self-evaluation: A self-validation approach. European Journal Of Social Psychology, 39(6), 1053–1064. https://doi.org/10.1002/ejsp.607.

Camere, S., Karana, E. (2018). Experiential characterization of materials: Toward a toolkit, In the Proceedings of the International Conference on Design Research Society (DRS), Limmerick.

Cannon, W. B. (1927). The James-Lange Theory of Emotions: A Critical Examination and an Alternative Theory. *The American Journal of Psychology, 39*(1/4), 106–124. https://doi.org/10.2307/1415404

Chivo. (2016). *De zwakte van de powerpose - Chivo - Kennisinstituut vitaliteit*. Chivo - Kennisinstituut Vitaliteit. https://chivo.nl/powerpose/

Collins, R. (1981). On the microfoundations of macrosociology. *American journal of sociology, 86*(5), 984-1014.

confidence. (2025). In *Merriam-Webster Dictionary*. https://www.merriam-webster.com/dictionary/confidence

Cuddy, A. J. C., Wilmuth, C. A., Yap, A. J., & Carney, D. R. (2015). Preparatory power posing affects nonverbal presence and job interview performance. *Journal Of Applied Psychology, 100*(4), 1286–1295. https://doi.org/10.1037/a0038543.

Desmet, P., & Fokkinga, S. F. (2020). Thirteen Fundamental Psychological Needs. TU Delft Open, 20.

Entwistle, J. (2013). *'Power Dressing' and the Construction of the Career Woman*. https://doi.org/10.4324/9781315004853-37

Griggs, M. & Kellogg, K. (2022) Weighted blanket [Photograph]. https://www.self.com/gallery/best-weighted-blankets

Hester, N., & Hehman, E. (2023). Dress is a Fundamental Component of Person Perception. *Personality and Social Psychology Review, 27*(4), 414-433. https://doi-org.tudelft.idm.oclc.org/10.1177/10888683231157961

Huang, X., & Lajoie, S. P. (2024). A scoping review on effective measurements of emotional responses in teamwork contexts. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues, 43*(31), 25661–25682. https://doi.org/10.1007/s12144-024-06235-7.

Ihunwo, O. C. (2023). The Psychology of Auditioning: Overcoming Nerves and Boosting Confidence. *International Journal of Humanitatis Theoreticus.*, *7*(2).

James, W. (1894). Discussion: The physical basis of emotion. *Psychological review, 1*(5), 516.

Karaman, F., Genc, A., Sen, A. N. Y., Rashidi, M., Yildirim, G., Jafarov, G. U., Acar, R., & Sahin, B. S. (2024). Effects of love glove application on vital signs for COVID-19 patients in the intensive care unit. *Nursing Open, 11*(2). https://doi.org/10.1002/nop2.2106

Kleinginna Jr, P. R., & Kleinginna, A. M. (1981). A categorized list of emotion definitions, with suggestions for a consensual definition. *Motivation and emotion, 5*(4), 345-379.

Kuhnke, E. (2016). *Body language: Learn how to read others and communicate with confidence*. John Wiley & Sons.

Lindeman, R., Desmet, P.M.,and Filippi, M.(2023) Wearing Black when feeling Blue: An exploration of the relationship between clothing and mood., in De Sainz Molestina, D., Galluzzo, L., Rizzo, F., Spallazzo, D. (eds.), *IASDR 2023: Life-Changing Design*, 9-13 October, Milan, Italy. https://doi.org/10.21606/iasdr.2023.502

Loncar, T. (2021, June 8). *A decade of power posing: where do we stand?* BPS. https://www.bps.org.uk/psychologist/decade-power-posing-where-do-we-stand

Luca, J., & Tarricone, P. (2001). Does emotional intelligence affect successful teamwork? Research Online. https://ro.ecu.edu.au/ecuworks/4834/.

Messaoud, H. E. B. (2022). A Review on Self-Confidence and How to Improve It. *Global Journal of Human Resource Management, 10(5), 26-32.*

Mok, M. C. L., Schwannauer, M., & Chan, S. W. Y. (2019). Soothe ourselves in times of need: A qualitative exploration of how the feeling of 'soothe' is understood and experienced in everyday life. *Psychology and Psychotherapy Theory Research and Practice, 93*(3), 587–620. https://doi.org/10.1111/papt.12245

Murray, D., & Lesser, M. (2006). Confidence, self-confidence and social confidence. *Coming Out Asperger: Diagnosis, Disclosure and Self-confidence*, 53-66.

Nair, S., Sagar, M., Sollers, J., Consedine, N., & Broadbent, E. (2014). Do slumped and upright postures affect stress responses? A randomized trial. *Health Psychology, 34*(6), 632–641. https://doi.org/10.1037/hea0000146.

Oostermeijer, M. (2023). De (eeuwige) kracht van een powersuit. *Vogue NL*. https://www.vogue.nl/cultuur/voices/kracht-powersuit-promotie/

Price, T. F., & Harmon-Jones, E. (2015). Embodied emotion: the influence of manipulated facial and bodily states on emotive responses. *Wiley Interdisciplinary Reviews Cognitive Science, 6*(6), 461–473. https://doi.org/10.1002/wcs.1370.

Revelle, W., & Scherer, K. R. (n.d.). Personality and Emotion. In *Oxford Companion to the Affective Sciences*. Oxford University Press. https://personality-project.org/revelle/publications/revelle.scherer.08.pdf

Rocca, K. A. (2009). Participation in the College Classroom: The Impact of Instructor Immediacy and Verbal Aggression. *The Journal Of Classroom Interaction, 43*(2), 22–33. http://files.eric.ed.gov/fulltext/ED461899.pdf.

Sanders, E., & Stappers, P. (2013). *Convivial Toolbox: generative research for the front end of design.* Bis.

Saunt, R. (2021). 'Hands of love' glove [Photograph]. https://www.dailymail.co.uk/news/article-9475903/Covid-patients-comforted-fake-hand-filled-warm-water.html

Scheff, T. J. (1988). Shame and Conformity: The Deference-Emotion System. *American Sociological Review, 53*(3), 395. https://doi.org/10.2307/2095647

Shukla, A. (2020). A 5-Step mindfulness grounding technique to ease anxiety & why mindfulness works. *Cognition Today.*

Stappers, P. and Giaccardi, E. (2014, January 1). *Research through Design*. Interaction Design Foundation - IxDF. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/research-through-design

Somnox.com. (n.d.). Somnox sleep pillow [Photograph]. https://start.somnox.com/bestellen

Uvnäs-Moberg, K., Handlin, L., & Petersson, M. (2015). Self-soothing behaviors with particular reference to oxytocin release induced by non-noxious sensory stimulation. *Frontiers in Psychology*, 5. https://doi.org/10.3389/fpsyg.2014.01529

Van Boeijen, A. G., Daalhuizen, J., & Zijlstra, J. (2020). *Delft design guide: Perspectives, models, approaches, methods*. bis Publishers.

Visser, F. S., Stappers, P. J., van der Lugt, R., & Sanders, E. B.-N. (2005). Contextmapping: experiences from practice. *CoDesign, 1*(2), 119-149. https://doi.org/10.1080/15710880500135987

Winch, R. F., & Rosenberg, M. (1965). Society and the adolescent Self-Image. *Social Forces, 44*(2), 255. https://doi.org/10.2307/2575639

APPENDIX

Appendix Overview
(Note: Appendices are located in a separate PDF document)