

A game where setbacks help to grow

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Final Bachelor Project

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In collaboration with Garage2020 By Robin van Overbeek | r.v.overbeek@student.tue.nl | 14-06-2023 Eindhoven University of Technology Department of Industrial Design Inclusive design and technology

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1. Executive summary

Performance pressure is a growing societal problem, which Garage2020 aims to innovate in. Many factors influence performance pressure. Research shows that early intervention helps to decrease the impact on individuals' happiness and mental health. To introduce children to performance pressure and talk about their influential factors, I have developed a technology-enhanced tabletop game in collaboration with Garage2020 for children between the ages of 8 to 12 to play in the classroom.

The goal of this project is to design a playful way for children to talk about performance pressure and its influences. First and foremost, the game should be fun and engaging, to get children to want to play it again. The game, called Pida, was evaluated in the context of after-school care facilities with 11 participants between 8 to 12 years old to test engagement and enjoyment. In addition, 13 adults played Pida to test the game mechanics, experience, and usability. It has shown that Pida is fun to play and motivates players to want to play it again. It briefly touches upon performance pressure in a light-hearted, accessible way.

This project contributes to mental health innovation and social design for young people by showing opportunities for early intervention in a playful way. It supports introducing children to topics such as performance pressure, without making the game dull and lose its speed. For long-term benefits, further research and development is required.



2. Prologue

Dear adventurer,

This Final Bachelor Project (FBP) has been conducted at the Inclusive Design and Thoughtful Technology squad at the Technical University of Eindhoven. This squad focuses on vulnerable target groups and how to include them in society. This is connected to my vision of including more user thinking in our design process and focusing on the societal impact (see Appendix A). As a designer who prefers a structured organized process, this squad offers a detailed schedule and a good helping hand when it comes to including vulnerable user groups in my design process.

Just like the developed tabletop game takes its players on an adventure, I too walked a path during this project. I invite you to travel along with me in this report, from research and expert meetings to prototyping and testing, following a design thinking path.

Kind regards, Robin van Overbeek



3. Introduction

Once upon a time...

During the course Stakeholder Perspectives in Design, I came in contact with the company Garage2020 and its vision of creating a better future for the younger generation. This resonated with my interest of wanting to design playful products that improve people's well-being, especially that of young people. For my Final Bachelor Project, I arranged a handshake* with Rens Brankaert and connected with Garage2020 to collaborate on my FBP.

The adventurer's mission

At the beginning of the project, Garage2020 gave me a couple of societal problems for which they are trying to innovate, research, and create. Here I chose the one that first was still in its infancy and secondly made me the most excited to work on. Performance pressure was that societal problem that needed attention. The pressure to achieve is a growing problem for society as it causes stress and could even lead to burnout and depression. Therefore, I have been developing a card game for children in collaboration with Garage2020 to increase awareness and engage children in the topic. In the card game, the players venture into a part of nature that needs rebuilding. Together they try to create a thriving ecosystem, but not without the occasional setbacks.

This report outlines the design process and design decisions. This is divided into three main sections, which are all part of the design thinking process. Here playtests, iterations, and research are woven into each other, ending in a final evaluation and final design.



Figure 1: Demoday Setup

4. My vision

This project was sparked by a personal passion for games and wanting to help the mental well-being of people, in particular young people.

My goal is to design a more playful, relaxed world, where experiencing and well-being are the main focus. Products and designs should support the community and society and thus we as designers should always have the experience of the user in mind while making design decisions.

I believe designers can shape the future and we, as designers, bear the responsibility to help people to create a fulfilling, and joyful life. Design and new media design are important mediums to help shape that future and transition into a world with stimuli all around. For me, to design is to create real value and purpose, and evoke positive experiences.

This Final Bachelor Project was thus used to develop my understanding of how play and games can be used to support vulnerable groups, such as young people, in their development and growth.

*A handshake can be given by a coach to only one FBP student. Here the student can propose to do his own project and if the coach agrees, the student receives a handshake.





5. Related works

The growing societal problem of increased performance pressure

While the Dutch people claim to belong to the happiest countries in Europe, the pressure to perform has increased in the last decade (Adrichem et al., 2022; van Yperen et al., 2019). Data from national as well as international studies show an increase in pressure (Raad voor Volksgezondheid en Samenleving., 2018; Samele et al., 2018). One-third of adolescents experience pressure caused by school and meeting expectations (Doornwaard et al., 2021). Almost half of 16-year-olds experience pressure(Kleinjan et al., 2020). High-school students and university students struggle with mental well-being problems due to stress and pressure (Nederlands Jeugdinstituut, n.d.-a). This pressure increases with age in adolescents, according to research from CBS (Kloosterman et al., 2021; Nederlands Jeugdinstituut, 2021).

According to studies from the Trimbos Institute increased pressure to perform and achieve is a growing societal problem, that creates stress (BNNVARA, 2022; de Haan et al., 2021). Prolonged stress can lead to a mental health decline and has a major impact on mental well-being (Slimmen et al., 2022). This can lead to psychosocial problems, burnout symptoms, depression, performance decrease, and even suicidal feelings (Dopmeijer et al., 2022; Nieuwenhuys & Oudejans, 2017).

All the above numbers and studies show that even though the Dutch belong to the happiest countries in Europe, there still is a significantly growing problem regarding pressure on the individual. The decrease in the individual's pressure and increase in their mental well-being in turn affects society as a whole. Happier individuals create happier societies. There are even studies that suggest that a happier society can lead to a more sustainable society(Sameer et al., 2021; Suttie, 2021). So not only is investing in mental health beneficial for the individual, but also for the economy (McDaid et al., 2019; Mcdaid et al., 2022).

Influential factors of performance pressure

Many different aspects influence the pressure a person feels. These aspects can be from external factors, but also internal factors (Kreutzer, 2020; Pieter's Corner: The Stressed Society, 2018; Visser, 2022). Some individual factors can be for example placing a lot of pressure on yourself. Adolescents also experience perfectionism, wanting to make the 'right choice' at the first time, and the urge to prove themselves (Doornwaard et al., 2021). (see Table 2 for an overview of the factors).

In addition to internal factors, external factors also play a big role. The external factors include the societal pressure to never fail, always get good grades, an unrealistic ideal portrayed by social media, parental pressure, competitive environments, and a social yardstick to meet (Bonnie, 2015; Bonnie et al., 2014; Kraak & KLeinjan, 2021; Saiphoo et al., 2020; Sarwar & Soomro, 2013; Verus, 2022). According to the CBS, performance pressure occurs more often in females (Centraal Bureau voor de Statistiek, 2021; RIVM, 2019). So not only internal factors are at play, but the environment in which an individual develops is of great importance when talking about performance pressure.

The protective factors

Some influences can protect the individual against performance pressure and its consequences (Doornwaard et al., 2021; Kleinjan et al., 2020; Visser, 2022). These can range from an individual level to a systemic level. Individual influences can include creating a healthy lifestyle, increasing resilience, and developing a positive self-image and mindset. On a systemic level, there are other protective factors, such as having a good support system, a positive relationship with teachers and school, and social capital (See Table 2 for an overview of the factors).

It is important to be aware of the risk and protective factors during the project to ensure that the product does not deviate from these factors. These factors help to focus and scope the project.

Advances made to decrease performance pressure

Society knows this pressure is important to address, and there are already some advances made. Prevention of decline in mental well-being is being researched and shows that this more sustainable practice is possible (Mendelson & Eaton, 2018; Monsell et al., 2021; O'Connell et al., 2009). In addition, there is more attention on ways the system and external factors can decrease their pressure on the individual (Nederlands Jeugdinstituut, n.d.-c, n.d.-b). Early intervention also helps to decrease the impact on individuals' happiness and mental health (McGorry, 2013). Intervention can help change the perspective and mindset of students. According to an American study, a shift of mindset to a growth mindset, can increase achievement and decrease negative beliefs (Yeager et al., 2019).

The access to these interventions is being assessed to develop more accessible, youth-specific services such as Headspace (McGorry et al., 2013). Game design also finds its way into mental health care (Siriaraya et al., 2021; Wehbe et al., 2022). Board games can be used in multiple contexts and promote social cohesion and interaction (O'neill & Holmes, 2022).

Learning which advances have already been made, helps to learn what works and what does not. Keeping this in mind gives focus to the project, such as focusing on early intervention in a playful way, such as with tabletop games.



Previous work

Current tabletop games are mostly made by independent businesses. Games such as 'Open Kaart', 'Bliss Kids', and 'Terra Nova' are more discussion and reflection-based (Het Verbond, n.d.; Stichting Terra Nova - Democratisch Design, 2019; the bliss project, 2023). Through play and question cards players reflect on topics and get to discuss them with each other. Other games are more focussed on creating a safe environment, social cohesion skills, and connection with other players, such as the games 'De kat is kwijt', 'Picoo', 'Yalp Memo', 'Gripper', and 'Poco Loco' (Echter Ontwerp, 2021; Garage2020, 2020, 2021, 2023; Picoo, n.d.; Yalp Interactive, 2022). What they all do is learn through play.

These projects showed me the importance of fun in learning and inspired me to pursue fun in my project.

6. Design Process

6.1 Process overview

The design process was based on the design thinking process together with the Stepby-Step guide of 'Think Like a Game Designer' (Gary, 2018) The design thinking process model gives an organized process and structure, which still has the possibility of being a non-linear, iterative process(Dam, 2022; Gibbons, 2016; Interaction Design Foundation, n.d.; Stanford d. School, 2010). In addition, it is a user-centered process that has user experience at its core, and looping back to the user is encouraged. The prototyping phase of the design thinking process contains another process for game development, which is explained in the guide of Justin Gary (Gary, 2018).

As I am collaborating with Garage2020 and I want to show them that my product has value for the users, I also want to create a visual theme and branding. See Figure 2 for the overview of my process.



Figure 2: Design Process

6.2 Understand

The Understand phase spans a time frame of 5 weeks, from February 10th to March 17th. The Understand phase is characterized by lots of desktop research, literature research, and networking. It lays the groundwork on which to build the first iteration.

Pressure Cooker

A pressure cooker is a design method that I used to get the ball rolling. Here you get a set amount of time (one week) where you quickly go through the design thinking process. A pressure cooker forces you to make quick decisions and move on. Here the design thinking bootleg contains exercises to help with this process (Hasso Plattner Institute of Design at Stanford University, 2018). However, it is mostly based on assumptions instead of being backed up by research and user studies. The pressure cooker ended with a very low-fidelity prototype (see Figure 3).



Figure 3: Card Game Mock-up - Pressure Cooker

Contacting Experts

After the pressure cooker, I decided that to fully understand the user I needed not only literature research and benchmarking, but also a network of experts and partners to help me brainstorm. They could also help to inspire new ideas and contact new partners. Within a few weeks, I had gained a valuable network around me, which you can find in Table 1.

Number	Expert name	Expertise	Why I contacted the expert
1	Martijn Schuurmans	White Goblin Games video Presentator and Board Game Designer	To brainstorm about game design, receive feedback on prototypes, and playtest
2	Mitchel Jacobs	Interaction designer	Receive information on creating a product for children
3	Marjet van Bragt	GGD behavioral scientist	To learn about the problems with the target group
4	Lieke Vermeulen	Designer	Getting an understanding of her design process and receiving information on creating a game for children
5	Anna Broek	Psychologist	To understand the target group and how they think
6	Fenna Dam	Garage2020 contact	To gain insight into the problem and receive feedback
7	De Dobbelsteen	Commercial game store	To benchmark games and talk about gameplay and theme for the target group

Table 1: Contacted experts

Empathize

Working with a vulnerable group such as children requires research for the designer to step into their shoes. Literature research on the problem, benchmarking competitor solutions, and talking to the psychologists in my network helped to create that understanding. Another part of this phase is understanding the system of the problem. Here talking to one of the stakeholders and developing a value framework (Den Ouden, 2012; den Ouden & Valkenburg, 2016), was key (see Figure 4).



Figure 4: The Value framework

The goal of the project was established fairly early. How can we design something to decrease the performance pressure? Figuring out what caused performance pressure, what influences it, and what already helps, was step one. Through literature research (see Chapter 5), I made an overview of the biggest influences and protective factors (see Table 2). In addition, two seminars were attended, hosted by garage2020 on performance pressure, and expert brainstorming sessions were held with two psychologists to discover how they view performance pressure and where possible opportunities lie. From this an empathy map was made using the literature research, to gain a better understanding and overview of the user (see Figure 5) (BNNVARA, 2022; Gibbons,

The most valuable insights I got during those expert meetings were that performance pressure starts young. Even though adolescents are having the most trouble with it, children are also experiencing it. The children are less aware that it is performance pressure, but some already struggle with it from the age of 8. Both psychologists think that building resistance is a valuable skill for a child to learn and cope with pressure. A surprising insight was that children are smarter than I initially thought. When guided correctly even 8-year-olds can have a good introspective view. They can reflect well, especially when using metaphors and visualizing.

	Risk factors	Protective factors
Individual level	 Perfectionism Social comparison Emotional instability Falling behind in school Urge to prove themselves 	 Postitive self image Healthy lifestyle Self-compassion Resilience Positive mindset Experiencing enough free time
Immediate environment	 Parental pressure Pressure from school Focus on getting high grades Competitive environment Unrealistic ideal image on social media Vulnerable family situation Overprotective (controlling) parents Tense peer group Being bullied Meeting the social yardstick 	 Social capital Appreciation Focus on mental wellbeing Safe and supportive school environment Supportive network
Systemic level	 Little room to fail Measurable Society High expectations of happiness 	

2018).

Table 2: Influence factors

Empathy Map



Figure 5: Empathy Map

Game Research

Another big part of the empathize phase was to look for recent solutions. Here I looked for games, physical and digital (see chapter 5). They all touched upon a certain protective factor, but the main purpose of these games was not to discuss or decrease performance pressure.

Parallel with literature research, I decided to learn more about tabletop games and game design. I believed that game design gave opportunities to playfully learn about performance pressure. As I did not have a lot of knowledge in this area, I worked my way through the book 'Think Like a game designer' by Justin Gary. The first couple of weekends were thus dedicated to playing lots of tabletop games, to get inspired and learn about mechanics and framing (see Appendix B for detailed exercises and insights). More on the game design research will be discussed in chapter Explore.

Define

During the empathize phase, lots of information was collected. The define phase is where we make sense of that information and create a more detailed goal.

From the influences and protective factors, lots have something to do with having or creating social capital and a support system. Thus I saw an opportunity to develop a product that could be used at school in the classroom. From here personas were created for a teacher and three children (see Figures 6, 7, 9, and 10). These were created using information gathered during expert brainstorm sessions with psychologists and from the related works. The persona's are still used as a brainstorm tool and thus based on informed assumptions instead of by interviewing the target group.





Stardh is an 33 year old primary school teacher. After doing a masters in pedagogy, she decided she wanted to teach and loves to teach through play.

Need

She wants a way to playfully engage students into talking about emotions. She also wants the class to feel more cohesive and that the children have each others back.

Positive trends

- She loves to do psychology courses outside of work to use inside the classroom
- She has a connection with her students
- She is very patients and understanding towards her students

Opportunities

- More and more young teachers come into the workfield that back up her way of teaching
- She has a supportive wife who
- studied children psychology - She feels fulfilled when teaching
- She feels fulfilled when feaching

Hopes

- To increase her students resilience
- to have a fun time in the classroom
- To change the focus of the educational system

Negative trends

- School does not have a lot of money and time to invest in teacher training
- not a lot of matierlas to teach with
 curriculum does not allow for more classroom creativity

Headaches

- Still needs to meet educational standards
- Not a lot of support from the principal

Fears

That some of her students end of in early burnout do to the pressure they or their environment puts on them The product needed good metaphors as the experts suggested and a low threshold way to discuss performance pressure. This connected with the idea I created during the pressure cooker, a card game for children where failing is part of the game.

To analyze if a card game with possible enhanced technology fits the problem and creates value for the users, multiple tools were used. Here the product is viewed as a product being pursued by a specific business. Together with personas, value propositions (see Figures 11 and 12) and a value ladder were made (see Figure 8). This to get an overview of the values and see which are addressed. In addition, a business model canvas was used to describe how the business would operate. The business model canvas was used more as a brainstorm tool, to get a feel for further business applications and production. The business model canvas can be found in Appendix H. A card game showed great potential, so I decided to follow through with this idea.



Figure 8: Value ladder (O'Neill & Holmes, 2022)

Naomi



Story Naomi is a 10 year old girl who loves being creative. She dances and does acrobatics. She loves playing outdoors and building tree houses with her older brother and boyfriend

Need

She loves competing but need to learn how to still be proud of herself even if she does not come in first place with dance competitions. She also needs help balancing training and social/school life and understanding math

Figure 9: Persona child 2

- Positive trends
- Older brother who helps her with her school work
- A loving boyfriend with whom she holds hands and plays every day
- Sits in front of the class so the teacher can help her with math

Opportunities

- Very good body awareness Ambitious attitude towards
- dancing Great at seeing details, which
- helps her enjoy biology and nature

Hopes

- To become a professional dancer - To win the national dance
- competition this year with her
- group To stay with her boyfriend together and always have fun with him

Negative trends

- Spends a lot of times doing activities and training
- Does not have many friends in the class except her boyfriend
- Has dyscalculia and lots of trouble with math

Headaches

- Lots of resistance trying to solve math problems
- Feels alone when her boyfriend is
- playing with his friends

Fears

- Fears to come in last place and be not good enough for the dancing professional world
- Fears that after elementary school her and her boyfriend split up and she will be all alone

Laura

Positive trends

- Smart for her age Sits next to one of her close friends in class
- Everybody thinks she is very sweet

- **Opportunities** Talent to become a great student Show off her logical thinking skills
- to her peers Has great ideas when given the
- space to express

Hopes

- Loves a bigger friend group she could have sleepovers with
- Wants to go to the highest education level for high school
- Wants a cat

Negative trends

- Has a hard time talking to new people
- Gets insecure when think do not go as expected Would like to have more
- challenging questions and puzzles at school

Headaches

- Quiet voice that is easily
- overshadowed
- Not very good at history
- Gets insecure and shy when she does not know what to do or how to keep a conversation going

Fears

- Getting bad grades Not being invited to birthday
- parties
- Not getting new friends when
- going to high school

Figure 10: Persona child 3

Need

engaged.

Story Laure is a smart 12 year old girl. She

is a bit shy, and loves to draw and fix math problems.

She would love to have more friends

puzzles. She needs more challenging

that also like to solve riddles and

questions from school to keep her



Figure 11: Value proposition child



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6.3 Explore

The explore phase spans a timeframe of 7 weeks, from March 17th till May 5th. In this phase lots of things happen in parallel, but the main focus is ideating and prototyping. Even though preparations for the final user test also happened during this period, this will be discussed later in chapter 6.4. Through prototyping, playtesting, and iterating a final design was made that could be tested with the target group.

Version 1: the basics

The first step in game design was to learn how to think like a game designer with the help of Justin Gary's book (Gary, 2018). This resulted in multiple game nights where through playing lots of board games, I learned my likes and dislikes, game mechanics, and gems in game design. For a more detailed process, see Appendix B. From these likes and dislikes, patterns emerge which helped me to generate concept ideas. The ideas already had some metaphorical themes to represent balance, failing, or building resilience.

Just like a design process, the game design process needs framing in the early stages. Here we look at the target group, motivations, the hook of the game, and its restrictions. From talking with experts, and literature research I decided to focus the game on children between the age of 8 till 12, as this is the age where they are already capable of reflecting while not yet in the most performance-pressured ages such as adolescents (Kloosterman et al., 2021; Nederlands Jeugdinstituut, 2021). Persona's and value propositions are referred back to during the process to keep the user in mind.

After getting inspired and framing, brainstorming is next. This brainstorming is done with one of the concepts from the inspiration in mind. Here a mind map is created to organize the ideas (see Figure 13). From an expert meeting, I took the advice to first start with what kind of behavior I want to evoke, then look for the game mechanics that support that feeling (see Appendix B).



The first version of the game is a cooperative game to support cohesion and build a supportive instead of a competitive environment. In the game, the players try to save an ecosystem while balancing with the weather, too many storms are not good for the ecosystem but sometimes you need its silver linings to progress (see F. The game consists of 2 card piles, one nature card pile, and one weather card pile. The goal is to gain as many points as possible to ensure a thriving ecosystem. Even though the game is cooperative, players are not allowed to communicate. When a storm card is drawn depends on the number of turns or a die, this is yet to be tested. The turn structure is first to play a card from your hand, then draw a weather card. A possibility to look into is to have rounds (seasons) where players can also earn bonuses.

Drocgte STORM 6 5 Overstroming 2 struiten + 4 paddenstellen 2 bornen kapot 8 paddensteelen gaan dood maar als je 5 podden Staelen aan einde nebt verdrinken maar alls je een meer dan 2 bornen hebt kigg je 5 konus mag je er 2 spelen Noem 3 positieve dingen van varige Hoe voelt jouw lichoan vandaag? Wat used je als iets niet goed goat? Sneeuw Veel wind Bosbrand leg deze kaait p & struiken, Drocqte aantal bomen 5 struiken dood 90 dat overleeft hý gaat pas weg als je 1 maar je kriggt = aantal spelers, 2 paddenstoelen boom omhakt de rest gaat dood terug Wat kun je doen om minder verdrietig te ninder verdrietig te White four neb & zelf tegenslag deze week? laatst gemaakt? Figure 14: Storm Cards

Figure 15: Playtest first version



Figure 16.: Midterm Demoday setup

The game is meant to play in the classroom with 4-6 students. Here they try to build a thriving ecosystem, but as nature also does, there will be setbacks, heavy rainfall, snow, storm, and drought. The key here is that with every event card, the children must pick a silver lining card with a question written on it. These silver lining cards give silver linings and bonuses for the game. The questions are related to the game but also to the aspects surrounding performance pressure, to get them to think about failure as an opportunity,

Version 2: simpler and automated

Now that I have a general idea of the game mechanics and flow of the game, it is time to build the first version. The first version is a quick and dirty paper card game. This is to test the core mechanics to see what interferes with the gameplay speed, what supports the idea, and what feels confusing. These playtest sessions were done with friends, family members, and other people who wanted to try. Throughout the development, lots of playtesting was done, but only the valuable insights are mentioned.

First, the game was only by card, but this made the game feel to have too much information. To give the idea of getting information only when needed, technology could be implemented to automate the process. This way the teacher could also influence the questions that were asked through an online teacher platform connected to the game.

This resulted in a second version of Fail-the game, which was presented during the midterm demo day (see Figure 16).

listen more to their body, and talk about performance pressure. The teacher can influence the game by choosing which topics he wants his students to focus on in the questions. This is done in the setup of the game. This way the teacher can direct the discussions. This prototype was developed to resemble an MVP (see Figure 18) that could verify the problem-solution fit together with the problem-solution fit canvas (see Figure 17).

In conclusion, the first version of the game consisted of too many components, the die was removed and the rounds (seasons) were deemed unnecessary. Questions were added to the storms so children could reflect more on the influential factors of performance pressure. To spread the information needed to play the game, a digital platform was created so players only get the information needed to move on one piece at a time. A digital platform also allows including technology instead of dismissing it and installs a way for the teacher to tailor storm questions to the student's needs. The game is simplified and automated, which increased gameplay speed and enjoyment.

Problem-Solution fit canvas 2.0

Purpose / Vision Opening discussion playfully in the classroom on performance pressure

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) 8-12 year old children, almost going to high school	6. CUSTOMER CONSTRAINTS CC Spending time to talk about it, no available low threshold solutions, not knowing how to deal with it without having to change the whole system	5. AVAILABLE SOLUTIONS AS Apps to learn how to express emotions Therapy later on in life Mostly changing the system	Explore AS, differentiate
Focus on J&P, tap into BE, understand RC	2. JOBS-TO-BE-DONE / PROBLEMS J&P Connecting with peers Dealing with setbacks Increasing pressure to perform Having fun	9. PROBLEM ROOT CAUSE RC Always striving for happiness No room for failure Measurable society Ideal image of social media	7. BEHAVIOUR BE powering through, talk to peers, go to therapy, distract themselves and procrastinate	Focus on J&P, tap into BE, understand RC
Identify strong TR & EM	3. TRIGGERS TR Feeling alone Not knowing how to talk about their feelings 4. EMOTIONS: BEFORE / AFTER EM lonely > feelings of connection pressure to do it all alone > open confident	10. YOUR SOLUTION SL A card game to open discussion and raise awereness with young people before performance pressure becomes a big problem at high school	8. CHANNELS of BEHAVIOUR CH Seeking distraction and connection through social media 8.2 OFFLINE Stress, anxiety, excessive perfectionism, psychological complaints	Extract online & offline CH of I
0	discussion with others on the subject	onCommercial-NoDerivatives 4.0 license	📩 AMALTAN	Ä

Figure 17: Problem-Solution-Fit Canvas

Project Name: Made by: Robin van 07/04/2023 **MVP Experiment Canvas** Tegenslag Overbeek 4. Customer Engagement 💗 7. Experiment Scenario / Workflow 😔 10. Results 🟁 We are asking them to play the game and afterwards for direct feedback. If they want, I First, the game and rules will be explained. Enjoyment and immersiveness during the could eventually link them to my report and evaluations. Then after there are no more questions, the game. children will play the game in groups of 4-6. The researcher observes what happens and how engaged and excited the children are. Afterwards a few geustions will be 2. Value Proposition 🞁 1. Your Customer Segment 👤 asked about their experience. Child between the age of 8 to 12, going My company Robin is developing a 11. Learnings & Insights 🔑 to school in the Netherlands experience tabletop game with digital component Missing complexity when drawing a sun the product. They are almost going the where topics surrounding performance card high school were a lot will change and the pressure are touched upon in a playful Animals helped to get immersed in the pressure to achieve is increased. accessible way. The main value is having game a fun co-operative card game to play No need for a playing token together with your peers. Sometimes the children found the game dull and boring as the actions are quite the 8. Metrics 📈 same We will measure quality data about the 3. Channel(s) 🚚 usability and satisfaction, but also about their Through word to mouth and using the BSO (after school care) system of Partou and/or feelings. (In addition, a co create session will be held beforehand and playtesting with Kanteel the children are reached. The value proposition will be delivered through the game and the feeling of engagement and excitement. students is also done to assess usability) 5. Riskiest Assumption(s) 🗳 6. Experiment Format ج 9. Success Criteria 🏆 12. Next steps Make drawing a sun also exciting For the solution to succeed it is necessary If the children liked the game and were Before letting children play, already ask Deleting the player token that the children like to play the game and on what they think of the product and if intrueged is is considered successful. If Finding a way to include more tension the students see potential and a possible they would like to play it. It will be a user want to do it more. It is also necessary that they engage in conversation on topics test with observation and a small interview. posititve influences, it is also considered regarding performance pressure (think of As the goal is only to see if they like the succesful. fear of failure, self compassion, comparing game, no risky questions will be asked on with others etc.) reflecting on the questions. 23 This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License. Made by Bram Kanstein (twitter.com/b.

Learn more and download the canvas at themvpcanvas.com

Version 3: intuitive and in control

After the mid-term, I had 2 expert meetings with designers. The game designer, with whom I frequently met, gave a valuable insight that visuals help to increase the intuitiveness of the game, instead of just being for the aesthetics. Here we came up with illustrating the cards in such a way that the players would know where to place cards and it contributes to the whole picture of building the ecosystem (see Figure 20 and 21). He also helped to establish details, such as when the game ends and whether you can tell fellow players your hand cards.

To quickly create a deck, a program callede NanDeck was used (see Figure 19). It is a great software for simple cards and quickly creating a deck. But, as the game cards are very illustrative, later on in the process it was easier to use illustrator to build the deck.

Pida Ca	ards v3.txt Add new tab	
1	; Robin van Overbeek	
2	; Cards for cardgame FBP Pida	
з	; 29 april 2023	
4	;v3	
5		
6		
7	; Settings	
8	Unit = CM	
9	Page = 21, 29.7, PORTRAIT, HV	
10	BORDER = RECTANGLE, #000000, 0, MARKDOT	P
11	CARDSIZE = 6.35, 8.89	
12		
13		
14	LINKMULTI = Count	
15	LINK = "v3 nanDeck Pida Cards.xlsx"	
16		
17	;link to excel file with exported visuals from adobe illust	trator
18	VISUAL=, 10, 10	
19		
20	;IMAGE="1-81",[IMAGE],0\$,0\$,100\$,100\$	
21	VECTOR = "1-81", [IMAGE],0%,0%,100%,100%	
22	ENDVISUAL	
23		
24	;Print back to the right front	
25	Duplex = 1-49, 80	
26	Print = Duplex	
27	Duplex = 50-79, 81	
28	Print= Duplex	

24



M3





The other expert touched upon an interesting point, even though it is a game where players need to deal with the uncertainty of not knowing when storms happen, they still need to feel in control. This way they feel authority about their process. She also convinced me to make the game's interactions and illustrations feel rather too grown-up instead of too childish.

So visuals now play a role instead of being there for the aesthetics. Another implementation was the ability to place animals in the ecosystem, to make the nature reserve that the players are building feel more alive and include more tactics into the game. These need to be made, but during a playtest, these animals were represented through Monopoly Figures.

The feeling of more control during the game was implemented by giving the players options for the silver



25

Figure 21: Sketch cards

Co-create session

To have the game appeal to the target group of 8 to 12-year-olds, co-create sessions were held. These were held in collaboration with Claire Vos who created a CoCreate tool that she wanted to test. My goal during these sessions was to Figure out the style and some UI elements of the cards. Should the illustrations be realistic or cartoony, with lots of colors or minimalistic, names or icons?

The sessions consisted of 3 phases, each around 30 minutes with a 10-minute break. The first phase was a show and tell session where the children each chose 5 tabletop games they like to play and why. During the second phase, the children would list these chosen games in order of likability, together with 5 illustrations and reflect on them (see Figure 22). Lastly, they would design their own 2 cards for the game, one nature card and one stormy weather card.

Results

In total, 7 children participated in the co-creation session. During the show and tell phase, lots of games were chosen, but most of the games were chosen because the children connected with their family in this way. During the reflect phase the illustration with the animal and the mushrooms ended up high on the ranking. Whereas the darker illustration and the forest with less true to nature colors ended up low on the ranking. For all the results and analyses, please see Appendix C.

Conclusion

According to reflection phase of the cocreation session, we can carefully say the game should be a little illustrative, without feeling too cartoony in order to appeal to the target group. This can be accomplished by still using nature like colors. The shapes can be exaggerated but not too much, and the colors should still feel bright and lively. From the create phase we can derive that there was no significant difference noticed if the cards needed a name and/or explanation on the card.



Figure 22: Cocreate Reflection phase Results

After co-creation sessions, I was confident the style of the game I created, appealed to the target group. I decided to change the interface elements of the cards to display more of the illustration, so names on the bottom of the cards were replaced with icons on the top left of the cards. The game store I frequently spoke to, gave a useful tip on how to make the illustrations feel more exaggerated and interesting, which can be seen in Figure 23 After these changes another playtest was conducted.

Multiplayer playtest

The goals of the playtest were to analyze how intuitive the game was and decrease the kinks of the game. The first round was a round where nothing was explained and the question for the players was 'These are the components, how do you think it should be played?' Within 5 minutes they Figured out the big picture and how the cards should be placed on the playing field. This all fell into place when one of the players saw how the tree card fit perfectly on top of the bush card. Another situation I initially did not think of was what would happen if a player had nothing to place and could only pass the turn (see Figure 24). That is exactly why I wanted to playtest throughout the process, to find these situations so I can make a rule for it.

To summarize, the game is made more intuitive by giving the cards illustrations with hints on where to place other cards. Animal Figures are added to increase the complexity of the game and give more tactic options as well as a feeling of control. In addition, choosing between silver lining bonuses increases the feeling of control.



Figure 23: Dynamic shapes exercise



Figure 24: Multiplayer playtest

Version 4: last details Branding

Now that I knew the style that appeals to the target group, I could build the brand. In my personal development plan goals, I stated that I want a coherent visual style and brand. A name was chosen and a logo was created, together with an icon, patterns, and brand colors (see Figure 24 and Appendix J for brand guidelines). The name of the game should be easy to say and give a cute light-hearted but quick energy. It is a personal preference to use old languages that when translated mean something for the game. This is how I stumbled upon the Sanskrit word Pida, meaning hardship as well as compassion in some translations. Both hardship and compassion relate to the game where storms are hard but silver linings help to rebuild and grow. The translations also connect to performance pressure and being compassionate towards yourself can decrease its negative impact.

Pida	Pida	Pida
Pida	Pida	Pida
Pida	Pida	Pida
Pida	Pida	Pida

Final details

Lastly, it was time for the finishing touches. 3d models were created using a resin printer (see Figures 27 and 28) (Creaciones3d, 2021; GalaxyBoss, 2021; Jecko18, 2023; Kelleoth, 2023; RomainDewaele, 2022; RubixDesign, 2017). These were painted in 2 colors, white as a constant within the different animals and an earthy tone for each animal (see Figures 29 and 30). Weather cards were designed (see Figure 26) and the online heavy weather questions were reviewed by a psychologist in training and two pedagogical employees from the after-school care center. As the game accompanist, the teacher, can choose which kind of questions the children get during their game, an application had been made for this part as well (see Figure 31). A rule book has been created, which can be found in Appendix E.

In conclusion, Pida is a cooperative game for children between the ages of 8 to 12. Here they build a thriving ecosystem, where storm cards occasionally cause damage. After the storms pass, silver lining questions are asked to ask the players to reflect on the influential factors of performance pressure, after which a silver lining bonus choice can help to rebuild and grow the ecosystem. The goal is to gain enough points, which can be accomplished by placing nature cards or animals into the ecosystem.



Figure 25: Branding Colors and name



Figure 27: 3D model of the Animals



Figure 29: Painted Animals



Figure 28: Resin Printed Animals







Pida

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Group

Pida

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Figure 31: Teacher website mockup

Pida

5 min

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orteen nieuw spe

Pida

Welke onderwerpen wilder de kinderen bespreken

Positief Zelfbeeld

Voegeigen

vrogen toe

Emoties



Group 8

VOOIDEIEIOIN9 VOOI UE SPEIEIS Haa 3 paddemooel kaarten uit de natuurstopel en leg te naast elkaa L haa 3 paddemooel kaarten uit de natuurstopel en leg te naast elkaa

op het opgelveld
 op het opgelveld
 op de resterenten netuurkaarten en geet ledere opgelet. Verdeel
 Schud de resterent not op de hand.
 Schud de resterent netuurkaarten uit de weerkaarten stadel. Verdeel
 Schud de resterent netuurkaarten uit de weerkaarten stadel. Verdeel

• suppose meet op erkent. • suppose meet op erkent. • teg de dietige paat het speelgebied. 5 Geef de jongde speler het spelers fiche

Deze koarten neemt hij op de hand. Deze koarten neemt hij op de hand. Haa ale som Maarten ui de weekaart som koart in iedere s Haa ale som Maarten of staat. Haa ale som Maarten of elkaar. Lien de dieries naast het soeeleebied. Lien de dieries naast het soeeleebied.

Group 8

1 Haal 3 Paddensweld

34

proup8

To experience the prototypes please click the following link:

<u>Teacher prototype</u>

<u>Player prototype</u>

6.4 Materialize

The final phase consisted of testing and analyzing the results. This phase spans a timeframe of 6 weeks, from May 5th till June 16th. After analyzing a home stretch is made, resulting in the final design discussed in chapter 7.

The final evaluation consisted of 2 different user tests. One user test was done with the target group, children between the ages of 8 to 12, and one was done with adults to get more data on the usability and experience of the game.

User test – children

Goal

The goal of the user test with children was to investigate how users perceived the game and if the game fits this target group.

Methodology

As the game is meant to be played with peers in a classroom, I asked the after-school care facility Partou if the user tests could be conducted there. Schools have a tight schedule to adhere to, so after-school care facilities mimic that situation. Through convenience sampling participants were recruited. Partou distributed the consent forms amongst the parents and verbal consent was asked from the children (see Appendix K for the consent form). There was always a pedagogical employee present during the user test.

During the user test, the children would play the game, which lasted around 30 minutes. After the game, a few questions and possible follow-up questions were asked in a semi-structured interview of a maximum of 5 minutes (Chauncey Wilson, 2014). To make sure the analysis was thorough, the interviews were recorded.

Results

In total, 3 games were conducted at the location of the after-school care facility with 11 children between the ages of 8 to 12. One game had three participants and two games were conducted with 4 participants. The total user test lasted around 45 minutes. Based on the thematical analysis dimensions were established, which can be found in Table 3 and Table 4 (for the full analysis, see Appendix D). The data collection was done through observation and interview audio recordings. Naturalistic observation notes were made during the gameplay, together with unidentifiable photos of the playing field. Since the emerging themes were unknown beforehand, the interview data and observational notes were analyzed through an inductive, semantic thematical analysis (Braun & Clarke, 2006). The focus of thematic analysis is to find themes within the data. Here the data is initially coded to then find the themes/dimensions (see Appendix K for the study guide).

The participants could choose a sticker with their favorite game animal after the session, to show my appreciation for their time.

Dimensions	Count of dimensions and subdimensions
criticism	8
educational	5
enjoyment	35
production	3
suggestion	12
understandable	2
Total	65

Table 3: Codes count of interview transcript

Dimensions	Count of dimensions and subdimensions
animal sympathize	9
enjoyment	3
game aesthetics	7
game mechanics	16
immersive	3
not immersive	7
player turn	18
storm	26
suggestion	2
sun card	5
tactic	8
Total	104

Table 4: Codes count of observational notes

Evaluation

When looking at the interview notes and observational notes, we can see that the game was enjoyed by the children. They sympathized with the animals and reacted when something happened to the ecosystem. Sometimes they got distracted (see 'not immersive'). During and after the game they expressed more joy and positive feedback than criticism and suggestion. The suggestions and criticism were mostly about the repetitive actions of the card taking and the children felt that the sun cards could also do something extra, such as a bonus or even do something bad when there is too much sun. When talking about gameplay, a few things are mentionable. The player token to help remember whose turn it is is unnecessary. At some point, the group would ask why the token needs to be used or just forget to pass it along. They would also discuss tactics and storm consequences and remind each other of the order of the turn actions.

Overall we can carefully conclude that the game is enjoyable and fun to play

User test - adults

Goal

The goal of the user test with adults was to gain a deeper understanding of the experience and usability of the game.

Methodology

Through convenience sampling Industrial Design students were recruited to take part in the user test. A recruitment form was sent through WhatsApp, where people could choose a timeslot to participate.

During the user test, the participants would play the game, which lasted around 30 minutes (see Figure 33a and 33b). Fluctuations happened when participants discussed their tactics more and discussed answers to the Silver Lining questions. After the game, a questionnaire was conducted with standardized questionnaires, the User Experience Questionnaire(UEQ) (Laugwitz et al., 2008; (PDF) User Experience Questionnaire Handbook, n.d.), the System Usability Scale questionnaire(SUS) (Brooke, 1995; Sauro, 2011), and the AttrakDiff questionnaire (Clement, n.d.; Marc Hassenzahl et al., 2003). SUS

Results

With a total of 13 participants, 4 games were played. The user test took about 45 minutes to complete, where an average of 7 minutes was spent on completing the online questionnaire. Figure 34 shows the mean per word pair of the User Evaluation Questionnaire. Here was used to measure usability and is even with small sample sizes still reliable. UEQ and AttrakDiff seem similar, but to avoid misinterpretation and provide better insights, both were conducted as recommended by a paper written by (Nakamura et al., 2021).

Observational notes were used to acquire data during the game and anonymous pictures of the game were taken. The observational notes were evaluated using an inductive, semantic analysis because the emerging themes were unknown in advance(Braun & Clarke, 2006). Questionnaire answers were obtained through Microsoft Forms and analyzed using Microsoft Excel.

The participants could choose a sticker with their favorite game animal after the session, to show my appreciation for their time.

we can see a lot of pairs between 0 and 3, except for the word pair unpredictable-predictable, which leans more towards unpredictable. Figure 35 shows the mean and variance per dimension of the UEQ.



Figure 33b: Adult User test

34



Figure 34: UEQ results per word pair



Table 5 and Figure 36 show the results of the System Usability Scale. Here all except one participant score a B or higher. The standard deviation is low, showing that the data is clustered closely around the mean.

The Attrakdiff scale results are shown in three different ways. Figure 37 shows the results per word pair, grouped per dimension. Figure 38 shows the total mean on a pragmatic-hedonic quality grid. Here are scores on the positive side of both qualities. The mean of all four dimensions is shown in Figure 39. Here the Attractive dimension scores higher, whereas the hedonic stimulation quality dimension scores lowest. All the means of each dimension still perform positively on the scale. For a full analysis, please see Appendix G.

Lastly, the observation notes taken during the user tests were analyzed (see Table 6). Here 9 dimensions emerged. the observations were focused on finding out if the gameplay and mechanics work, which is why 5 of the dimensions are focused on this. For the full analysis, please refer to Appendix F.

Participant	SUS-Score	stdev	Grade
1	80.0	0.60	A
2	77,5	0,54	В
3	75,0	0,77	В
4	82,5	1,42	A
5	90,0	0,92	A
6	62,5	1,02	D
7	90,0	1,20	A
8	87,5	0,50	A
9	97,5	0,30	A
10	75,0	0,45	В
11	90,0	0,66	A
12	92,5	0,46	A
13	75,0	0,89	В

Mean SUS score	82,7	A
Stdev	9,65	

Table 5: SUS-score result per participant



SUS-Score per participant (mean and stdev)

Figure 36: SUS-score result per participant



Figure 37: Attrakdiff result mean per word pair



Figure 38: Attrakdiff result hedonic-pragmatic quality



Figure 39: Attrakdiff result mean per dimension

Dimensions	Count of dimensions and subdimensions
animal sympathize	10
criticism	2
game aesthetics	12
game mechanics	20
player turns	14
storm	36
suggestion	2
sun card	6
tactic	22
Total	124

Table 6: Count per dimension of observational notes

Evaluation

From the word pair results of both the Attrakdiff and UEQ, we can see that the participants felt positive about the experience of the game. They both show a high average result on the Attractive dimension as well as the Pragmatic dimension (such as efficiency and ease of use). One of the word pairs, unpredictablepredictable, falls into the negative part of the scale, meaning that the participants felt the game to be more unpredictable than predictable on average. As we want the game to feel somewhat unpredictable this is a positive result.

Interpreting the SUS score is done using grades, it is not a percentile range. We can see that over half of the participants scored an A. We do need to take into consideration that answereing the SUS questionnaire can be confusing for the participant as it is unclear wether the answers should be about the whole game or just the digital part. This could have causes the outlier.

From the observations, we can see that these participants talked a lot about tactics and how to approach the game. They also sympathized with the animals and reacted to each other's turns and actions (which can be found under game mechanics in Appendix G).

The players expressed some criticism while passing the player token. One group dismissed passing the player coin altogether.



tin

Final Design

The final version of the design was implemented with the user test results and a more professional finished look. The player token was deleted from the game. The cards' corners were rounded to convey a more finished look. A teacher platform prototype was made to get a feel for the whole system, including the setup. Finally, an additional 10 questions were developed together with a psychologist in training. This final design was presented during Demoday at the Technical University of Eindhoven (see Figure 40).

Pida is now a cooperative game that has been developed, commissioned by Garage2020, to introduce children to the topic of performance pressure in a playful way. The game is played in the classroom. During the game, the children try to build a nature area while experiencing setbacks. These setbacks come in the form of storm cards, where a question is asked, before receiving a silver lining bonus, about topics regarding performance pressure, such as a positive self-image, feeling emotions, and dealing with setbacks. The questions can be tailored to the players during the setup of the game through the teacher platform.

The goal of the game is to be fun and playful while introducing children to a difficult abstract topic like performance pressure.

Costs per game

The final prototype was made with less than €20,manufacturing costs. This was due to favors and handwork by the designer. If the game would go into production, the costs vary depending on sustainability and budget. If the game stayed the same, with 3d printed models, the price would be higher than creating the game with flat carton illustration animals. If Pida is produced locally and sustainably, like Terra Nova (Stichting Terra Nova - Democratisch Design, 2019), the price would increase to a possible \in 100,-. However, if Pida was mass-produced in a country in Asia, like most boardgames, the manufacturing costs could drop lower than €10,- , when changing the 3d resin printed animals to a carton token (Novac, 2021). These costs are based on estimations based on other games and a conversation with the game store about production.

7. Conclusion

The design created and tested in this report shows an opportunity for creating fun games that touch upon big abstract topics such as performance pressure. It shows promising results when we still keep fun at its core. The goal in the first place was to create a fun playful game, which is accomplished according to the results.

Pida is a game to introduce the difficult abstract topic of performance pressure in a playful metaphorical way to children between the ages of 8 to 12. The cooperative nature of the game helps to create more connection amongst players and the animals help to feel more immersed in the game.

The game was tested with children and students, through which insights regarding game mechanics, experience, and enjoyment immerged. A thematic analysis was performed on observational and interview notes of the children user test as well as on the observational notes of the student user test. A User Evaluation Questionnaire, a System Usability Scale, and an Attrakdiff scale were conducted during the student user test. The results show that the game is perceived as fun and playful and most of the children would like to play it again. The game provokes discussion on tactics, but not so much discussion on questions regarding performance pressure. Further iterations could be made to increase reflection on performance pressure during the questions, this will be discussed in Chapter 8 – future work. Further research could be conducted to see the longterm effects of the game on mental well-being and performance pressure.

During this project, I went outside my comfort zone a lot. I dared to go beyond my network and asked for continuous feedback from psychologists, (game) designers, game players, and game sellers. I was able to quickly iterate through sketching, prototyping, and playtesting and learned about game design, which I rarely did before. With a user-centered approach, I was able to design a technology-enhanced tabletop game that applies to the age group and shows future potential. The game was tested with the actual target group in a fairly real context. I am proud to have delivered a project that shows my capabilities as a designer.

Pida

A game where setbacks help to grow

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Robin van Overbeek Final Bachelor Project

Coached by Rens Brankaert Joost Liebregts

Client Garage2020

inclusive design
 • • thoughtful technology

8. Future

Discussion

Pida supports the idea that game design can play a role in mental health care and early interventions. The game operates from a vision that a tabletop game should first be fun to play, to encourage players to play the game more often. To make a game fun to play, an immersive experience and visual appeal are important. Pida engages its players through a simplistic style with 3d animals with which the players can sympathize. This helps to motivate the players. It creates tension by not knowing when a storm will happen but gives players a feeling of control by giving them multiple ways to play and multiple silver lining bonuses to choose from.

Prospective design

Although the game work and is fun to play, some components should be changed when going into production.

The questions used now are ordered the same, to make the user test conditions variate the least. When going into production more questions should be developed with psychologists and the questions should be randomized during the setup. The setup of Pida should be created by the teacher. The idea was that the players can fill in the answers in the app. This is not the case right now and should be tested to see if this does not significantly change the speed of the game. The answers of the players should also be connected to the teacher platform, for reflection and to keep records of the game.

Limitations

Although the game is fun to play, it does not invite to talk a lot about the questions as this decreased the speed of the game. This can be because of the phrasing of the questions. It can also be caused by the game mechanics. When there is only one question to answer, it does not allow follow-up questions to dive deeper into the topic, and reflect more on the previous answers.

The vision for the game was to be played inside the classroom, but due to the busy school schedule, testing was done in after-school care facilities instead of in the classroom. Although this context mimics the classroom, it is not the same environment and setting. In addition, to validate the concept more users should test it. In addition, the user tests were conducted once but to investigate the long-term influences of the game a long-term user test should be conducted over several years to see if this way of early intervention and introduction to performance pressure creates more resilience and social cohesion in the long run. In addition, the game has not been tested with teachers, who could also provide valuable feedback.

We should also account for researcher bias during observation. The researcher is also the designer and even though I tried to be as objective as possible, it still could have occurred that I did not see negative reactions towards the game when trying to observe four participants at once and wanting the game to be perceived as exciting and fun.

In hindsight, the questionnaires used were now standardized questionnaires. A less-known game experience questionnaire could have provided more valuable and targeted insights for future development.

Figure 42: Fox Component

Pida



Figure 43: All components of the game Pida

Future work

Right now the game does not support lots of reflection and deeper conversion as this decreases the speed of the game. To include that discussion and reflection future implementations can be made. For example, if we consider Pida to be more of an introductory game, a learning package can be created around Pida with a workbook and exercises, referring back to the game and supporting conversation that dives deeper into the topics regarding performance pressure. By creating a lesson package it also appeals to subsidies for education and social projects.

Pida can also be developed not only for 8 to 12-year-

olds, but has potential for high school students, family situations, or in therapeutic practices, according to psychologists and teachers spoken to at Demoday and during expert meetings. This potential should be researched through a Needs Assessment.

Lastly, the game should be developed further with a focus on balancing the gameplay. Right now, when players Figure out that animals give lots of points, it is easier than to try and play trees. The tactics and point system should be balanced out more through lots of playtesting, as well as the storm questions and bonuses.

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Now we are at the end of our adventure, thank you for travelling with me

11. Appendices

- A. PDP February 2023
- B. Think like a game designer exercises
- C. Co-Create Data
- D. User test Children Analysis
- E. Game rulebook
- F. User test Students Qualitative Analysis
- G. User test Students Quantitative Analysis
- H. Business analysis
- I. Prototype pictures
- J. Brand Guidelines
- K. Study guide including consent form

If you do not have access to the appendix zip file, but would like to, please contact the designer at r.v.overbeek@student.tue.nl