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Abstract

With the solemn reality of modern society, where increasing demand for high achievements and performance in every aspect of life causes people to crumble under the pressure. The negative mental health effects on the public have been called an epidemic and are especially apparent for the youth and children.

With this project I wanted to research and promote leisure, relaxation and having fun for the simple reason that it feels good.

Through play humans and animals alike develop their main cognitive functions, play is said to be the brain's favourite way of learning.

This project starts off in the humble act of play, researching its importance both in cognitive development but also the mental health benefits. Further on looking at the digitalisation of play as well as peeking into the Swedish youth culture and mental health.

Deciding on working with digitalisation rather than against it, by developing a video game concept for Swedish teen girls, hoping to target some of the issues stated above.

In order to develop a video game concept I needed to research the process. To-gether with the help of two alumni from the Industrial Design programme (and now active in the video game industry) I constructed a strategy implementing both industrial design methodology as well as game design principles. Lastly I dabbled in animation and a bit of programming in the process of creating a visual representation of the concept.

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Research

1.1: Introduction

The initial research covers why humans play, the intrinsic and evolutionary value of play and how it's a core mechanism in developing cognitive and behavioral abilities. The second section accounts for how play is affected by digitalisation and what similarities, risks and benefits video games can have on cognitive and behavioral development, and how game based learning can be used for educational purposes as well as developmental.

In the summary the collected information and research is analysed and discussed and the first stage project topic is presented and motivated.

1.2: Evolution of play

The act of playing is not reserved to humans. It is believed that play is linked to evolving intelligence. A reviewed and accepted theory presented in the book "PLAY: It's Role in development and evolution" explains; The more complex the animal the longer the period of immaturity, this facilitates more advanced forms of development and learning through the act of playing. [4]

How can play develop intelligence?
The theories of Lev S. Vygotsky on self-regulation explains that the context of play enables exploratory and iterative behaviour both on the inter-subjective (shared) plane and by providing opportunities to practice self-regulatory components of

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4 Play: It's role in development and evolution" by J.S. Bruner, A. Jolly & K. Sylva, Orig. Publ. Penguin Books Ltd. 1976, e-Book 2017 International Psychotherapy Institute

multiple mental functions: fulfilling both real and symbolic desires, understanding and using the concept of delayed gratification, reflection and the ability to take on multiple perspectives.[5]

"In play a child is always above his average age, above his daily behavior; in play it is as though he were a head taller than himself. As in the focus of a magnifying glass, play contains all developmental tendencies in a condensed form; in play it is as though the child were trying to jump above the level of his normal behavior"
- Lev S. Vygotsky [6]

These are just two examples of many that conclude the importance of play as a core mechanism in human development both in cognitive, social and emotional learning. For a quick overview of the collected theories and data I used the paper "The role of play in children's development: a review of the evidence".

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5 Vygotsky, L.S. 1978. "Mind in society: The development of higher mental processes.", Cambridge, MA: Harvard University Press.

6 Vygotsky, L.S. 1967. "Play and Its Role in the Mental Development of the Child." Soviet Psychology 5:6–18

1.3: Forms of play

When an activity is perceived as play it combines joy with high levels of active engagement, resulting in an optimised learning platform. When studying how play develops certain skills and abilities, it's often categorized into different forms of play. In the white paper: "The role of play in children's development:a review of the evidence[4]", play is categorized into five forms of play:

Physical play:
Physical play can in turn be divided into three separate categories: activity play, fine motorics play and rough-and-tumble play. Activity play consists of pastimes such as climbing, swinging, dancing and so on. Fine motorics play consists of activities such as coloring, manipulating objects, cutting and so on. Lastly rough-and-tumble play is typically referred to as "play fighting".

Physical play is mainly associated with developing a good physique and the numerous health benefits from the inherent exercise in the activity, however a small selection of studies gives reason to believe that physical play also contributes in developing cognitive self regulation, various forms of academic progress and social competency.

Object Play:
Object play is essentially a form of explorative play. Object play also includes forms of fine motorics- and pretend play. In the infantile stage object play mainly consists of a basic form of interaction with objects such as grasping, tasting, and observing. As the child grows the object play may consist of classifying and contructional use of objects, sorting and building. And with pretence play the child might assign roles or abilities to objects to represent something else.

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4 *"The role of play in children's development: a review of the evidence (research summary)", Whitebread, D., Neale, D., Jensen, H., Liu, C., Solis, S.L., Hopkins, E., Hirsh-Pasek, K. Zosh, J. M. (2017). . The LEGO Foundation, DK*

The studies and data are small and arguably contradictory, however there are links between object play and the development of representational abilities, reasoning and problem solving strategies.

Object play is also believed to contribute to the development of language acquisition, mathematics and spatial ability.

Symbolic play:

Symbolic play or semiotic play relies heavily on the ability of symbolic representation. A skill that is only found in humans since it requires an understanding of various advanced symbolic and representational systems and how to communicate the meaning within. Symbolic play emerges as the child develops an understanding for the symbolic systems humans use; language, numbers, writing, various visual media, music and so on.

Regarding symbolic play the studies are speculative. It is believed that symbolic play aids in the learning and understanding of these systems but whether it helps in any other form of development for the child is unclear. Some research links musical play with developing communication skills and higher cognitive function which contributes to self-regulation.

Pretend play

Pretend play consists of imaginatory and representational play, it can be with or without objects and is based on the child's perception and understanding of symbolism and awareness of the world. Being able to fabricate characters, objects and stories from their own imagination and their surroundings. Pretend play is the most thoroughly studied form of play and is believed to develop reasoning skills, and may have an impact on social development. It is also believed to generate awareness and recognition of other beings' minds.

Pretend play might aid in the development of emotional regulation, language and narrative skill. Lastly, it is indicated that framing an activity as pretence may increase childrens' motivation. According to a study conducted on 38 preschoolers who were given the challenge of either catching as many fish as they could for a sticker reward or pretending to be fishermen and during the activity the chil-

dren performing pretend play demonstrated several a higher level of persistence and engagement.

Games with rules
What differentiates play and games? Games have rules, and when you play a game the fun is largely based on the conditions and limitations that rules create. This form of play is commonly practised by adults and children alike.
The benefits of playing games with rules are many. Playing games developed a wide range of social skills, both in communicating the rules, abiding by the rules, repercussions of not abiding by the rules to name a few. Board games are believed to improve numerical and mathematical abilities. There are also the physical benefits of sports practitioning and other physical games like tag, as well as the mentioned above social skills in performing team efforts.

In the next section a detailed account regarding the research on developmental risks and benefits of video games will be provided.

1.4 Play today?

Has digitalisation affected playtime? And as a result affected the children's learning and development? In the annual report "ISFE Key Facts 2019" by the Interactive Software federation of Europe, 76 percent of kids ages 6-11 play video games on a regular basis.[5]

According to developmental behavioral pediatrician and researcher Jenny Radesky, mobile devices are an unavoidable part of children's lives today. Understanding both the benefits and the pitfalls is crucial in mediating the digital lives of kids today. When discussing "gamified childhood" Radesky highlights some key differences in games contra play, and what effects that needs to be considered by parents, professors and designers.[6]

5 "ISFE Key Facts 2019" published by the Interactive software federation of Europe, (2019), https://www.isfe. eu/wp-content/uploads/2019/08/ISFE-Key-Facts-Brochure-FINAL.pdf

6 Beata Mostafavi, (October 24 2019). Gamified childhood: Are Digital Devices replacing traditional playtime? M Health Lab, Michigan Medicine, Michigan University. https://labblog.uofmhealth.org/health-tech/gamified-childhood-are-digital-devices-replacing-traditional-playtime

Starting with the child's autonomy, the general tech based games have a closed loop design, where the child's behavior is constrained to a preset of actions and outcomes. Leaving the child with little to no room for their own modifications, ideas and exploration of the game.

There's also the issue of stimulus overload. Digital games are attention grabbers, their goal is to keep the child hooked for as long as possible by constant stimuli in sounds, effects, rewards and so on. While unstructured play is attention building, the activity demands that the child engages and makes an effort in order to create their own rewards.

Lastly there's the social aspect. When children interact with each other during play, they encounter social dilemmas where they need to adapt to a group, learning to compromise, empathize, understand body language and social cues, and how to communicate. Complex human behavioral skills.

However digital games aren't to be ruled out. In the paper "Digital Games for Young Children Ages Three to Six: From Research to Design" by Debra A. Lieberman, Maria Chesley Fisk, and Erica Biely, the authors suggest that there are many things to be learned from games, and there is a huge potential in the medium if consciously and smartly designed.

"A small body of research has found that games—when well designed—can provide rich, fun, interactive experiences that can foster young children's learning, cognitive development, skill building, social interactions, physical activity, and healthy behaviors."[7]

7 "Digital Games for Young Children Ages Three to Six: From Research to Design" by DEBRA A. LIEBERMAN, MARIA CHESLEY FISK, and ERICA BIELY, published by the Taylor & Francis Group, (2009), University of California, Santa Barbara, Santa Barbara, California, USA.

James Paul Gee is a professor and researcher of literacy studies who's been advocating for the potential of game based learning and has conducted extensive academic research on the topic.

In his essay; "GOOD VIDEO GAMES AND GOOD LEARNING" he summarises his essays on game based learning and concludes 16 learning principles of "good" video games.[8]

"Identity: To deeply and thoroughly learn something you need to commit with your identity, "the self" to the subject, in games this is done by either relatable and well developed characters or letting the player customize their own.

Interaction: Interaction forces you to synthesize your knowledge into action. In every aspect of a video game the player is required to perform informed decision making in order to play.

Production: Video games also ask the players to become producers in the game, their decisions shape the events, and outcome in a sense co-writing the game.

Risk taking: Well designed video games usually promote risk taking and exploration. Learning by failing and trying again. This is done to produce a greater feeling of gratification for the player when they "finally" overcome a troublesome task.

Customization: Players can usually customize several aspects of a game, like difficulty and playing style to suit their abilities and interests. When a level of customization is allowed the player can work with their own strengths and weaknesses instead of against them.

Agency: In games players have an ownership and a real sense of control of what they are doing, which is rarely the case in real life, especially not in school or work.

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8 Biography, James Paul Gee's official website, page visited: 15th of March 2020, https://www.jamespaulgee.com/academics

Well ordered Problems: Many video games are based on a levelling system, the skills and tasks of the game build upon each other, developing a multilayered understanding of the mechanisms and structures which prepares the player for the advanced levels.

Challenge and consolidation: To keep a game engaging and interesting there needs to be a good balance of challenge and consolidation, where the player develops a skill, masters it, and is then required to adapt to a new situation or incorporate a new skill into their regime. The cycle loops over and over again, forcing the player to continuously advance and deepen their skills. This cycle is referred to as "the cycle of expertise" and it's the way in which any skills or abilities are mastered, not just in video games.

"Just in time" and "on Demand": In Video games the players rarely receive any extensive or out of context information. They recieve just what they need at a certain time to perform a certain task, or "on demand" where they themselves choose to attain it. The information becomes useful instantly and feels valid as it fills a need for the player resulting in no information overload and a higher likelihood of remembrance.

Situated meanings: Studies show that in order to fully comprehend the meaning of a word or a phrase you need more than words to describe it, you need situations, images, experiences. In video games this is standard practise since it's a visually interactive media while in traditional academic environments it is rare.

Pleasantly frustrating: In a well designed game the player is kept in a challenging but "doable" state. This keeps the game interesting and enjoyable. The same principle could be applied to traditional learning by allowing for a more customized or individually adaptable curriculum. Of course it's an issue of assets, finances and politics.

System based thinking: Players are required to make their decisions in relation to the system and mechanisms of the game. They need to consider a wide range of

aspects and potential scenarios based on their knowledge of the system. In multi-player games they also need to consider the actions of other players.

Explore, Think Laterally, Rethink Goals: *Games encourage players to explore thoroughly before moving on too fast, to think laterally and not just linearly, and to use such exploration and lateral thinking to reconceive one's goals from time to time.*

Smart tools and distributed knowledge: *In both solo and multiplayer games the player is confronted with smart tools and distributed knowledge. In solo gaming a character might automatically perform a certain set of tasks, and the player's task is to manage and distribute the character's automated behaviour in a strategic and efficient way. In multiplayer games this could consist of team based playing where different characters have different skill sets and you only control and manage your character but need to consider and adjust your actions to the rest of your team, both the characters and the players. In this type of scenario players need to develop their communication and cooperation skills.*

Cross functional teams: *As mentioned above, in multiplayer games the player must consider not only their own character's skills and abilities but also the rest of the team and sometimes the opponents too. This results in cross-functional learning, understanding enough of each other's specializations to integrate and coordinate with them.*

Performance before competence: *In good video games players are allowed to perform without being competent, by either smart tools or guided help incorporated in the game. In a multiplayer setting; chat rooms or forums, or in-game help from more advanced players. This promotes learning by doing which is necessary in understanding large scale complex systems such as the act of language acquisition."*

- James Paul Gee

1:5: Summary

In conclusion, play is the foundation in cognitive and behavioural development for children. Play is also an effective way of learning and developing new knowledge and skills in general. Since digitalisation the majority of children spend an increasing amount of time playing video games, and interacting over the web rather than in person with traditional play. However digitalisation does not only concern playtime, 9 out of 10 jobs are estimated to require digital skills according to the European Commission.[9]

Which led me to wonder if the digitalisation of play might be positive in preparing for the future professional climate?
Dr Anesia Hosein conducted a study at the University of Surrey showing that girls who regularly play video games are 3.3 times more likely to pursue a career in STEM (Science, Technology, Engineering and Mathematics).[10]
As stated in the above segment, there are proven benefits in both development and learning with well designed video games. Exploring this subject and aiming to understand the principles and mechanics seemed like a promising start in both allowing for a wide range of interesting design decisions and possibilities as well as a deeper knowledge for human behaviour and the (to me) unknown sector of video game design.

However the topic was still not refined enough to formulate a brief, so moving forward in the project I decided to engage in a deeper research to define a target group.

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9 *"The digital skills gap in Europe", published 19/10 2017 by the European commission, the official website of the European union. https://digital-strategy.ec.europa.eu/en/library/digital-skills-gap-europe*

10 *"Girls' video gaming behaviour and undergraduate degree selection: A secondary data analysis approach" by Dr Anesa Hosein, Published by Elsevier Ltd 2018, ScienceDirect ®is a registered trademark of Elsevier B.V. https://www.sciencedirect.com/science/article/abs/pii/S0747563218304862*

Chapter 2: Directed Research

2:1 Intro

This chapter covers the next step in the research phase, including a deep look on behaviors, lifestyles and health of Swedish children and adolescents as well as a directed market- and video game industry research. In the last segment the collected information and data is summarized and analysed, motivating goals and formulating a brief for the project.

2:2 Target Group

The first step of the directed research was to slim down the scope. Focusing on Swedish children and adolescents would simplify decision making by having comparable and relatable data. The body of information was collected from Barnombudsmannen, Statens Medieråd, Folkhälsomyndigheten and Statistiska Centralbyrån, all governmental institutions and organisations that conducts research, provides data and reports to be used in analytical and legislative procedures.

2,414,374 Children and youths in the ages 0-19 in Sweden Today (2020)
Popular Data collected from "Statistiska Centralbyrån"[11]

From the age of 11, 90 percent of Swedish children have their own smartphone. When they reach 18 it's 97 percent.[12]

The majority of younger Swedish children do not have a smartphone of their own, however 27% of 5-8 year olds play games on smartphones every day.

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11 *"Sveriges befolkningspyramid", last updated 2021-10-13 by SCB https://www.scb.se/hitta-statistik/sverige-i-siffror/manniskorna-i-sverige/sveriges-befolkningspyramid/*

12 *"Unga & medier 2019", page 6, published 2019-09-10, by Statens Medieråd, last updated 2021-04-18 https://www.statensmedierad.se/rapporter-och-analyser/material-rapporter-och-analyser/ungar--medier-2019*

Most young children use smart devices such as phones or pads to watch movies, shows and videos although from 5 and upwards video games become more common, mostly with the boys however.

YouTube is by far the most popular app and the video games Swedish children play are mainly Roblox or Minecraft.

Regarding video games on consoles or computers, Minecraft tops the charts for both girls and boys with 27 % of boys playing and 17% of girls.[13]

The highest consumption of games on any device is in the ages 9-12 where 79% of the participants state they play regularly. 78% of the boys and 81% of the girls. Boys continue to play with 81% of 13-16 year olds stating they play while girls drop the activity as they grow older with 57% stating they play in the ages 13-16.

Regarding high level consumption (more than 3 hours per day) there's a significant gender differentiation with the statistics for the boys averaging around 30% and the girls are below 10%.

[14]

Minecraft and Roblox appeals to both genders, however mainly in the ages 9-12 the differences in video game preference seems to increase with age, where the boys play more "battle royale"-style games like Fortnite, League of Legends and Counter Strike: GO where players compete against each other often in teams. Girls play more mobile puzzle games like Helix Jump and Candy Crush and sandbox video games like Minecraft and The Sims. Puzzle games are as the name implies solving puzzles or challenges and earning scores and achievements or leveling up from it, while sandbox games often times does not have a specific goal or achievement but rather lets the player make their own goals for the game, allowing a high level of creativity and autonomy in the gaming experience.

13 "Småungar& medier 2019", published 2019-09-10, by Statens Medieråd, last updated 2021-04-18 https://www.statensmedierad.se/rapporter-och-analyser/material-rapporter-och-analyser/smaungar--medier-2019

14 "Unga & medier 2019", published 2019-09-10, by Statens Medieråd, last updated 2021-04-18, https://www.statensmedierad.se/rapporter-och-analyser/material-rapporter-och-analyser/ungar--medier-2019

However the most performed leisure activity in the ages 13-18 is social media where over 95% states that they consume various social medias daily. With Snapchat and Instagram topping the charts.[15]

According to a study conducted by Folkhälsomyndigheten psychosomatic health for Swedish children and youth is declining. Psychosomatics is exploring the relationship between social, psychological and behavioral factors on bodily processes and quality of life. Such as trouble sleeping, anxiety, stomach- and headache, irritation and dizziness.[16]

The study states that the lowered quality of the Swedish Schooling system in combination with the increased awareness of higher demands and competition for employment could contribute to the decline in health for the Swedish children and adolescents.

The increase in socioeconomic inequalities as well as structural changes such as increased individualisation could also be contributing factors. Worth to mention is however the lowered stigma surrounding mental health which also could explain an increase in the statistics.

They conclude the study by suggesting measures to improve the Swedish Schooling System are needed in order to strengthen the children's learning outcomes and secure their future labouring opportunities.[17]

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15 *"Unga & medier 2019", page 47, published 2019-09-10, by Statens Medieråd, last updated 2021-04-18, https://www.statensmedierad.se/rapporter-och-analyser/material-rapporter-och-analyser/ungar--medier-2019*

16 *"Varför har den psykiska ohälsan ökat bland barn och unga i Sverige", page 5, by Folkhälsomyndigheten, published 2018-04-26 https://www.folkhalsomyndigheten.se/publicerat-material/publikationsarkiv/v/varfor-har-den-psykiska-ohalsan-okat-bland-barn-och-unga-i-sverige-kortversion/*

17 *"Varför har den psykiska ohälsan ökat bland barn och unga i Sverige", page 7,written and published by Folkhälsomyndigheten(2018-04-26) https://www.folkhalsomyndigheten.se/publicerat-material/publikation-sarkiv/v/varfor-har-den-psykiska-ohalsan-okat-bland-barn-och-unga-i-sverige-kortversion/*

The report "Barn som växer upp i utsatta kommuner och förorter" by Barnombudsmannen, gives a deepend perspective on the consequences of the socioeconomic inequalities and how they affect the Swedish children and youth. Statistics show that inequalities in performance in school, health and economics are linked to where the child lives.[18]

Exclusion and low expectations towards themselves and society is common for the children and adolescents in these areas. They either feel neglected, forgotten or discriminated against because of where they live depending on if it's a suburban- or a sparsely populated area. This affects the child's perception of the self and their optimism about the future. Results from surveys showed that one out three boys from suburban areas have little to no faith in their futures compared to one out of five in urban areas.

However the report also shows that when given a chance to participate and engage in leisure activities where their actions matter and can have a real influence over things, the children tend to feel less excluded and more valued as human beings by both themselves and society.

Gender is also a determining factor in mental health and well being. Folkhälsomydighetens data show that boys and girls are generally happy about themselves and their lives as children but when they reach adolescents the girls mental health declines.[19]

There are links between media usage and decreased mental health especially in girls. The data only shows that Swedish children and youth with several perceived psychosomatic issues tend to have a higher media usage, not that it's correlated in the sense that the media usage is what's causing the issues. [20]

18 "Barn som växer upp i utsatta kommuner och förorter" , written by Anna Karin Hildingson Boqvist, published by barnombudsmannen.se (2018-03-27) https://www.barnombudsmannen.se/barnombudsmannen/vart-arbete/skrivelser/2018/barn-som-vaxer-upp-i-utsatta-kommuner-och-fororter/
19 "Pojkar mår bättre än flickor i tonåren",written and published by Folkhälsomyndigheten (2019-03-08) https://www.folkhalsomyndigheten.se/nyheter-och-press/nyhetsarkiv/2019/mars/pojkar-mar-battre-an-flickor-i-tonaren/

20 "Medieanvändning och psykisk ohälsa bland tonåringar", written and published by Folkhälsomyndigheten (2015-10-20)
https://www.folkhalsomyndigheten.se/publicerat-material/publikationsarkiv/m/medieanvandning-och-psykisk-ohalsa-bland-tonaringar/

Summary

Concluding the Target Group-research, it's clear the Swedish children and youth of today are very much a digital generation that lives a large part of their everyday lives online.

There are gender differences in how boys and girls consume media and use their smartphones. Especially as they enter their teens. Boys spend more time playing video games while girls spend more time on social media.

Due to structural changes in society, cultural and socioeconomic, many feel a lessened faith in their futures and high pressure to perform both in school and socially. Many lack a sense of agency and the ability to affect and control their own lives. There are gender differences in mental health regarding teen girls who experience a lower satisfaction with themselves and their lives, they also are more affected by psychosomatic issues. Many who experience mental health issues have a high media consumption, especially teen girls.

Moving forward, I chose teen girls with psychosomatic problematics to focus on. I wondered if the split that occurs in the ages 10-12 where girls on a larger scale develop mental health issues could be linked to the fact that they "need to grow up" faster. Puberty occurs earlier for girls and it might impose in a sense on the girl's childhood. Play is associated with children and could be seen as a taboo activity for a teen, a video game could be a way around it while still catering to the same needs and behaviours that actual play would, while being the more socially acceptable activity. A video game is also more in line with the digital generations' interests and lifestyle.

Designing a video game for teen girls could be a way of extending, albeit temporarily childish behavior. Promoting a sense of accomplishment and agency even if it's in an imaginary setting. Promoting a healthy escapism where they can take a break from the pressures of everyday life.

2:3 Market Research and analysis

In the report Unga och Medier 2019 that's been previously cited, the collected data showed that The Sims tops the charts for 13-18 year old girls and are amongst top three for 9-12 year olds. The 9-12 year olds rate Minecraft and Roblox higher. This could imply that as the girls enter their teens they are more concerned with how they are perceived and since The Sims are one of the few games not marketed towards men/boys, they feel more inclined to play The Sims rather than Fortnite or League of Legends that tops the charts for the boys in the same age group.[21]

Besides The Sims, the girls also state they play several mobile games;

Helix Jump: A puzzle game where the player controls and leads a bouncy ball through a spiral labyrinth

Hay Day: A Farm simulation sandbox game where the player builds their own farm. They grow crops, harvest and tend to animals and collect points in order to expand.

Candy Crush: A tetris like puzzle game where the player moves and matches candies in puzzles in order to get scores.
The Swedish teen girls seem to be more likely to play mobile games rather than consoles or PC. They also seem more likely to play games that are marketed towards them. The genres that seem to be most popular are Sandbox and puzzle games.

According to the Interactive Software Federation of Europe "Key Facts" of 2019, 46 percent of "gamers" in Europe are female. And yet in the same report stating the top selling games, none are marketed towards a female audience. N umber one being FIFA a Soccer video game that's only in the latest release started to include female Soccer players. Number two is Red Dead Redemption II, a western role-playing game with a male based cast and narrative.

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21 *"Unga & medier 2019", page 44/45, published 2019-09-10, by Statens Medieråd, last updated 2021-04-18*
https://www.statensmedierad.se/rapporter-och-analyser/material-rapporter-och-analyser/ungar--medier-2019

Number three Call of Duty: Black Ops 4, a first-person shooter game. [22] Considering the data in the Quantic foundry study by Nick Yee engaging 270 000 gamers worldwide,that showed sports- and tactical shooter games are the least played genres by females.[23]

There's clearly a gap in the market seeing the number of players who are female and the number of games made and marketed towards them.
An earlier publication from the same study showcases a chart of primary motivators for female gamers and the top motivators are completion, fantasy, design and community.[24]

In conclusion, there seems to be a lot of space to cover in designing video games for women. The video game industry isn't focused on or catering to women's interests and preferences regarding games. (not including mobile games) Since men and boys generally spend more money on video games and as such are the more profitable target group it makes sense the market looks this way, however there seems to be a lost opportunity considering the scale of the female audience or why not a combined audience. Instead the female interests and motivators are mostly accounted for in mobile games, maybe because mobile games are cheaper and quicker to develop and make revenue by advertisements and in-app purchases which allows targeting a female audience without the "risk" of losing revenue.

22 "ISFE-key-Facts-2019", written & published by the Interactive Software Federation of Europe (2019)
https://www.isfe.eu/publications-research/

23 "Beyond 50/50: Breaking Down the Percentage of Female Gamers by Genre" written by Nick Yee, published by Quantic Foundry (2017-01-19)
https://quanticfoundry.com/2017/01/19/female-gamers-by-genre/

24 "7 Things We Learned About Primary Gaming Motivators From Over 250 000 Gamers", written by Nick Yee,published by Quantic Foundry (2016-12-15)
https://quanticfoundry.com/2016/12/15/primary-motivations/

2:4 Formalizing A brief

Considering the market- and target group research I was inclined to design some form of video game with teen girls as the target group. The objective being that the game should promote playful behaviour and utilize the benefits of play to target psychosomatic issues, like stress and anxiety.

The initial brief needed to define a direction yet remaining quite open since it was so early on in the project. I had personal goals of developing deeper skills in sketching and illustration, as well as interaction and experience design and figured it could be combined in making a 2D game.

As such the initial brief ended up like this:

"Design a 2D video game prototype for Swedish teenage girls"

Chapter 3: Defining a method

This chapter will account for the research regarding video game design as well as the formulation of a project strategy. The first segment contains interviews with two alumni from the Industrial Design Programme who are active in the video game Industry. The second segment contains research of game design principles and how to implement them into the workflow.

The last segment presents a strategy and a timeline for the project.

3:1: Interviews

Thanks to my supervisors I got in contact with two alumni from the Industrial Design Programme, they were both active in the video game industry as Environment Artist and Studio Art Director at leading companies. As such their full names and the companies won't be disclosed. However their insight and information was extremely valuable in this stage of the project.

Since I wasn't able to record the interviews, I'll proceed by doing a summary instead, presenting the topics that were discussed and the take-aways.

With both of them I discussed what their professional titles entailed. The studio Art Director is the creative lead who coordinates the graphics staff with the rest of the production. The art director usually formulates the concepts as well as supervises the rest of the design process as well as marketing. The Environment artist responsibilities entails creating in-game assets and environments/backgrounds.

The Studio Art Director got his position from working his way up from an internship at a Swedish video game company. The Environment Artist studied specifically to work with video game graphics.

They both concluded that the video game development pipeline isn't very different from industrial design methodology.
The main difference is to design for fun, excitement and engagement instead of function. However the Environment Artist suggested starting with conceptualizing a theme and world/environment, then move on to the main character and lastly do the props, props meaning items, collectables and non playable characters.

Both of them thought the research was thorough and the brief was good but could need some specification in order to move forward with the project, alternatively create a functional analysis based on the research to act as a guide for decision making.

Regarding what kind of game I could create based on the research I had suggested making a role playing game, creating an engaging narrative that sweeps the player away. The Studio Art Director recommended I'd use an existing story in order to focus on designing and developing the game and the characters instead of story writing.

Concerning the scope of the project both of them advised me to make it as small as possible, that learning new things takes time and it's wiser to create something small but well made. WMaking it a 2D game was a good choice, it's a quicker workflow and doesn't need as much programming as 3D.

Lastly they advised me to create a "playable" prototype, to focus on the concept and mainly create a prototype for demonstrative purposes.

3.2 Game Design Principles

Upon finishing the interviews, it was clear I needed a crash course in what makes good video game design. How do you design "fun"? One attempt at an explanation is given in the paper "MDA: A Formal Approach to Game Design and Game Research" by Robin Hunicke, Marc LeBlanc, Robert Zubek.[25]

MDA: Mechanics, Dynamics and Aesthetics

Mechanics describes the particular components/ "rules" of the game

Dynamics describes the run-time behavior of the mechanics acting on player inputs

Aesthetics describes the desirable emotional responses evoked in the player when interacting with the game

25 *"MDA: A Formal Approach to Game Design and Game Research" written by Robin Hunicke, Marc LeBlanc, Robert Zubek, published by Stanford GTD, Stanford University*
https://gdt.stanford.edu/mission/methodology/

They also presented a taxonomy to describe the components of "fun" in a game:

Sensation: Game as sense-pleasure

Fantasy: Game as make-believe

Narrative: Game as drama

Challenge: Game as obstacle course

Fellowship: Game as social framework

Discovery: Game as uncharted territory

Expression:Game as self-discovery

Submission: Game as pastime

However I needed more practical examples of what the process actually looks like when designing a game. Discovering the text "3 Primary Game Design Principles To Keep in Mind When Making Games" written by Dustin Tyler, aided in making the framework of game design concrete and cohesive.[26]

Tyler described the process as an iterative design process that circles around three primary principles that lays the basis for constructing and refining a game.

Firstly Tyler describes how all games are built around a core mechanic. The main action the player performs is the core action, taking Super Mario as an example it's running and jumping over and over again either to avoid enemies, moving forward through the level or collecting coins/rewards.

"If this mechanic, which players will be performing constantly during your game, is boring or uninteresting, your design has failed."

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26 *"3 Primary Game Design Principles To Keep in Mind When Making Games", written by Dustin Tyler, published by gamedesigning.org, last update (2021-06-25) https://www.gamedesigning.org/learn/game-design-principles/*

Tyler also suggests introducing new elements to keep the game interesting, since the core mechanic itself needs to be strong enough to be repeated over and over and remain fun.

Referencing back to Gee and his principles:

"To keep a game engaging and interesting there needs to be a good balance of challenge and consolidation, where the player develops a skill, masters it, and is then required to adapt to a new situation or incorporate a new skill into their regime. The cycle loops over and over again, forcing the player to continuously advance and deepen their skills. This cycle is referred to as "the cycle of expertise" and it's the way in which any skills or abilities are mastered, not just in video games." [27]

Suggesting the core mechanic is what the player "masters" by repetition and adaptation to new situations and elements.

Tyler's second principle aligns with this as he describes it as:
"Easy to learn, fun to master"
A game should be accessible and easy to engage with as someone who's never played before, whilst still having the depth to keep playing it for years to come. Tyler presents Chess as an example, a game that's been around for centuries, anyone can learn it, yet to this day professional chess players keep expanding and discovering new strategies. In conclusion, good game design is making a game approachable by making it playable on several levels of skill, the beginner should enjoy the game just as much as the master.

Lastly Tyler demonstrates the concept of *"Rewarding the player"*, the third principle which states that human beings approve of and respond well to positive reinforcement. Tyler even proclaims there's nothing that motivates human beings

27 " GOOD VIDEO GAMES AND GOOD LEARNING" by James Paul Gee,(2007) Tashia Morgridge Professor of Reading, University of Wisconsin-Madison, Madison, USA.

more than positive reinforcement.

Arguably the point of games is to facilitate an enjoyable experience, and receiving praise, cheer and adoration is enjoyable.

Tyler describes classic ways to implement positive reinforcement in games such as scores, awards and achievements. He rendered the list of ways to reward players as endless, the importance is that a game designer makes it a priority to do so.[28]

3:3 Design Strategy

After conducting the interviews and researching game design principles, I had the tools to construct a strategy for the project. Going back to address the original brief: "Design a 2D video game prototype for Swedish teenage girls", there was a need for slight iteration considering the advice from the alumni interviews. To focus more on concept and less on the prototype the tweakment became this:

"Design a 2D video game concept for Swedish teenage girls"

From the research of game design principles combined with the input from the interviews I constructed a three phased design process:

Phase one:

Concept development:
Theme & Core mechanic
I decided to conceptualize these simultaneously since they should support each other, aiming for good Aesthetics considering the MDA methodology as well as being based and motivated in regards to the target group interests and preferences.

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28 *"3 Primary Game Design Principles To Keep in Mind When Making Games", written by Dustin Tyler, published by gamedesigning.org, last update (2021-06-25) https://www.gamedesigning.org/learn/game-design-principles/*

Characters & Gameplay

In this section I'll be focusing on developing a strong lead character that suits the theme and the core mechanic as well as structuring the gameplay: Dynamics and Mechanics. Also here it will be of utmost importance to consider the Target group and their preferences in gameplay and design.

Evaluation & Iteration

As always it's good to take a step back, test the choices against the research and make modifications accordingly. Both the alumni were onboard to give me feedback during the project.

Phase two:

Constructing a prototype
Research and skill development
In creating a prototype I'll need to develop skills in creating game assets as well as game development coding

Basic prototyping
Create a basic prototype for testing and troubleshooting early on for quicker and easier alterations.

Assembly
Create the Assets, Animations, and assemble the final prototype

Phase three:

Finalization & presentation
Finalize the prototype
Make final adjustments and polish the prototype and create showcase material for presentational purposes.

Exhibition
Tailor showcase material of the project to suit an exhibitional setting.

Reflection & documentation
Reflect and discuss the results, room for improvements and learnings. Assemble and finalize a project documentation.

Chapter 4: Concept Development

This chapter describes the process from the initial conceptual stages up til the finalization and a presentation of the results. With a substantial coverage of the integration of both industrial- and game design methods, in combination with the target group research, resulting in a thorough design process and thus enabling the fulfillment of the project brief.

4.1 Theme and initial concept

The first design decisions, regarding theme and core mechanics were based on the quantic foundry study regarding primary motivators for female gamers. Where the data revealed the top motivators as completion, fantasy, design and community.[29]

My slight iteration of this to define the needs and desires a bit more, became imagination, friendship and scenic imagery. Also considering the Studies from Folkhälsomyndigheten that showcased a decline in mental health for the Swedish youth(primarily regarding females), demonstrating a significant increase of experiencing stress and anxiety on a regular basis. [30]

I wanted to assert this issue in the project, creating a calming atmospheric environment that helps the player unwind and take a break from everyday life. Hence I decided upon a forest setting, since it both enables a scenic visual concept and also creates a tranquil atmosphere as forests are associated with attributes like longevity, stillness and life essence.

Regarding Core Mechanic it wasn't as easily connected to the research. The Studies from Medierådet showed that Swedish teen girls prefer puzzle and sandbox games and the core mechanic varies in all the games that were stated as the top five. [31]

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29 *"7 Things We Learned About Primary Gaming Motivators From Over 250 000 Gamers", written by Nick Yee,published by Quantic Foundry (2016-12-15)*
https://quanticfoundry.com/2016/12/15/primary-motivations/

30 *"Varför har den psykiska ohälsan ökat bland barn och unga i Sverige", page 5, by Folkhälsomyndigheten, published 2018-04-26 https://www.folkhalsomyndigheten.se/publicerat-material/publikationsarkiv/v/varfor-har-den-psykiska-ohalsan-okat-bland-barn-och-unga-i-sverige-kortversion/*

31 *"Unga & medier 2019", page 47, published 2019-09-10, by Statens Medieråd, last updated 2021-04-18 https://www.statensmedierad.se/rapporter-och-analyser/material-rapporter-och-analyser/ungar--medier-2019*

Considering the statements in the report referenced above by Folkhälsomyndigheten. They mention a probable contributing factor to the decline in mental health, as the individualisation of society. That the focus is to be fantastic on your own. Self realisation is about the individual's accomplishments, and if you are not successful you can't be realised as a person(of course you can define what "success" means on your own but it's generally decided by society). This mindset will undeniably increase the pressure to perform and thus contributing to raised levels of stress and anxiety as the option of being non successful or just mediocre is seen as a failure of life and a bad utilisation of all the tools modern day society has offered you.[4]

In an attempt to promote togetherness and less focus on the self and self realisation I decided to incorporate friendship and cooperation.
Having the player navigate two characters and utilising their different strengths and weaknesses in order to complete levels and solve puzzles. And since representation matters the two characters would be girls. The depiction of female friendship has increased over the years but there's still a low representation and oftentimes women are competing instead of supporting each other and that stereotype is rather harmful, especially to young impressionable girls and boys.

To summarize the theme "Dreaming of nature and friendship" or the more concrete "Friendship in a fantasy forest". The game would be a tranquil and slow paced puzzle game where balancing the two character's traits and abilities would be an integral part of the game.

With this I decided to construct a functional analysis to define the direction and the central aspects of the game.

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4 *"Varför har den psykiska ohälsan ökat bland barn och unga i Sverige", page 5, by Folkhälsomyndigheten, published 2018-04-26 https://www.folkhalsomyndigheten.se/publicerat-material/publikationsarkiv/v/varfor-har-den-psykiska-ohalsan-okat-bland-b*

What the concept Needs:

Be visually attractive to a female audience (since so many state they won't play a game that looks "ugly")

Apply the prefered playstyle of young females with a focus on fantasy, creativity and community

Implement puzzle game features since it's the genre most appreciated by young females

Represent girls as lead characters (beacuse representation matters)

Other desired features:

Promoting mental health by de-stressing the players with slow puzzle solving mechanics and calming scenery

Promoting mental health by building confidence in ability through achievements and rewards

Promoting mental health by offering a "break" from everyday life

4.2 Game Mechanics

In this stage I wanted to define the mechanics of the game, mainly the core loop - the action to be performed over and over again by the character/characters.

I wanted the puzzles to be based on the environment of the levels to emphasize the forest thematics. There were also the 2D platformer constraints to think about when designing the mechanics. The Characters will only be able to move in a linear path in a 2D space. Also keeping in mind the feedback from the alumni to keep it simple.
Running and jumping is a given mechanic but what is the goal, why are the characters performing these actions, and what obstacles do they face, what makes the game challenging?

Returning to the initial concept of cooperation and utilizing the characters' individual assets.

"Physical" obstacles that require the right usage of character and combination.
Inspiration from the game "Portal" where the player moves and directs lasers in order to open doors and pass through rooms.
Using jumping, crouching, climbing and pushing, maybe lifting objects, using the right character at the right obstacle and in the right combination to move both characters safely through the level.

Core loop: combine the two characters' abilities in order to solve puzzles.

4.3 Designing the Environments

This segment explains the process of creating the visual aesthetics of the game, starting with the environment, the dreamlike forest.

I started off by assembling a palette. I choose dark pastelles to create a dreamy hue with a mellow tone. This to contrast the general bright and "sunny" palettes that most video games use.
When Designing the Forest backgrounds I wanted to create a variety of vast and "wild" landscapes. I found a lot of inspiration in The old Alaskan forests and the Nordic "Fjäll" & "Urskog". Striving to create a look of untouched wilderness.
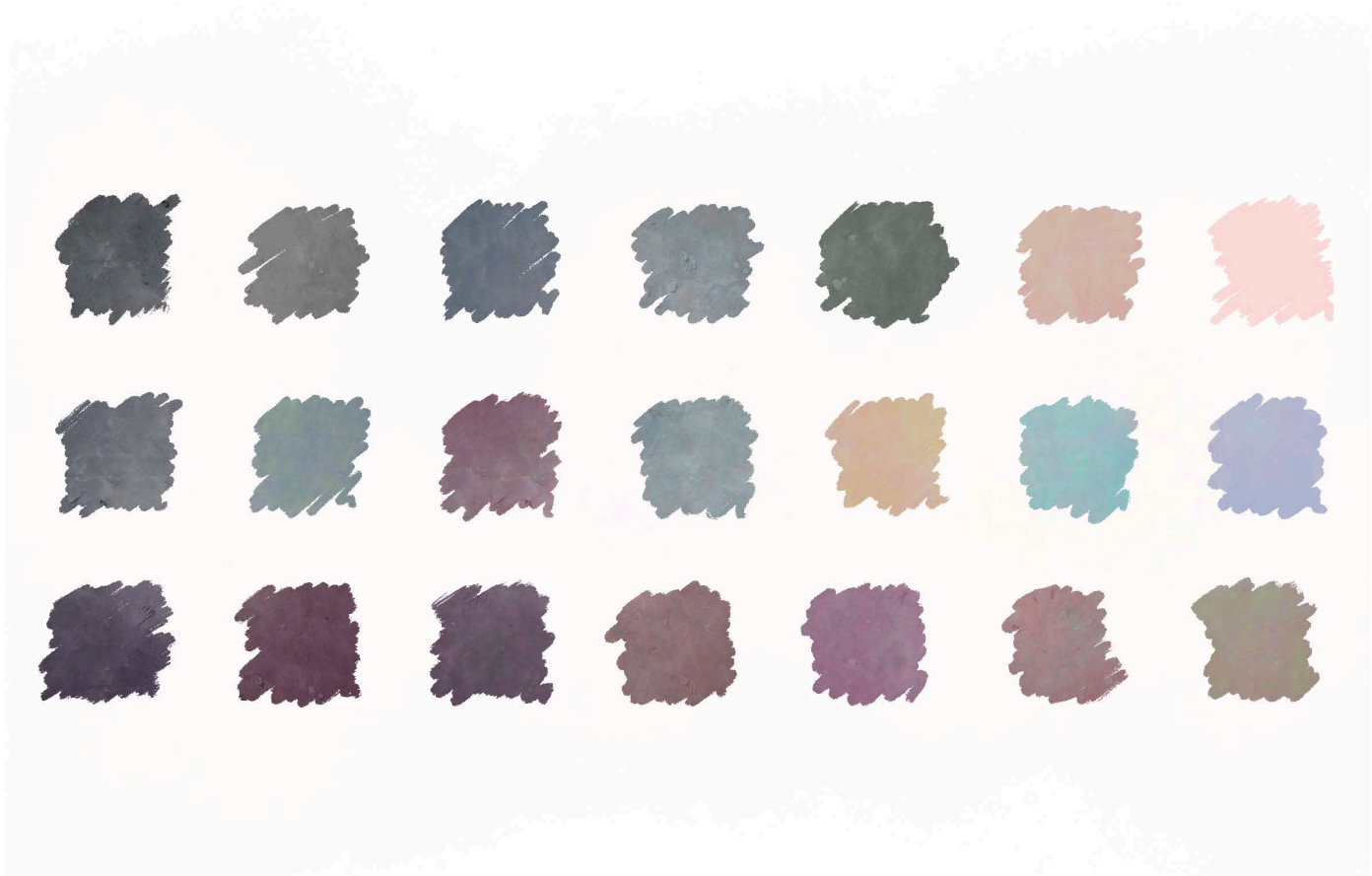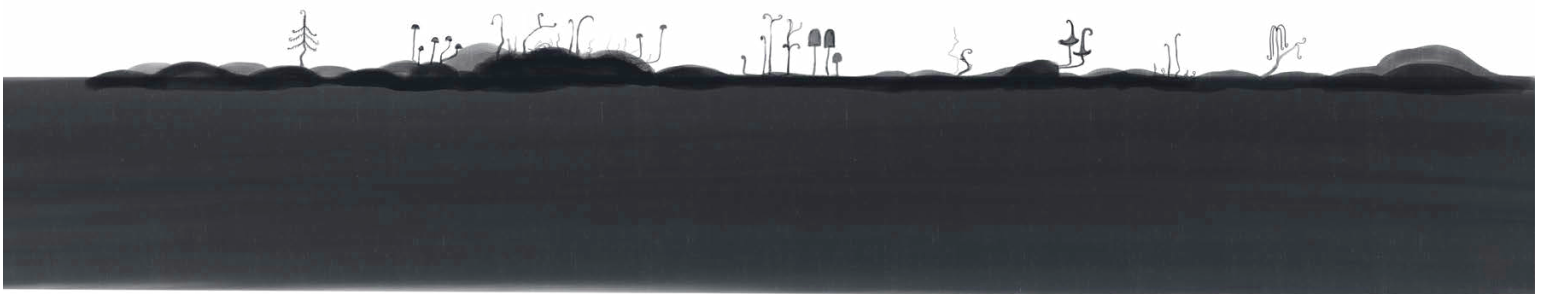
4.4 Character Development

The main focus with designing the characters was to create two unique yet relatable characters. I wanted their features to be fairly neutral while still creating a memorable persona.

Researching Character design methodology, I decided to use two techniques to test and implement in the process.

The 1-2-3- technique and the Silhouette-technique.

The silhouette-technique is a classic method to design characters based on a memorable silhouette. The idea is that the character should be recognized by only it's silhouette. The Character's traits need to stand out and be "visible" even just as an outline.

Here's a great example of a flawless execution of the silhouette technique, The Simpssons family from the iconic televsions series *"The Simpsons"* designed & created by Matt Groening.

Each character is highly indistinguishable with their prominent features clearly visible by just viewing the character's silhouette.
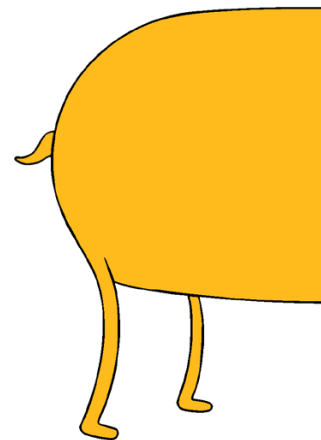
The 1-2-3- Technique builds on creating a memorable character by creating a balanced look using three prominent character traits. Building balance in the visual information by not making it overbearing nor lacking.

These techniques were introduced to me by the "Character-Design-Challenge" community and sourced through their webpage: characterdesignreferences.com.

This character's name is Jake and he is one of the two main characters of the television series "Adventure Time " created by Pendleton Ward.
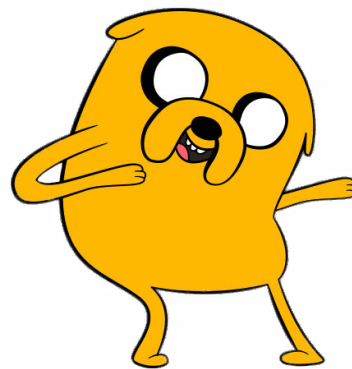
Jake is defined by his big eyes with a large portion of "shine" to them.
Also his floppy nozzle and yellow stretchable body.

These are his main traits and he can be seen in many variations in the show but these three are always consistent to visualize his character.
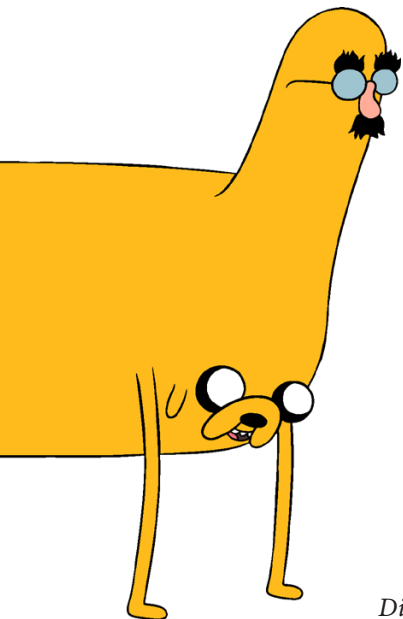
Disclaimer:
All artworks of Jake belong to Frederator Studios and Cartoon Network Studios.
All Artworks of The Simpsons belong to 20th Century Studios.

Designing the Characters

For some reason I wanted to name them before designing them. Maybe to get a sense of whom I was trying to visualize. However just browsing names proved unfruitful since It didn't really give any other information than the name itself and thus didn't provide much inspiration. So I gravitated towards looking up gemstones, their names and abilities as well as colors and textures. Here I found what I was looking for, finding both inspiration for the character's persona and visual appearance.

I ended up choosing the gemstone "Olivine" or "Peridot" for the main character and "Carnelian" for the secondary character. With the green and red as complementary colors I thought it fit with the overall concept of the game.

The values or abilities associated with the gems were also fitting, with balance and harmony symbolizing Olivine, and protection, energy and inner strength symbolizing Carnelian.

OLIVINE

MAIN CHARACTER

Core:
Empathy & Balance

Main skills:
Jumping, gliding
& communication.

CARNELIAN

SECONDARY CHARACTER

Core:
Strength & Loyalty

Main skills:
Strength, endurance & agility.

Following the name giving and gemstone research I created a mood board and did some basic sketching for the clothes and accessories. The main inspiration was sourced from early 20th century outdoor gear and the modern "Living off the grid" aesthetic.

Sketching & Idea Generation

After collecting inspiration and resources I implemented the silhouette, & the 1-2-3 technique into my sketching to apply a methodical approach to the design process.

OLIVINE   CARNELIAN
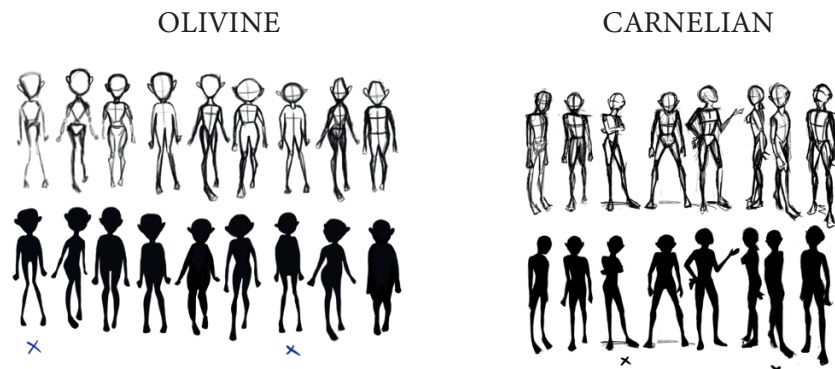
Firstly I sketched silhouettes, only focusing on stance, body- and head shapes. Starting with the basics and building my way up.

I moved forward with the body shapes and stances that stood out and represented te character descriptions

Next I sketched silhouettes with clothes, hairstyles and accessories, here I choose a couple ones to test with colors and textures.

The decisions were based mainly on what "stands out" and is distinguishable and easy to read.
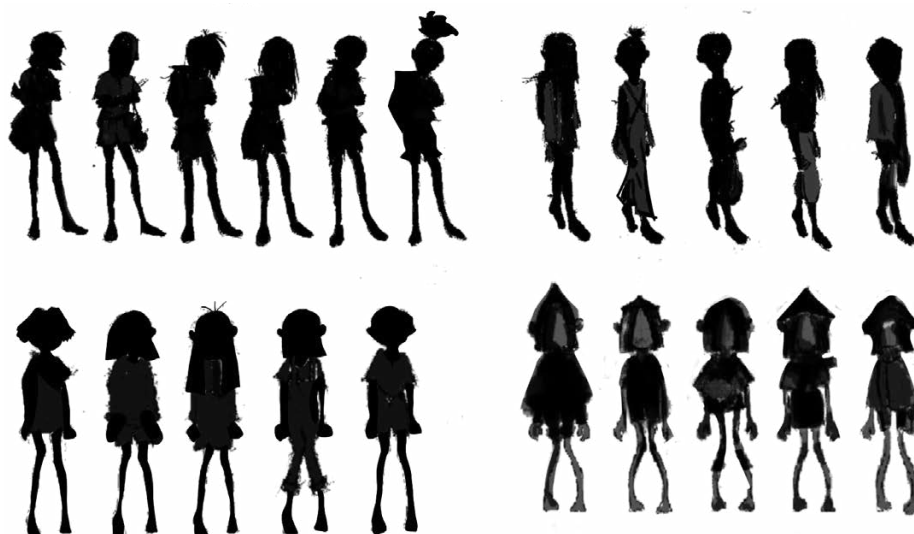
Testing different color combos, outfits and hairstyles.

"Spaghetti legs"

OLIVINE   CARNELIAN

The Results

The finished design of the two character's is simple and playful with their long goofy limbs and big ears to symbolize a teen's body that is something in-between a child's and an adult's.

Their color schemes compliment each other with both the complimentary colors green and red, as well as the earthy browns and beiges. Their silhouettes are distinct and easy to read. Their faces are simple for easy animation.

Olivine's 1-2-3's are her hat, green scarf and poncho.

Carnelian's 1-2-3's are her curly ponytail, her big red backpack, and her puffy shorts.

4.5 Evaluation

At this point my I had created a video game concept for Swedish teen girls. There were however some elements that needed more explanation and definition. Mainly for demonstrative purposes, my supervisor Anna and I, decided that I'd try to make a small showcase trailer.

Since I didn't know the first thing about programming or animation, I sought the advice from The Environment Artist, who suggested I'd make just the basic 2D platformer environment and record the characters moving around the space to make the trailer and thus creating a basic "game prototype" while creating a visual demonstration of the Game with a trailer. He suggested that I'd use the software "Godot" that's open source and free to use and quite easy to learn.

Chapter 5: Synthesis

This chapter explains the process of creating a basic testing prototype for a 2D platformer in the game engine Godot. Next is the process of creating a story-board for the trailer, the principles and techniques of animation and construct-ing it all in godot and eventually premier pro. Lastly the final results are shown in "action" Images since this format does not support video. However the feature trailer can be seen on https://lusid.se/project/equilibrium/.

5.1: Basic Prototyping

Following the tutorial series "Godot 3.2: Let's Build a 2D Platformer!" by BornCG. I got to program squares moving around in a 2D space. Jumping, walk-ing and falling. Through these series I also learned how to implement animation "sprites"- Sprites are the visual assets to a video game, the "clothes" for the code.
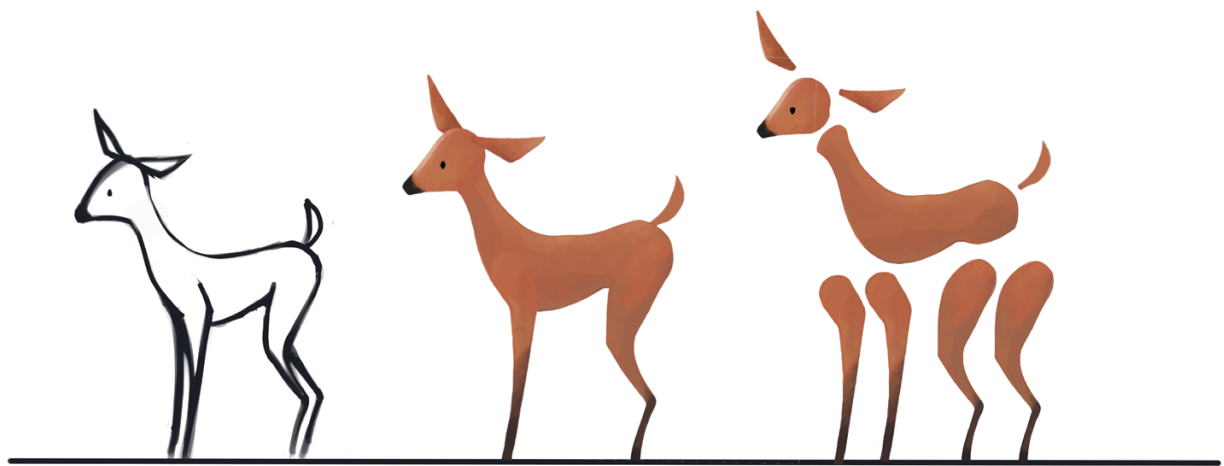
looks up
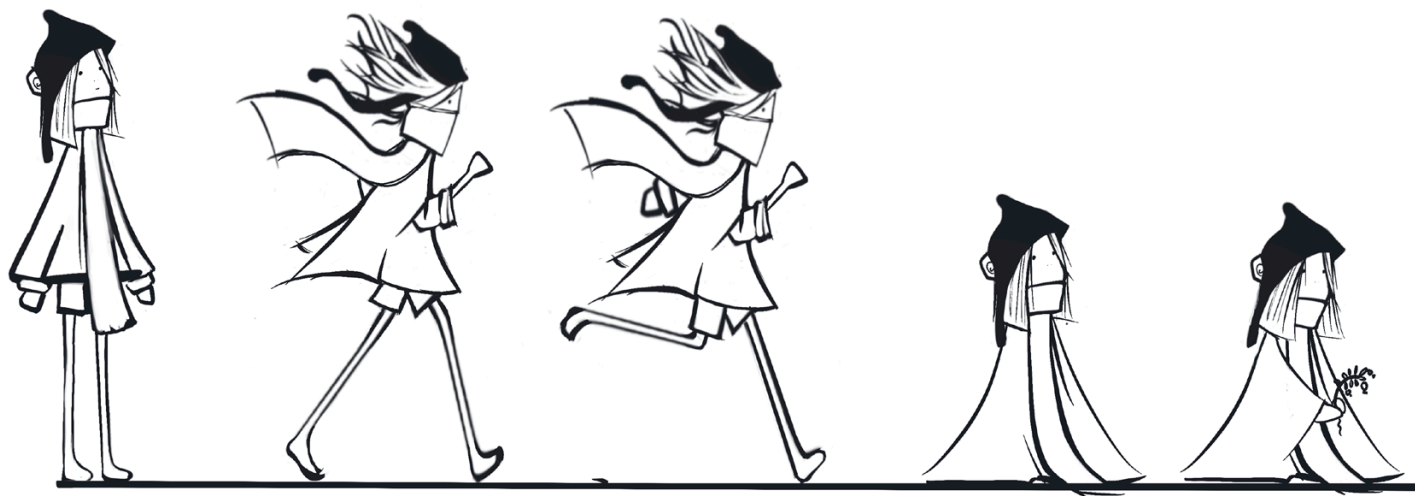
5.2: Assembly

In order to design a trailer I needed to start with the overall structure, the basic sketch. So I started off by creating a storyboard, not knowing at this point just how much work it is to create even one animation, and I needed a full trailer.

Next was sketching the animations and trying to implement it all in godot to create moving scenes for the trailer. I needed to make rigs, basically a clipart/ "skeleton" doll where every limb moves freely around an appointed axis, in order to animate the way i needed to in Godot, and sadly after trying to get it right after what felt like the hundredth time, I decided to animate the trailer completely in Premiere pro, where I could sketch out the animations instead of having to take the extra step of rigging and then coding to get the characters to "come to life".

Using premiere pro had its own hiccups and in the end I wasn't too happy with the trailer, it was snappy and stiff looking. However, time was up so instead I focused on creating "snapshots' ' or action images that were to represent scenes from the Game.
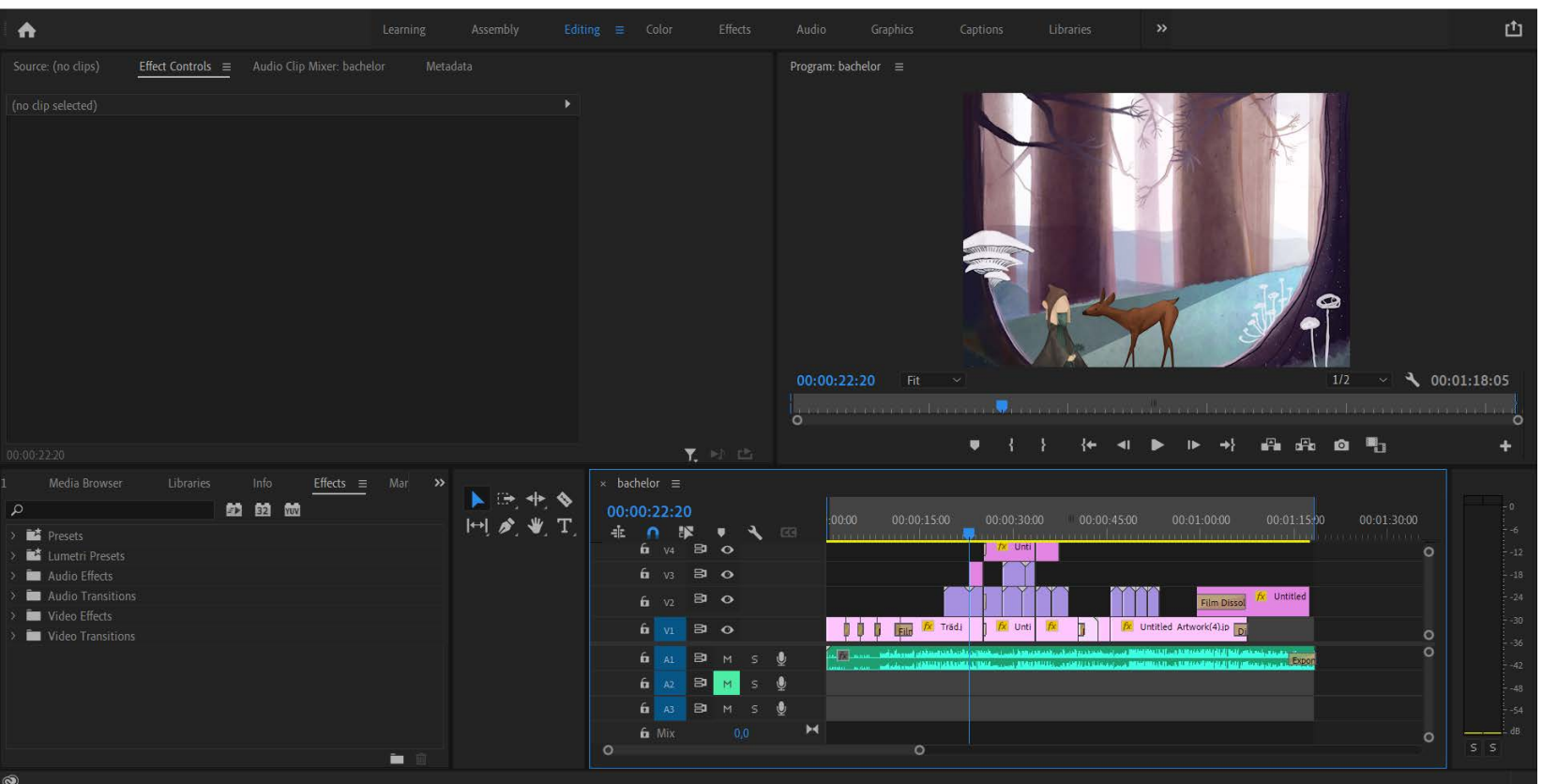
5.3: Final Results

The final Imagery presents a polished version of the Video Game Concept. The name "Equilibrium" came about as a representation of the balancing act between the two characters and their abilities as well as the game mechanics.

Merging industrial design and video game development, resulted in a thoroughly researched concept with an aesthetic built on the target group's preferences combined with my personal artistic touch and skillset.

The sales pitch for the game would sound something like this:

"The game unfolds in a post-anthropocene distant fantasy where the player interacts with the characters Olivine and Carnelian. They are polar opposites and the player's mission is to unfurl their individual strengths in order to generate a symbiosis where their differences is the key in unlocking the complex challenges of the forest."
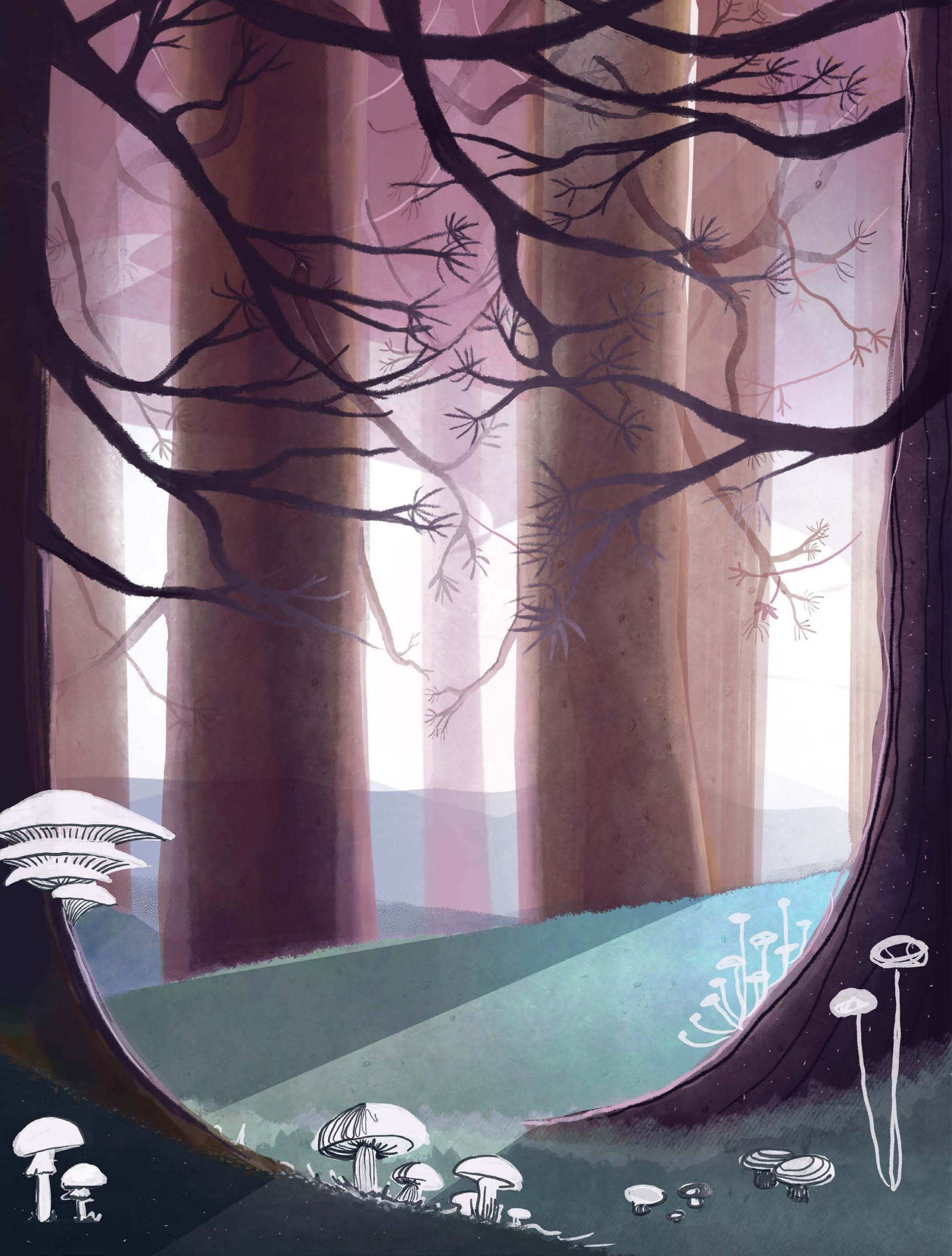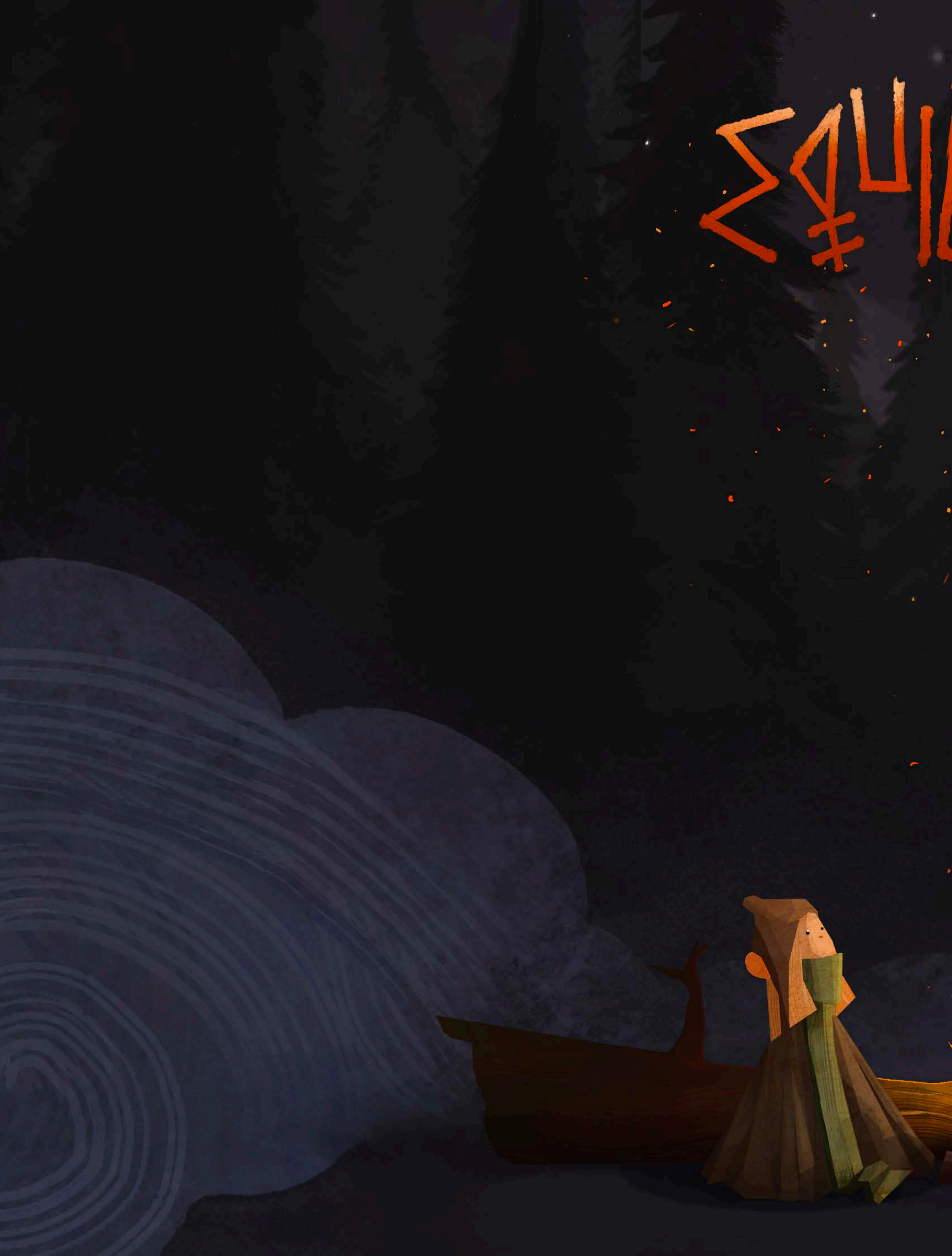
Chapter 6: Discussion

This project, my finale in the bachelor programme of Industrial design, ended up very far from Industrial Design. Maybe it wasn't very wise not to utilize the resources of teachers, tools and the Industrial design skillset.

However, I needed to escape the format, the rules and the values I had learned and cultivated in the past 2,5 years. In a way I had lost my own voice being too concerned with what others thought and did. With every project I felt increasingly insecure about my decisions and always ended up feeling like a failure.

With this project, the grand one, I was terrified to repeat the same pattern of my previous projects. Feeling lost and not good enough but now on a larger scale with no more chances of redemption. Obviously this became too much pressure. Instead I chose to switch direction towards something unknown in order to rediscover the joy in creative work and design.

By creating a video game concept, I could create without judgement and comparison. And it actually worked, especially paired with the isolation of the pandemic, I was able to fully focus and become completely emerged in my own process with little to no regard for the outside world. In a way it was blissful and restored some of the creative confidence I had lost.

Still, I was not completely on my own, or this project might have become just a bundled up mess.

I received guidance and input from my supervisor Anna as well as tremendous support from the two Alumi's, whom without this project would be nowhere near legitimate.

A conceptual project has a tendency to feel a bit "unfinished", and maybe it isn't finished, not many things are. But maybe completion is sometimes besides the point. This experience, both in making this project but also the three years of educating myself in the field of industrial design is hard to sum up. Still it is clear that a lot of things have happened, I've gotten older, maybe wiser, definitely more knowledgeable of industrial design. Exactly what would be expected, still this has been far from what I expected embarking upon this project of studying to become an Industrial Designer. I don't know what the future holds, but I know I'm slightly more prepared.

Thank you all for your time and dedication.

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