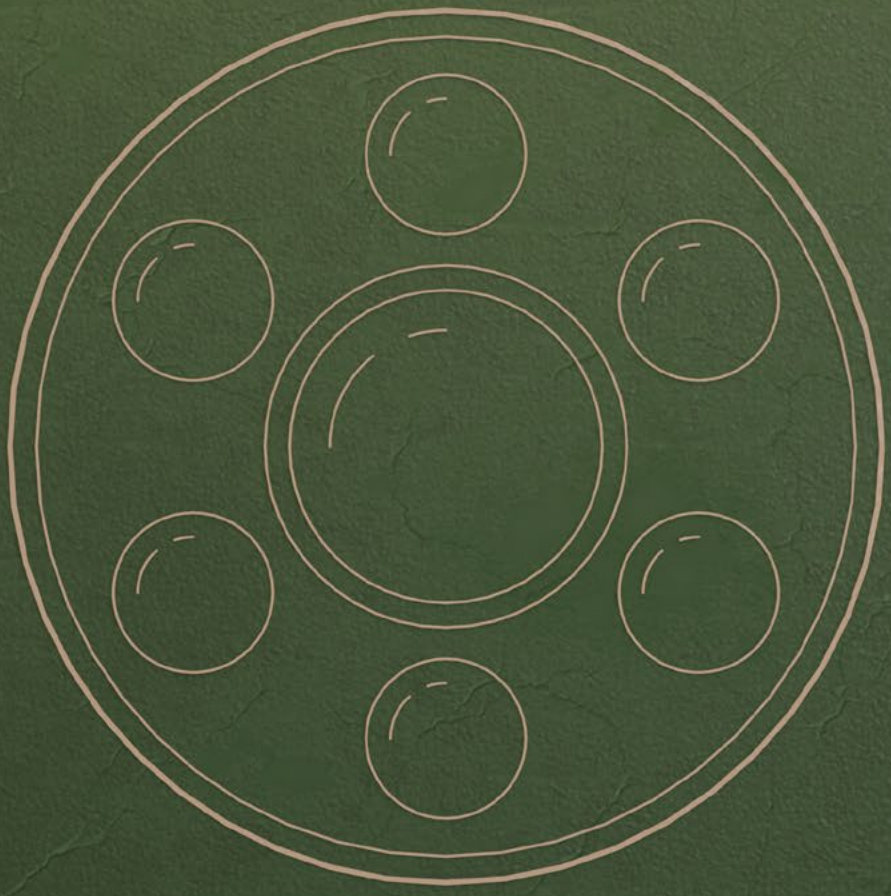
WRITE YOUR OWN STORY



FINAL BACHELOR PROJECT

THIJS REIJNDERS | 1699237

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Author
Thijs Reijnders

Project coach
Erik van der Spek

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Summary

This report describes the development process of “Write your own story,” an interactive animated experience designed to empower youth with a positive self-image. One in seven young people today struggle with mental health problems (WHO, 2024). However, research shows that many of them experience barriers to seeking professional help (Radez et al., 2021). Literature study and conversations with an expert in this field show that increasing awareness of the causes of a negative self-image and providing insight into therapeutic methods can contribute to lowering this barrier. This project, therefore, focuses on developing an experience that offers young people more (self)knowledge and encourages them to seek help sooner when necessary.

The experience shows, through narrative elements, what the causes are of a negative self-image and then provides lessons and methods to build a positive one. By making choices and playing minigames within the story the user will be able to change the narrative and discover their unique collection of character traits. At the end of the experience, a positive visualization representing these character traits will be shown. Along with the lessons and techniques learned, it will serve as a foundation for their first therapy session.

Project Goal

“Design an experience to help empower the youth with a positive self-image”

Figure 1, The experience: “Write your own story“

Prologue

This story starts from a personal experience. I have always had a passion for telling stories. Whether it was through art, animation, or writing, I sought to create narratives that could have a lasting impact and change the world. These artistic expressions have always served as a means for me to express my ideas and emotions and to help me navigate my problems so I could inspire or help others.

Mental health has always been a topic that was prominent in my art, as I have been struggling with my mental health, especially with my self-image, for quite some time. It is a topic for which I always find new ideas or stories to tell, as it comes from personal experience. For me, the FBP was a perfect opportunity to bring these ideas to life while also further developing my own identity as an experienced designer.

That is why I have decided to complete my final project in the Games & Play squad, as it aligns with my personal identity and vision as a designer and the vision behind my project. This squad focuses on interactivity through gamification and storytelling, which is something I wanted to explore in my project. Furthermore, I was interested in combining physical and digital Interactions. The squad seemed like a perfect way to learn more about this area of design and explore how I could implement this into my vision of combining animation (digital) with interaction design (physical).

Design Process

The design process of “Write your own story” (Figure 2) started with extensive research, followed by discussions with an expert in child therapy. This allowed me to establish the core of the project, including the story and the integrated working methods. Following this, development focused on three key areas: animation and storytelling, physical interaction, and digital interaction. The narrative and visual style were shaped through an iterative process that involved user testing. The interactions were evaluated and refined through user testing and prototyping, ultimately resulting in an integrated final design: an interactive animated experience.

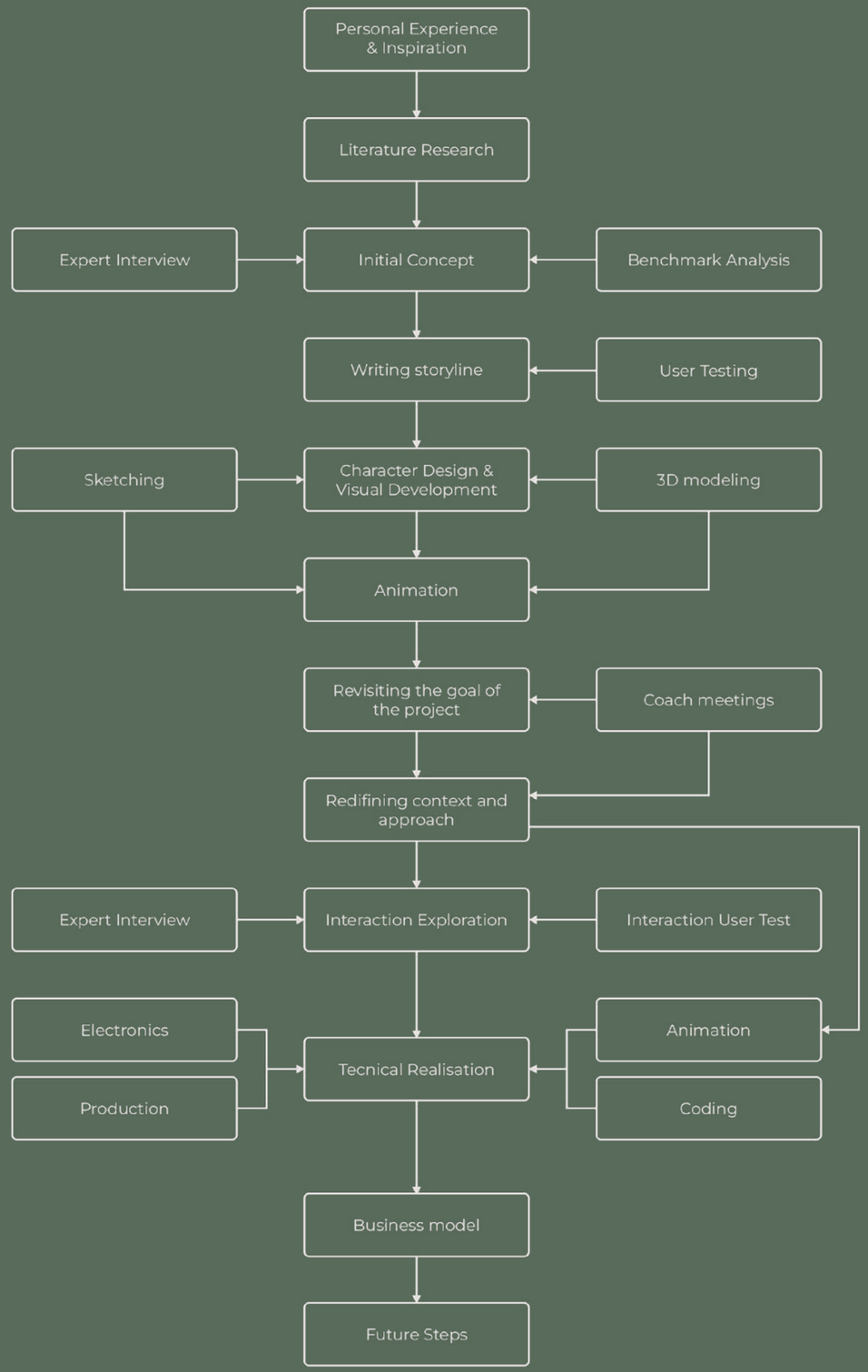
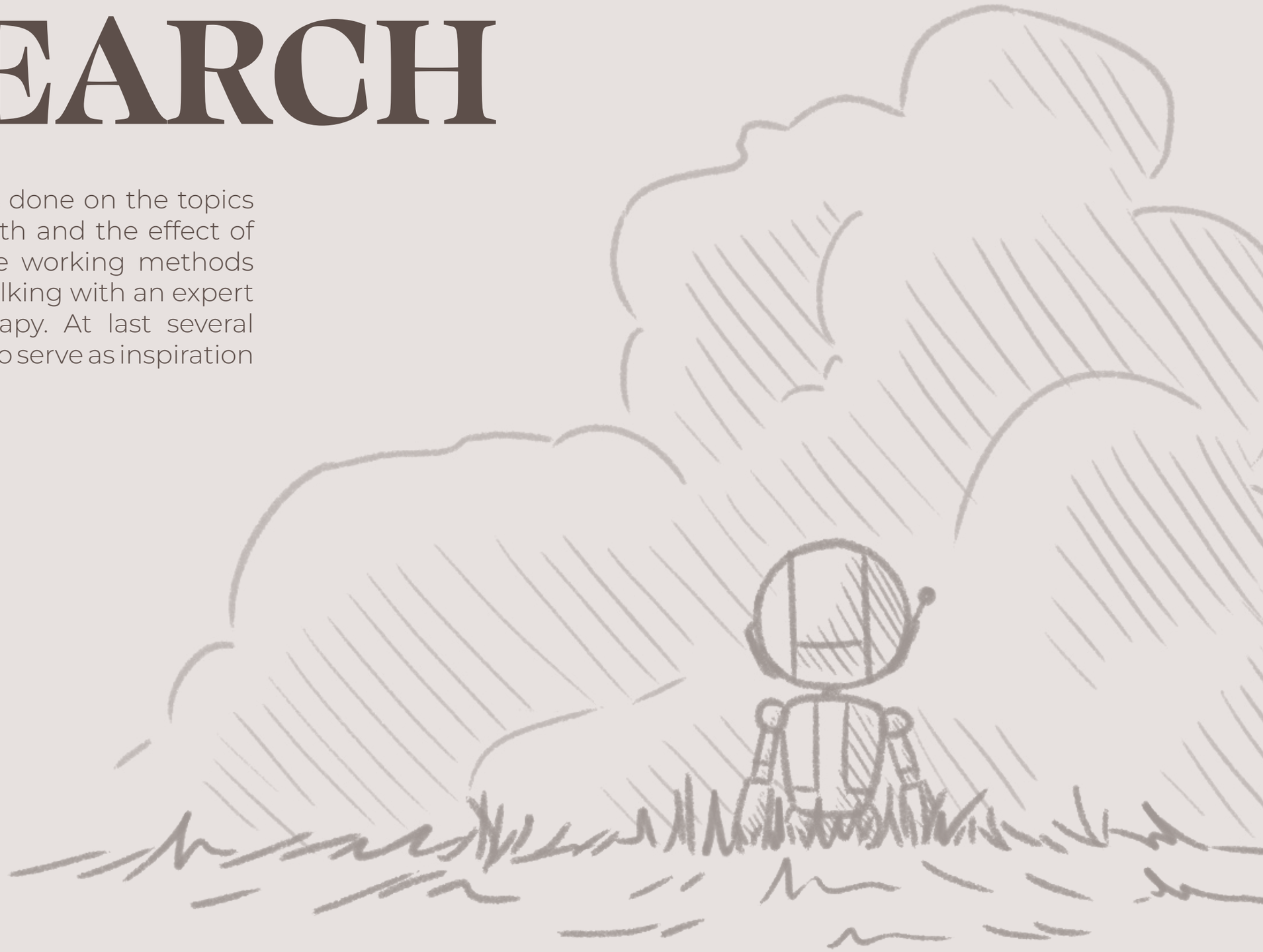


Figure 2, Design process diagram

CHAPTER 1

RESEARCH

In this chapter, research is done on the topics of self-image, mental health and the effect of social media. Furthermore working methods are being researched by talking with an expert in the field of child therapy. At last several benchmarks are analysed to serve as inspiration for this experience.



Related Works

In recent years, there has been a massive increase in mental health problems (WHO, 2022). More and more people experience external pressure, which can lead to depression and anxiety. This is becoming an increasingly serious problem, especially among younger generations. The World Health Organization (WHO) even states that one in seven adolescents between the ages of 10-19 struggle with mental disorders (WHO, 2024). These figures are worrying, and more attention must be paid to them.

Young people are particularly vulnerable, as this is the period during which they undergo enormous growth and change. A change that will essentially form their own identity. For example, they enter new social environments during this period, such as when transitioning to secondary school, and undergo physical changes associated with puberty. During this period, it is often difficult for young people to discuss these changes, and this is often accompanied by uncertainty in their quest for a unique identity (ECLG, n.d.; Beresin, 2022). Research furthermore shows that how you develop in adolescence also affects how you learn to care for yourself as young adults. It is, therefore, essential to focus on developing a positive self-image at a young age to prevent depression and mental health problems later in life (Gruenenfelder-Steiger et al., 2014).

The APA Dictionary of Psychology describes one's self-image as: "one's view or concept of oneself. Self-image is a crucial aspect of an individual's personality that can determine the success of relationships and a sense of general well-being. A negative self-image is often a cause of dysfunctions and of self-abusive, self-defeating, or self-destructive behavior." (APA, 2018) This description immediately shows the contrast between a positive and

negative self-image and especially how destructive it is to have a negative self-image. The problem with a negative self-image is that an individual views themselves from a reality that is not real (SoCal Mental Health, 2024), and the more they think about it, the more they tend to believe it. It is, therefore, crucial to clarify how their way of thinking about themselves can influence their self-image so that they can escape this self-created reality. That is why this project focuses on raising awareness about the causes of developing a negative self-image.

Social comparison is a key concept in this development. Festinger describes social comparison as the tendency to assess ourselves in relation to others (Festinger, 1954). According to Festinger, there are two different ways individuals compare themselves to others. Downward comparison involves evaluating oneself against those who are performing worse, which can lead to a more positive self-image. In contrast, upward comparison occurs when individuals compare themselves to those who appear to be doing better, often resulting in a more negative self-image. Research shows that individuals with a lower self-image are more likely to compare themselves upward (Midgley et al., 2021). This leads them into a spiral, which becomes increasingly difficult to break.

This social upward comparison with others has become a lot easier nowadays due to social media. Despite the many advantages of social media, there are also increasing concerns about the influence of social media on young people, especially on their mental health and self-image. Social media often gives a distorted picture of reality. It presents a seemingly perfect reality, while this content is often staged or edited (SoCal Mental Health, 2024; Social Media Victims Law Center, 2025). Furthermore, Research shows that the longer an individual spends on social media each day, the worse these adverse effects become not only on one's self-image but also on their sleep patterns and body image (Kelly et al., 2019). Social

media, therefore, plays a significant role in upward social comparison and the development of a negative self-image. Awareness of this role has become an important theme in this project.

Despite the significant consequences and the problems that young people experience due to their negative self-image, they have much trouble seeking (professional) help. Various studies (Ehmke, 2025; Beeston, 2024; Radez et al., 2021) show that there is a stigma surrounding seeking help and therapy, for example, that it is a sign of weakness, which is why young people prefer not to do so. Furthermore, they often struggle to discuss their problems because they either believe it is just who they are, do not know how to articulate it, or are ashamed of their issues. Finally, young people often do not have a good idea of how a therapist works, which makes them have a more negative attitude towards therapists and, therefore, less open to seeking help.

These studies have demonstrated that awareness is a crucial theme in the field of mental health. That is why the project aims to raise awareness about the causes of a negative self-image in the field. However, it also provides more insights into the methods that a therapist can use in a session.

Expert Insights

After conducting literary research in the field of self-image, I continued to investigate how care providers work to develop a more positive self-image and the methods they use for this purpose. To gain a clear understanding of this and to approach the working methods correctly, I collaborated with an expert in child therapy, Mrs. Canisius. In one of the first conversations, I was introduced to the HSP talent plan (HSP Academie, 2021), a working method that utilizes a set of cards with different character traits. The young person is asked to find seven character traits from this set. By doing this and having their unique combination of character traits in front of them, the young person learns to see how special they are and where their strengths lie. In my experience, this working method can feel pressured, as having someone present to monitor the process may impact how choices are made. To relieve the pressure, I wanted to allow the user to make choices in a more relaxed manner in this project.

With this as a starting point, we examined how the story or experience could be shaped. It is essential that, in addition to raising awareness of the causes of a negative self-image, the story also clarifies how one will work on developing a positive self-image through various lessons and working methods. From the conversations with Mrs. Canisius, a clear point of attention emerged; “Young people are better able to recognize their strengths and learn to use them in daily situations through a positive mindset.” (L. Canisius, personal communication, 2025) This approach has become the main objective of the project, and the selected working methods reflect this focus.

Three working methods were selected for the project to provide deeper insight into one's thoughts. Their combined use supports young people in developing a stronger, more positive mindset and self-image. These working methods have each been carefully integrated into the designed experience in collaboration with Mrs. Canisius:

First, mindfulness is introduced through meditation, focusing on breathing. By practicing mindfulness, one can cultivate more inner peace and learn to live in the present moment. This practice makes it easier to break free from negative thought spirals and cultivate more self-compassion (Headspace, 2023).

The other two methods stem from the use of green language, an approach derived from NLP (Neuro-Linguistic Programming) (NLP Academie, 2025), which emphasizes the conversion of negative (red) language into positive (green) language.

The first method here involves learning to recognize and focus on positive thoughts amidst a cloud of negative thoughts. It is also important for the young person to learn to recognize that negative thoughts can sometimes seem positive, which can unconsciously lead to a negative spiral.

"How you think and talk about yourself is essential in creating your self-image." (L. Canisius, personal communication, 2025) That is why the last method incorporated into the project is creating one's own positive affirmations. Affirmations are empowering statements that can improve self-esteem and encourage a positive mindset (Koosis, 2024). Mrs. Canisius mentioned that it is important that you formulate and apply the affirmations in the right way, in green language.

Figure 3, interview with the expert and using the HSP Talentenplan (HSP Academie, 2021)

Benchmarks

After analysing various benchmarks, I divided the project into three core themes that together form the experience. These are immersion, storytelling, and interactivity. Below, the analysed benchmarks are described in their respective themes.

Immersion

Creating an immersive experience is something Efteling excels at, and it has been a great source of inspiration for this project. The experience offered by Efteling attractions extends far beyond the ride itself, it's about the complete environment. A clear example is the recently opened Danse Macabre (Efteling, 2023) attraction, where the story begins well before the ride. The queue area, with its music, visual details, and even the behaviour of the staff, gradually immerses visitors into the narrative, making the attraction the climax of the experience. This approach is also used in attractions like Baron 1898 and Symbolica. In the same way, this project focuses on creating a complete experience from beginning to end, where the interactive animation becomes part of a larger whole.

Figure 4, Concept image Danse Macabre (Efteling, 2023)

Storytelling

For storytelling, inspiration came mainly from animated films and their ability to convey emotion through story and character. These films immerse viewers in the characters' lives through compelling backstories, which foster emotional connection. For this reason, considerable attention was given to creating an emotional connection with the project's main character.

Disney's Soul (Soul, 2020) A beautiful story about finding one's true self and valuing the experience of life over the pursuit of a big goal. One element within the animation that has inspired this project's story is the way each soul carries their personal characteristics on their chest, which they discover through different experiences, before starting their life.

The Wild Robot by DreamWorks (The Wild Robot, 2024) tells a moving story of a robot on a journey to discover her identity. A quote from the film describes it beautifully: "Sometimes, to survive, we must become more than we were programmed to be." The character's development and design served as a strong inspiration for this project.

Finally, Disney Wall-E (WALL·E, 2008) served as inspiration for the character design. Creating an emotional bond with a robot character is challenging, but Wall-E achieves this through expressive eyes and posture. This approach has been applied in the creation of the main character of this project.

Interactivity

Inspiration was drawn from both design projects, where user actions align seamlessly with the design's response, and video games that demonstrate how narratives can be gamified while still conveying a meaningful message.

Fonckel One by Philip Ross (Ross, 2012) is an interactive lamp that clearly shows how user input directly influences the design's output, making the interaction feel intuitive and natural.

Plugg, a prototype by Skrekkøgle (Skrekkøgle, 2012), further illustrates how tangible and logical interactions connect closely with a design's function. This logical and natural interactivity inspired the connection between physical and digital elements in this project.

Figure 5, Fockel One in its context (Ross, 2012)

Figure 6, Fockel One in its context (Ross, 2012)

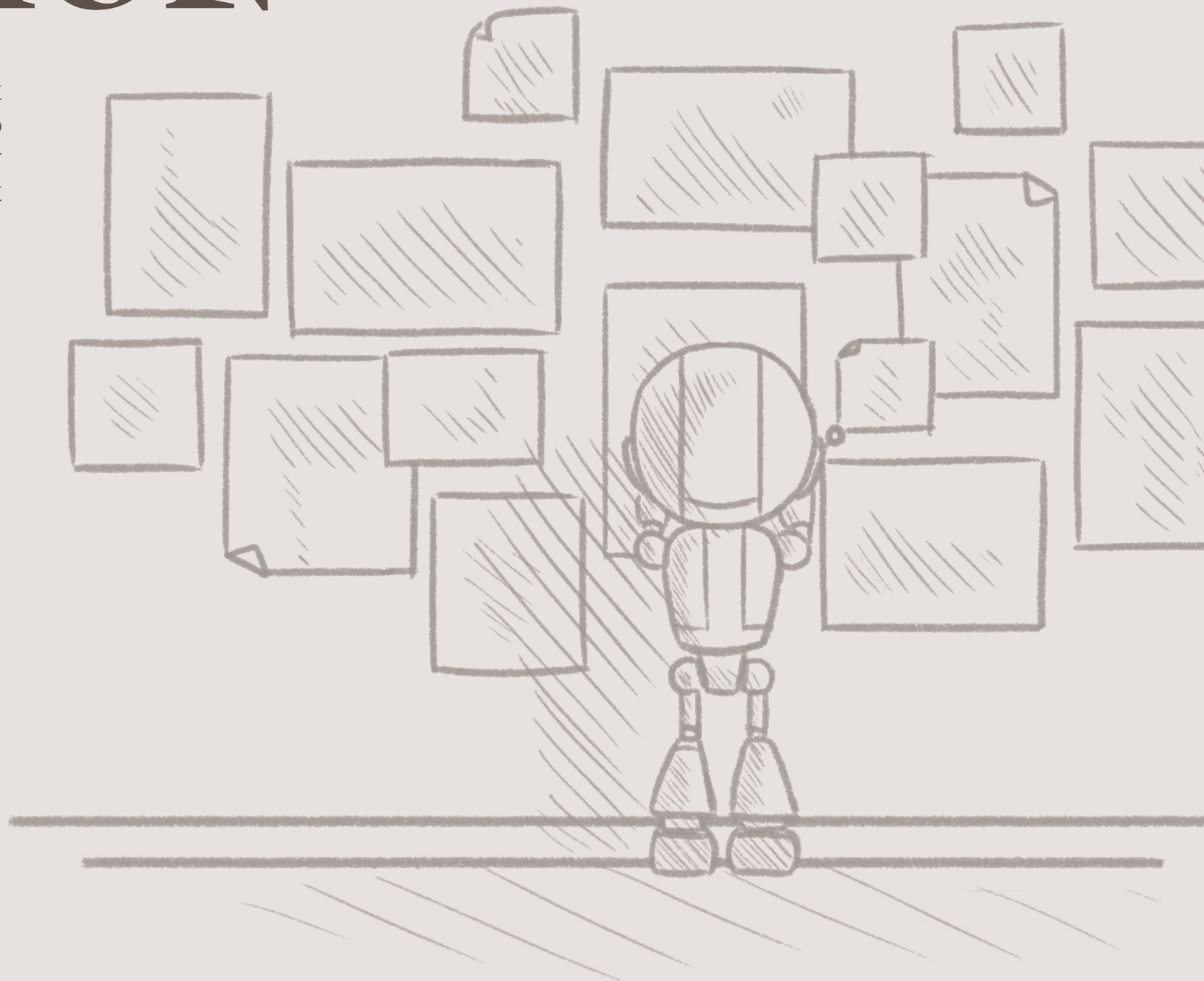
Stanley's Parable (The Stanley Parable, 2013) is an interactive story game where the player's choices shape the story's outcome, creating a personal and engaging experience, something this project also aims to achieve.

Celeste (Celeste, 2018) is a 2D platformer that tells a story about overcoming anxiety, effectively translating this journey through dialogue and game mechanics. Its meditation mini game was a key inspiration for the mindfulness mini game in this project.

CHAPTER 2

IDEATION

This chapter outlines the initial concept for the project and offers insight into the process and analysis, including user testing carried out to create a story that resonated with the target group.



Initial Concept

With the research as a solid foundation, I developed the initial concept of my experience: an interactive, animated experience designed to empower youth with a more positive self-image.

This would be an animated story in which the user follows a character who loses their self-esteem and then embarks on a journey to find themselves again and build a more positive self-image. Within this story, the user would learn about the causes of negative self-image and then discover new methods to build a more positive self-image. These working methods involve interactive minigames to make the learning process more playful and engaging. Based on the conversations with Mrs. Canisius, three different working methods would be incorporated. The first one is mindfulness, which involves a meditation minigame where the user focuses on their breathing. The second one would be a minigame about finding the positive thoughts in a cloud of negative thoughts. The last working method involves affirmations, accompanied by a minigame that supports creating positive affirmations to help develop the user's mindset.

To support the development of the user's self-image, the story would also include various options to choose from, which would change certain aspects of the story and create a personalized, positive visual representation of the user, displayed at the end of the experience. This was based on the previously mentioned working method, the HSP talentenplan (HSP Academie, 2021), where the young person chooses their personality traits out of a set of cards. In this experience, the user discovers their character traits through the interactive story by making choices and playing minigames within the animation using a physical controller. The system would collect these traits throughout the story and then display them at the end of the experience to show the user how unique they truly are.

Figure 7, Intial Concept Sketch showing the experience

Figure 8, Intial Concept Sketch showing the possible interaction

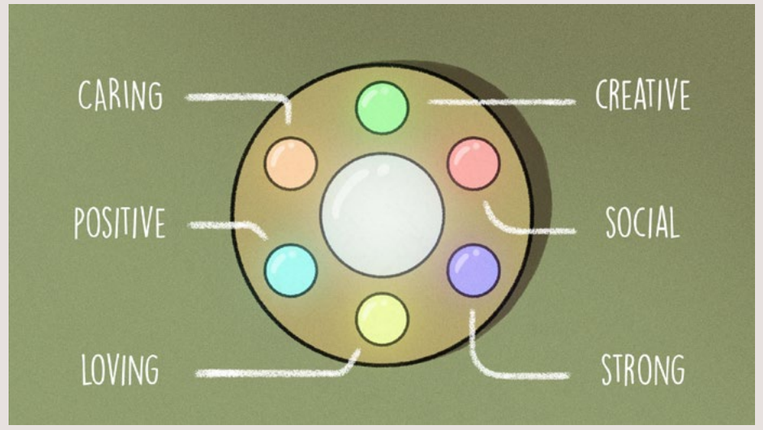


Figure 9, Intial Concept Sketch showing the positive visual

User Research

To ensure that young people would genuinely take something away from the story, it needed to be both engaging and relatable. It was important that they were drawn into the narrative and could see aspects of themselves in the main character, allowing them to empathize with the story on a deeper level. To explore this, I conducted a user test to identify which elements of the animation, such as the main character, side characters, environments, and interactions, felt most recognizable or interesting to them within the context of the project.

Figure 10, all the gamified user test tools

From my own experience with previous projects, I have noticed that participants often feel compelled to do things during a user test and that they want to answer what the researcher wants to hear, which means that valuable information does not always emerge from a user study. It is also often a static experience that involves asking questions and providing answers. Since the target group of my project is 12-18 years old, I found it essential that the participants felt comfortable and that it did not feel like a test where they had to give the perfect answer.

This is why I designed my own gamified explorative research method to create a more interactive and engaging environment in which young people can give their answers without feeling obligated. The research consists of several elements (Figure 10): a game board and a pawn, which each participant receives; hand-drawn playing cards (Appendix B) that represent the different elements of an animated film; and tokens that can be placed on the game board. The idea is that the participants will each write their own story (on the game board) by answering questions and collecting the elements (the tokens) that fit into their unique story. For example, one question asks: “Which animated main character do you relate to the most?” Participants would see several character cards and use their pawn (included with the game board) to rate each character as relatable, neutral, unrelatable, or childish. They would then be asked to explain their answer, after which they continue to the next card. After reviewing all the character cards, they will select the one they relate to most as their main character token, forming the beginning of their story.

This process is repeated for each element of the research, such as environments, side characters, and interactions. With each question, participants earn more tokens until their game board is complete and they have written their own story.

Findings

Some parts of the user research led to clear results, while others, especially those related to the main and side characters, were less straightforward. Looking back at how the research was conducted, it became clear that this had a lot to do with personal preferences, the group dynamic, and how the questions were framed.

This could mean that, in the further development of the project, character selection could be an element that significantly enhances the experience and makes the story recognizable or interesting to a broader audience. For this project, the decision was made to choose a robot character based on feasibility and story elements.

When it came to side characters, most participants preferred the “multiple characters” option. However, given the short timeframe, this was not feasible. Instead, I chose a single side character based on the given answers. The ‘wise man’ character wasn’t always the first choice, but every participant said they would trust him to give advice and life lessons, which made for a fitting character in this project.

Lastly, participants mentioned they would like to see open questions included alongside the mini-games to give more freedom in shaping their own storylines. Although this is not feasible in the current version of the project, it is something to explore in future development.

Evaluation Points

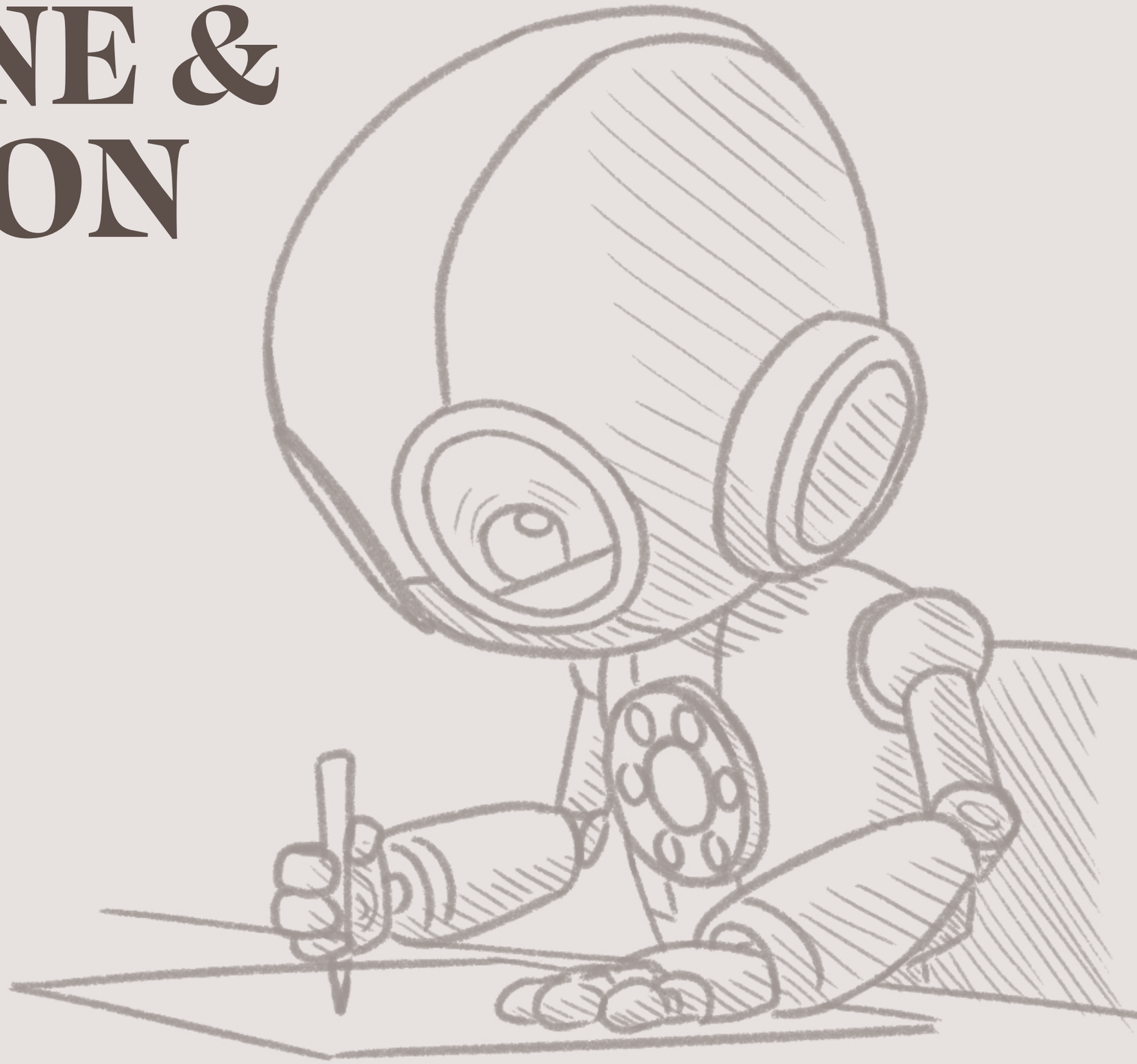
- The gamified approach kept participants engaged and motivated to create personalized stories.
- Group size influenced responses; larger groups, especially of friends, showed some peer influence. Smaller or more diverse groups may result in more honest feedback.
- Clear explanations are crucial, early vague wording caused confusion about “recognizing yourself” in a character.

Figure 11, conducting the user test with two participants

CHAPTER 3

STORYLINE & ANIMATION

Based on user research, preliminary insights, and expert input from child therapy, the story for the interactive experience was developed. Integrating these elements in an engaging way was essential to clearly convey the lessons and methods. Key elements and metaphors from the storyline are explained here, with the full story detailed in the final design chapter.



Storytelling

The project is about the process of discovering oneself and creating one's own story. The young robot, who is the main character of the story, has also undergone this process, and in the animated film, narrated by the older version of this character, he explains to the viewer how he did it. He reads his story from his book, which is why sketches appear throughout the film, as the book was written and illustrated by the main character himself. It was a conscious choice to let the story be told by the narrator rather than just shown. This gives the viewer a clearer insight into the process happening inside the character's mind and allows them to witness how his thoughts gradually change.

In the world where the story takes place, every robot has a mechanical heart (Figure 12) on its chest. This heart shows the robot's development through a series of lights. Each light represents a character trait, and a light turns on when the robot discovers one. When all six lights are on, the robot becomes an 'adult,' and its main light begins to shine. This main light symbolizes both maturity and self-knowledge.

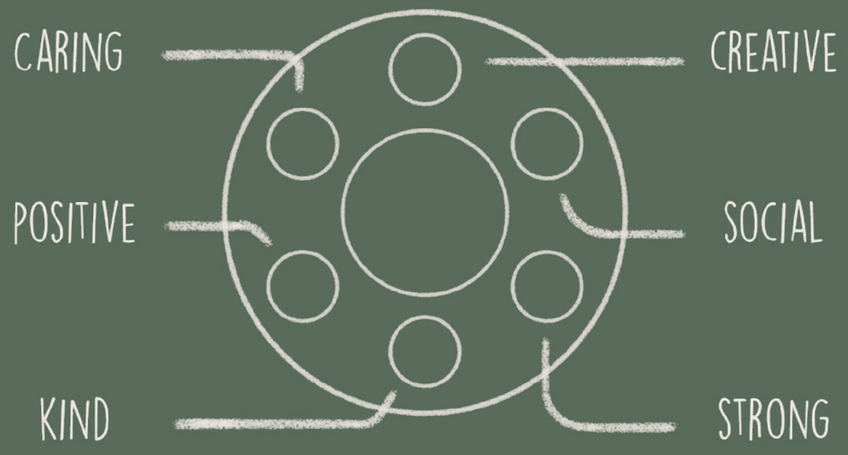


Figure 12, Concept Sketch showing the positive visual

The story also refers to the 'Big City,' which functions as a metaphor for adult life but also for modern society. Everyone wants to reach the Big City because it is said to be the place where dreams come true. However, it is also where those who do not truly know themselves end up living lives that are not their own, guided instead by higher ranks. The Big City is also the one that delivers the screen to the main character.

This screen shows precisely what the City wants. It presents itself as a way to make the City look appealing and lures people in with unrealistic promises, only to have them end up working as standard robots for those in power. The screen is a metaphor for social media. It features well-known robots who pretend to have all the answers and promote idealistic lifestyles. The screen is the antagonist in the story. It is the thing that causes the main character to lose himself, just as social media can distort the self-image of many young people.

Ultimately, it was a deliberate choice to set the environment where the main character begins to work on himself, and rediscover who he is, in nature. Nature is often seen as a place of peace and reflection. (Weir, 2020) This choice was also supported by insights from the user research conducted for this project.

Figure 13, Concept Sketch showing a nature environment

Character Design

The main character is the most important element of this story, and as such, considerable attention was devoted to their design, personality, and backstory. I began the character design process by developing the character's personality. The viewer must be able to empathize with the character right from the start in order to become invested in the story.

The main character is an enthusiastic, curious, and creative young robot who aspires to become a renowned artist in the big city when he grows up. He enjoys being outside and is deeply fascinated by nature, which serves as the biggest inspiration for his artwork. However, the arrival of the screen also brings out a more vulnerable side of him. He is very insecure about himself, especially now that he can see all those robots from the big city on the screen. He wants to be just like them, they come from the big city, and if he wants to become a famous artist, he believes he has to be like them. However, he is from the countryside and does not have the latest tools or equipment. His 'heart,' his ears, and the plate on his head are even made from scrap materials. He was content with everything he had, with what his parents did for him and the cozy house he lived in, but now, everything he once loved makes him feel insecure.

From this description of his personality, I started designing the character. It was essential that the character design clearly convey the robot's various aspects and character traits. I, therefore, made several design sketches (Figure 14), in which I iterated on different sizes, body shapes, and facial features.

Figure 14, Main character sketches, testing out different designs

Eventually, I came up with a final design (Figures 15, 16) that effectively captures the robot's personality and age. The head is the focal point of the character; it is, therefore, slightly larger than the standard proportions, just like the eyes. This emphasizes that the character is still young and also provides more expressiveness. The robot character, as described in the research, can only convey emotions through its eyes and posture. By choosing large eyes with mechanical eyelids, this can be achieved. In addition, this character also fits well due to the round shape language that the design employs. Shape language can reveal a great deal about a character's personality (The Walt Disney Family Museum, n.d.). The round shapes that are used ensure that the character looks friendly and harmless, which fits well with the personality. Finally, an important detail is that this design clearly shows that the heart, the ears, and the plate on his head are made of scrap material. It was deliberately chosen that they are made of bronze because this is beautiful in its way, which is, of course, one of the messages: Everyone is beautiful and unique just the way they are.

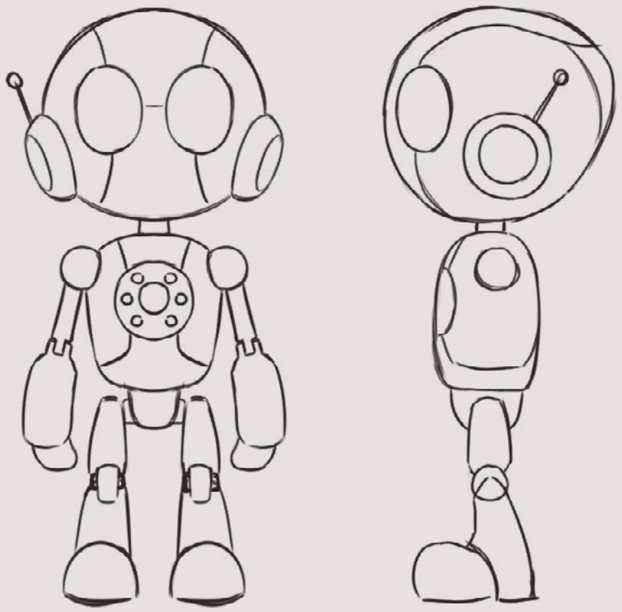


Figure 15, Main character: Final design sketch

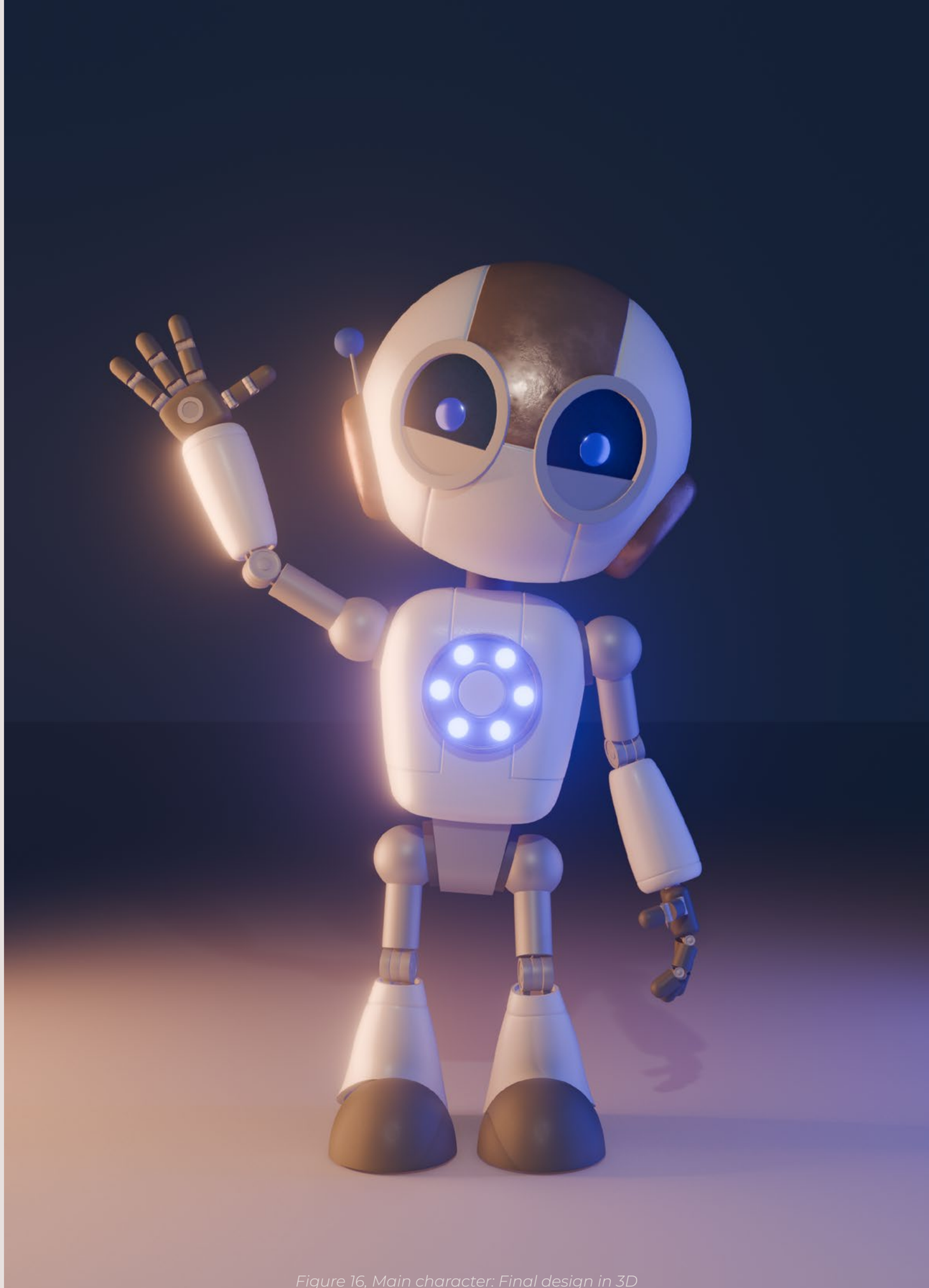


Figure 16, Main character: Final design in 3D

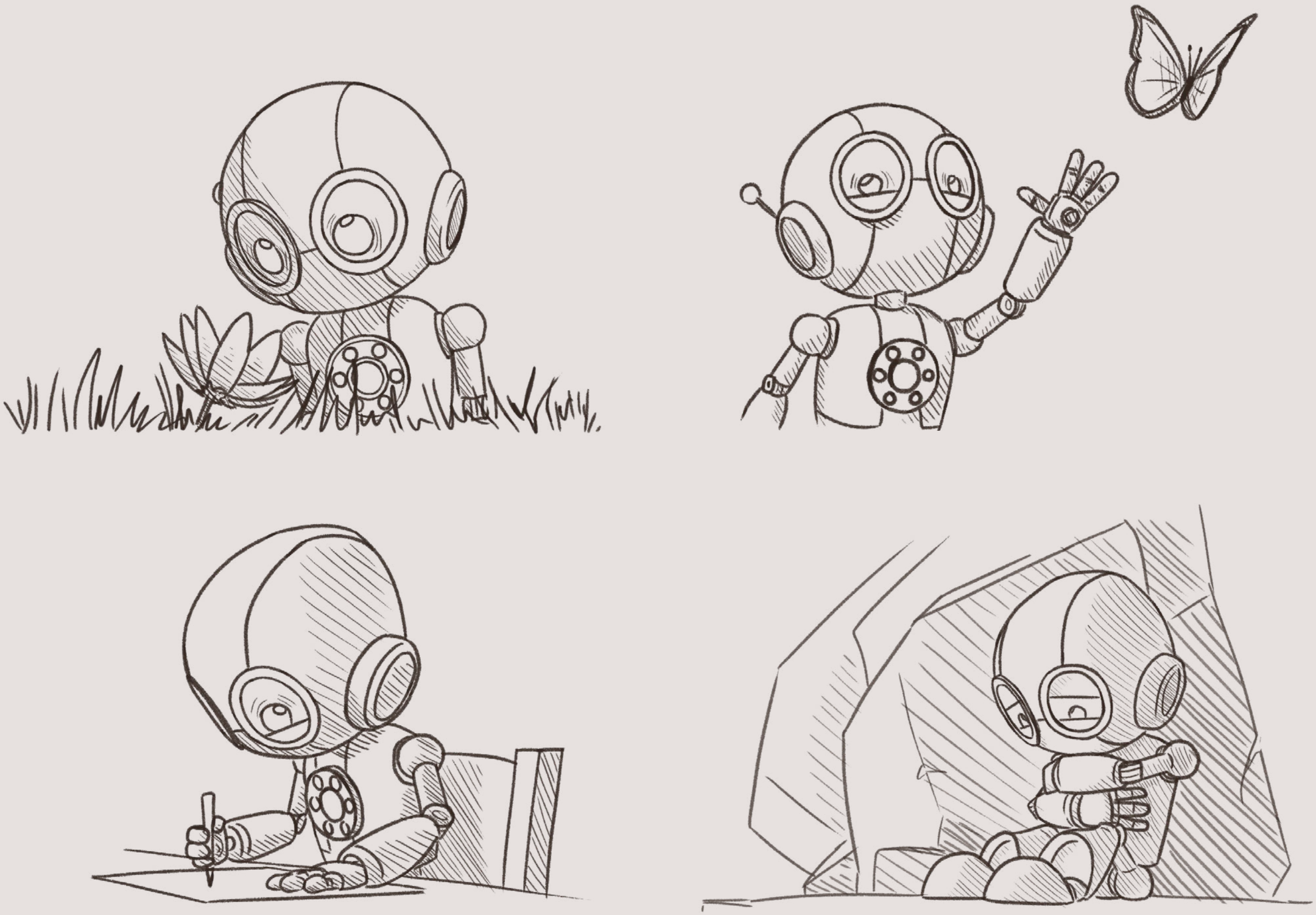


Figure 17, Several character drawings showing different emotions and expressions

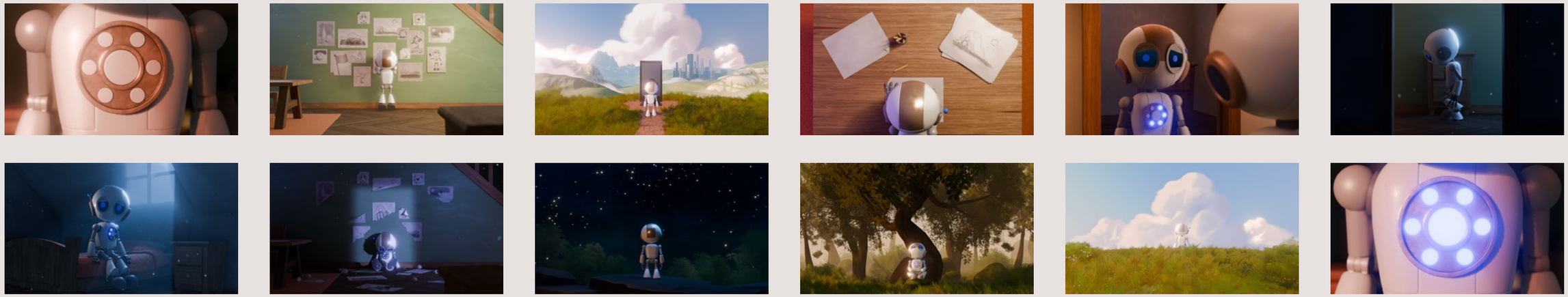


Figure 18, Visual Development. The change of color and light throughout the

Visual Development

Emotion and mood are essential elements in the story, as it is crucial to establish a clear contrast between a positive and negative self-image. This can be demonstrated not only through the story and characters but also by the effective use of color and light. Color and light can evoke specific emotions and moods and even contribute to the visualising the development of a character (Yellowbrick, 2024; Byard Art, 2024).

In the animation and visuals of this project, considerable attention has been paid to the use of color and light in the scenes. As shown in (Figure 18), the color palette evolves throughout the story alongside the main character. At the beginning of the story, the character is enthusiastically engaged in his passion for creating art. The warm colors in the red-orange range, along with the lighting, enhance the cozy and pleasant feeling the character experiences when he's immersed in his passion at home. The character knows who he is and what he wants, and the visuals reflect that.

As soon as the character discovers the screen, the color and light slowly changes from warm light tones to cold dark tones. The cool blue colors represent the character's growing feelings of emptiness and negative thoughts. The more he loses himself, the colder and darker his surroundings feel. Even the house and his drawings can no longer give him the warmth that he experienced before. When he leaves his house, he is at his lowest point, and the contrast is strong. However, warm lights remain visible from the house, reflecting that he is now completely leaving his safe space behind.

As the character learns more about himself and rediscovers his traits throughout the story, the colors and lighting gradually return to the original warm and bright tones. The growth that the character undergoes is reflected in the surroundings and visuals, providing the viewer with a sense of peace and relief. This is particularly important because it shows that positive growth is possible and that the story's working methods and lessons can help achieve it. By the end of the experience, the story should leave the young person feeling positive and reassured.

Figure 19, Several scenes from the 3D animation

CHAPTER 4

IMMERSION & CONTEXT

A large part of the project was dedicated to creating 3D scenes and animating the story in Blender. As the deadline approached, it became clear I couldn't animate the entire story. After a valuable conversation with a squad coach, I revisited the project's goal, leading to a shift in focus. This chapter explores this refocus.

Goal

“Empowering youth with a positive self-image by creating an interactive animate experience in which you **learn about self-esteem** and **make choices** to **build a positive self-image.**”

I realized that the animation, which I had been dedicating all my time to, was only a small part of the whole. Equally, if not more, important was the process of getting to know yourself and discovering your character traits, which are central to the project’s purpose.

I decided to shift my focus and take a different approach. The animation was essential for creating awareness about the causes of a negative self-image. This was especially evident in the first part of the story. The second part centres on self-insight, exploring character traits and learning lessons and methods to foster a more positive self-image. Although this part was essential, I had not yet developed it in detail. Therefore, I decided to animate only the first part of the story and then fully focus on developing the interactive elements for the second part. This approach allowed me to ensure the entire experience achieved its purpose. To keep the storyline clear, I planned to convey the narrative in the second part through images.

Context

For the interactive animation, I initially wanted to add a physical controller with light feedback to enhance immersion. However, a conversation with a squad coach highlighted the need for a clear reason to implement them, these physical elements had to fit the context of the experience. While supportive of the idea, the coach advised me to first define the context more clearly. To do so, I created a user journey describing the steps and interactions that shape the overall experience.

1 Hesitation

The user is someone struggling with their self-image and having difficulty asking for help. They may be hesitant about therapy, unsure of who they truly are and how to talk about themselves, or unaware of what working on self-esteem even looks like.

2 Safe Entry Point

The user decides to try this experience since it seems low-pressure. They’re informed that it doesn’t require them to “have answers”, it is simply a starting point to explore who they are through an interactive animation. The appearance of the full experience sparks curiosity and the room in which it is in feels like a safe space.

3 The Experience

The interactive animation draws the user in while offering insights into the roots of low self-esteem and methods for building a more positive self-image. Through engaging interactions, they begin forming a more positive understanding of themselves. The personalized visual at the end offers a meaningful starting point for their conversation with the therapist.

4 Therapy Session

The user brings the personalized visual, saved on a personal token they receive after the experience, to their therapy session. It serves as a concrete starting point for conversation, helping them express thoughts and feelings that may have been difficult to articulate otherwise.

5 Development

The user is able to return to the experience in future sessions. As they learn more about themselves through the therapy sessions, they are able to revisit the story and develop their personal visualization. The story evolves with them, supporting personal development and growth.

The experience will be part of the first therapy session. However, this will take place in a separate room before the conversation with the therapist. This way, the client can go through the experience in peace, without pressure or obligation. The room functions as a kind of ‘safe space,’ in which the client discovers more about themselves in a safe manner and is prepared for what will be discussed later in the session.

Tangible Interactions

Based on the new context, as described in the user journey, I decided to incorporate tangible interactions into the project. Since the experience, as mentioned earlier, takes place in a separate space, it is essential that not only the animation but also the entire setting fits the story. This way, the user is fully immersed in the experience, which contributes to a sense of involvement and connection.

The use of physical interactions contributes to a more meaningful and memorable experience. In contrast to a keyboard, which offers a standard and static form of interaction, tangible interactions provide an intuitive and attractive way of interacting. They connect with the visual elements on the screen, making the experience more interactive, playful, and layered. This type of interaction supports both the message and the emotional impact of the experience.

User Test

To determine which kind of tangible interaction would best fit my experience, I wanted to conduct another user test to gain a deeper understanding, from the user’s perspective, of what was working and what was not. I started with exploring various input options and controllers through a preliminary analysis (Table 1). Each was evaluated based on factors such as interactivity, visual style and its integration within the story, feasibility, cost, and the alignment between physical input and digital interaction.

This analysis resulted in three options that scored highest across the selected criteria. I tested these three options in a follow-up user test. For this, I made lo-fi prototypes (Figure 20 on the next page) using cheap electronics and a 3D printer. I also designed a simple digital interface in Adobe XD, allowing participants to visualize the interaction in combination with the animation.

During the test, participants were asked to try out each of the three interactions. Afterward, I asked participants to provide feedback and rate each interaction on a scale of 1 to 5 based on interactivity, usability, and enjoyment. Finally, I asked them to choose which interaction they felt best suited the experience.

	Interaction	Style	Feasability	Low Price	Fits Digital	Total
Buttons	2	4	5	5	3	***19***
Joystick	4	3	4	4	4	***19***
Rotary Knob	5	5	4	5	5	***24***
Slider	3	3	3	3	2	***14***
Trackball	3	4	2	3	3	***17***
Touchscreen	3	5	2	1	4	***15***

Table 1, Preliminary analysis of different interaction controllers/inputs

Figure 20, 3D printed Lo-Fi interaction prototypes for the user test

Findings

The rotary knob, which also functions as a push button, clearly emerged as the favourite. This was experienced as the most intuitive and connected well with what was happening on the screen, something that turned out to be important for many participants. This type of interaction also offered a pleasant and accessible experience, which is why I decided to include this button in the final design.

Digital Interactions

Tangible interactions contribute significantly to the overall experience, but digital interactions also play a crucial role. It was essential that these interactions not only integrated smoothly into the storyline but also clearly and accurately represented the working methods behind them.

Based on the conversations with Mrs Canisius, three working methods were chosen. I developed a minigame for each of these working methods, allowing the user to become acquainted with the content in an interactive and accessible way. The minigames were then built using Unity, as described in further detail in Chapter 5.

Mindfulness

In this minigame (Figure 21), you learn to focus your attention on the moment using a simple breathing exercise. Your breathing is visualized with a leaf that falls (exhale) and moves up when you press the rotary knob (inhale). The aim is to keep the leaf between two lines in a calm, rhythmic manner. Boxes appear alternately at the top and bottom: if you hit the box at the right time, you score a point. In this way, you learn to playfully follow the rhythm of your breathing while experiencing the fundamentals of mindfulness and meditation.

Positive Thoughts

In a cloud of negative thoughts, it can be challenging to think positively. However, there is always a positive thought; you just have to learn to focus on it. That is precisely what this minigame (Figure 22) is about. Several sentences appear around the head of the main character; only one of them is positive, and the rest are negative. The idea is that you recognize and select the positive sentence. The challenge is that some sentences initially seem positive but are not. This way, you learn to consciously seek out genuine positive thoughts and work on playfully cultivating a more positive mindset.

Affirmations

The last minigame is about applying the previously mentioned green language (NLP Academie, 2025). How you talk about yourself strongly influences how you think about yourself. That is why it is important to practice using positive language. In this minigame (Figure 23), you complete positive sentences about yourself, starting with “I am...”. There are no wrong answers, every positive thought counts. This way, you learn to speak more consciously and positively about yourself in an approachable manner.

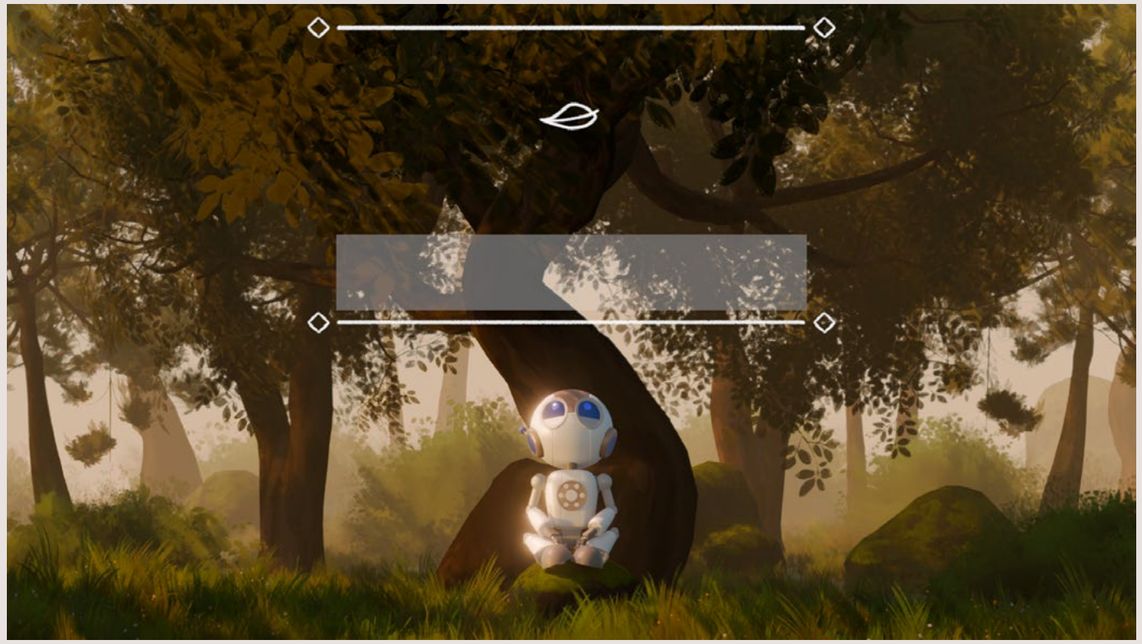


Figure 21, Meditation minigame made in Unity

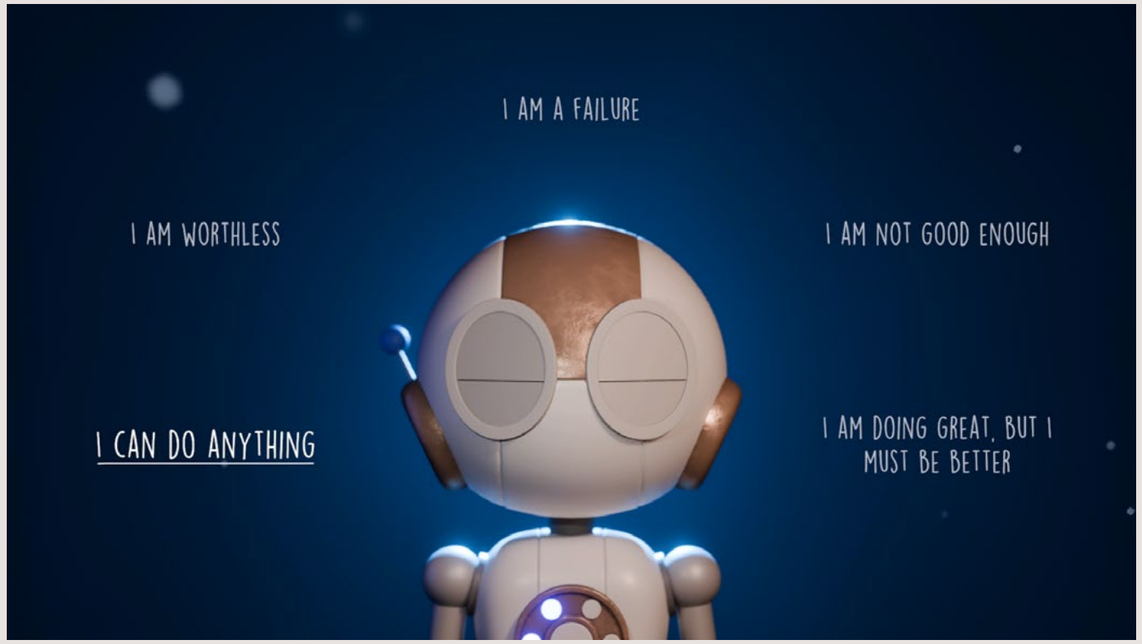


Figure 22, Positive thoughts minigame made in Unity

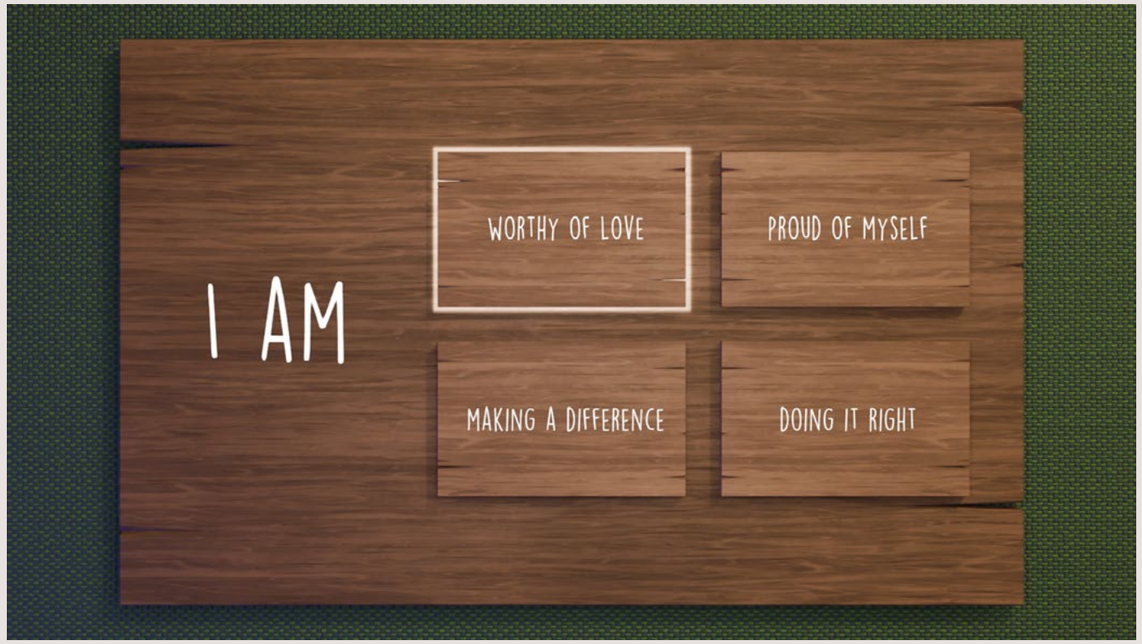


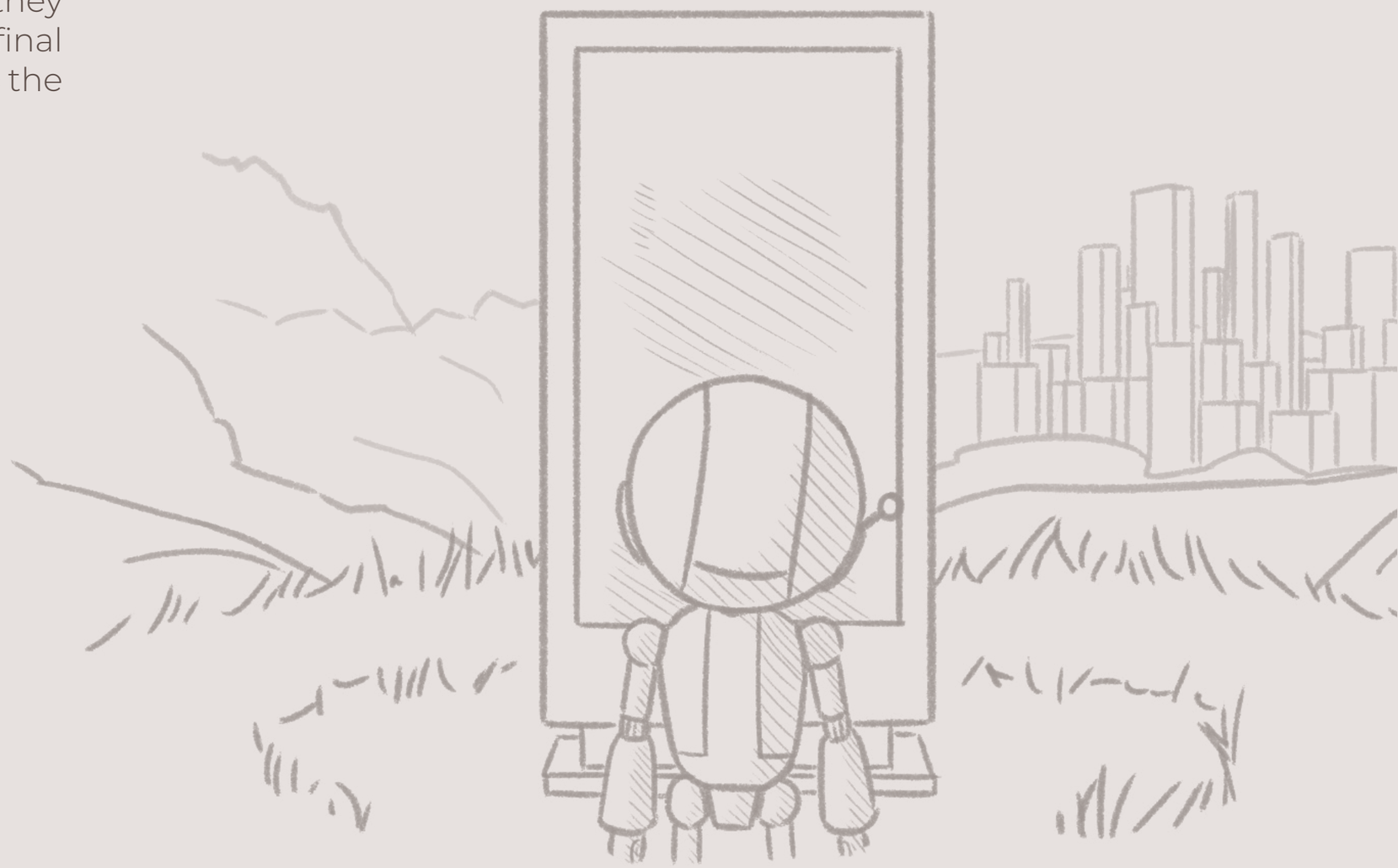
Figure 23, Affirmations minigame made in Unity

Figure 24, One of the choice interactions that are also integrated into the experience

CHAPTER 5

THE EXPERIENCE

This chapter explains the final design of the project. It describes all the separate elements of the experience and how they come together to form a cohesive final design, from the design and the story to the electronics and the game loop.



Final Concept

“Write your own story” is an interactive animated experience designed to empower the youth with a positive self-image. Within the experience the user will follow the story of a small robot character who loses his self-esteem and goes on a journey to find himself again. The animated story will show, through narrative elements, what the causes are of a negative self-esteem and then provide lessons and methods to build a positive self-image. During the experience the user will be able to play minigames and make choices that effect the story through a physical controller. These interactions will help them gather their unique collection of personality traits that will be displayed at the end of the experience. This positive visualization will show them how special they truly are and will serve as a starting point for their therapy session. The experience as a whole is designed as an immersive narrative that eases the user into the process, especially if starting a session feels difficult or unclear. By offering insight into the topic of self-esteem and how it can be worked on in therapy, it helps prepare them for a more open and meaningful conversation with their therapist.

Figure 25, Movie poster “Write Your Own Story“

Figure 26, Final Design of the experience including the wooden book, mechanical heart, controller and explanation

The Design

The physical design of the experience is shaped like a wooden book, which contains the controller, a physical representation of the mechanical heart, and a brief explanation (Figure 26). Together with the music, the book sparks curiosity and invites the user to immerse themselves in the experience. Opening the book symbolizes the beginning of your own story. The book and its accompanying stand are made of plywood and milled to size using a CNC machine. The designs of the cover and side are then laser-engraved into the wood.

Inside the book are the controller and the physical heart, a copy of the mechanical heart of the main character. During the experience, a light will light up for each character trait discovered. The goal is to eventually activate all the lights as a visual representation of your unique combination of traits. This makes the experience more personal and reinforces the feeling that you are writing the story yourself, even though you are initially following the character's narrative.

Both the controller and the heart are 3D printed with bronze-colored PLA filament. The LED covers are made of plexiglass. The controller's design is closely tied to the heart's design in terms of shape and style, creating a unified visual whole that strengthens the connection between the physical and digital.

The Story

In the world where the story takes place, each robot has a “heart” on its chest. (Figure) This heart consists of six small lights and one main light. These small lights represent the robot’s character traits, and the big light will turn on when it becomes an adult.
In the story, you follow a young robot as it grows up. Through various experiences and moments in his life, he discovers his unique character traits, and the lights in his heart begin to shine. He develops into a creative and curious individual, and his big dream is to become a famous artist in the big city (which is a metaphor for adult life).

Just as the young robot lights up all six of his small lights and is almost ready to become an adult, the big city sends him a screen on which all the videos and posts from the big city (social media) can be seen. The young robot is curious and continues to scroll. However, this has an adverse effect: he starts to compare himself more and more with what he sees on the screen, and one by one, his lights go out as he believes in himself less and less. When his last light dims, he decides to leave his home because he has lost himself completely and does not want anyone to see him in this state.

Far from his home and away from the big city, he finds a wise robot. The robot lives deep in nature, where he finds peace and joy in the simplicity of life. Shaped by his own experiences, he carries with him a quiet wisdom and a deep desire to share what he has learned with the young robot. Through the wise robot’s lessons, the young robot learns more about himself and discovers the beauty in life’s small moments. As he slowly rebuilds his self-image, one by one, the six little lights in his heart begin to shine again.

The story ends when the young robot returns home and reunites with his parent. When he returns, his big light awakens, and he finally becomes an adult. He is now ready to venture out into the world on his journey to the big city.

Electronics

This project uses two different microcontrollers, each serving its own function and operating with dedicated electronics. The corresponding Arduino codes for both controllers are included in appendix D & E.

The first microcontroller is an Arduino Uno (Figure 27, Left), which is responsible for controlling the LEDs in the physical heart. This is achieved through serial communication with Unity, where the digital interactions are programmed. Unity sends data related to the identified character traits to the Arduino, which then translates this data into corresponding LED output.

The second microcontroller is an Arduino Uno R4 Minima (Figure 27, Right), which handles input from the rotary encoder. This input is converted into keyboard commands using the Keyboard.h library, enabling the controller to function as an input device within Unity. Since this library only works with USB-compatible microcontrollers, the R4 Minima was chosen specifically for its compatibility.

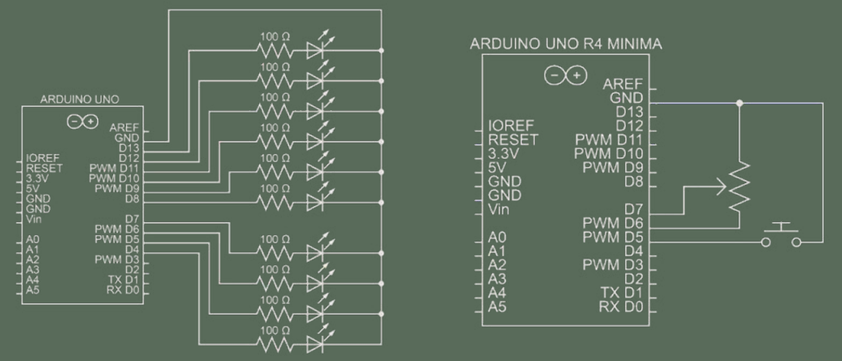


Figure 27, Schematics of electronics. Left: Mechanical heart - Right: Controller

Unity

I used Unity to develop the digital system responsible for managing interactions and visualizing the character traits. In preparation, I first created a game loop diagram (Figure 28), which mapped out the necessary scenes and their relationships within the experience.

The central component of the Unity project is the GameManager script, which controls the entire course of the experience. The script for this game manager and a link to a Google Drive with the other scripts can be found in appendix F. The GameManager keeps track of which scene is active and automatically switches to the next step within the game loop. After playing a video, for instance, the associated interactive scene is automatically started. The outcome of this interaction, the discovered character trait, is saved. After all the scenes are played, a final scene follows, in which the collected character traits are visually displayed. From this final scene, the experience can be restarted, whereby all data is reset.

Since I had limited experience with Unity and C# at the beginning of the project, I utilized Gemini AI from Google (Google, 2025) to establish the program's foundation. By giving clear instructions, I was able to build my first Unity project step by step with the help of AI. I also received explanations about the generated code, which helped me to understand better how it works.

However, as the project grew, it became clear that working with AI also has its limitations. The code became confusing, inconsistent from scene to scene, and did not always function as intended. To make the system more robust, modular and manageable, I began restructuring and rewriting the code myself.

I want to emphasize that, even after completing this project, I do not consider myself a full programmer. Using AI allowed me to quickly create a functioning prototype, but it doesn't mean I have mastered the underlying programming knowledge. However, by actively working with the code, I have gained a better understanding of how Unity works and the logic behind it. I can now make adjustments independently when needed, though I would not call myself proficient in C#.

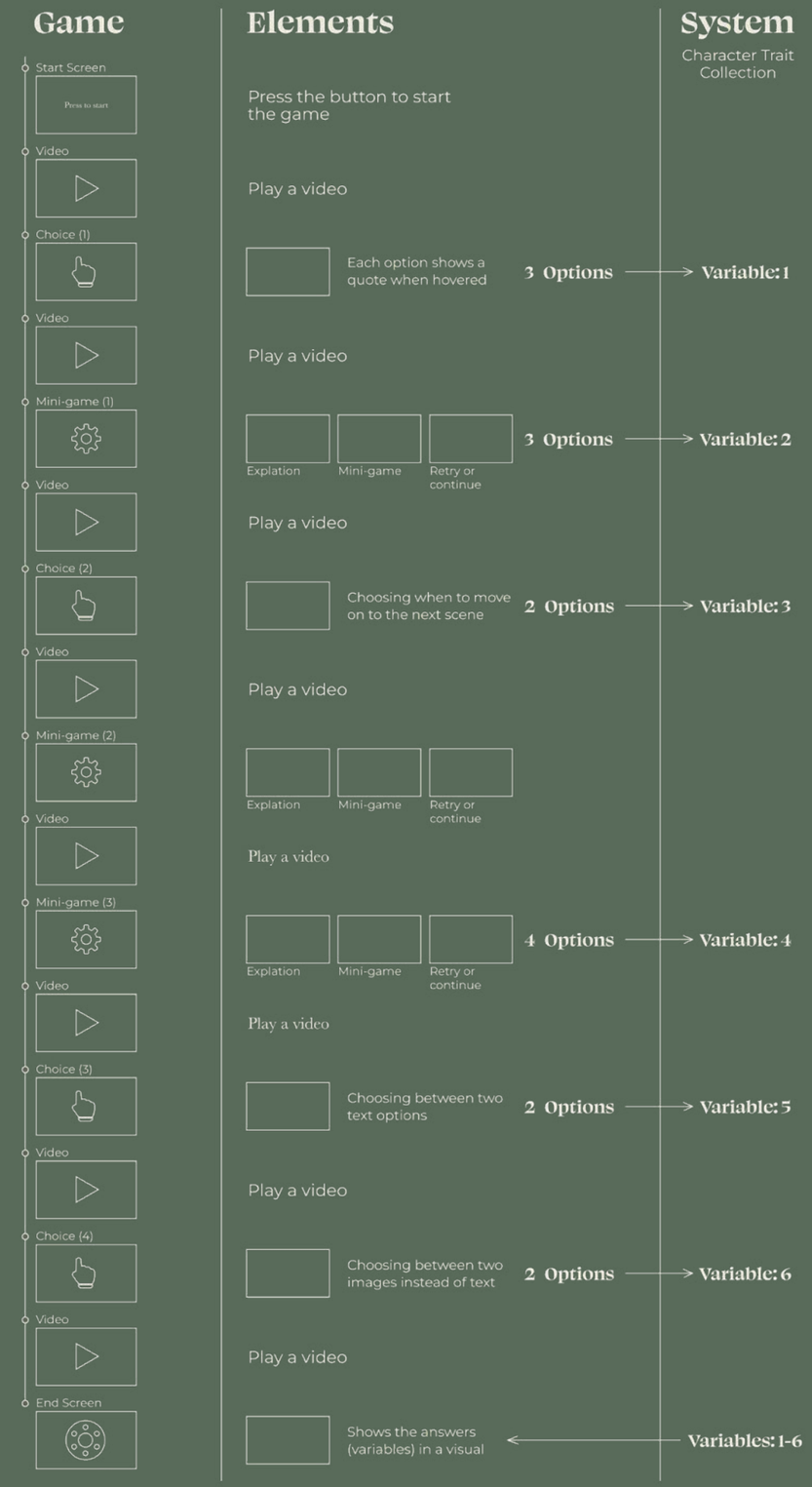


Figure 28, Schematics of electronics. Left: Mechanical heart - Right: Controller

Business Model Canvas

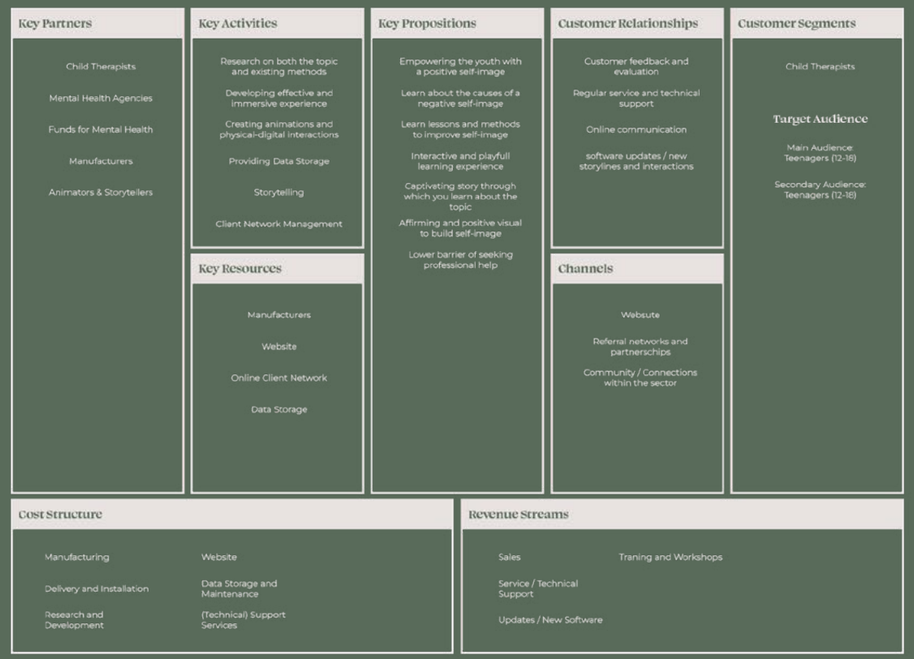


Figure 29, Business Model Canvas made for the business strategy

Value Proposition Canvas

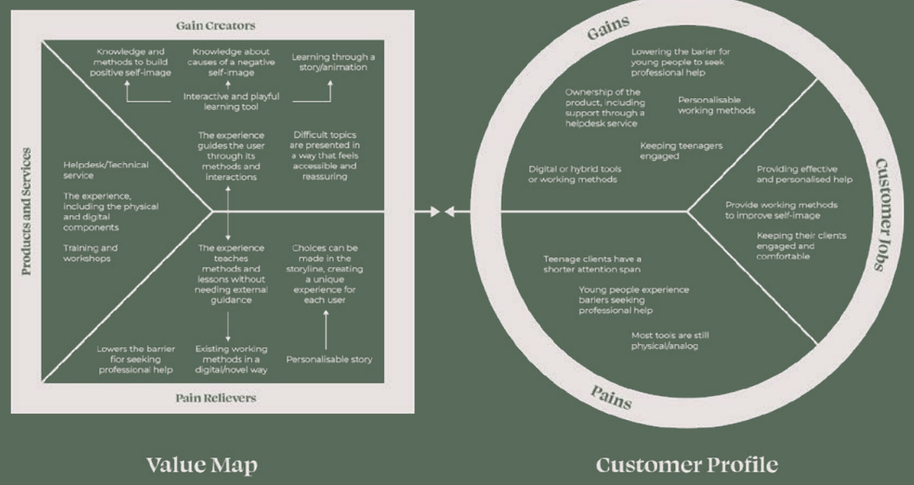


Figure 30, Value Proposition Canvas made for the business strategy

Business Strategy

To develop a business strategy that aligns closely with the project's goal and the values of the key stakeholders, specifically child therapists, I created a Business Model Canvas (Figure 29) and a Value Proposition Canvas (Figure 30). This process was carried out in close collaboration with Mrs. Canisius, which provided me with a better understanding of the needs and values of child therapists.

The analysis of both canvases reveals that developing the sales experience requires significant resources. A carefully designed marketing strategy is crucial to recover this investment while keeping the price accessible for child therapists. In addition, it is important that the therapists own the product, allowing them the freedom to use it as they see fit and to determine for themselves whether future updates are relevant and worthwhile. Finally, the analysis reveals that a helpdesk and technical support are essential to assist users with questions or technical issues. This not only contributes to a positive user experience but also fosters a long-term customer relationship.

Based on the analysis, a product-service hybrid business model was chosen. The experience is sold as a physical product, with child therapists gaining full ownership and deciding how it is used. Upon purchase, access to the helpdesk, technical support, and updates is included for one year. After this year, these services can optionally be extended via an additional service subscription.

In addition, training and workshops are available separately for therapists who require further guidance beyond the manual. This model aligns with the desire for ownership while also offering space for long-term support and customer relationships. Additionally, this model supports recovering the substantial production and development costs without unnecessarily increasing the initial purchase price for therapists.

Looking ahead, a potential direction for expanding the business strategy is to target not only child therapists but also educational institutions such as high schools, environments where teenagers are already encouraged to learn, yet where self-esteem and related topics have not yet become central but can have a significant impact (European Education Area, 2024). Looking further ahead, there is also potential to expand the project into various mental health institutions, further broadening its reach and impact.

Another possible future expansion of the business strategy is the development of an additional app that allows children to apply the working methods learned in the experience at home. This option offers opportunities for deeper engagement and longer-lasting effects but requires the establishment of a digital infrastructure with associated server costs. For this reason, it was decided not to include this development in the current strategy.

CHAPTER 6

REFLECTION

In this chapter, I reflect on the design process of this project. Several discussion points are addressed, and future possibilities for the project are explored. A personal reflection can be found in Appendix A.

Conclusion

This report discussed the design process of my project: “Write your own story.” An interactive animated experience designed to empower youth with a more positive self-image. Based on research and conversations with an expert in child therapy, a story was created that explores the causes of low self-esteem and introduces lessons and methods to support the development of a more positive self-image.

At a critical moment during the process, the original goal of the project was revisited to strengthen the context of the experience. From this reflection, the physical part of the project was further developed. The elements of the story and the physical interactions were shaped by insights gained through user testing.

Although the design has not yet been validated, it provides a meaningful starting point for further development and evaluation. The discussion and future works sections go deeper into the lessons learned and possible directions for the next phases of the project.

Figure 31, Interacting with the final design, one light has been turned on

Discussion

From the design process of this project, a number of important discussion points have emerged. First, I want to address the use of AI. As mentioned before, the Gemini AI from Google (Google, 2025) was used to support the programming of the Unity code. Additionally, the voice-overs in the animation film were created using the Elevenlabs.io AI (ElevenLabs, 2025). This was a conscious choice because the price of a professional voice-over was too high for this project, and this was a fast and effective way to add a voice-over to the animation. Throughout the project, I have found that AI is effective in developing a quick prototype but lacks the quality and nuance necessary to deliver a professional end product. If this project is to be brought to market, professionals must be hired to write the code and provide voice-overs to deliver the quality expected of it.

Although various user tests were conducted during the design process to investigate and validate individual elements of the experience, such as animation and physical interactions, no interim validation of the experience as a whole occurred during the process. Although the final result was received positively, this interim evaluation might have revealed bottlenecks in the coherence between the various elements earlier on in the process, which would have created more room for optimization and strengthening the experience.

Time management was another important aspect of this project. Since the experience consisted of multiple elements working together, effective planning was crucial. Although a schedule was created at the start, it was not reviewed or adjusted often enough throughout the process. This created time pressure, which led to various changes and concessions in the final phase. For future projects, it is therefore important not only to create a clear schedule but also to actively maintain and adjust it to ensure steady and effective progress.

Future Works

In the future, this project can be further developed to become an integral part of the therapy process. The experience is now a fixed story in which choices can be made. The experience can be revisited in later therapy sessions to observe how the user has gained new insights about themselves through the sessions. However, the project and concept would become stronger if the story evolved along with the user's growth, allowing the user to truly write their own unique story by the end of their therapy trajectory.

The token can play an important role in this. The token in the current version of the project is not yet functional. The idea is that, in the future, this token will store the user's character traits, allowing them to scan it at the therapist's office to display their unique personal visual. This can be achieved by using an RFID chip in the token. In the distant future, this token could even store the user's profile, allowing them to return to the story at any time during the therapy method and, as previously discussed, develop it in the process.

Furthermore, the story is not yet fully animated; to fully evaluate the experience's effect, this must be done, as narrative elements significantly contribute to awareness and working methods. Once the animation is complete and the token has been successfully implemented, extensive user research can be conducted, allowing for the development of an effective marketing plan that includes the costs of all physical components and the creation of the animation.

CHAPTER 7

REFERENCES

In this chapter I have noted down all the references and added extra files to the appendix.

References

APA. (2018). Apa Dictionary of Psychology. American Psychological Association. https://dictionary.apa.org/self-image

Beeston, A. (2024, June 30). Why don't teenagers get help for anxiety and depression? NIHR Evidence. https://evidence.nihr.ac.uk/alert/why-dont-teenagers-seek-help-anxiety-depression/

Beresin, E. V. (2022). Low self-esteem in adolescents: What are the root causes?. Psychology Today. https://www.psychologytoday.com/us/blog/inside-out-outside-in/202206/low-self-esteem-in-adolescents-what-are-the-root-causes

Byard Art. (2024, June 13). The impact of colour psychology in Visual Arts. https://byardart.co.uk/impact-of-colour-psychology-in-visual-arts/?srsltid=AfmBOorhyIGHjmAjip6RK5sQUjT-B63lo1pVd3DoNRKe_jeiv2O0kIpg

Docter, P. (Director). (2020). Soul [Film]. Pixar Animation Studios; Walt Disney Pictures

ECLG. (n.d.). Negatief Zelfbeeld. Negatief zelfbeeld bij kinderen en jeugdigen| kenmerken en behandeling. https://www.eclg.nl/negatief-zelfbeeld-kind/kenmerken-behandeling

Efteling. (2023, March 7). Ontwerper Onthult invulling themagebied rond Danse macabre. Ontwerper onthult invulling themagebied rond Danse Macabre. https://www.efteling.com/nl/blog/nieuws/20230307-schets-themagebied-danse-macabre

Ehmke, R. (2025, April 1). Helping resistant teens into treatment. Child Mind Institute. https://childmind.org/article/helping-resistant-teens-into-treatment/

ElevenLabs. (2025). ElevenLabs voice AI [Artificial intelligence system]. https://elevenlabs.io

European Education Area. (2024). Wellbeing at school. https://education.ec.europa.eu/education-levels/school-education/wellbeing-at-school

Festinger, L. (1954). A Theory of Social Comparison Processes. Human Relations, 7(2), 117-140. https://doi.org/10.1177/001872675400700202 (Original work published 1954)

Galactic Cafe. (Developer). (2013). The Stanley Parable [Video game]. Galactic Cafe.

Google. (2025). Gemini [Artificial intelligence model]. Google AI.

Gruenenfelder-Steiger, Andrea & Allemand, Mathias & Robins, Richard & Fend, Helmut. (2014). Low and Decreasing Self-Esteem During Adolescence Predict Adult Depression Two Decades Later. Journal of personality and social psychology. 106. 325-38. 10.1037/a0035133.

Headspace. (2023). Meditation for self-esteem. https://www.headspace.com/meditation/self-esteem

HSP Academie. (2021, June 10). Je Missie Leven op de hsp academie - holistische opleidingen. HSP academie. https://hsp-academie.com/

Kelly, Y., Zilanawala, A., Booker, C., & Sacker, A. (2019). Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study. EClinicalMedicine, 6, 59–68. https://doi.org/10.1016/j.eclinm.2018.12.005

Koosis, L. A. (2024, September 30). The Science of Affirmations: The Brain's response to positive thinking. MentalHealth.com. https://www.mentalhealth.com/tools/science-of-affirmations

Maddy Makes Games. (Developer). (2018). Celeste [Video game]. Maddy Makes Games.

Midgley, C., Thai, S., Lockwood, P., Kovacheff, C., & Page-Gould, E. (2021). When every day is a high school reunion: Social media comparisons and self-esteem. Journal of personality and social psychology, 121(2), 285–307. https://doi.org/10.1037/pspi0000336

NLP Academie. (2025, May 30). Wat is NLP? https://www.nlpacademie.nl/wat-is-nlp/

Radez, J., Reardon, T., Creswell, C., Lawrence, P. J., Evdoka-Burton, G., & Waite, P. (2021). Why do children and adolescents (not) seek and access professional help for their mental health problems? A systematic review of quantitative and qualitative studies. European child & adolescent psychiatry, 30(2), 183–211. https://doi.org/10.1007/s00787-019-01469-4

Ross, P. (2012). 2012: Fonckel one. Studio Philip Ross. https://studiophilipross.nl/fonckel-one

Sanders, C. (Director). (2024). The Wild Robot [Film]. DreamWorks Animation; Universal Pictures.

Skrekkøgle. (2012). Plugg. https://skrekkogle.com/projects/plugg/

SoCal Mental Health. (2024, March 26). Distorted self-image. https://socalmentalhealth.com/distorted-self-image/#:~:text=A%20distorted%20self%2Dimage%20can%20lead%20to%20severe%20depression%2C%20social,and%20more%20harmful%20over%20time.

Social Media Victims Law Center. (2025, March 10). Social Media's effect on self-esteem: How does it affect teens? https://socialmediavictims.org/mental-health/self-esteem/

Stanton, A. (Director). (2008). WALL·E [Film]. Pixar Animation Studios; Walt Disney Pictures.

The Walt Disney Family Museum. (n.d.). Tips & Tricks Shape Language. Waltdisney. https://www.waltdisney.org/sites/default/files/2020-04/T&T_ShapeLang_v9.pdf

Weir, K. (2020). Nurtured by nature. Monitor on psychology. https://www.apa.org/monitor/2020/04/nurtured-nature

WHO. (2022). Covid-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide. World Health Organization. https://www.who.int/news/item/02-03-2022-covid-19-pandemic-triggers-25-increase-in-prevalence-of-anxiety-and-depression-worldwide/?utm_source=chatgpt.com

WHO. (2024). Mental health of adolescents. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health

Yellowbrick. (2024, August 26). Exploring the psychology of color in animated films. https://www.yellowbrick.co/blog/animation/exploring-the-psychology-of-color-in-animated-films

Appendix A: Reflection

Reflection FBP Thijs Reijnders

The process of my FBP has been a period full of learning moments and new insights. It was a valuable moment for me to discover who I want to be as a designer and what my unique identity is. During my studies, I mainly focussed on sustainability. I aimed to create visually appealing products that could make a positive impact on the world. Although this theme remains important to me, my interest began to take a different direction during the last year of my studies.

During P3 and my internship, I discovered how I could integrate my passion for animation into my design practice. This meant my first real introduction to experience design, a field that has since become very interesting to me. My FBP offered me the opportunity to explore this direction in more detail. I have experienced that animation and interaction design can truly reinforce each other within an experience. I have also come to realize that experience design extends beyond the digital realm and applies to physical environments as well. In previous projects, I primarily stayed within my digital comfort zone; however, in this project, I challenged myself to also work with physical materials. By experimenting with Arduino and building the wooden book, I discovered how inspiring it can be to design with tangible elements. This, combined with my research, taught me how important it is that all components within an experience function in coherence to form a convincing whole. In the future, I aim to delve further into this topic, for instance, by looking into embodied interactions, further to develop my design identity as an experience designer.

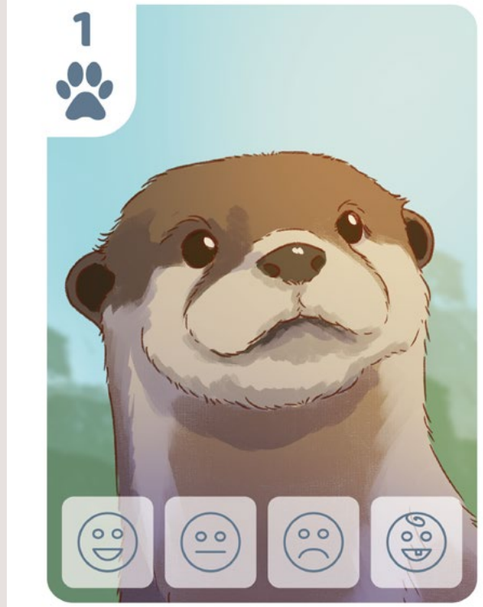
The aim of contributing to a better world remains the core of my motivation as a designer. Where this previously mainly occurred from a sustainability perspective, I now focus more on social themes, such as mental health and self-image, topics that were central to this project. Thanks to extensive literature research and collaboration with an expert, I have come to realize the importance of thoroughly exploring the theme you are addressing. In previous projects, I often went through the research part relatively quickly; however, in this project, I paid much more attention to it. This approach enabled me to make more informed and substantiated design choices. In addition, the collaboration with the expert ensured that I could substantiate the project with existing methods and theories, which significantly increased the effectiveness and relevance of my design.

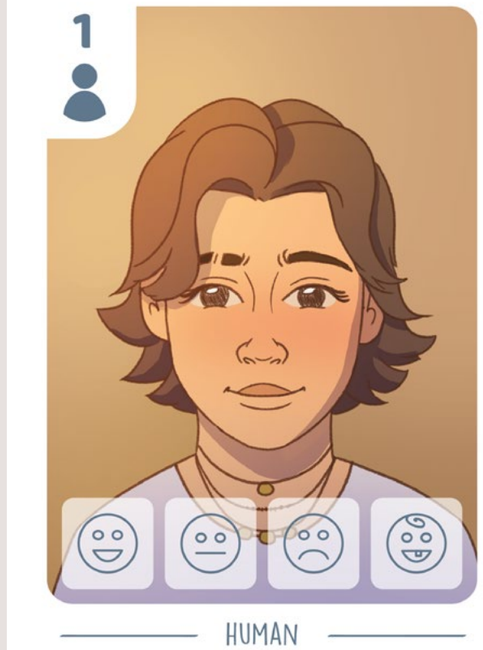
Additionally, in this project, I aimed to learn more about involving users and gathering valuable feedback. In the past, I often found user testing to be slightly uncomfortable and static, which is why I preferred to share this task with others. In this project, however, I attempted to transform the user test itself into an experience where input was collected playfully. This not only helped me learn to work more effectively with physical materials (such as in the development of game tools) but also gain a deeper understanding of the user experience and how it can be tested. I consider this gamified approach to user testing to be successful and see opportunities for further application in future projects.

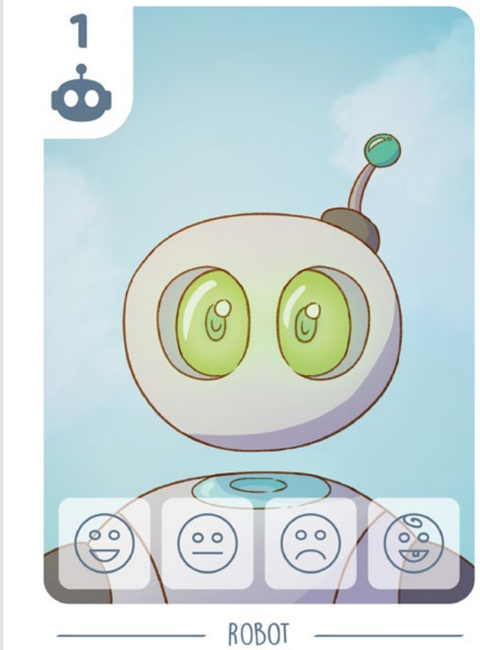
Finally, the combination of the Design Innovation Methods course and the collaboration with the expert helped me further develop my knowledge in the field of business strategy. This is an area of design that I previously had less affinity with, partly because I experienced it as complex. However, by using the methods from DIM and working with the expert's values (in this case, the child therapist), this process became more insightful and logical. In future projects, I aim to integrate these insights earlier in the design process, ensuring the business side of the project is more integrated into the entire design process.

In conclusion, this project has played an important role in shaping my identity as a designer. My interest lies in developing immersive experiences that combine animation with meaningful physical interactions. I strive to create experiences that are not only aesthetically and technically interesting but also contribute to a better, more social world. In the coming years, and especially during my master's program, I aim to further investigate, deepen, and refine this design identity.

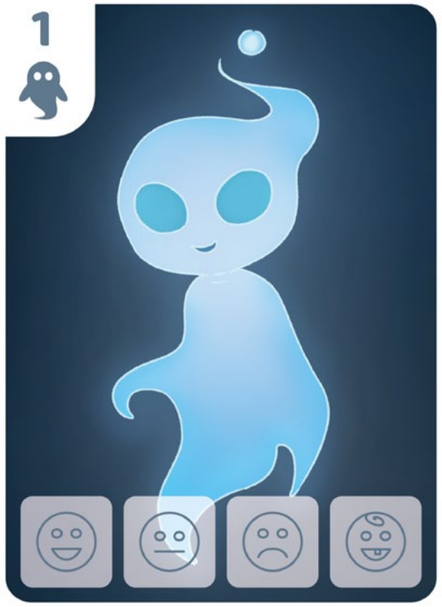
Appendix B: Hand drawn Playing Cards used in the first User Test







1



SOUL

2

WHAT DO YOU DO WHEN YOU WANT TO RELAX?

_____

WRITE YOUR ANSWER IN THE WHITE BOX

ANSWER

2

WHERE WOULD YOU GO?

TAKE THE EASY ROUTE

TAKE THE DIFFICULT ROUTE

TURN BACK TO THE START

STAY AND ENJOY THE VIEW

CHOOSE YOUR ANSWER TO THE QUESTION

CHOICES

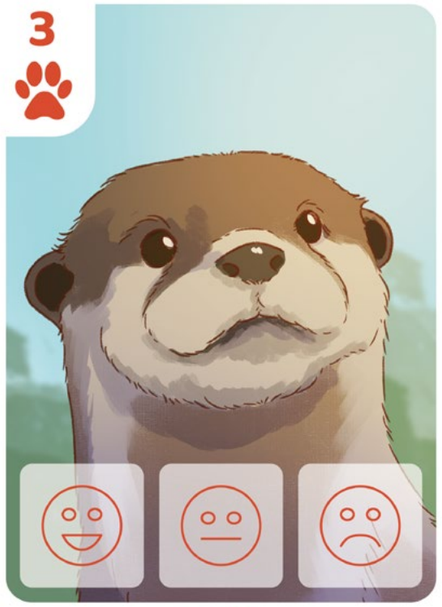
2

MEMORY

FIND YOUR ANSWER WITHIN THE TILES

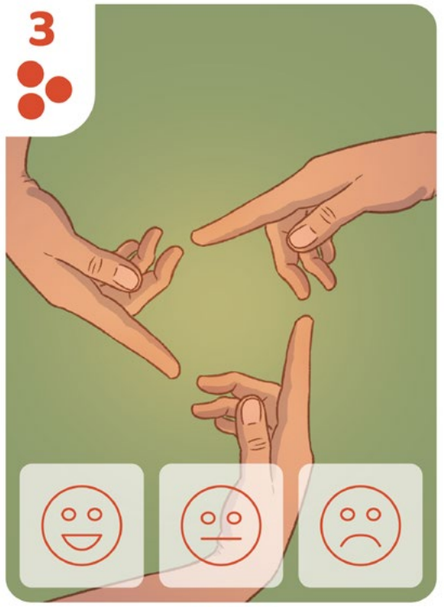
MINIGAME

3



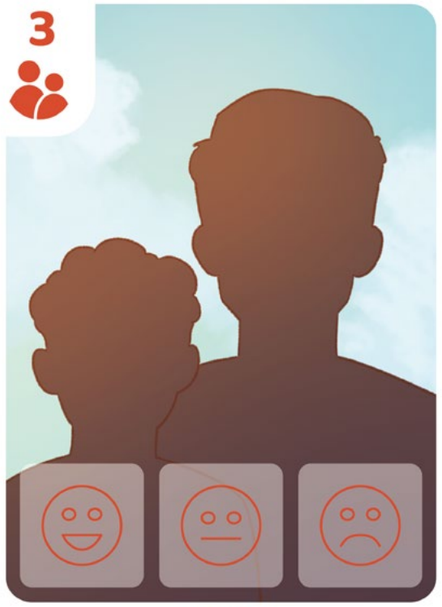
ANIMAL

3



MULTIPLE

3



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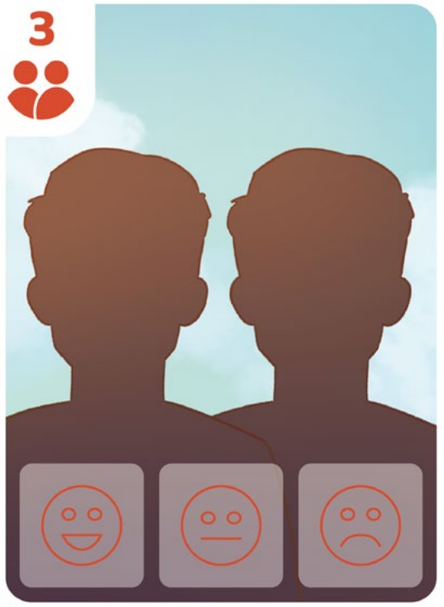
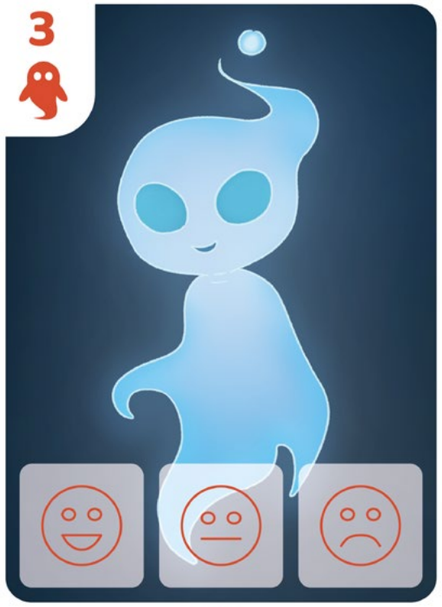


SAME AGE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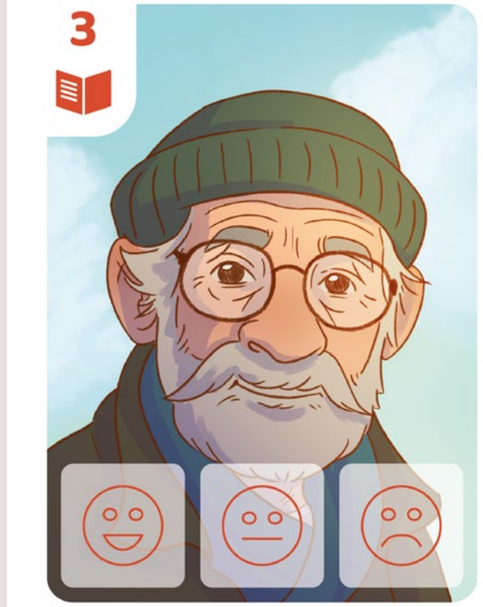
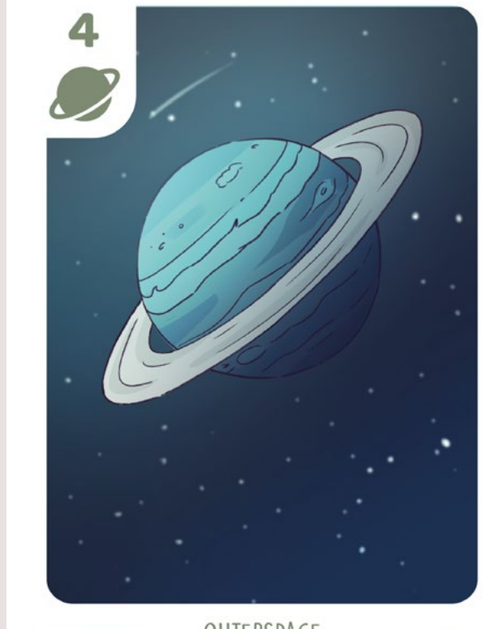
SOUL


3
WISE


4
CITY ENVIRONMENT


4
FANTASY ENVIRONMENT


4
NATURE ENVIRONMENT


4
OUTERSPACE

Appendix C: Script “Write your own Story“

Write your own story

An animation

By Thijs Reijnders

Final draft 05/06/2025

Thijs Reijnders

t.j.c.reijnders@student.tue.nl

Born, The Netherlands

ACT I - LOOSING YOUR SELF-ESTEEM

INT. WORKSHOP - SUNSET - 3D ANIMATION

DARKNESS. A small light appears on the screen. The light multiplies itself until there are six lights, all in a circular pattern. At last, one big light appears in the centre of the six smaller lights.

NARRATOR

Every second a new being is born.

Ready to discover their unique personality traits.

Each one with their own story to write.

FADE INTO:

The lights turn of and fade into the “HEART”. This heart gets taken by a hand and placed inside the body of the MAIN CHARACTER. CLICK!

CHARACTER BOOTS UP!

First small light turns on.

NARRATOR

This… is where my story starts.

TRANSITION INTO 2D ARTWORK:

BEGIN HISTORY MONTAGE:

INT./EXT. BOOK PAGES - SHOWING MEMORIES - 2D ARTWORKS

A SERIES OF SHOTS all accompanied by the narrator.

- Main character looking at butterfly
- Main character running after butterfly
- Main character working on an artwork
- Main character looking at big city in the distance
- Main character hanging his artwork on the art wall

NARRATOR

I was a curious kid.

Chasing after butterflies. Staring for hours at beautiful patterns. Nature became my biggest inspiration.

I started creating art. Trying to capture the beauty that I saw, so I could share it with others. It became my biggest passion. I drew every minute of the day. Created drawing after drawing. Knowing that one day, my big light would shine, and I would become the most famous artist in the big city.

So, I kept focussing on my passion. I kept creating. I kept drawing.

END HISTORY MONTAGE

TRANSITION INTO 3D:

INT. ROOM FILLED WITH ARTWORKS - DAY

Main character is hanging his new artwork on the wall. DOORBELL RINGS! The main character looks to the right, towards where the sound came from.

EXT. AT THE DOOR

The main character opens the door and peeks his head around the corner. His eyes light up.

EXT. IN FRONT OF THE HOUSE - BIG CITY IN THE BACKGROUND

A BIG SCREEN stands in the front of the house. The main character walks up to it and looks at it. He is nervous, but curious.

He presses the screen.

BLEEP! BLEEP!

SCREEN

Welcome to the big city. Where everything is possible, and dreams come true.

NARRATOR

I was amazed by what I saw.

This machine showed my everything. It would be my ticket to becoming the most famous artist in the big city. But what I didn't realize was how much this screen would cost me…

SCREEN

The houses here in the big city are amazing, way better than those on the countryside. Those houses

are boring. They don't even have a pool. If you are still living there then you better get here soon, because these houses are way better.

The main character changes his expression to slightly sad. He looks behind him at his own house. The focus goes to the house.

He then turns around and fixes his expression.

NARRATOR

I didn't realize that I would become a totally different person.

As the narrator finishes his line the main character presses the screen.

CUT TO BLACK:

INT. INSIDE HOUSE DRAWING TABLE DAY

TOP VIEW CAMERA ANGLE. Main character is working on his drawings. He holds it up and shakes his head. He proceeds to work more.

A SERIES of shots follow where the table gets filled with drawings. He crumples a drawing once again

NARRATOR

I started pushing myself. I wanted to be like the artists on the screen. I needed to improve. I needed to be better. But it was never enough.

Each time I compared myself to them, I realized I wasn't there yet. I wasn't good enough. I would never be like them.

EXT. IN FRONT OF SCREEN

Main character is looking at the screen again.

Screen shows an artist from the big city. The main character analyses them.

NARRATOR

Why was I not good enough?

OVERLAP TRANSITION:

INT. HOUSE - IN FRONT OF MIRROR

Main character is looking at himself and to the parts of his body that make him unique.

NARRATOR

I needed to be more like them. I needed to act like them and look like them. Everybody could see that I didn't come from the big city.

INT. HOUSE - IN FRONT OF MIRROR

Main character covers his uniqueness with self-made cardboard covers.

NARRATOR

I needed to change who I was.

BOOK PAGE TRANSITION:

EXT. OUTSIDE - IN FRONT OF SCREEN - SEQUENCE

SEQUENCE OF SHOTS where the weather and mood changes.

NARRATOR

But it didn't help. I still wasn't good enough. I kept comparing myself to the others.

I got obsessed with what I saw.

I just stood there, looking at the screen, day in, day out.

FADE TO BLACK:

INT. HALLWAY - SEEN FROM ANOTHER ROOM - DAWN

Main character walks through the hallway. The audience can see him when he passes through a door. His posture and expression are sad.

INT. BEDROOM

Main character sits on his bed. He is sad.

KNOCKING ON DOOR!

PARENT

Is everything alright? You looked sad.

MAIN CHARACTER

Yeah, I am fine, just a little tired.

PARENT

Okay... Well, I am off to the store. Guess you don't want to join today.

Why don't you start a new drawing? That always cheers you up.

See you soon, buddy.

NARRATOR

Maybe he is right I thought. I haven't been drawing, because I have been so busy watching that screen. So, I grabbed my supplies and started drawing.

INT. INSIDE HOUSE - DRAWING TABLE - DAY

Main character is drawing again. Fuelled by new energy and passion he creates new art. Main character holds his artwork up proudly.

NARRATOR

It felt like I re-discovered my passion. I worked for hours, and I felt the joy of creating again. Until…

VOICES OF THE SCREEN (MEMORY)

If you don't finish your artwork in 3 hours you are not drawing the right way.

If you don't follow these 5 steps when you're drawing, then…

Famous artists only draw using these methods.

In panic and disbelief, the main character smacks down his artwork and sweeps everything off his table. One artwork sweeps in front of the camera.

OVERLAY TO BLACK:

INT. HOUSE IN FRONT OF THE WALL WITH ARTWORKS

Screen is still DARK. You hear the main character ravaging his workspace.

MAIN CHARACTER (angry and sad)

I am not good enough.

I can't draw like them.

Why can't I draw.

I am not like them.

I will never be like them.

I am just not good enough.

I am not an artist.

I will never be an artist.

I will never get as good as them.

As the screen fades in, you see the main character sitting against the wall where his artworks where hanging. Most artworks lay on the ground, torn of the wall.

NARRATOR

That moment I felt lost. I had forgotten who I was.

BOOK PAGE TURNS OVER:

EXT. VIEW OF THE HOUSE - NOON

Wide shot of the house standing on the hill. Main character is walking away.

NARRATOR

Instead of helping me fulfil my dreams, the screen had slowly shattered them. I needed to get away from it. So, I left…

Main character looks over his shoulder to his house and then walks of the screen.

ACT II - FINDING YOURSELF

EXT. LANDSCAPE - ON A HILL WALKING

A SERIES OF SHOTS with each a change of weather and time.

- SUNSET - Main character has energy

- NIGHT - Main character is overthinking

- WINDY - Main character loses self-made cover

- COLD Main character is cold

- RAIN - Main character feels lost and runs out of screen

BOOK PAGE TURN OVER:

EXT. UNDER SMALL ROCKY OVERHANG - RAINY

Main character sits on the ground, completely lost and sad. He has given up. Shadow creeps up on the wall.

NARRATOR

Days passed as I walked away from all that I knew. I had hoped leaving would help. It didn't. I just got more lost. I was scared, ready to give up. And then… I saw a friendly face.

EXT. ENTRANCE OF SMALL OVERHANG

A wise robot appears holding a warm light. He looks kind and compassionate.

WISE MAN

Well, hello there. What are you doing here all alone in the cold?

EXT. UNDER SMALL OVERHANG FIREPLACE

Main character and the wise robot are sitting around a fireplace. Main character is talking.

NARRATOR

The friendly robot lit a fire to keep us warm. While we sat together, I suddenly started talking. About drawing, the screen, the artists from the big city. About my doubts, my frustrations and how I left my home. I told him my story.

Hours had passed when I finished talking. He hadn't spoken, but it felt like he understood me.

The wise robot nods and then gets up. He turns towards the open sky and looks at it.

WISE MAN

You know, when all seems lost and dark, just remember this: "Only in darkness you can see the stars shine."

And these stars are more than just lights in the sky. They show us how special it is that we are alive. They can give a sense of purpose, if you look close enough. Take a look, maybe you find something you need.

CHOICE I - CHOOSE A QUOTE THAT FITS YOUR PURPOSE

EXT. IN FRONT OF ROCKY OVERHANG - NIGHT

Main character is looking up at the sky and when he says the quote out loud, his first light turns on again.

MAIN CHARACTER

~ chosen quote ~

NARRATOR

That night changed something in me. It brought hope. It gave me purpose.

EXT. FOREST SCENE - DAY

The sun shines bright on the top of the trees. You see the sky and forest.

NARRATOR

The kind robot asked me if I wanted to stay for a while. I was excited and I had so many questions to ask him, but I didn't know where to start. What would I…

EXT. FOREST - TREE STUMP ON PATH

BANG! The main character has fallen over a tree stump.

WISE MAN

Is everything alright?

MAIN CHARACTER

Yeah, I just wasn't paying attention. I was thinking so much that I did not see the tree stump.

WISE MAN

You see, sometimes the mind can be so busy with what was and what will be, that we forget to be aware of what is now. So, focus on the present, because that is the only thing we can control.

MAIN CHARACTER

But I can't stop these thoughts from appearing.

WISE MAN

That is true, you can't stop thoughts, but you can be aware of them and re-direct focus on what is in the present. Let me show you how.

EXT. FOREST - UNDER A BIG TREE

Main character is sitting on a tree stump / patch of grass in a meditation pose.

WISE MAN

Focus your breathing on the movement of the leaf.

MINIGAME I - MINDFULNESS

NARRATOR

This method really helped me realise how calming it is to be in the moment. That by focussing on the here and now, you can truly enjoy all that is around you.

BOOK PAGE TURN OVER:

EXT. HILL - SUNSET

Shot starts with a view of the sky and zooms to the characters.

Main character and wise robot are sitting on a hill looking at the sky and listening to the sounds of nature.

MAIN CHARACTER

Is everything alright? You look a little sad?

The wise robot stays silent for a little bit.

WISE MAN

Sometimes you just need to sit in silence and appreciate all that is around you. Try it. If you wait long enough, maybe you learn something interesting.

CHOICE 11 - DECIDING ON HOW LONG TO STAY

WISE MAN

You know, I am really glad you decided to stay for a while. It means a lot to me, because you are also helping me with something I felt was missing. So, thank you.

View moves up in and gets covered by the leaves of the trees.

TRANSITION FROM LEAVES:

EXT. HOUSE IN FOREST

LEAVES get pushed to the side and the camera gets to see the cozy house in the open space in the forest.

MAIN CHARACTER

It's beautiful.

WISE MAN

It's not much, but it is home and that is everything I need.

INT. HOUSE IN FOREST - ITEMS ON SHELF AND ART ON WALL

The camera follows shelves where you can see all sorts of items. In the centre of the shelf, we can see a statue of the wise robot.

As the camera moves through the interior, we see the main character standing in front of a few artworks.

The wise robot is standing next to the main character.

MAIN CHARACTER

Wow, that's an actual painting from RENDER. And that one is from LUMA. You even have an artwork of GRAPHIN?

WISE MAN

You know these artists?

MAIN CHARACTER

Yeah, I do. They are some of the most famous artists from the big city. How did you get these artworks?

WISE MAN

They all came here in search for some peace and quietness, away from their busy life. As a thank you for letting them stay here, they gave me some of their artworks.

I did think they were really talented, but I didn't know they were famous.

Main character's fascination turns into sadness.

WISE MAN

You look sad. I though you liked art.

MAIN CHARACTER

I do, but… I will never be like them.

WISE MAN

I am glad you won't, because you are unique. It is important to focus on who you are, not on who others are. A wise person once told me:
"Comparison is the thief of joy."

MAIN CHARACTER

How can you always be so positive?

WISE MAN

Because "positive thinking will let you do everything better than negative thinking will do."

MAIN CHARACTER

But it seems like I only have negative thoughts.

WISE MAN

That is not because you don't have positive thoughts. That is because you choose to focus only on the negative ones. Close your eyes and focus on

your thoughts, then you will see that there is always positivity to be found.

Main character closes his eyes.

WISE MAN

Focus on finding the positive thoughts.

MINIGAME II - POSITIVE THINKING

MAIN CHARACTER

I see now.

WISE MAN

Well done! If you keep practicing this, then you will see that there will start to be more positive thoughts.

Oh, and another thing. Thoughts are not the only things that can change your mind. Your words have this power to. So, learn to use them in a positive manner. If you remove words such as 'but' and 'not', you will truly find how great you can be. Try it and you will see.

The wise robot hands over a WOODEN BOARDGAME.

WISE MAN

Let these positive sentences describe who you are.

MINIGAME III - AFFIRMATIONS

BOOK PAGE TURN OVER:

INT/EXT. HOUSE, FOREST AND FIELD - DAY

A SERIES OF SHOTS accompanied by a voice-over

- Main character meditating in front of tree

- Main character drawing and sculpting with wood

CHOICE III - FIXING THE PROBLEM OR INNOVATING

- Main character sitting in field

NARRATOR

The lessons of the wise robot had really motivated me to keep working on myself. I started living more in the moment, focussing on who I wanted to be. I

started drawing again and re-discovering my passion for art. I even found new ways of creating.

He had really helped me with my problems. So, I stayed a little bit longer and helped him too.

This journey had really changed my life. But I also knew that it was time for me to go home.

CHOICE IV - DECIDING WHO TO MAKE A GIFT FOR

EXT. ON THE HILL SUNSET

Main character finishes his sculpture and stares into the sunset.

BOOK PAGE TURN OVER:

EXT. HOUSE IN FOREST - DAY

Main character waves to the wise robot and then walks away.

LEAVES OVERLAY TRANSITION:

EXT. HILL - DAY

Main character is running and jumps in the air out of excitement.

(IF CHOSEN:

INT. HOUSE IN FOREST ITEMS ON SHELF DAY

The wise robot puts down the sculpture next to his)

BOOK PAGE TURN OVER:

INT. HOUSE - WALL OF ART - NOON

Parent of main character is carefully putting back all the artworks. Some of them have been put together again with tape.

Main character walks in the frame and looks at parent.

Main character runs to parent and hugs him.

MAIN CHARACTER

I am so sorry. I didn't know what to do. I didn't want to hurt you or make you worried. I'm…

PARENT

It’s alright, you are here now. That is all that matters.

INT. HOUSE - WALL OF ART

They are both sitting against the wall, talking.

(IF CHOSEN: Main character gives his wooden sculpture)

NARRATOR

That evening I told him all about my journey. What surprised me was that he wasn’t even mad, he was proud of who I had become.

When the narrator finishes the BIG LIGHT of main character turns on.

FADE TO STANDING OUTSIDE:

EXT. IN FRONT OF HOUSE - DAY

Main character is waving and then walks away to the horizon. Big city is visible in the background.

As the narrator talks the camera pans up to the sky.

QUOTE APPEARS!

NARRATOR

I had finally found myself.

I was ready to live the life that I wanted.

How are your writing the story of your life?

Appendix D: Arduino Code “Heart“

```
// Pin definitions for each LED
const int ledPin01 = 13;
const int ledPin02 = 12;
const int ledPin03 = 11;
const int ledPin04 = 10;
const int ledPin05 = 9;
const int ledPin06 = 8;
const int ledPin07 = 7;
const int ledPin08 = 6;
const int ledPin09 = 5;
const int ledPin10 = 4;


void setup() {
  // Setup LED pins as output
  pinMode(ledPin01, OUTPUT);
  pinMode(ledPin02, OUTPUT);
  pinMode(ledPin03, OUTPUT);
  pinMode(ledPin04, OUTPUT);
  pinMode(ledPin05, OUTPUT);
  pinMode(ledPin06, OUTPUT);
  pinMode(ledPin07, OUTPUT);
  pinMode(ledPin08, OUTPUT);
  pinMode(ledPin09, OUTPUT);
  pinMode(ledPin10, OUTPUT);

  // Initialize serial communication for debugging output
  Serial.begin(9600);

  // Indicate that the program has started
  Serial.println(“Arduino Ready”);
}

void loop() {
  // Check if data is available from the Serial input
  if (Serial.available() > 0) {
    // Read the incoming data
    char data = Serial.read();

    // Print the received character
    Serial.print(“Received: “);
    Serial.print(data);
```

```
// Check the value of the received character and take action
    if (data == '1') {
      // Turn on LED 01
      digitalWrite(ledPin01, HIGH);
      Serial.println("LED 01 ON");
    } else if (data == '2') {
      // Turn on LED 02
      digitalWrite(ledPin02, HIGH);
      Serial.println("LED 02 ON");
    } else if (data == '3') {
      // Turn on LED 03
      digitalWrite(ledPin03, HIGH);
      Serial.println("LED 03 ON");
    } else if (data == '4') {
      // Turn on LED 04
      digitalWrite(ledPin04, HIGH);
      Serial.println("LED 04 ON");
    } else if (data == '5') {
      // Turn on LED 05
      digitalWrite(ledPin05, HIGH);
      Serial.println("LED 05 ON");
    } else if (data == '6') {
      // Turn on LED 06
      digitalWrite(ledPin06, HIGH);
      Serial.println("LED 06 ON");
    } else if (data == '7') {
      // Turn on LEDs 07 to 10
      digitalWrite(ledPin07, HIGH);
      digitalWrite(ledPin08, HIGH);
      digitalWrite(ledPin09, HIGH);
      digitalWrite(ledPin10, HIGH);
      Serial.println("LED 07 ON");
      Serial.println("LED 08 ON");
      Serial.println("LED 09 ON");
      Serial.println("LED 10 ON");
    } else if (data == '0') {
      // Turn off all LEDs (01 to 10)
      digitalWrite(ledPin01, LOW);
      digitalWrite(ledPin02, LOW);
      digitalWrite(ledPin03, LOW);
      digitalWrite(ledPin04, LOW);
      digitalWrite(ledPin05, LOW);
      digitalWrite(ledPin06, LOW);
      digitalWrite(ledPin07, LOW);
      digitalWrite(ledPin08, LOW);
      digitalWrite(ledPin09, LOW);
      digitalWrite(ledPin10, LOW);
      Serial.println("ALL LEDs OFF");
    } else {
      // If the character is not recognized, print a warning
      Serial.print("Unknown data received: ");
      Serial.println(data);
    }
  }
}
```

Appendix E: Arduino Code Controller

```
#include <Keyboard.h> // Include the core Arduino library

// Pin definitions for the rotary encoder
#define CLK 5   // Clock pin of the rotary encoder (used for button input)
#define DT  6   // Data pin of the rotary encoder
#define SW   7    // Switch pin (button) of the rotary encoder (used for rotation detection)

// Variables for clicking and holding of the rotary encoder button
int buttonState = 0;          // Variable for reading the pushbutton status (current state)
int buttonStatePrevious = HIGH; // Variable to store the previous button status, initialized to HIGH (unpressed)
unsigned long buttonPressStartTime = 0; // Variable to store the time when the button was pressed
bool buttonHeld = false;       // Flag to indicate if the button is being held

// Variables for the rotation of the rotary encoder
int counter = 0;        // Counter for tracking rotary encoder position
int SWState;         // Current state of the rotary encoder's switch (SW pin)
int SWLastState;      // Last state of the rotary encoder's switch (SW pin)
String currentDir = "";  // Stores the direction of rotation (for serial output)

// Constants for timing
const unsigned long LONG_PRESS_THRESHOLD = 500; // Time in milliseconds for a long press

void setup() {
  // Set rotary encoder pins as inputs with internal pull-up resistors
  pinMode(SW, INPUT_PULLUP);
  pinMode(DT, INPUT_PULLUP);
  pinMode(CLK, INPUT_PULLUP);

  // Initialize serial communication for debugging output
  Serial.begin(9600);

  // Indicate that the program has started
  Serial.println("Rotary Encoder with Space/W Output Started");

  Keyboard.begin();
  delay(1000);
}
```



```
void loop() {

  // Rotary Encoder Push Functionality (single W output for short press - constant W output for long press )

  // Read the current state of the CLK input of the Rotary Encoder (this is the button input)
  buttonState = digitalRead(CLK);

  // Check if the button was just pressed (transition from HIGH to LOW)
  if (buttonState == LOW && buttonStatePrevious == HIGH) {
    // Button is pressed, record the start time
    buttonPressStartTime = millis();
    buttonHeld = true; // Indicate that the button is now being held
    Serial.println("Button pressed");
  }

  // Check if the button is currently being held down
  if (buttonState == LOW && buttonHeld) {
    // Check if the button has been held for longer than the threshold
    if (millis() - buttonPressStartTime >= LONG_PRESS_THRESHOLD) {
      // Long press detected, continuously send 'w'
      Serial.println("Button held - continuously sending w");
      Keyboard.print("w");
    }
  }

  // Check if the button was just released (transition from LOW to HIGH)
  if (buttonState == HIGH && buttonStatePrevious == LOW) {
    // Button released after a short press (less than the threshold)
      if (!buttonHeld || (millis() - buttonPressStartTime < LONG_PRESS_THRESHOLD)) {
      Serial.println("Button released - short press - sending w");
      Keyboard.print("w");
    }
    buttonHeld = false; // Reset the held flag
  }

  // Update the previous button state for the next loop iteration
  buttonStatePrevious = buttonState;
```

```
// Rotary Encoder Rotation Functionality (A and D Keys)

  // Read the current state of the SW pin (this is one of the encoder's outputs)
  SWState = digitalRead(SW);

  // If the current state of SW is different from its last state, a pulse has occurred.
  // This indicates rotation.
  if (SWState != SWLastState) {
    // If the DT pin's state is different from the SW pin's state,
    // the encoder is rotating clockwise (CW).
    if (digitalRead(DT) != SWState) {
      counter++;          // Increment counter for CW rotation
      currentDir = "CW - Right"; // Set direction string
      Serial.print("Direction: ");
      Serial.println(currentDir);
        Keyboard.print("a"); // Send 'a' for rightward movement (corrected from original 'd')
    } else {
      // Otherwise, the encoder is rotating counter-clockwise (CCW).
      counter--;          // Decrement counter for CCW rotation
      currentDir = "CCW - Left"; // Set direction string
      Serial.print("Direction: ");
      Serial.println(currentDir);
        Keyboard.print("d"); // Send 'd' for leftward movement (corrected from original 'a')
    }
    Serial.print("Position: ");
    Serial.println(counter);
  }

  // Update the previous state of the SW pin with the current state for the next loop iteration.
  SWLastState = SWState;
}
```


Appendix F: Unity GameManager Script

Link to Google Drive with the other codes of the Unity program:
https://drive.google.com/drive/folders/1EMzuVqkWBh5nEFIRdJMghte6u0kma2M4?usp=share_link

```
using UnityEngine;
using UnityEngine.Video;
using UnityEngine.SceneManagement;
using System.Collections;
using System.Collections.Generic;
using UnityEngine.InputSystem;
using System;
using System.IO.Ports;

public class GameManager : MonoBehaviour
{
    public enum SceneType
    {
        Video,
        Interaction,
        Invalid
    }

    [System.Serializable]
    public class GameScene
    {
        public SceneType sceneType;
        public string sceneName;
        public VideoClip videoClip;
        public string interactionTrait;
    }

    public GameScene[] gameScenes;
    public string endScreenSceneName;
    public string startScreenSceneName;
    [HideInInspector] public List<string> collectedCharacterTraits = new List<string>();

    // These AudioSources should be COMPONENTS ON THE SAME GAMEOBJECT AS THIS GAMEMANAGER SCRIPT
    public AudioSource backgroundMusic;
    public AudioSource selectSound;
    public float musicFadeOutDuration = 1.0f;

    private VideoPlayer videoPlayer;
    private bool gameStarted = false;
    private int currentSceneIndex = 0;
    private bool isPlayingVideo = false;
    private bool sceneLoaded = false;
    private Coroutine videoCheckCoroutine;
    private string previousSceneName = "";

    public string portName = "/dev/cu.usbmodem21101"; // Ensure this is still correct
    public int baudRate = 9600;
```

```
 private SerialPort serialPort;
   private float leds = 0;


   void Awake()
   {
      // Enforce singleton pattern
      if (FindObjectsByType<GameManager>(FindObjectsSortMode.None).Length > 1)
      {
         Destroy(gameObject);
         return;
      }
      DontDestroyOnLoad(gameObject); // Make GameManager persistent

      // Get references to AudioSources (they should be on this GameObject)
       // This is safer than relying on Inspector assignment if they might be children or not
direct components
      // but for public variables assigned in Inspector, it's generally fine.
      // Still good practice to ensure they are assigned.
      if (backgroundMusic == null) backgroundMusic = GetComponent<AudioSource>();
      if (selectSound == null && GetComponents<AudioSource>().Length > 1)
      {
         // If more than one AudioSource, you might need to grab them by order or tag
        // For simplicity, assuming selectSound is the second AudioSource if backgroundMusic
is the first.
         // A more robust way might be two separate public AudioSource variables and assign.
         // For now, let's assume they are assigned in inspector directly.
      }
   }

   void Start()
   {
      try
      {
         serialPort = new SerialPort(portName, baudRate);
         serialPort.Open();
         Debug.Log("Serial port opened successfully on " + portName);
      }
      catch (Exception e)
      {
         Debug.LogError("Error opening serial port: " + e.Message);
      }

      gameStarted = false;
      currentSceneIndex = 0;
      isPlayingVideo = false;
      sceneLoaded = false;
      previousSceneName = "";
      SceneManager.sceneLoaded += OnSceneLoaded;

      // Ensure background music is playing from the start, as it's now persistent
      if (backgroundMusic != null && !backgroundMusic.isPlaying)
      {
         backgroundMusic.Play();
      }
   }
```



```
   void OnDestroy()
   {
      SceneManager.sceneLoaded -= OnSceneLoaded;
   }

   void Update()
   {
      if (!gameStarted && Keyboard.current.wKey.wasPressedThisFrame)
      {
         gameStarted = true;
         Debug.Log("Game Started!");

         // Check if selectSound is valid before playing
         if (selectSound != null)
         {
            selectSound.Play();
         }
         else
         {
            Debug.LogWarning("Select Sound AudioSource is not assigned or is null!");
         }

         StartCoroutine(StartGameWithFade());
      }

      if (sceneLoaded && previousSceneName != SceneManager.GetActiveScene().name)
      {
      Debug.Log("Scene Loaded in Update. SceneName: " + SceneManager.GetActiveScene().
name + ", isPlayingVideo: " + isPlayingVideo + ", currentSceneIndex: " + currentSceneIndex);
         previousSceneName = SceneManager.GetActiveScene().name;
      }

      if (Keyboard.current.rKey.wasPressedThisFrame)
      {
         ResetGameloop();
      }

      if (Keyboard.current.lKey.wasPressedThisFrame && currentSceneIndex == 0)
      {
         if (leds == 7)
         {
            serialPort.Write("0");
            Debug.Log("Sending '0' for test");
            leds = 0;
         }
         else
         {
            serialPort.Write("1");
            serialPort.Write("2");
            serialPort.Write("3");
            serialPort.Write("4");
            serialPort.Write("5");
            serialPort.Write("6");
            serialPort.Write("7");
            Debug.Log("Sending '1-7' for test");
            leds = 7;
```

```
        }
    }

}

IEnumerator StartGameWithFade()
{
    // Fade out background music before loading the first scene
  yield return StartCoroutine(FadeOutAudio(backgroundMusic, musicFadeOutDuration));
    LoadNextScene();
}

void LoadNextScene()
{
    sceneLoaded = false;
    Debug.Log("LoadNextScene called. currentSceneIndex: " + currentSceneIndex);

    if (currentSceneIndex >= gameScenes.Length)
    {
        LoadEndScreen();
        return;
    }

    try
    {
        switch (gameScenes[currentSceneIndex].sceneType)
        {
            case SceneType.Video:
                LoadVideoScene(currentSceneIndex);
                break;
            case SceneType.Interaction:
                LoadInteractionScene(currentSceneIndex);
                break;
            case SceneType.Invalid:
                Debug.LogError("Invalid Scene Type! Check the scene setup in the Inspector.
Scene Index: " + currentSceneIndex);
                LoadEndScreen();
                break;
            default:
                Debug.LogError("Unknown Scene Type! Check the scene setup in the Inspector.
Scene Index: " + currentSceneIndex);
                LoadEndScreen();
                break;
        }
    }
    catch (Exception e)
    {
        Debug.LogError("Exception in LoadNextScene: " + e.Message + ", Scene Index: " +
currentSceneIndex);
        LoadEndScreen();
    }
}

void LoadVideoScene(int index)
{
    if (index < gameScenes.Length && gameScenes[index].sceneType == SceneType.Video)
```



```
 Debug.Log("About to load video scene: " + gameScenes[index].sceneName);
        SceneManager.LoadScene(gameScenes[index].sceneName);
        isPlayingVideo = true;
        sceneLoaded = true;
         Debug.Log("Loading Video Scene: " + gameScenes[index].sceneName + ", index: " +
index);
    }
    else
    {
        Debug.LogError("Invalid scene index or scene type in LoadVideoScene.");
    }
}

void OnSceneLoaded(Scene scene, LoadSceneMode mode)
{
    // If we are currently playing a video and the loaded scene matches the expected video
scene
        if (isPlayingVideo && currentSceneIndex < gameScenes.Length && scene.name ==
gameScenes[currentSceneIndex].sceneName)
    {
        FindAndPlayVideo();
    }
    // If we loaded the start screen or end screen, ensure music state is correct
    else if (scene.name == startScreenSceneName)
    {
        if (backgroundMusic != null && !backgroundMusic.isPlaying)
        {
            backgroundMusic.volume = 1f; // Ensure volume is up for start screen
            backgroundMusic.Play();
        }
    }
    else if (scene.name == endScreenSceneName)
    {
        // Decide if you want music on end screen. If so, ensure it's playing.
        // If not, it would have been faded out/stopped before loading the end screen.
    }
    // For other scenes (like interaction scenes), the music should typically continue playing
    // unless explicitly stopped/faded out by the scene itself.
}

void FindAndPlayVideo()
{
    videoPlayer = FindFirstObjectByType<VideoPlayer>();
    if (videoPlayer != null)
    {
        Debug.Log("VideoPlayer found: " + videoPlayer.gameObject.name + " in scene: " +
SceneManager.GetActiveScene().name);

        if (videoPlayer.clip != gameScenes[currentSceneIndex].videoClip)
        {
            videoPlayer.clip = gameScenes[currentSceneIndex].videoClip;
            Debug.Log("Video clip changed to: " + gameScenes[currentSceneIndex].videoClip.
name);
        }

        if (!videoPlayer.isPlaying)
```

```
videoPlayer.Play();
            }

            videoPlayer.loopPointReached += OnVideoFinished;
            videoCheckCoroutine = StartCoroutine(CheckVideoPlayback());
        }
        else
        {
         Debug.LogError("VideoPlayer NOT found in scene: " + SceneManager.GetActiveScene().
name + ". Attempting to proceed.");
            isPlayingVideo = false; // Cannot play video if player not found
            LoadNextScene(); // Proceed to next scene
        }
    }

    IEnumerator CheckVideoPlayback()
    {
        yield return new WaitForSeconds(0.2f); // Small delay to allow video to start buffering/
playing

        if (videoPlayer != null && !videoPlayer.isPlaying && isPlayingVideo)
        {
         Debug.LogWarning("VideoPlayer is not playing after starting. Forcing VideoFinished.");
            StopVideoCheckCoroutine();
            VideoFinished();
        }
    }

void OnVideoFinished(VideoPlayer vp)
{
    if (vp != null)
    {
        vp.loopPointReached -= OnVideoFinished;
    }
    StopVideoCheckCoroutine();
    VideoFinished();
}

void StopVideoCheckCoroutine()
{
    if (videoCheckCoroutine != null)
    {
        StopCoroutine(videoCheckCoroutine);
        videoCheckCoroutine = null;
    }
}

void VideoFinished()
{
    isPlayingVideo = false;
    sceneLoaded = false;
    Debug.Log("Video Finished. currentSceneIndex: " + currentSceneIndex);
    currentSceneIndex++;
    LoadNextScene();
}
```



```
 void LoadInteractionScene(int index)
    {
            if (index < gameScenes.Length && gameScenes[index].sceneType == SceneType.
Interaction)
        {
            SceneManager.LoadScene(gameScenes[index].sceneName);
            isPlayingVideo = false;
            sceneLoaded = true;
           Debug.Log("Loading Interaction Scene: " + gameScenes[index].sceneName + ", index:
" + index);
        }
        else
        {
            Debug.LogError("Invalid scene index or scene type in LoadInteractionScene.");
        }
    }

    public void InteractionFinished(string trait)
    {
        sceneLoaded = false;
                Debug.Log("Interaction  Finished.  Trait:  "  +  trait  +  ",  currentSceneIndex:  "  +
currentSceneIndex);
        collectedCharacterTraits.Add(trait);
        LogCollectedTraits();
        currentSceneIndex++;
        leds++;
        if (leds == 1)
        {
            serialPort.Write("1");
            Debug.Log("Sending '1' for test");
        }
        else if (leds == 2)
        {
            serialPort.Write("2");
            Debug.Log("Sending '2' for test");
        }
        else if (leds == 3)
        {
            serialPort.Write("3");
            Debug.Log("Sending '3' for test");
        }
        else if (leds == 4)
        {
            serialPort.Write("4");
            Debug.Log("Sending '4' for test");
        }
        else if (leds == 5)
        {
            serialPort.Write("5");
            Debug.Log("Sending '5' for test");
        }
        else if (leds == 6)
        {
            serialPort.Write("6");
            Debug.Log("Sending '6' for test");
        }
```

```
LoadNextScene();
    }

    public void InteractionFinishedNoCharacterTrait()
    {
        sceneLoaded = false;
        LogCollectedTraits();
        currentSceneIndex++;
        LoadNextScene();
    }

    void LoadEndScreen()
    {
        leds++;
        if (leds == 7)
        {
            serialPort.Write("7");
            Debug.Log("Sending '7' for test");
        }
        SceneManager.LoadScene(endScreenSceneName);
        Debug.Log("End Screen Loaded");
    }

    public void ResetGameloop()
    {
        // Reset collected character traits
        collectedCharacterTraits.Clear();
        Debug.Log("Character traits reset.");

// Reset current scene index
currentSceneIndex = 0;
Debug.Log("Current scene index reset to 0.");

// Reset game started flag
gameStarted = false;
Debug.Log("Game started flag reset to false.");

// Reset is playing video flag
isPlayingVideo = false;
Debug.Log("Is playing video flag reset to false.");

// Reset scene loaded flag
sceneLoaded = false;
Debug.Log("Scene loaded flag reset to false.");

// Reset previous scene name
previousSceneName = "";
Debug.Log("Previous scene name reset.");

// If a video is currently playing, stop it and clear the reference
if (videoPlayer != null)
{
    videoPlayer.Stop();
    videoPlayer = null;
    Debug.Log("Video player stopped and reset.");
}
```



```
// Stop the video check coroutine if it's running
        if (videoCheckCoroutine != null)
        {
            StopCoroutine(videoCheckCoroutine);
            videoCheckCoroutine = null;
            Debug.Log("Video check coroutine stopped.");
        }

        leds = 0;
        serialPort.Write("0");
        Debug.Log("Sending '0' for test");

        // Music should start again from start screen
        // The OnSceneLoaded for startScreenSceneName will handle bringing it back.
        // We only stop and reset state here.
        if (backgroundMusic != null)
        {
            backgroundMusic.Stop(); // Stop playing while transitioning
            backgroundMusic.volume = 1f; // Reset volume for next time it plays
        }

        Debug.Log("GameManager fully reset.");
        SceneManager.LoadScene(startScreenSceneName);
        Debug.Log("Loading start screen: " + startScreenSceneName);
    }

    private void LogCollectedTraits()
    {
        if (collectedCharacterTraits.Count > 0)
        {
            Debug.Log("Collected Traits: " + string.Join(", ", collectedCharacterTraits.ToArray()));
        }
        else
        {
            Debug.Log("No traits collected yet.");
        }
}

IEnumerator FadeOutAudio(AudioSource audioSource, float duration)
{
    if (audioSource == null) // Add a null check
    {
        Debug.LogWarning("AudioSource for fade out is null.");
        yield break; // Exit coroutine if null
    }

    float startVolume = audioSource.volume;
    float time = 0;

    while (time < duration)
    {
        audioSource.volume = Mathf.Lerp(startVolume, 0f, time / duration);
        time += Time.deltaTime;
        yield return null;
    }
    audioSource.volume = 0f;
```

```
 audioSource.Stop();
   }

   void OnApplicationQuit()
   {
      // Close the serial port when the application quits
      if (serialPort != null && serialPort.IsOpen)
      {
         leds = 0;
         serialPort.Write("0");
         Debug.Log("Sending '0' for test");
         serialPort.Close();
         Debug.Log("Serial port closed.");
      }
   }

}
```


Appendix G: ERB User Research

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Ethical Review Form

(Version 2.2)

This Ethical Review Form should be completed for every research study that involves human participants or personally identifiable personal data and should be submitted to ethics@tue.nl. For more information about how this process works please click here. Please check if you are using the correct form: Ethical Review Form (version 2.2). Please click here to obtain this latest version.

Part 1: General Study Information

1	Project title / Study name	Positive Self-Esteem
2	Name of the researcher / student	Thijs Reijnders
3	Email of the researcher / student	t.j.e.reijnders@student.tue.nl
4	Supervisor(s) name(s) *Additional explanation: Please write down the name of your direct supervisor. You can mention several supervisors if appropriate, but at least one supervisor should be mentioned.*	Erik van der Spek
5	Supervisor(s) email address(es) *Additional explanation: Please give the email address of the supervisor(s) mentioned in question 4.*	e.d.v.d.spek@tue.nl
6	Department / Group *Additional explanation: Please specify group if relevant e.g. JADS or HTI*	Industrial Design - Games & Play Squad
7	What is the purpose of this application?	☐ Scientific study ☒ Bachelor education. Course: FBP ☐ Master education. Course:…… ☐ Other (e.g. external, following external regulations):……
8	Research location *Additional explanation: Where will the data collection take place? On campus, in a company, in public space, online, etc.*	☐ Eindhoven University of Technology campus ☒ Other, name organization(s): At my home ☐ Public space ☐ Online
9	Start date data collection *Additional explanation: Please state when your data collection will start. Please note that you do not have to provide information about your complete (PhD) project, but only on this particular sub-study that you are submitting for approval in this form.*	28/02/2025 **Why this timeframe:** This timeframe is taken since I will be doing multiple group sessions with different participants. These dates are being selected together with the participants and the sessions themselves will take around 20-30 min.
10	End date data collection	08/03/2025
11	Does your project receive external funding (e.g., NWO, relevant for special regulations from funders)?	☐ Yes. Name Funder: ☒ No
12	Which internal and external parties are involved in the study? Think about sharing data or information between TU/e and other universities, commercial companies, hospitals, etc. *Additional explanation: Describe all internal and external parties that are involved in the study or project, including:* • *researchers or research groups at the TU/e who participate in the study;* • *(Researchers at) other universities/institutions that provide data/services, help analyzing the data, etc.;*	Internal parties • Researcher(s): Thijs Reijnders (I am conducting the research to use it within my project) • Supervisor: Erik van der Spek (Is my coach for this project and will be told the results of the research in coach meetings)

1

	• *(commercial) partners, companies, government bodies, municipalities, consultancy firms, hospitals or care institutions that provide data (e.g., contact details of participants, data for further analysis).* *Indicate which role each party plays: who defines the means and purposes in the study, who will supply the data (external parties?), who will process/handle the data, who will be able to access the data during and after research (only researchers at TU/e or also others)?*	External parties: None • Other universities/institutions: • Others: ……
13	Have any special agreements already been made with an external party, such as a Non-Disclosure Agreement (NDA) or a data sharing agreement?	☐ Yes, namely: ☒ No
14	Has your proposal already been approved by an external Ethical Review Board or Medical Ethical Review Board? *Additional explanation: For example, when you are collaborating with another university and the project has been approved by their Ethical Review Board, or when you received a WMO-waiver from a Medical Ethical Review Board.*	☐ Yes ☒ No
15	If yes: Please provide the name, date of approval and contact details of the ERB. Please also include the registered number for your project approval. Additionally, please send in the Ethical Review Form upon which ethical approval was granted together with this form.	n.d.
16	If you process personal data that are likely to result in high privacy risks for participants, you need to perform a Data Protection Impact Assessment (DPIA). Have you done this for this or a very similar project? ***Please read the information below: a DPIA is not the same as a regular privacy impact assessment. More detailed questions on privacy will follow in the section below.*** *Additional explanation: A Data Protection Impact Assessment (DPIA) is a formal document that must be drafted under the guidelines of the General Data Protection Regulation (GDPR). Think of research with vulnerable people, high-risk medical research,* *The Dutch DPA (Autoriteit Persoonsgegevens) and our website provides more information about a DPIA.*	☒ Not applicable (no high privacy risks) ☐ Yes (the form is attached to the application) ☐ No
Part 2: Medical study		
1	Does the study have a medical scientific research question or claim? *Additional explanation: Medical/scientific research is research which is carried out with the aim of finding answers to a question in the field of illness and health (etiology, pathogenesis, signs/symptoms, diagnosis, prevention, outcome or treatment of illness), by systematically collecting and analyzing data. The research is carried out with the intention of contributing to medical knowledge which can also be applied to populations outside of the direct research population. If your research contains questions about health and health related parameters (such as well-being, vitality, feelings of anxiety or stress) but your research question is not primarily medical, then you can answer 'no' to this question.*	☐ Yes* ☒ No

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Ethical Review Form

Part 3: Use of (medical) devices in the study		
1	Does your research include a device? *Additional explanation: A device is a complete piece of physical hardware that is used to compute or support computer functions within a larger system. Devices can be divided into input-, output-, storage-, internet of things-, or mobile device.*	☐ Yes, not self-made ☐ Yes, self-made ☒ No
2	Please describe your device or link to an online description of the device	n.d.
3a	Will you use a device that is 'CE' certified for **unintended use** (meaning you will use existing CE certified devices for other things than they were originally intended for) or use a device that is not 'CE' certified? *Additional explanation: You can find more information about CE certification here*	☐ Yes ☐ No ☒ n.d. ☐
3b	If no: Please explain to what extent the device was assembled according to relevant standards and provide a risk assessment *Additional explanation: You can find more information about a risk assessment here*	
3c	If yes: Do you use a device or software that has a medical purpose such as diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease or injury?	☐ Yes, my device or software currently has a medical purpose ☐ Yes, my device or software could have a medical purpose in the near future ☐ No ☐ I'm not sure
Part 4: Information about the study		
1	What are your main research questions? *Additional explanation: You need to provide at least one clear research question.*	"Which characters, environments, and interactions do teenagers find most relatable in an interactive animated experience?"
2a	Please check the box that indicates the relevant study population *Additional explanation: Please select which persons are eligible for your study.*	☐ Students ☒ General healthy population ☐ General population with specific feature, e.g., pregnancy, specifically …… ☐ Patients, specifically …… ☐ Other, specifically ……
2b	Age category of participants	☐ Younger than 12 years of age ☒ Older than 11 and younger than 16 years of age ☒ 16 years or older
3	Description of the research method (select all that applies)	☐ (Semi-structured) interviews ☐ Surveys

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Ethical Review Form

	Additional explanation: Please specify your research method. Note that you need to provide information about the research method in an additional file that you attach to the ERB form. E.g., for interviews you provide the interview questions, for surveys you provide the survey questions, etc.	☒ Group workshops/roundtable discussios ☐ Diary studies ☐ Behavioral observations ☐ Building sensor data ☐ Wearable device (e.g. Fitbit watch, on-skin sensors) ☐ User testing ☐ Pilot study ☐ GPS tracking/location data ☐ Living Lab ☐ Other, namely .....
4	Description of the measurements and/or stimuli/treatments *Additional explanation: Think about your outcome measures and the variables you will be collecting and describe them in a way such that another person understands what the participant will experience. For example: Participants will perform task A and see pictures from database B, and we measure validated Scale 1.*	This user research aims to gather input on key aspects of the animation, including the main character, side characters, environments, and interactions. To do this, I designed a gamified explorative research method where participants express their opinions on different elements of the animation. Each participant will receive a base-plate, where they will collect tokens to build their story. These tokens are awarded based on their answers to specific questions. For example, one question asks: "Which animated main character do you relate to the most?" Participants will see several character cards and use their pawn (included with the base-plate) to rate each character as relatable, neutral, unrelatable, or childish. They will also explain their choices. After reviewing all the character cards, they will select the one they relate to most as their main character token, forming the beginning of their story. This process is repeated for each element of the research, such as environments, side characters, and interactions. With each question, participants earn more tokens until their base-plate is complete. As a thank-you for their help, they get to keep their base-plate. Throughout the research, I will carefully note their answers and ask for reasoning when needed. **What do I want to achieve with this research:** This research is explorative in nature and aims to help me make well-informed decisions about various elements of my animation. By gathering opinions on different aspects, such as characters, environments, and interactions, I can determine which elements resonate with the audience and which may not. For example, by evaluating character relatability, I can identify which traits, including factors like gender representation, ensure that the story feels inclusive and engaging for a broad audience. This research will provide valuable insights to guide the development of characters and settings that effectively connect with viewers.
5	Describe and justify the number of participants you need for this study. Also justify the number of observations you need, taking into account the risks and benefits. *Additional explanation: Think about if you need 3 or 30 participants for example, and why? Do they need to provide their input once, or several times, and why? If relevant, specify the duration of the study per participant and the compensation that is needed for the study.*	For this research I will aim for around 10-15 participants. The reasoning for this is that I want a diverse group of people to participate. So both younger teenagers and older teenagers, but also both genders. This is so that the animation and its elements will be relatable to most of the target group. Since they only have to give their answers to the questions once, it was important that I have a sufficient amount of answers (participants) to work with.

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Ethical Review Form

6	Explain why your research is societally important. What benefits and harm to society may result from the study? *Additional explanation: What benefit will the results of your study have to society in general?*	My project and thus my research is about teaching teenagers about their self-esteem and what causes them to have a negative self-image. With this research I hope to gather the necessary information to create an relatable animated story and with this improve the self-esteem of teenagers and learning them about what influences it.
7	Describe the way participants will be recruited *Additional explanation: How will you recruit participants for your study? For example, by using flyers, personal network, panels, etc.*	☐ Survey link posted online, e.g., social media platforms ☐ On campus flyers ☐ Personal network ☐ Via a company, namely …….. ☐ Via a hospital, namely …….. ☐ Via an organization …….. ☐ By a Consortium Partner, namely …….. ☒ Other, namely by asking in the friend groups of my brother and sister
8	Provide a brief statement of the risks you expect for the participants or others involved in the study and explain. Also take into consideration any personal data you may gather and associated privacy issues. *Additional explanation: Risks for the participants can be anything from risk of data breach to risk of safety or well-being (think about stress, extreme emotions, visual or auditory discomfort). Describe these possible risks and describe the way these risks are mitigated.*	No risks are expected, since the data collected is totally anonymous and contains no personal or medical data. Furthermore, all participants personally know me (since they are friends of my brother and sister) and the environment in which the research will be done (my home).

Part 5: Self-assessment checklist

		Yes	No
	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval		
1a	Does the study involve human material? (e.g., surgery waste material derived from non-commercial organizations such as hospitals)		x
1b	Will blood or other (bio)samples be obtained from participants? (e.g., hair, sweat, urine or other bodily fluids or secretions, also external imaging of the body)		x
2	Will the participants give their consent – on a voluntary basis – either digitally or on paper? Or have they given consent in the past for the purpose of education or for re-use in line with the current research question?	x	
3	Are the participants, outside the context of the research, in a dependent or subordinate position to the investigator? Additional explanation: Think about doing research on your own students or on your own employees. When there is a dependency or power imbalance between you and the research participants, you need to answer 'yes' to this question.		x
4	Does the study involve participants who are particularly vulnerable or unable to give informed consent? (e.g., children (<16 years of age), people with learning difficulties, patients, people receiving counselling, people living in care or nursing homes, people recruited through self-help groups)	x	
5	Will participating in the research be burdensome? (e.g., requiring participants to wear a device 24/7 for several weeks, to fill in questionnaires for hours, to travel long distances to a research location, to be interviewed multiple times)?		x
6	May the research procedure cause harm or discomfort to the participant in any way? (e.g., causing pain or more than mild discomfort, stress, anxiety or by administering drinks, foods, drugs, or showing explicit visual material)		x
7	Will financial inducement (other than reasonable expenses and compensation for time) be offered to participants? Additional explanation: For an explanation of what is considered a reasonable compensation, see the topic participant fees from the HTI group		x
8a	Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g., covert observation of people)		x
8b	If yes: Will you be observing people without their knowledge in public space? (e.g. on the street, at a bus-stop)		
9	Will the study involve actively deceiving the participants? (e.g., will participants be deliberately falsely informed, will information be withheld from them, or will they be misled in such a way that they are likely to object or show unease when debriefed about the study)		x
10	Will participants be asked to discuss or report sexual experiences, religion, alcohol or drug use, suicidal thoughts, or other topics that are highly personal or intimate? Additional explanation: Think about your research population. For some participants, particular topics can be considered sensitive or intimate, whereas the same topics will not be perceived as such by other participants.		x
11	Elaborate on all boxes answered outside of the blue boxes in part 5. Describe how you safeguard any potential risk for the research participant.	My participants will be between the ages of 12-18 since this is the target audience of my project. For this research I asked friends of both my sister (14 years old) and brother (17 years old) to participate. This means that they already know me and my project and furthermore are comfortable in the research space (our home) **Why did I choose my target audience:** With a rapidly changing world with a lot of digitalization, Social media has become a prominent factor in the lives of everyone, especially teenagers, having a negative effect on their self-esteem. [1] Research shows that people in their adolescence (teenage years) experience a decrease in self-esteem [2] and the importance of	

having a positive self-esteem for further personal development in later years [3]. This decrease in self-esteem has negative effects on their self-image on emotional, competence and physical levels. [4]

Furthermore it is important for a teenager to learn about self-esteem and how to positively work on it to prevent becoming depressed and having a bad self-esteem in the early stages of young adulthood [5]. So giving them a good foundation of knowledge and skills will help them in their young adulthood to keep developing their self-image in a positive way, since research suggests this is still a major thing to be developed at that age. [6]

[1] Ehmke, R. (2024, November 18). How using social media affects teenagers. Child Mind Institute. https://childmind.org/article/how-using-social-media-affects-teenagers/

[2] Chung, J. M., Hutteman, R., Aken, M. A. G. van, & Denissen, J. J. A. (2017, July 4). High, low, and in between: Self-esteem development from middle childhood to young adulthood. Journal of Research in Personality. https://www.sciencedirect.com/science/article/abs/pii/S0092656617300697

[3] Gruenenfelder-Steiger, A. E., Allemand, M., Robins, R., & Fend, H. (2014, February). Low and decreasing self-esteem during adolescence predict adult depression two decades later. Research Gate. https://www.researchgate.net/publication/259953878_Low_and_Decreasing_Self-Esteem_During_Adolescence_Predict_Adult_Depression_Two_Decades_Later

[4] Galletta, D., Califano, A., D'Amaro, M., & Celentano, S. (2020, July 2). Teenagers Today: The point about self-esteem. EBSCOhost. https://openurl.ebsco.com/EPDB%3Agcd%3A10%3A30089738/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Agcd%3A160386236&crl=c&link_origin=scholar.google.nl

[5] Masselink M, Van Roekel E, Oldehinkel AJ. Self-esteem in Early Adolescence as Predictor of Depressive Symptoms in Late Adolescence and Early Adulthood: The Mediating Role of Motivational and Social Factors. J Youth Adolesc. 2018 May;47(5):932-946. doi: 10.1007/s10964-017-0727-z. Epub 2017 Aug 7. PMID: 28785953; PMCID: PMC5878202.

[6] Erol RY, Orth U. Self-esteem development from age 14 to 30 years: a longitudinal study. J Pers Soc Psychol. 2011 Sep;101(3):607-19. doi: 10.1037/a0024299. PMID: 21728448.

Part 6: Self-assessment on privacy

The following questions (1-11) concern privacy issues, as laid down in the General Data Protection Regulation (GDPR). The Data Stewards and – if necessary – privacy team of TU/e will assess these questions. In some cases, more information is required to assess the privacy risks. If this is the case, you will be notified that the Data Stewards team will contact you.

The GDPR defines 'personal data' as any information relating to an identified or identifiable natural person ('data subject'). Personal data also includes data that indirectly reveals something about a natural person. Personal data can lead to the physical, physiological, genetic, mental, economic, cultural or social identity of a natural person. There are two main categories of personal data: regular personal data and special category personal data.

If you are not sure whether some of these questions below should be answered with a Yes or No, please contact a Data Steward first through rdmsupport@tue.nl.

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	Yes	No
1	Will the study involve discussion/collection/processing of **regular** personal data, or will you collect and (temporarily) store video or voice recordings for the purpose of conducting interviews? *Additional explanation: For example, name, address, phone number, email address, IP address, gender, age, video or interview recordings? If you are not sure whether your data contains personal data, please contact the Data Stewards Team (rdmsupport@tue.nl).*	x	
1A	If yes: Please describe which regular personal data you will collect in this study?	During the user research I will collect anonymous photo's to use in my final report. These photo's will only be made in the group of teenagers above the age of 16 and will be made without showing their faces.	
2	Will the study involve discussion/collection/processing of **special category** personal data or other **sensitive data**? *Additional explanation: Examples of special category personal data are race, religion, health information, political views, genetic or biometric data for the unique identification of a person, sexual preference, etc. Health information concerns personal data of the physical or mental health of persons, including the provision of health care. Examples of other sensitive data is information such as communication data, financial records or credit scores, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, criminal records, data of vulnerable persons (children, people with disabilities, refugees), BSN number etc. Please be aware that the use of special category personal data in research requires extra security measurements in order to safeguard the privacy of data subjects and to comply with the GDPR. Processing of this special category data is prohibited, except for specific purposes and under certain circumstances. If you need to process special category data, please consult the data stewards at rdmsupport@tue.nl.*		x
2A	If yes: Please describe which special-category personal data and/or sensitive data you will collect in this study?		

If you answered yes to either question 1 or 2, please answer the questions below. If you answered no to both questions, you can skip this part and continue onto part 7. Also, if an answer to any of the following questions is 'yes', please contact a Data Steward at rdmsupport@tue.nl

		Yes	No
3	Will your project involve the processing of personal data on a **large scale**? *Additional explanation: In general, any processing that involves more than 10.000 data subjects should be considered "large scale". However, if the data of approximately 1000 persons (or more) are involved, the data processing may still be considered large scale. In that case, besides the number of persons involved in the study, one should also assess (i) the amount of data collected from these persons taking into account the type/risk level of the personal data, (ii) the duration of the data processing, (iii) the geographic scope or extent of the processing. For example, if you would collect and process data across several European countries with 10+ socio-economic data items of 1200 individual persons for several years in a row, that is likely "large-scale processing". Other examples of a large-scale processing activity are:* • *Monitoring driving behavior of road users on Dutch highways* • *Collecting data of Covid patients* • *A hospital that processes patient data as part of its usual operations* • *A transport company that processes travel information of people who travel by public transport in a certain city. For example, by tracking them through travel maps.*		x
4	Does this processing activity involve the use of new or innovative technologies? ***Examples of a new technology: combining fingerprints and facial recognition for physical access control, the use of bodycams in public spaces, the use of new technical methods in conducting research such as AI. This question also refers to new technologies that have not been deployed by TU/e so far.***		x
5	Does your study involve systematic (c.q. automated) monitoring of persons? *Additional explanation: Consider data processing activities that have the purpose of observing, monitoring or controlling individuals, for example in circumstances where the individuals are not aware by whom their personal data is collected and how it is used. Examples of such activities are using camera systems to monitor driving behavior on highways, monitoring email inactivity or employee phone use, certain applications of machine learning and artificial intelligence.*		x
6	Does the study involve collaborations (with third parties) in which data are shared or exchanged in order to link or combine data? *Additional explanation: This may often apply in a collaboration between the university and a commercial party, contract research, etc. It is important to assess this for all data in the entire project, not just your own data. An important consideration in this situation is whether the person whose data is involved could have expected that data from these different databases or sources of information were to be combined. For example, it is less likely for data subjects to expect that databases from different parties will be combined and the results are used for different purposes than one could reasonably expect; this may apply for example in a collaboration between the university and a commercial party.*		x
7	Will the study include data processing activities that prevent data subjects from exercising their rights or using a service or contract? *Additional explanation: Examples include processing operations carried out in public places that people cannot avoid (train station, airport, shopping mall, public university premises, etc.) or processing operations whose purpose is to allow or not allow data subjects to use a service or enter into a contract (examples: by refusing to pay a benefit, not being able to apply for a loan, etc.).*		x
8	Will the study process personal data to score, rank or profile persons? *Additional explanation: Examples: monitoring (highway) roads to give road users a "score" based on their detected driving behavior, a bank assessing its customers based on their creditworthiness, or an organization building behavioral and marketing profiles based on use of their website or navigating their website.*		x
9	Does your data processing include activities that involves composing "**blacklists**" – and, in particular, in relation to sensitive or special category data, such as communication data, financial records or credit scores, genetic data, biometric data, health data, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, etc. *Additional explanation: This situation will not be a common occurrence in research, but you may indirectly be involved in this. In general, this typically concerns processing operations involving personal data relating to criminal convictions and offences, data relating to unlawful acts, data concerning unlawful or annoying behaviour or data concerning bad payment behaviour by companies or individuals are processed and shared with third parties (blacklists or warning lists, as used, for example, by insurers, hospitality companies shopping companies, telecom providers as well as blacklists relating to unlawful behavior of employees, for example in the healthcare sector or by employment agencies, etc.).*		x
10	Will personal data be transferred or shared outside the EU/EEA? EU data protection rules apply to the European Economic Area (EEA), which includes all EU countries and non-EU countries Iceland, Liechtenstein and Norway. *Additional explanation: The GDPR has drafted additional requirements for transfers data outside of the EU/EEA. Typically, additional safeguards must be implemented to protect the personal data of residents in the European Union. For example, if you collaborate with an American, Indian or Chinese university or other third party outside the EU/EEA, you must first check whether this is allowed and under which conditions this is allowed. Another typical example is storage of data on American providers of cloud (storage) services. Please contact the data stewards first to discuss this.*		x
11	Will any raw or anonymized personal data or any other sensitive data or research results from the project possibly be transferred to a high-risk country*? ***High risk countries: China, Russia, Iran, Turkey, and North Korea.*** ***If personal data or other potentially sensitive data is exchanged with one of these countries, or if part of the data processing takes place in one of these countries: an advice from the Data Protection Officer, the kennisveiligheidsteam (knowledge security team), and the CISO (Chief Information Security Officer) is ALWAYS required.***		x

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Part 7a: Processing of research data

1	Is consent your legal basis for processing the personal data in your study? *Additional explanation: What is a legal basis? One of main principles in the GDPR is to ensure that personal data is processed lawfully, fairly, and transparently. To comply with this principle, the processing of personal data also requires that you have a valid legal basis for the personal data processing activity.* *In research projects, the legal basis is often but not always consent. However, it is possible that it is not clear or not possible to establish whether to use consent as a legal basis.* *Some examples where consent may not be applicable as legal basis are covert research, data collection in public spaces, secondary data analysis of existing data, data that are transferred to you by a third party, consent is not possible or would require disproportionate effort, etc. In that case, please indicate which legal basis you think that applies or (preferably) contact a data steward first.*	☒ Yes and it will be obtained via an informed consent form ☐ No, I will use another legal basis to process the data. Namely, ……..
2	Where will the data come from?	☐ Data obtained from another party (secondary data use) ☒ New data collected only by my research team ☐ New data collected together with collaborators
3	Which of the following tools will you use to process personal data?	**Surveys** ☐ Qualtrics ☐ Limesurvey ☐ MS Forms ☐ Other, namely …….. **Interview/workshop recordings** ☐ Voice/video recorder ☐ Phone in a flight mode ☐ MS Teams ☐ Other, namely …….. **Transcription** ☐ Manual transcription ☒ Microsoft Office software (e.g. Word, Teams) ☐ Other, namely …….. **Statistical analysis** ☐ SPSS ☐ R ☐ Other, namely …….. **Other tools**, specifically……
4	Where will the data and in particular the personal data be stored during and after completion of the study? If you have already uploaded your Data Management Plan, you can refer to your Data Management Plan.	☒ Onedrive ☐ Research Drive ☐ Network Drive

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	Additional explanation: University supported-storage facilities are SURF Research Drive, Ceph, departmental drives (this includes BE Project Drive), and the TU/e instance of Microsoft OneDrive. For most personal data, the use of SURF Research Drive or departmental drives (including BE Project Drive) is required.	☐ Research Manager ☐ Other, namely ……

Part 7b: Safety and security measures

1	Will you pseudonymize/anonymize the data? *Additional explanation:* *Anonymization: remove all direct identifiers (name, address, telephone number etc.) but also indirect identifiers (age, place of birth, occupation, salary) that, linked with other information, can lead to a person's identification. Anonymization to the point that a data subject is no longer identifiable means that the anonymized data is not considered to be personal data anymore.* *Pseudonymization: replacing the unique identifier of a data subject with an artificial pseudonym. This means that identification is still possible with the identification key. The identification key needs to be stored securely and separately from the pseudonymized data. If the data subject can be identified by combining data with additional information, the data is also called pseudonymous.*	☒ Yes ☐ No If yes, describe how: no names will be collected. I will only use participant numbers without any names connected to them.
2	Is access to (personal) data restricted? (Select all that apply)	☐ No ☒ Yes, via access control ☐ Yes, via password protection ☐ Yes, access only given to TU/e research team ☐ Yes, access only given to research team, including non-TU/e collaborators ☐ Other, specify……
3	Who will have access to the data during and after completion of the project? (Select all that apply)	☒ Main researcher ☐ TU/e supervisor(s) ☐ External supervisors ☐ TU/e research team ☐ Other, specify……
4	Will you store data for future research?	☒ No ☐ Yes, in a public data repository ☐ Yes, in a public data repository under restricted access ☐ Yes, in a TU/e-recommended storage (SURF Research Drive, Network Drive)
5	Will you share data outside the TU/e?	☒ No ☐ Yes, in a fully anonymized form ☐ Yes, raw or pseudonymized data* *If you selected this box, make sure that a suitable data agreement is put in place. You can contact the Data Stewards for support in preparing such an agreement
6	How long will data be stored after the end of the project?	It will be removed at the end of the project.

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Part 8: Closures and Signatures

1	Enclosures (tick if applicable and attach to this form):	☒ Informed consent form ☐ Informed consent form for other agencies when the research is conducted at a location (such as a school) ☐ Text used for ads (to find participants) ☐ Text used for debriefings ☐ Approval other research ethics committee ☐ The survey the participants need to complete, or a description of other measurements ☐ Data Protection Impact Assessment checked by the privacy officer ☐ Data Management Plan checked by a data steward
2	Signature(s)	Signature(s) of applicant(s)  Date: 23/02/2025 Signature research supervisor  Date: 27/02/2025

To:
Thijs Reijnders

Cc:
Erik van der Spek

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Ethical Review Board TU/e

T +31 (0)40 247 6259
ethics@tue.nl

intranet.tue.nl/ethics

Date
February 28, 2025

Reference
ERB2025ID46

Ethical review research proposal

Dear Thijs,

It is a pleasure to inform you that the Ethical Review Board (ERB) has approved your application.

Furthermore, the Board wants to draw your attention to the terms and conditions in the appendix.

Good luck with your research!

Sincerely,

Dr. D. Lakens
Chair Ethical Review Board TU/e

Enclosures
1

Appendix H: ERB Interaction User Test

Date
February 28, 2025

TU/e

APPENDIX 1

Terms and conditions

Amendments
When considerable amendments are made to the design of the study or educational activity, or when the time period between ERB approval and start of the study is longer than one year, please consult the ERB.

Privacy and research data management
The ERB would like to point out that collecting, handling and storing personal information is subject to the General Data Protection Regulation. Please visit TU/e intranet for the latest information and regulations on
www.tue.nl/rdm

The ERB retains the right to revise its decision regarding the implementation and the WMO[1]/WMH[2] status of any research study in response to changing regulations, research activities, or other unforeseen circumstances that are relevant to reviewing any such study. The ERB shall notify the principal researcher of its revised decision and of the reasons for having revised its decision.

[1]WMO: Law on Medical Scientific Research involving Human Beings (in Dutch: Wet medisch-wetenschappelijk onderzoek met mensen)
[2]WMH: Medical Device Directive (in Dutch: Wet op de medische hulpmiddelen)

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Ethical Review Form
(Version2.3)

This Ethical Review Form should be completed for every research study that involves human participants or personally identifiable personal data and should be submitted to ethics@tue.nl. For more information about how this process works please click here. Please check if you are using the correct form: Ethical Review Form (version 2.2). Please click here to obtain this latest version.

Part 1: General Study Information

1	Project title / Study name	Positive Self-Esteem Interaction User Test
2	Name of the researcher / student	Thijs Reijnders
3	Email of the researcher / student	t.j.e.reijnders@student.tue.nl
4	Supervisor(s) name(s) *Additional explanation: Please write down the name of your direct supervisor. You can mention several supervisors if appropriate, but at least one supervisor should be mentioned.*	Erik van der Spek
5	Supervisor(s) email address(es) *Additional explanation: Please give the email address of the supervisor(s) mentioned in question 4.*	e.d.v.d.spek@tue.nl
6	Department / Group *Additional explanation: Please specify group if relevant e.g. JADS or HTI*	Industrial Design - Games & Play Squad
7	What is the purpose of this application?	☐ Scientific study ☒ Bachelor education. Course: FBP ☐ Master education. Course:…… ☐ Other (e.g. external, following external regulations):……
8	Research location *Additional explanation: Where will the data collection take place? On campus, in a company, in public space, online, etc.*	☒ Eindhoven University of Technology campus ☐ Other, name organization(s):…… ☐ Public space ☐ Online
9	Start date data collection *Additional explanation: Please state when your data collection will start.* ***Please note that the date has to be in the future. Forms with a date in the past will not be accepted.*** *Please note that you do not have to provide information about your complete (PhD) project, but only on this particular sub-study that you are submitting for approval in this form.*	15/05/2025
10	End date data collection	23/05/2025
11	Does your project receive external funding (e.g., NWO, relevant for special regulations from funders)?	☐ Yes. Name Funder: ☒ No

12	Which internal and external parties are involved in the study? Think about sharing data or information between TU/e and other universities, commercial companies, hospitals, etc. *Additional explanation: Describe all internal and external parties that are involved in the study or project, including:* • *researchers or research groups at the TU/e who participate in the study;* • *(Researchers at) other universities/institutions that provide data/services, help analyzing the data, etc.;*	Internal parties • Researcher(s): Thijs Reijnders (I am conducting the research to use it within my project) • Supervisor: Erik van der Spek (Is my coach for this project and will be told the results of the research in coach meetings)

	• *(commercial) partners, companies, government bodies, municipalities, consultancy firms, hospitals or care institutions that provide data (e.g., contact details of participants, data for further analysis).* *Indicate which role each party plays: who defines the means and purposes in the study, who will supply the data (external parties?), who will process/handle the data, who will be able to access the data during and after research (only researchers at TU/e or also others)?*	External parties: None • Other universities/institutions: • Others: ……
13	Have any special agreements already been made with an external party, such as a Non-Disclosure Agreement (NDA) or a data sharing agreement?	☐ Yes, namely: ☒ No
14	Has your proposal already been approved by an external Ethical Review Board or Medical Ethical Review Board? *Additional explanation: For example, when you are collaborating with another university and the project has been approved by their Ethical Review Board, or when you received a WMO-waiver from a Medical Ethical Review Board.*	☐ Yes ☒ No
15	If yes: Please provide the name, date of approval and contact details of the ERB. Please also include the registered number for your project approval. Additionally, please send in the Ethical Review Form upon which ethical approval was granted together with this form.	n.d.
16	If you process personal data that are likely to result in high privacy risks for participants, you need to perform a Data Protection Impact Assessment (DPIA). Have you done this for this or a very similar project? ***Please read the information below: a DPIA is not the same as a regular privacy impact assessment. More detailed questions on privacy will follow in the section below.*** *Additional explanation: A Data Protection Impact Assessment (DPIA) is a formal document that must be drafted under the guidelines of the General Data Protection Regulation (GDPR). Think of research with vulnerable people, high-risk medical research,* *The Dutch DPA (Autoriteit Persoonsgegevens) and our website provides more information about a DPIA.*	☒ Not applicable (no high privacy risks) ☐ Yes (the form is attached to the application) ☐ No
	Part 2: Medical study	
1	Does the study have a medical scientific research question or claim? *Additional explanation: Medical/scientific research is research which is carried out with the aim of finding answers to a question in the field of illness and health (etiology, pathogenesis, signs/symptoms, diagnosis, prevention, outcome or treatment of illness), by systematically collecting and analyzing data. The research is carried out with the intention of contributing to medical knowledge which can also be applied to populations outside of the direct research population. If your research contains questions about health and health related parameters (such as well-being, vitality, feelings of anxiety or stress) but your research question is not primarily medical, then you can answer 'no' to this question.*	☐ Yes* ☒ No

Part 3: Use of (medical) devices in the study		
1	Does your research include a device? *Additional explanation: A device is a complete piece of physical hardware that is used to compute or support computer functions within a larger system. Devices can be divided into input-, output-, storage-, internet of things-, or mobile device.*	☐ Yes, not self-made ☐ Yes, self-made ☒ No
2	Please describe your device or link to an online description of the device	
3a	Will you use a device that is 'CE' certified for **unintended use** (meaning you will use existing CE certified devices for other things than they were originally intended for) or use a device that is not 'CE' certified? *Additional explanation: You can find more information about CE certification here*	☐ Yes ☐ No ☒ N.d.
3b	Please explain to what extent the device was assembled according to relevant standards and provide a risk assessment *Additional explanation: You can find more information about a risk assessment here*	n.d.
3c	Do you use a device or software that has a medical purpose such as diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease or injury?	☐ Yes, my device or software currently has a medical purpose ☐ Yes, my device or software could have a medical purpose in the near future ☒ No ☐ I'm not sure
Part 4: Information about the study		
1	What are your main and applicable sub, research questions? *Additional explanation: You need to provide at least one clear research question.*	How do the participants experience the interactivity, usability, and enjoyability of the different iterations of interaction? Which interactions fits the digital part of the project the best?
2a	Please check the box that indicates the relevant study population *Additional explanation: Please select which persons are eligible for your study.*	☒ Students ☐ General healthy population ☐ General population with specific feature, e.g., pregnancy, specifically ..... ☐ Patients, specifically ..... ☐ Other, specifically .....
2b	Age category of participants	☐ Younger than 12 years of age ☐ Older than 12 years, younger than 16 years ☐ Older than 16 years, younger than 18 years ☒ 18 years or older
3	Description of the research method (select all that applies)	☒ (Semi-structured) interviews ☐ Surveys *If you tick one of the above, send the interview/survey questions with this form. Without them the form will not be accepted.*

	Additional explanation: Please specify your research method. Note that you need to provide information about the research method in an additional file that you attach to the ERB form. E.g., for interviews you provide the interview questions, for surveys you provide the survey questions, etc.	☐ Group workshops/roundtable discussios ☐ Diary studies ☐ Behavioral observations ☐ Building sensor data ☐ Wearable device (e.g. Fitbit watch, on-skin sensors) ☒ User testing ☐ Pilot study ☐ GPS tracking/location data ☐ Living Lab ☐ Other, namely .....
4	Description of the measurements and/or stimuli/treatments If needed you may elaborate *Additional explanation: Think about your outcome measures and the variables you will be collecting and describe them in a way such that another person understands what the participant will experience. For example: Participants will perform task A and see pictures from database B, and we measure validated Scale 1.*	In this quick and simple user test I want to see which type of input interaction would be best fitting and most interactive for my final design. I have three different interaction possibilities: - Three buttons - A joystick with a button - A rotary knob that also functions as a button Furthermore, I have created a simple prototype program in Adobe XD to function as the digital output. The interactions, so the buttons, etc., are not actually working. I am using the Wizard of Oz method to simulate the interactions working with the digital system. The user test itself will go as follows. I will ask the participant (a student from the TUe) to try out all three inputs and ask them what they think of them; whether they can rate them on a scale of 1 to 5 on a few elements; and ask which one they like best. This way I can make a substantiated choice for which input to use for my final design.
5a	What number of participants do you need for this study? *Additional explanation: Think about if you need 3 or 30 participants for example, and why? Do they need to provide their input once, or several times, and why? If relevant, specify the duration of the study per participant and the compensation that is needed for the study.*	I am aiming for 5 to 7 participants for my user test. This way I can gather a sufficient amount on input to make a substantiated choice for my project.
5b	Justify the number of observations you need, taking into account the risks and benefits. *Additional explanation: Think about if you need 3 or 30 participants for example, and why? Do they need to provide their input once, or several times, and why? If relevant, specify the duration of the study per participant and the compensation that is needed for the study.*	Same as the previous answer. I am aiming for 5 to 7 participants for my user test. This way I can gather a sufficient amount on input to make a substantiated choice for my project.
6	Explain why your research is societally important. What benefits and harm to society may result from the study? *Additional explanation: What benefit will the results of your study have to society in general?*	This research will help with choosing an interesting and innovative way of interacting with my project. My project is about teaching teenagers about their self-esteem and what causes them to have a negative self-image. Creating interesting and fun interactions will help with the effectiveness of the project.

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7	Describe the way participants will be recruited *Additional explanation: How will you recruit participants for your study? For example, by using flyers, personal network, panels, etc.*	☐ Survey link posted online, e.g., social media platforms ☐ On campus flyers ☐ Personal network ☐ Via a company, namely …… ☐ Via a hospital, namely …… ☐ Via an organization …… ☐ By a Consortium Partner, namely …… ☒ Other, namely via the Games & Play Squad
8	Provide a statement of the risks regarding data breach, safety or well-being (think about stress, extreme emotions, visual or auditory discomfort) that you expect for the participants or others involved in the study. Explain these possible risks and describe the way these risks are mitigated. Also take into consideration any personal data you may gather and associated privacy issues.	No risks are expected, since the data collected is totally anonymous and contains no personal or medical data. Furthermore, the interactions are all Wizard of Oz, meaning that they don't actually work, so there are no risks of electrical components causing harm to the participants.

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Part 5: Self-assessment checklist

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	Yes	No
1a	Does the study involve human material? (e.g., surgery waste material derived from non-commercial organizations such as hospitals)		x
1b	Will blood or other (bio)samples be obtained from participants? (e.g., hair, sweat, urine or other bodily fluids or secretions, also external imaging of the body)		x
2	Will the participants give their consent – on a voluntary basis – either digitally or on paper? Or have they given consent in the past for the purpose of education or for re-use in line with the current research question?	x	
3	Are the participants, outside the context of the research, in a dependent or subordinate position to the investigator? Additional explanation: Think about doing research on your own students or on your own employees. When there is a dependency or power imbalance between you and the research participants, you need to answer 'yes' to this question.		x
4	Does the study involve participants who are particularly vulnerable or unable to give informed consent? (e.g., children (<16 years of age), people with learning difficulties, patients, people receiving counselling, people living in care or nursing homes, people recruited through self-help groups)		x
5	Will participating in the research be burdensome? (e.g., requiring participants to wear a device 24/7 for several weeks, to fill in questionnaires for hours, to travel long distances to a research location, to be interviewed multiple times)?		x
6	May the research procedure cause harm or discomfort to the participant in any way? (e.g., causing pain or more than mild discomfort, stress, anxiety or by administering drinks, foods, drugs, or showing explicit visual material)		x
7	Will financial inducement (other than reasonable expenses and compensation for time) be offered to participants? Additional explanation: For an explanation of what is considered a reasonable compensation, see the topic participant fees from the HTI group		x
8a	Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g., covert observation of people)		x
8b	If yes: Will you be observing people without their knowledge in public space? (e.g. on the street, at a bus-stop)		
9	Will the study involve actively deceiving the participants? (e.g., will participants be deliberately falsely informed, will information be withheld from them, or will they be misled in such a way that they are likely to object or show unease when debriefed about the study)		x
10	Will participants be asked to discuss or report sexual experiences, religion, alcohol or drug use, suicidal thoughts, or other topics that are highly personal or intimate? Additional explanation: Think about your research population. For some participants, particular topics can be considered sensitive or intimate, whereas the same topics will not be perceived as such by other participants.		x
11	Elaborate on all boxes answered outside of the blue boxes in part 5.		

Part 6: Self-assessment on privacy

The following questions (1-11) concern privacy issues, as laid down in the General Data Protection Regulation (GDPR). The Data Stewards and – if necessary – privacy team of TU/e will assess these questions. In some cases, more information is required to assess the privacy risks. If this is the case, you will be notified that the Data Stewards team will contact you.

The GDPR defines 'personal data' as any information relating to an identified or identifiable natural person ('data subject'). Personal data also includes data that indirectly reveals something about a natural person. Personal data can lead to the physical, physiological, genetic, mental, economic, cultural or social identity of a natural person. There are two main categories of personal data: regular personal data and special category personal data.

If you are not sure whether some of these questions below should be answered with a Yes or No, please contact a Data Steward first through rdmsupport@tue.nl.

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	Yes	No
1	Will the study involve discussion/collection/processing of **regular** personal data, or will you collect and (temporarily) store video or voice recordings for the purpose of conducting interviews? *Additional explanation: For example, name, address, phone number, email address, IP address, gender, age, video or interview recordings? If you are not sure whether your data contains personal data, please contact the Data Stewards Team (rdmsupport@tue.nl).*		x
1A	**If yes**: Please describe which regular personal data you will collect in this study?		
2	Will the study involve discussion/collection/processing of **special category** personal data or other **sensitive data**? *Additional explanation: Examples of special category personal data are race, religion, health information, political views, genetic or biometric data for the unique identification of a person, sexual preference, etc. Health information concerns personal data of the physical or mental health of persons, including the provision of health care. Examples of other sensitive data is information such as communication data, financial records or credit scores, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, criminal records, data of vulnerable persons (children, people with disabilities, refugees), BSN number etc. Please be aware that the use of special category personal data in research requires extra security measurements in order to safeguard the privacy of data subjects and to comply with the GDPR. Processing of this special category data is prohibited, except for specific purposes and under certain circumstances. If you need to process special category data, please consult the data stewards at rdmsupport@tue.nl.*		x
2A	**If yes**: Please describe which special-category personal data and/or sensitive data you will collect in this study?		

If you answered yes to either question 1 or 2, please answer the questions below. If you answered no to both questions, you can skip this part and continue onto part 7. Also, if an answer to any of the following questions is 'yes', please contact a Data Steward at rdmsupport@tue.nl

		Yes	No
3	Will your project involve the processing of personal data on a **large scale**? *Additional explanation: In general, any processing that involves more than 10.000 data subjects should be considered "large scale". However, if the data of approximately 1000 persons (or more) are involved, the data processing may still be considered large scale. In that case, besides the number of persons involved in the study, one should also assess (i) the amount of data collected from these persons taking into account the type/risk level of the personal data, (ii) the duration of the data processing, (iii) the geographic scope or extent of the processing. For example, if you would collect and process data across several European countries with 10+ socio-economic data items of 1200 individual persons for several years in a row, that is likely "large-scale processing". Other examples of a large-scale processing activity are:* • *Monitoring driving behavior of road users on Dutch highways* • *Collecting data of Covid patients* • *A hospital that processes patient data as part of its usual operations*		x

	• *A transport company that processes travel information of people who travel by public transport in a certain city. For example, by tracking them through travel maps.*		
4	Does this processing activity involve the use of new or innovative technologies? ***Examples of a new technology: combining fingerprints and facial recognition for physical access control, the use of bodycams in public spaces, the use of new technical methods in conducting research such as AI. This question also refers to new technologies that have not been deployed by TU/e so far.***		x
5	Does your study involve systematic (c.q. automated) monitoring of persons? *Additional explanation: Consider data processing activities that have the purpose of observing, monitoring or controlling individuals, for example in circumstances where the individuals are not aware by whom their personal data is collected and how it is used. Examples of such activities are using camera systems to monitor driving behavior on highways, monitoring email inactivity or employee phone use, certain applications of machine learning and artificial intelligence.*		x
6	Does the study involve collaborations (with third parties) in which data are shared or exchanged in order to link or combine data? *Additional explanation: This may often apply in a collaboration between the university and a commercial party, contract research, etc. It is important to assess this for all data in the entire project, not just your own data. An important consideration in this situation is whether the person whose data is involved could have expected that data from these different databases or sources of information were to be combined. For example, it is less likely for data subjects to expect that databases from different parties will be combined and the results are used for different purposes than one could reasonably expect; this may apply for example in a collaboration between the university and a commercial party.*		x
7	Will the study include data processing activities that prevent data subjects from exercising their rights or using a service or contract? *Additional explanation: Examples include processing operations carried out in public places that people cannot avoid (train station, airport, shopping mall, public university premises, etc.) or processing operations whose purpose is to allow or not allow data subjects to use a service or enter into a contract (examples: by refusing to pay a benefit, not being able to apply for a loan, etc.).*		x
8	Will the study process personal data to score, rank or profile persons? *Additional explanation: Examples: monitoring (highway) roads to give road users a "score" based on their detected driving behavior, a bank assessing its customers based on their creditworthiness, or an organization building behavioral and marketing profiles based on use of their website or navigating their website.*		x
9	Does your data processing include activities that involves composing "**blacklists**" – and, in particular, in relation to sensitive or special category data, such as communication data, financial records or credit scores, genetic data, biometric data, health data, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, etc. *Additional explanation: This situation will not be a common occurrence in research, but you may indirectly be involved in this. In general, this typically concerns processing operations involving personal data relating to criminal convictions and offences, data relating to unlawful acts, data concerning unlawful or annoying behaviour or data concerning bad payment behaviour by companies or individuals are processed and shared with third parties (blacklists or warning lists, as used, for example, by insurers, hospitality companies shopping companies, telecom providers as well as blacklists relating to unlawful behavior of employees, for example in the healthcare sector or by employment agencies, etc.).*		x
10	Will personal data be transferred or shared outside the EU/EEA? EU data protection rules apply to the European Economic Area (EEA), which includes all EU countries and non-EU countries Iceland, Liechtenstein and Norway. *Additional explanation: The GDPR has drafted additional requirements for transfers data outside of the EU/EEA. Typically, additional safeguards must be implemented to protect the personal data of residents in the European Union. For example, if you collaborate with an American, Indian or Chinese university or other third party outside the EU/EEA, you must first check whether this is allowed and under which conditions this is allowed. Another typical example is storage of data on American providers of cloud (storage) services. Please contact the data stewards first to discuss this.*		x
11	Will any raw or anonymized personal data or any other sensitive data or research results from the project possibly be transferred to a high-risk country*? ***High risk countries: China, Russia, Iran, Turkey, and North Korea.*** ***If personal data or other potentially sensitive data is exchanged with one of these countries, or if part of the data processing takes place in one of these countries: an advice from the Data Protection Officer, the kennisveiligheidsteam (knowledge security team), and the CISO (Chief Information Security Officer) is ALWAYS required.***		x

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Part 7a: Processing of research data		
1	Is consent your legal basis for processing the personal data in your study? *Additional explanation: What is a legal basis? One of main principles in the GDPR is to ensure that personal data is processed lawfully, fairly, and transparently. To comply with this principle, the processing of personal data also requires that you have a valid legal basis for the personal data processing activity.* *In research projects, the legal basis is often but not always consent. However, it is possible that it is not clear or not possible to establish whether to use consent as a legal basis.* *Some examples where consent may not be applicable as legal basis are covert research, data collection in public spaces, secondary data analysis of existing data, data that are transferred to you by a third party, consent is not possible or would require disproportionate effort, etc. In that case, please indicate which legal basis you think that applies or (preferably) contact a data steward first.*	☒ Yes and it will be obtained via an informed consent form. ☐ No, I will use another legal basis to process the data. Namely, ……
2	Where will the data come from?	☐ Data obtained from another party (secondary data use) ☒ New data collected only by my research team ☐ New data collected together with collaborators
3	Which of the following tools will you use to process personal data?	**Surveys** ☐ Qualtrics ☐ Limesurvey ☐ MS Forms ☐ Other, namely …… **Interview/workshop recordings** ☐ Voice/video recorder ☐ Phone in a flight mode ☐ MS Teams ☐ Other, namely …… **Transcription** ☐ Manual transcription ☒ Microsoft Office software (e.g. Word, Teams) ☐ Other, namely …… **Statistical analysis** ☐ SPSS ☐ R ☐ Other, namely …… **Other tools**, specifically……
4	Where will the data and in particular the personal data be stored during and after completion of the study? If you have already uploaded your Data Management Plan, you can refer to your Data Management Plan.	☒ Onedrive ☐ Research Drive ☐ Network Drive

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	Additional explanation: University supported-storage facilities are SURF Research Drive, Ceph, departmental drives (this includes BE Project Drive), and the TU/e instance of Microsoft OneDrive. For most personal data, the use of SURF Research Drive or departmental drives (including BE Project Drive) is required.	☐ Research Manager ☐ Other, namely ……
Part 7b: Safety and security measures		
1	Will you pseudonymize/anonymize the data? *Additional explanation:* *Anonymization: remove all direct identifiers (name, address, telephone number etc.) but also indirect identifiers (age, place of birth, occupation, salary) that, linked with other information, can lead to a person's identification. Anonymization to the point that a data subject is no longer identifiable means that the anonymized data is not considered to be personal data anymore.* *Pseudonymization: replacing the unique identifier of a data subject with an artificial pseudonym. This means that identification is still possible with the identification key. The identification key needs to be stored securely and separately from the pseudonymized data. If the data subject can be identified by combining data with additional information, the data is also called pseudonymous.*	☐ ☐ No ☒ Yes: If yes, describe how: no names will be collected. I will only use participant numbers without any names connected to them.
2	Is access to (personal) data restricted? (Select all that apply)	☐ No ☒ Yes, via access control ☐ Yes, via password protection ☐ Yes, access only given to TU/e research team ☐ Yes, access only given to research team, including non-TU/e collaborators ☐ Other, specify……
3	Who will have access to the data during and after completion of the project? (Select all that apply)	☒ Main researcher ☐ TU/e supervisor(s) ☐ External supervisors ☐ TU/e research team ☐ Other, specify……
4	Will you store data for future research?	☒ No ☐ Yes, in a public data repository ☐ Yes, in a public data repository under restricted access ☐ Yes, in a TU/e-recommended storage (SURF Research Drive, Network Drive)
5	Will you share data outside the TU/e?	☒ No ☐ Yes, in a fully anonymized form ☐ Yes, raw or pseudonymized data* *If you selected this box, make sure that a suitable data agreement is put in place. You can contact the Data Stewards for support in preparing such an agreement
6	How long will data be stored after the end of the project?	It will be removed at the end of the project.

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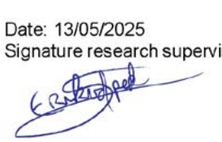
Part 8: Closures and Signatures

1	Enclosures (tick if applicable **and attach to this form**):	☒ Informed consent form ☐ Informed consent form for other agencies when the research is conducted at a location (such as a school) ☐ Text used for ads (to find participants) ☐ Text used for debriefings ☐ Approval other research ethics committee ☐ The survey the participants need to complete, or a description of other measurements ☐ Data Protection Impact Assessment checked by the privacy officer ☐ Data Management Plan checked by a data steward
2	Signature(s)	Date: 08/05/2025 Signature(s) of applicant(s):  Date: 13/05/2025 Signature research supervisor:  *Without both signatures we won't accept the form.*

Reijnders, Thijs

From: Mulder, Maartje on behalf of Ethics
Sent: Wednesday, 14 May 2025 16:19
To: Reijnders, Thijs
Cc: Spek, Erik van der
Subject: RE: ERB Form Interaction Research (Fast Track) FBP Thijs Reijnders

Dear Thijs,

Your application (ERB2025ID273) has been approved by the ERB.

We assume that you have answered all questions correctly. We will perform regular spot-checks so you need to keep your documentation (ERB form, informed consent forms, surveys/interview questions, description of experiment/prototype etc.) available for at least 6 months.

Good luck with your research and have a nice day!

With kind regards,
Maartje Mulder

TU/e

040-2475032
Secretary Integrity and Ethics Office
Secretary BoE EngD

From: Reijnders, Thijs <t.j.e.reijnders@student.tue.nl>
Sent: woensdag 14 mei 2025 12:00
To: Ethics <Ethics@tue.nl>
Subject: ERB Form Interaction Research (Fast Track) FBP Thijs Reijnders

Dear sir/madam,

I hope this email finds you well.
I am currently working on my Final Bachelor Project (FBP) in the Games & Play squad at Industrial Design. My project focuses on self-esteem, and I am developing an interactive animated experience.

To ensure an interactive experience I want to test several interaction possibilities for my final design with a simple and quick user test. This will help me to make a substantiated choice for the final product.

I have completed the ERB form and prepared the consent form. Along with an explanation of my user research approach, I am submitting these documents for evaluation.

Please let me know if everything is in order or if any additional information is needed. I appreciate your time in reviewing my research and look forward to your response.
Thank you in advance for your consideration.

Kind regards,
Thijs Reijnders
1699237
Industrial Design - Games & Play Squad

Appendix I: ERB Expert Interview

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Ethical Review Form

(Version2.3)

This Ethical Review Form should be completed for every research study that involves human participants or personally identifiable personal data and should be submitted to ethics@tue.nl. For more information about how this process works please click here. Please check if you are using the correct form: Ethical Review Form (version 2.2). Please click here to obtain this latest version.

Part 1: General Study Information		
1	Project title / Study name	Expert Interview
2	Name of the researcher / student	Thijs Reijnders
3	Email of the researcher / student	t.j.e.reijnders@student.tue.nl
4	Supervisor(s) name(s) *Additional explanation: Please write down the name of your direct supervisor. You can mention several supervisors if appropriate, but at least one supervisor should be mentioned.*	Erik van der Spek
5	Supervisor(s) email address(es) *Additional explanation: Please give the email address of the supervisor(s) mentioned in question 4.*	e.d.v.d.spek@tue.nl
6	Department / Group *Additional explanation: Please specify group if relevant e.g. JADS or HTI*	Industrial Design – Games & Play squad
7	What is the purpose of this application?	☐ Scientific study ☒ Bachelor education. Course:…… ☐ Master education. Course:…… ☐ Other (e.g. external, following external regulations):……
8	Research location *Additional explanation: Where will the data collection take place? On campus, in a company, in public space, online, etc.*	☐ Eindhoven University of Technology campus ☒ Other, name organization(s): At home ☐ Public space ☐ Online
9	Start date data collection *Additional explanation: Please state when your data collection will start.* ***Please note that the date has to be in the future. Forms with a date in the past will not be accepted.*** *Please note that you do not have to provide information about your complete (PhD) project, but only on this particular sub-study that you are submitting for approval in this form.*	09/06/2025
10	End date data collection	11/06/2025
11	Does your project receive external funding (e.g., NWO, relevant for special regulations from funders)?	☐ Yes. Name Funder: ☒ No

12	Which internal and external parties are involved in the study? Think about sharing data or information between TU/e and other universities, commercial companies, hospitals, etc. *Additional explanation: Describe all internal and external parties that are involved in the study or project, including:* • *researchers or research groups at the TU/e who participate in the study;* • *(Researchers at) other universities/institutions that provide data/services, help analyzing the data, etc.;*	Internal parties • Researcher(s): Thijs Reijnders (I am conducting the research to use it within my project) • Supervisor: Erik van der Spek (Is my coach for this project and will be told the results of the research in coach meetings)

	• *(commercial) partners, companies, government bodies, municipalities, consultancy firms, hospitals or care institutions that provide data (e.g., contact details of participants, data for further analysis).* *Indicate which role each party plays: who defines the means and purposes in the study, who will supply the data (external parties?), who will process/handle the data, who will be able to access the data during and after research (only researchers at TU/e or also others)?*	External parties • Other universities/institutions: • Others: ……
13	Have any special agreements already been made with an external party, such as a Non-Disclosure Agreement (NDA) or a data sharing agreement?	☐ Yes, namely: ☒ No
14	Has your proposal already been approved by an external Ethical Review Board or Medical Ethical Review Board? *Additional explanation: For example, when you are collaborating with another university and the project has been approved by their Ethical Review Board, or when you received a WMO-waiver from a Medical Ethical Review Board.*	☐ Yes ☒ No
15	If yes: Please provide the name, date of approval and contact details of the ERB. Please also include the registered number for your project approval. Additionally, please send in the Ethical Review Form upon which ethical approval was granted together with this form.	
16	If you process personal data that are likely to result in high privacy risks for participants, you need to perform a Data Protection Impact Assessment (DPIA). Have you done this for this or a very similar project? ***Please read the information below: a DPIA is not the same as a regular privacy impact assessment. More detailed questions on privacy will follow in the section below.*** *Additional explanation: A Data Protection Impact Assessment (DPIA) is a formal document that must be drafted under the guidelines of the General Data Protection Regulation (GDPR). Think of research with vulnerable people, high-risk medical research,* *The Dutch DPA (Autoriteit Persoonsgegevens) and our website provides more information about a DPIA.*	☒ Not applicable (no high privacy risks) ☐ Yes (the form is attached to the application) ☐ No
Part 2: Medical study		
1	Does the study have a medical scientific research question or claim? *Additional explanation: Medical/scientific research is research which is carried out with the aim of finding answers to a question in the field of illness and health (etiology, pathogenesis, signs/symptoms, diagnosis, prevention, outcome or treatment of illness), by systematically collecting and analyzing data. The research is carried out with the intention of contributing to medical knowledge which can also be applied to populations outside of the direct research population. If your research contains questions about health and health related parameters (such as well-being, vitality, feelings of anxiety or stress) but your research question is not primarily medical, then you can answer 'no' to this question.*	☐ Yes* ☒ No *If yes or in doubt, please contact Susan Hommerson via rdmsupport@tue.nl

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Part 3: Use of (medical) devices in the study		
1	Does your research include a device? *Additional explanation: A device is a complete piece of physical hardware that is used to compute or support computer functions within a larger system. Devices can be divided into input-, output-, storage-, internet of things-, or mobile device.*	☐ Yes, not self-made ☐ Yes, self-made ☒ No
2	Please describe your device or link to an online description of the device	n.d.
3a	Will you use a device that is 'CE' certified for **unintended use** (meaning you will use existing CE certified devices for other things than they were originally intended for) or use a device that is not 'CE' certified? *Additional explanation: You can find more information about CE certification here*	☐ Yes ☒ No
3b	Please explain to what extent the device was assembled according to relevant standards and provide a risk assessment *Additional explanation: You can find more information about a risk assessment here*	n.d.
3c	Do you use a device or software that has a medical purpose such as diagnosis, prevention, monitoring, prediction, prognosis, treatment or alleviation of disease or injury?	☐ Yes, my device or software currently has a medical purpose ☐ Yes, my device or software could have a medical purpose in the near future ☒ No ☐ I'm not sure
Part 4: Information about the study		
1	What are your main and applicable sub, research questions? *Additional explanation: You need to provide at least one clear research question.*	How can existing methods for helping the youth with their self-esteem be correctly implemented in an interactive narrative?
2a	Please check the box that indicates the relevant study population *Additional explanation: Please select which persons are eligible for your study.*	☐ Students ☒ General healthy population ☐ General population with specific feature, e.g., pregnancy, specifically …… ☐ Patients, specifically …… ☐ Other, specifically ……
2b	Age category of participants	☐ Younger than 12 years of age ☐ Older than 12 years, younger than 16 years ☐ Older than 16 years, younger than 18 years ☒ 18 years or older
3	Description of the research method (select all that applies)	☒ (Semi-structured) interviews ☐ Surveys *If you tick one of the above, send the interview/survey questions with this form. Without them the form will not be accepted.*

Ethical Review Form

	Additional explanation: Please specify your research method. Note that you need to provide information about the research method in an additional file that you attach to the ERB form. E.g., for interviews you provide the interview questions, for surveys you provide the survey questions, etc.	☐ Group workshops/roundtable discussios ☐ Diary studies ☐ Behavioral observations ☐ Building sensor data ☐ Wearable device (e.g. Fitbit watch, on-skin sensors) ☐ User testing ☐ Pilot study ☐ GPS tracking/location data ☐ Living Lab ☐ Other, namely .....
4	Description of the measurements and/or stimuli/treatments If needed you may elaborate *Additional explanation: Think about your outcome measures and the variables you will be collecting and describe them in a way such that another person understands what the participant will experience. For example: Participants will perform task A and see pictures from database B, and we measure validated Scale 1.*	This expert interview draws on expert input already gathered through initial exploratory interviews to better understand the topic and inform the development of the final project focus. Based on insights from these preliminary discussions, one final, formal expert interview will be conducted. This interview is designed to serve as a substantiated reference point for the key claims made in my report. The data collected will consist of a transcript of this interview, which will be used to support the study's conclusions.
5a	What number of participants do you need for this study? *Additional explanation: Think about if you need 3 or 30 participants for example, and why? Do they need to provide their input once, or several times, and why? If relevant, specify the duration of the study per participant and the compensation that is needed for the study.*	1 expert to validate claims made in the project.
5b	Justify the number of observations you need, taking into account the risks and benefits. *Additional explanation: Think about if you need 3 or 30 participants for example, and why? Do they need to provide their input once, or several times, and why? If relevant, specify the duration of the study per participant and the compensation that is needed for the study.*	1 expert to validate claims made in the project.
6	Explain why your research is societally important. What benefits and harm to society may result from the study? *Additional explanation: What benefit will the results of your study have to society in general?*	My project is about teaching teenagers about their self-esteem and what causes them to have a negative self-image and how they can build a more positive self-esteem.. With this interview hope to formally gather the necessary information to substantiate the choices made in the project and provide formal reference to the expert I have worked together with.
7	Describe the way participants will be recruited *Additional explanation: How will you recruit participants for your study? For example, by using flyers, personal network, panels, etc.*	☐ Survey link posted online, e.g., social media platforms ☐ On campus flyers ☒ Personal network ☐ Via a company, namely ..... ☐ Via a hospital, namely ..... ☐ Via an organization ..... ☐ By a Consortium Partner, namely ..... ☐ Other, namely .....

Ethical Review Form

8	Provide a statement of the risks regarding data breach, safety or well-being (think about stress, extreme emotions, visual or auditory discomfort) that you expect for the participants or others involved in the study. Explain these possible risks and describe the way these risks are mitigated. Also take into consideration any personal data you may gather and associated privacy issues.	No significant risks are anticipated for participants, as the data collected contains only their name and job title. Furthermore the images made during the interview will be taken without showing the face of the participant. The interview will focus solely on professional practices, existing therapeutic methods, and general perspectives on therapy provision — topics that are already publicly or professionally accessible. As such, the discussion is unlikely to cause distress or disclose confidential information

Part 5: Self-assessment checklist

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	Yes	No
1a	Does the study involve human material? (e.g., surgery waste material derived from non-commercial organizations such as hospitals)		x
1b	Will blood or other (bio)samples be obtained from participants? (e.g., hair, sweat, urine or other bodily fluids or secretions, also external imaging of the body)		x
2	Will the participants give their consent – on a voluntary basis – either digitally or on paper? Or have they given consent in the past for the purpose of education or for re-use in line with the current research question?	x	
3	Are the participants, outside the context of the research, in a dependent or subordinate position to the investigator? Additional explanation: Think about doing research on your own students or on your own employees. When there is a dependency or power imbalance between you and the research participants, you need to answer 'yes' to this question.		x
4	Does the study involve participants who are particularly vulnerable or unable to give informed consent? (e.g., children (<16 years of age), people with learning difficulties, patients, people receiving counselling, people living in care or nursing homes, people recruited through self-help groups)		x
5	Will participating in the research be burdensome? (e.g., requiring participants to wear a device 24/7 for several weeks, to fill in questionnaires for hours, to travel long distances to a research location, to be interviewed multiple times)?		x
6	May the research procedure cause harm or discomfort to the participant in any way? (e.g., causing pain or more than mild discomfort, stress, anxiety or by administering drinks, foods, drugs, or showing explicit visual material)		x
7	Will financial inducement (other than reasonable expenses and compensation for time) be offered to participants? Additional explanation: For an explanation of what is considered a reasonable compensation, see the topic participant fees from the HTI group		x
8a	Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (e.g., covert observation of people)		x
8b	If yes: Will you be observing people without their knowledge in public space? (e.g. on the street, at a bus-stop)		x
9	Will the study involve actively deceiving the participants? (e.g., will participants be deliberately falsely informed, will information be withheld from them, or will they be misled in such a way that they are likely to object or show unease when debriefed about the study)		x
10	Will participants be asked to discuss or report sexual experiences, religion, alcohol or drug use, suicidal thoughts, or other topics that are highly personal or intimate? Additional explanation: Think about your research population. For some participants, particular topics can be considered sensitive or intimate, whereas the same topics will not be perceived as such by other participants.		x
11	Elaborate on all boxes answered outside of the blue boxes in part 5.		

Part 6: Self-assessment on privacy

The following questions (1-11) concern privacy issues, as laid down in the General Data Protection Regulation (GDPR). The Data Stewards and – if necessary – privacy team of TU/e will assess these questions. In some cases, more information is required to assess the privacy risks. If this is the case, you will be notified that the Data Stewards team will contact you.

The GDPR defines 'personal data' as any information relating to an identified or identifiable natural person ('data subject'). Personal data also includes data that indirectly reveals something about a natural person. Personal data can lead to the physical, physiological, genetic, mental, economic, cultural or social identity of a natural person. There are two main categories of personal data: regular personal data and special category personal data.

If you are not sure whether some of these questions below should be answered with a Yes or No, please contact a Data Steward first through rdmsupport@tue.nl.

	Note: answers in the blue boxes indicate that your research is eligible for fast-track approval	Yes	No
1	Will the study involve discussion/collection/processing of **regular** personal data, or will you collect and (temporarily) store video or voice recordings for the purpose of conducting interviews? *Additional explanation: For example, name, address, phone number, email address, IP address, gender, age, video or interview recordings? If you are not sure whether your data contains personal data, please contact the Data Stewards Team (rdmsupport@tue.nl).*	X	
1A	**If yes**: Please describe which regular personal data you will collect in this study?	Name, Job Title, Images (without face) made during the interview	
2	Will the study involve discussion/collection/processing of **special category** personal data or other **sensitive data**? *Additional explanation: Examples of special category personal data are race, religion, health information, political views, genetic or biometric data for the unique identification of a person, sexual preference, etc. Health information concerns personal data of the physical or mental health of persons, including the provision of health care. Examples of other sensitive data is information such as communication data, financial records or credit scores, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, criminal records, data of vulnerable persons (children, people with disabilities, refugees), BSN number etc. Please be aware that the use of special category personal data in research requires extra security measurements in order to safeguard the privacy of data subjects and to comply with the GDPR. Processing of this special category data is prohibited, except for specific purposes and under certain circumstances. If you need to process special category data, please consult the data stewards at rdmsupport@tue.nl.*		X
2A	**If yes**: Please describe which special-category personal data and/or sensitive data you will collect in this study?		

If you answered yes to either question 1 or 2, please answer the questions below. If you answered no to both questions, you can skip this part and continue onto part 7. Also, if an answer to any of the following questions is 'yes', please contact a Data Steward at rdmsupport@tue.nl

		Yes	No
3	Will your project involve the processing of personal data on a **large scale**? *Additional explanation: In general, any processing that involves more than 10.000 data subjects should be considered "large scale". However, if the data of approximately 1000 persons (or more) are involved, the data processing may still be considered large scale. In that case, besides the number of persons involved in the study, one should also assess (i) the amount of data collected from these persons taking into account the type/risk level of the personal data, (ii) the duration of the data processing, (iii) the geographic scope or extent of the processing. For example, if you would collect and process data across several European countries with 10+ socio-economic data items of 1200 individual persons for several years in a row, that is likely "large-scale processing". Other examples of a large-scale processing activity are:* • *Monitoring driving behavior of road users on Dutch highways* • *Collecting data of Covid patients* • *A hospital that processes patient data as part of its usual operations*		X

	• *A transport company that processes travel information of people who travel by public transport in a certain city. For example, by tracking them through travel maps.*		
4	Does this processing activity involve the use of new or innovative technologies? ***Examples of a new technology: combining fingerprints and facial recognition for physical access control, the use of bodycams in public spaces, the use of new technical methods in conducting research such as AI. This question also refers to new technologies that have not been deployed by TU/e so far.***		X
5	Does your study involve systematic (c.q. automated) monitoring of persons? *Additional explanation: Consider data processing activities that have the purpose of observing, monitoring or controlling individuals, for example in circumstances where the individuals are not aware by whom their personal data is collected and how it is used. Examples of such activities are using camera systems to monitor driving behavior on highways, monitoring email inactivity or employee phone use, certain applications of machine learning and artificial intelligence.*		X
6	Does the study involve collaborations (with third parties) in which data are shared or exchanged in order to link or combine data? *Additional explanation: This may often apply in a collaboration between the university and a commercial party, contract research, etc. It is important to assess this for all data in the entire project, not just your own data. An important consideration in this situation is whether the person whose data is involved could have expected that data from these different databases or sources of information were to be combined. For example, it is less likely for data subjects to expect that databases from different parties will be combined and the results are used for different purposes than one could reasonably expect; this may apply for example in a collaboration between the university and a commercial party.*		X
7	Will the study include data processing activities that prevent data subjects from exercising their rights or using a service or contract? *Additional explanation: Examples include processing operations carried out in public places that people cannot avoid (train station, airport, shopping mall, public university premises, etc.) or processing operations whose purpose is to allow or not allow data subjects to use a service or enter into a contract (examples: by refusing to pay a benefit, not being able to apply for a loan, etc.).*		X
8	Will the study process personal data to score, rank or profile persons? *Additional explanation: Examples: monitoring (highway) roads to give road users a "score" based on their detected driving behavior, a bank assessing its customers based on their creditworthiness, or an organization building behavioral and marketing profiles based on use of their website or navigating their website.*		X
9	Does your data processing include activities that involves composing "**blacklists**" – and, in particular, in relation to sensitive or special category data, such as communication data, financial records or credit scores, genetic data, biometric data, health data, camera surveillance data, location/GPS data, internet-of-things data, employee monitoring, observing or influencing behaviour, etc. *Additional explanation: This situation will not be a common occurrence in research, but you may indirectly be involved in this. In general, this typically concerns processing operations involving personal data relating to criminal convictions and offences, data relating to unlawful acts, data concerning unlawful or annoying behaviour or data concerning bad payment behaviour by companies or individuals are processed and shared with third parties (blacklists or warning lists, as used, for example, by insurers, hospitality companies shopping companies, telecom providers as well as blacklists relating to unlawful behavior of employees, for example in the healthcare sector or by employment agencies, etc.).*		X
10	Will personal data be transferred or shared outside the EU/EEA? EU data protection rules apply to the European Economic Area (EEA), which includes all EU countries and non-EU countries Iceland, Liechtenstein and Norway. *Additional explanation: The GDPR has drafted additional requirements for transfers data outside of the EU/EEA. Typically, additional safeguards must be implemented to protect the personal data of residents in the European Union. For example, if you collaborate with an American, Indian or Chinese university or other third party outside the EU/EEA, you must first check whether this is allowed and under which conditions this is allowed. Another typical example is storage of data on American providers of cloud (storage) services. Please contact the data stewards first to discuss this.*		X
11	Will any raw or anonymized personal data or any other sensitive data or research results from the project possibly be transferred to a high-risk country*? ***High risk countries: China, Russia, Iran, Turkey, and North Korea.*** ***If personal data or other potentially sensitive data is exchanged with one of these countries, or if part of the data processing takes place in one of these countries: an advice from the Data Protection Officer, the kennisveiligheidsteam (knowledge security team), and the CISO (Chief Information Security Officer) is ALWAYS required.***		X

Part 7a: Processing of research data

1	Is consent your legal basis for processing the personal data in your study? *Additional explanation: What is a legal basis? One of main principles in the GDPR is to ensure that personal data is processed lawfully, fairly, and transparently. To comply with this principle, the processing of personal data also requires that you have a valid legal basis for the personal data processing activity.* *In research projects, the legal basis is often but not always consent. However, it is possible that it is not clear or not possible to establish whether to use consent as a legal basis.* *Some examples where consent may not be applicable as legal basis are covert research, data collection in public spaces, secondary data analysis of existing data, data that are transferred to you by a third party, consent is not possible or would require disproportionate effort, etc. In that case, please indicate which legal basis you think that applies or (preferably) contact a data steward first.*	☒ Yes and it will be obtained via an informed consent ☐ No, I will use another legal basis to process the data. Namely, ……
2	Where will the data come from?	☐ Data obtained from another party (secondary data use) ☒ New data collected only by my research team ☐ New data collected together with collaborators
3	Which of the following tools will you use to process personal data?	**Surveys** ☐ Qualtrics ☐ Limesurvey ☐ MS Forms ☐ Other, namely …… **Interview/workshop recordings** ☐ Voice/video recorder ☐ Phone in a flight mode ☐ MS Teams ☐ Other, namely …… **Transcription** ☒ Manual transcription ☐ Microsoft Office software (e.g. Word, Teams) ☐ Other, namely …… **Statistical analysis** ☐ SPSS ☐ R ☐ Other, namely …… **Other tools**, specifically……
4	Where will the data and in particular the personal data be stored during and after completion of the study? If you have already uploaded your Data Management Plan, you can refer to your Data Management Plan.	☒ Onedrive ☐ Research Drive ☐ Network Drive

	Additional explanation: University supported-storage facilities are SURF Research Drive, Ceph, departmental drives (this includes BE Project Drive), and the TU/e instance of Microsoft OneDrive. For most personal data, the use of SURF Research Drive or departmental drives (including BE Project Drive) is required.	☐ Research Manager ☐ Other, namely ……
	Part 7b: Safety and security measures	
1	Will you pseudonymize/anonymize the data? *Additional explanation:* *Anonymization: remove all direct identifiers (name, address, telephone number etc.) but also indirect identifiers (age, place of birth, occupation, salary) that, linked with other information, can lead to a person's identification. Anonymization to the point that a data subject is no longer identifiable means that the anonymized data is not considered to be personal data anymore.* *Pseudonymization: replacing the unique identifier of a data subject with an artificial pseudonym. This means that identification is still possible with the identification key. The identification key needs to be stored securely and separately from the pseudonymized data. If the data subject can be identified by combining data with additional information, the data is also called pseudonymous.*	☐ ☒ No ☐ Yes* *If yes, describe how:
2	Is access to (personal) data restricted? (Select all that apply)	☐ No ☒ Yes, via access control ☐ Yes, via password protection ☐ Yes, access only given to TU/e research team ☐ Yes, access only given to research team, including non-TU/e collaborators ☐ Other, specify……
3	Who will have access to the data during and after completion of the project? (Select all that apply)	☒ Main researcher ☐ TU/e supervisor(s) ☐ External supervisors ☐ TU/e research team ☐ Other, specify……
4	Will you store data for future research?	☒ No ☐ Yes, in a public data repository ☐ Yes, in a public data repository under restricted access ☐ Yes, in a TU/e-recommended storage (SURF Research Drive, Network Drive)
5	Will you share data outside the TU/e?	☒ No ☐ Yes, in a fully anonymized form ☐ Yes, raw or pseudonymized data* *If you selected this box, make sure that a suitable data agreement is put in place. You can contact the Data Stewards for support in preparing such an agreement
6	How long will data be stored after the end of the project?	It will be removed at the end of the project.

Part 8: Closures and Signatures

1	Enclosures (tick if applicable **and attach to this form**):	☒ Informed consent form ☐ Informed consent form for other agencies when the research is conducted at a location (such as a school) ☐ Text used for ads (to find participants) ☐ Text used for debriefings ☐ Approval other research ethics committee ☐ The survey the participants need to complete, or a description of other measurements ☐ Data Protection Impact Assessment checked by the privacy officer ☐ Data Management Plan checked by a data steward
2	Signature(s)	Date: 07/06/2025 Signature(s) of applicant(s):  Date: 08/06/2025 Signature research supervisor:  *Without both signatures we won't accept the form.*

Reijnders, Thijs

From: Severens, Marjolein on behalf of Ethics
Sent: Tuesday, 10 June 2025 09:35
To: Reijnders, Thijs
Subject: RE: Good Version! (Fast Track) Expert Interview ERB FBP Thijs Reijnders

Dear Thijs,

Your application (ERB2025ID359) has been approved by the ERB.

We assume that you have answered all questions correctly. We will perform regular spot-checks so you need to keep your documentation (ERB form, informed consent forms, surveys/interview questions, description of experiment/prototype etc.) available for at least 6 months.

Good luck with your research and have a nice day!

Best regards,

Marjolein Severens
ERB student assistent

From: Reijnders, Thijs <t.j.e.reijnders@student.tue.nl>
Sent: maandag 9 juni 2025 14:15
To: Ethics <Ethics@tue.nl>
Subject: Good Version! (Fast Track) Expert Interview ERB FBP Thijs Reijnders
Importance: High

Dear sir/madam,

You can ignore the last mail I send, as this is the one with all the right submission files.
I first of all want to sincerely apologize for the fact that I am sending this request this late.
For my FBP I have been working together with an expert in the field of child therapy and it was only made clear to me on DemoDay that I need an ERB to reference input from the expert in my report.
This is why I am sending you this email, since I wanted to do one non-explorative interview so I can substantiate my claims in the report.
I hope that you are still able to evaluate my submission before Wednesday, so I will be able to reference the accordingly.
Thank you in advance and I hope to hear from you soon!

Kind Regards,
Thijs Reijnders
1699237