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# Comparing the impact of game design methods on player emotional response



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## COMPARING THE IMPACT OF GAME DESIGN METHODS ON PLAYER EMOTIONAL RESPONSE

This thesis explores the impact of emotional design on players' emotional responses during gameplay, using the Mechanics Dynamics and Aesthetics (MDA) framework and flow theory to analyze a demo for the game Arrival of the Punnu. The thesis presents the different game design approaches and methods used to create the demo, with the goal of identifying elements that work as intended and areas in need of improvement.

Seven players with varying game preferences participated in this study, playing a 10-minute demo, and completing a questionnaire that mapped their player types and emotional responses to game events and characters. The MDA framework was used to analyze the demo's mechanics, dynamics, and aesthetics, while flow theory was used to explore the players' level of engagement and immersion in the game.

The results indicated that while players enjoyed the gameplay, their emotional responses did not align with the intended design. Most players reported contentedness and neutral emotions towards characters, rather than the intended emotional responses. Based on the analysis, the study concludes by providing suggestions for improving gameplay elements to better align with intended emotional responses, using the MDA framework and flow theory.

Overall, this study contributes to the field of game design by examining the impact of emotional design on players' experiences, and by providing practical insights and recommendations for designing games that effectively elicit the intended emotional responses from players.

### KEYWORDS:

Game design, Emotions, Games, Punnu Games, Comparative research, Gameplay, MDA

Susanna Ilmonen

## TUNTEISIIN VAIKUTTAMINEN PELIN AVULLA JA VASTAAVATKO DESIGN SEKÄ TODELLISUUS TOISIAAN: VERTAILEVA TUTKIMUS

Tämä opinnäytetyö tutkii tunnemuotoilun vaikutusta pelaajien tunnereaktioihin pelatessaan Arrival of the Punnu -pelin demoa. Analyysimenetelminä käytetään MDA-kehystä ja flow-teoriaa. Tutkimus esittelee erilaisia pelisuunnittelun lähestymistapoja ja -menetelmiä, joiden avulla tunnistetaan elementtejä, jotka toimivat tarkoitetulla tavalla, ja paljastetaan kehitettävät alueet.

Tutkimukseen osallistui seitsemän pelaajaa, joilla oli erilaiset peli-intoilut. He pelasivat 10 minuutin mittaisen demon ja täyttivät kyselylomakkeen, joka kartoitti pelaajatyyppejä ja tunteellisia reaktioita pelin tapahtumiin ja hahmoihin. MDA-kehystä käytettiin demon mekaniikkojen, dynamiikan ja esteettisten elementtien analysoimiseen, kun taas flow-teoriaa käytettiin tutkimaan pelaajien sitoutumisen ja uppoutumisen tasoa peliin.

Tulokset osoittivat, että pelaajat nauttivat pelin pelaamisesta, mutta heidän tunteelliset reaktionsa eivät olleet yhteneväisiä tarkoitetun suunnittelun kanssa. Useimmat pelaajat raportoivat tyytyväisyyttä ja neutraaleja tunteita hahmoja kohtaan, sen sijaan että he tuntisivat pelin suunniteltua tunnereaktiota. Analyysin perusteella tutkimus päättyy antamalla ehdotuksia pelattavuuselementtien parantamiseksi, jotta ne vastaisivat paremmin tarkoitettua tunnereaktiota, käyttäen MDA-kehystä ja flow-teoriaa näiden parannusten ohjaamiseen.

Kaiken kaikkiaan tämä tutkimus edistää pelisuunnittelun alaa tutkimalla tunnemuotoilun vaikutuksia pelaajien kokemuksiin ja antamalla käytännön näkemyksiä ja suosituksia pelien suunnittelemiseksi, jotka tehokkaasti synnyttävät tarkoitetun tunteellisen vastauksen pelaajilta.

### ASIASANAT:

Pelisuunnittelu, tunnereaktiot, pelit, Punnu Games, vertaileva tutkimus, pelattavuus

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# 1 INTRODUCTION

The emotional commitment of players is critical to the success of the gaming industry. Games rely on the emotional responses of players to create an immersive experience.

The goal of this thesis is to gain a detailed understanding of emotion by design and provide tools for invoking fellowship and companionship in players to make the game experience more meaningful. The study also aims to investigate the differences between designed emotions and actual player emotional responses.

The study presents the Mechanics, Dynamics and Aesthetics (MDA) framework and explores the psychology of players and how emotional responses can be triggered by design. The thesis discusses the theory and examples of creating game design and phases in emotion by design.

The study uses the demo of Arrival of the Punnu to show how emotions by design affect gameplay. Players are shown images and asked about their emotions to identify differences between designed and actual emotional responses.

The thesis concludes with a discussion of the results of the research and the possibilities for bringing the outcomes closer to the intended design.

## 2 LITERATURE REVIEW

In this chapter, a literature review on the emotional impact of games is presented. The chapter includes descriptions of different methods of how the emotional response can be a part of the game design.

### 2.1 Emotional impact of games

In games the emotional impact is designed and during all the time games have been developed, developers have honed this to create immersive experiences. Unlike movies or music, games offer an interactive platform instead of passive participation. Often, it all comes down to the choices the player makes and encounters and these feelings can become more complex and provide experience of guilt or accomplishment.

“To the human brain, playing a game is more like actually running a race than watching a film or reading a short story about a race. When I run, I make a series of choices about actions I will take that might affect whether I win.” (Ibister, 2016)

As players can make free choices in the game and change their own gameplay experience, it provides them also the “*flow*” experience, not unlike when musicians are playing or programmers coding while “in the zone”. This flow can be constructed by following the eight key factors discovered by researcher Mihail Csikzentmihalyi. In his book “*Finding Flow*” he describes that providing challenging activity, merging of action and awareness, clear goals, immediate feedback, focus on the task at hand, sense of control, loss of self-consciousness and altered sense of time, game designers can design a full emotional experience that creates the entirety of “*Immersion*”. (Csikzentmihalyi, 1998)

### 2.2 Phases of writing game design: emotion by design

In this section the building blocks of designing the emotional experience for players are presented based on the research by Kathrine Ibister in the book *Emotion by design*.

### 2.2.1 Defining concept and product

The game used in this research study is a single player game with interactive NPC characters, so the aspect of social interaction is also taken into account. The feeling of *companionship* can be designed as well, we will call this *Fellowship* from now on according to the *Mechanics, Dynamics, Aesthetics* framework. Players will learn more about the protagonist based on their interaction with other characters in the game world. Here choice can be another factor and the player can decide which way to take the game by deciding how to interact with other characters. In games the relationship with NPC characters can invoke deep and surprising feelings in players.

A powerful way of pulling the player away from the role of spectator is using a grounded cognition method, placing the player in an alternative identity or social situation. Designer of Sims, Will Wright, explored this social emotional aspect of games by treating a creature poorly when playing *Black and White: Creature Isle*.

“In this game, the player has a creature that he trains, who acts as his go-between with the villagers in the game world. The player can mold an evil creature by treating it badly or create a moral creature by treating it kindly. Curious about the outcome of ill treatment, Wright began to slap his creature—then was astonished to find himself feeling guilty about it, even though this was very obviously not a real being with real emotions” (Ibister, 2016)

The ability to invoke feelings like guilt is unique for games and gives designers more and more complex tools to create an emotionally full experience for players.

In Arrival of the Punnu the design of interaction is used to create a feeling of companionship. The tools used for the design are created with sound, images, interaction, and distance to create the feeling that the Punnu are alive. For the player the size and lack of limbs of the Punnu characters invoke a feeling of responsibility. When encountering enemies, the protagonist is in the battle and the Punnu are safe. Empathy and the need to protect those who are helpless compared to us is a key factor when designing emotions in this case.

Game designers are using a range of subtle social cues from the NPC characters to invoke different social feelings in players. A good example of the feeling of care is from a game called Hush, where the player needs to keep a virtual baby safe from soldiers. The player is taking the place of a Rwandan Tutsi mother, Liliane, where she needs to keep singing a lullaby to keep the baby quiet so they are not exposed to Hutu soldiers who would kill both the child and mother.

### 2.3. Mechanics, Dynamics, Aesthetics: Framework of game design

From the players perspective there are three main elements:

Rules → System → Fun

From the developer perspective however the three elements are:

Mechanics → Dynamics → Aesthetics

The MDA framework is formed from these three elements that make an order of influence between them and allow developers to provide the experience to players.

1. *Mechanics*: Describe the specific components of the game at the data level representations and algorithms. This is the “hidden” part of the game.

2. *Dynamics*: Describes the runtime behavior of mechanisms acting on player input and each other's outputs over time. This is the part that the player actually can see.

3. *Aesthetic*: Describe what the player is like to interact with the game system. The aesthetics are meant to invoke desirable emotional responses in players.

(Tan Guo Xin, 2019)

### 2.4. Emotional response to aesthetics in games

In aesthetics we can look back to Csikszentmihalyi “flow”. Aesthetics in games are used to pull players into the flow of eight key factors. This, from the player's perspective, is the “fun” in the game. To keep players playing, designers are using aesthetics to keep the player in the flow state, having fun. In research by Robin Hunicke, Marc LeBlanc, Robert Zubek (MDA: A Formal Approach to Game Design and Game Research) is suggested that game designers should move away from “fun” and “gameplay” towards more directed vocabulary, that include but is not restricted to:

1. *Sensation - Game as sense-pleasure*

2. *Fantasy - Game as make-believe*

3. *Narrative - Game as drama*

4. *Challenge - Game as obstacle course*

5. *Fellowship - Game as social framework*

6. *Discovery - Game as uncharted territory* ‘

7. *Expression - Game as self-discovery*

8. *Submission - Game as pastime*

Games can combine these eight vocabulary elements to create the aesthetics in a game. In their research Hunicke, LeBlanc and Subex are using Quake, The Sims, Charade and Final Fantasy as an example:

*Charades: Fellowship, Expression, Challenge.*

*Quake: Challenge, Sensation, Competition, Fantasy.*

*The Sims: Discovery, Fantasy, Expression, Narrative.*

*Final Fantasy: Fantasy, Narrative, Expression, Discovery, Challenge, Submission.*

(Hunicke et al. 2004)

## 2.5 What game dynamics are used to achieve the emotional state?

Dynamics can be seen as the bridge between developer and player by being the action that brings aesthetics to the player. Looking again at the research by Hunicke, LeBlanc and Zubek and the game examples they provide we can see how the emotions are created by actions within the game. *Challenge* can be implemented with time pressure or need for speed and accuracy to pass a challenge in the game. *Fellowship*, as in Arrival of the Punnu demo, can be created with closeness or as described before, with the need to care and nurture. This can be also sharing information or providing rewards that cannot be reached without cooperation. *Expression* is invoked by letting players affect the outcome of the game, leaving their mark by for example creating, modifying, personalization and decision making in the game. (Hunicke et al. 2004)

## 2.6 Mechanics in games based on MDA

Mechanics support dynamics by affording the player the actions, behaviors, and control mechanism to the player. Adjusting mechanics designers can affect the dynamics that are affecting aesthetics.

“The importance of defining mechanics is obvious: designers can invoke direct control to achieve desired emotional goals or aesthetic dynamics. Identifying them is at the heart of game design and

shouldn't be overlooked, nor should it take unnecessary time. This article wishes to propose a definition that makes it clear what should be defined as mechanics during the design process, and by doing so avoids unnecessary complexity and/or many mechanics to define when developing a game." (Tan Guo Xin, 2019)

### 3 PREVIOUS RESEARCH ON TOPIC

#### 3.1 Attempts to measure psychological and emotional impact on players.

Presented in several research, there are multiple options on how to measure the emotional impact games have on players. It can be measured through changes in the real-life psychological behavior, scoring system within the game, video recordings and analyzing those recordings, questionnaires, or even tracking the Electroencephalography (EEG) of the player during gameplay.

During gameplay the feelings that are most likely to surface to physical reaction can be seen from the recording, but the underlying emotions are left invisible.

“Whereas the spectrum created can be used to evaluate the emotional progress and capabilities of games, in the end emotional reactions are personal. Every person has their own reactions which are affected by their lives, personalities, and even how they have played the game, so two evaluations on the spectrum can end up being totally different. This tool can still be used for developers to understand the plots and emotional devices used in their games, and to develop the narrational properties of the writing” (Jerrett et al. 2020)

Psychological impact can be measured by observing the players in their real lives and evaluating the change in their behavior patterns and social interactions. In a psychological impact research by Aidan Taylor (The psychological impact of Games Design, 2019) he presents cases of game genres and their effect to player psychology in real life, for example Fantasy and role-playing games caused social withdrawal and increased share of dependent persons and strategy games increased the players problem solving skills and self-regulation. (Taylor, 2019)

As game designers share the responsibility to create games with positive emotional impact, the psychological aspect needs to be considered when considering emotional responses in games.

### 3.2 The unanswered questions and the contribution of this research

As presented previously there are a lot of tools and models in creating the emotional immersiveness and impact in games, but the understanding of how to measure reliably and improve the design towards more positive impact remains open.

Designers have various building blocks and frameworks such as the flow by researcher Mihail Csikzentmihaly or the MDA and the practical implementations in games are plenty as well. We can also measure emotional responses in players in various ways. Consider this example presented by Kathrine Ibister:

In a game called "Train" the players move boxcars full of passengers around, attempting to solve a puzzle. At the end of the game, it is revealed to the player that the train's destination is Auschwitz. The reaction and almost a panic was visible in players thus the emotional response was matching design and purpose as intended. (Ibister, 2016)

However, the emotions that are not as strong, but highly important when climbing the ladder to strong emotions of companionship, trust, respect, responsibility, or any other emotion that requires a longer amount of time to evolve, the steps that are taken towards that strong reaction are often hidden. Even when implemented to design, we have no accurate tools to map the ladder towards the end results designers wish to invoke in players. Looking back to the game Train, it comes clear that even the result is shocking, the proof of enjoying the game in the early parts is left somewhat hidden. We can assume and trust the player and we can interpret that the design was successful based on the reactions of the players.

The core question for this thesis is to understand if there is a way to compare and improve the design based on brain wave measurement during gameplay. Another important question is also if the design should be changed after the test or if there are unintended discoveries that lead to new findings, new emotions and that upon the following design can be based on.

## 4 AIM AND OBJECTIVES OF THIS RESEARCH

### 4.1 Questions this research is attempting to answer

The questions in this research are based on the demo for the game *Arrival of the Punnu*. This research is attempting to find if the intended design aligns with the players emotional experience of the game. The used tool is a simple questionnaire to players that first play through the demo and then answer the questions. The questionnaire determines the player persona in the beginning to see if the results are affected by the favored game genres or other game experience preferences. In the questionnaire the players are shown images from selected points in the game that are in the design determined to be the points to raise emotional responses. The players are asked to answer questions about their emotional responses towards individual game characters and their overall experience during gameplay.

An interesting question that this research will also attempt to answer based on the demo for the game *Arrival of the Punnu* is that if the emotional responses do not match the intended design, if something unexpected is found that the rest of the design can be improved upon. The objective is to see if the players who answer the questionnaire, emotional response especially towards the characters is the same as in the design.

The main objective in this research is to see if the demo for *Arrival of the Punnu* is performing on the emotional level of the player as the design intends it to if the players are not responding emotionally as the design intends to and what the cause might be to the deviation.

### 4.2 Objective and hypothesis of this research

Creating a narrative game design, emotion by design utilizing the *MDA framework* has been done several times in the game industry. This research is aiming to bring more to that research by testing this approach in a genre that is not typically considered emotional. Pure metroidvania games have been known to be narrative, but a more traditional sidescroller platformer games are usually more focused on *Challenge*.

**The objective in this research** is to bring insight into the *Fellowship* regarding virtual characters. In research such as *Emotion by Design*, by Katherine Ibister, *Fellowship* is regarded as a relationship between players. This research is attempting to broaden the definition to cover virtual non-humanoid characters.

By using the framework of *Aesthetics*, *Dynamics* and *Mechanics* in the *Artifact* (described in 4.4 and 5) this project has been created on a hypothesis that the feeling of true companionship can be achieved in a single player game. This research is attempting to prove the hypothesis by investigating the first building blocks of *Fellowship* by pulling the player into the *flow state* and exposing them to situations that allow emotional responses to pave way to a real companionship.

In the design certain points were designed to trigger emotional responses in the player. I will go through here one by one the points that were meant to trigger that response and what the response was supposed to be according to design.

In the questionnaires, the players were also asked about the *Aesthetics* of the gameplay. In the design according to the *MDA* pattern, it was intended to invoke enthusiasm of beginning adventure. To keep the player in the *flow state* the story is unraveling in the game as the player progresses. Music and visuals are basic building blocks in building *anticipation* and draw the player to the adventure.

In this part we will also go through the design for the characters and the forms of *Fellowship* the player feels towards the Punnu and the boy as well. Each character is designed to be personalities and from that point of view we want different emotions invoked in the player when they see an image from each character. In this part it will also be described what those emotions should be.

From a design point of view the goal is to make the player lose *sense of time* as they are drawn into the *flow state* during gameplay. The research attempts to find out the level that this goal was accomplished.

#### 4.2.1. Beginning of the demo

First image (Fig1) is a screenshot taken from demo of Arrival of the Punnu we can see an image of Planet Earth. This point in the emotional roadmap is designed so that the music and visuals meet to connect the attachment to our home world, watching it from orbit and the beginning of adventure when the Punnu are arriving from outer space.



Figure 1. Screen capture from the beginning of demo (Arrival of the Punnu).

The emotion that this trigger is designed to invoke is

*Excitement* and *Optimism* about the beginning adventure.

The goal of the design is to make the player want to see more at this point, ask questions such as “who are the Punnu” and thus encourage *Exploration*. The design in this part of the demo is to draw the player immediately to the *flow state* by giving them a *goal*: Find the Punnu. Even though that *goal* is not this early stated, it is assumed in the design to be the natural response to find out where they landed and who they are.

#### 4.2.2 The boy starts his adventure

In the very early part of the game is designed so that the player knows who their protagonist is and they are aware of the presence of the Punnu. There is some insecurity of *goal*, but the linear gameplay *Dynamics* are guiding them forward to prevent a sense of being lost. In the image (Fig2) we can see the Protagonist running.



Figure 2.

Protagonist in the beginning of gameplay in demo (Arrival of the Punnu).

The desired emotions in this trigger area are designed to be *joyful* and *optimistic*. The *flow state* is kept by the player getting their first touch of the *Mechanics* and *Dynamics*. This is also the first time they see the game world, and this invokes the sense of *Exploration*.

### 4.2.3 Meeting the Punnu

Meeting of the Punnu is the moment in the design where the *Fellowship* begins, the first step on the *roadmap of trust* (5.2. *Dynamics and mechanics*). In the design this moment is planned to make the player feel *Amazed* and *Excited*. In the image (Fig3) we can see the crashed spaceship and the Punnu next to it. We also see the Protagonist encountering the Punnu.



The arrival to this point is

Figure 2. Protagonist meets the Punnu. (Arrival of the Punnu).

surprising, the boy slips and lands in the puddle after a butt slide. This event was designed to make the player feel humane, a bit awkward and somewhat humble when approaching the Punnu. Also, this approach to the situation makes the Punnu feel more alive. Since we reflect our emotions from others thus those feelings are mirrored back to us from the virtual characters, the Punnu. This paves way in building a **real emotional bond** between the player and the Punnu, thus invoking the *Fellowship* between the player and the non-humanoid characters, Punnu.

### 4.2.4 The first obstacle together

First obstacle in the demo for Arrival of the Punnu is the first time the player gets to change to Punnu characters and play with them. This is an important point in invoking *Fellowship* and *Exploration*. In

the image (Fig4) we see the Punnu and the Protagonist together and a text above them that shows how to switch characters.



Figure 3.

Player learns to switch characters in demo (Arrival of the Punnu).

*Fellowship* in this emotional trigger point is the realization of making the player feel as if they are truly not alone in their journey. Making the Punnu come alive following *Dynamics* and *Mechanics* by allowing the player to take control of the Punnu strengthens the emotion of *companionship*.

Exploration in this trigger point is tied also to the player's ability to control the Punnu. What can they do, can the player control all of them, what in this particular area the Punnu should do? Leading to the point where the player understands they need to use the red Punnu to proceed in the game, they have a moment of full control of all four characters.

This trigger point is designed to invoke *joy*, *optimism*, *amazement* and/or *excitement* in the player. The emotional response is not meant to be very intense at this point of the game, so *peaceful* is a desired emotional outcome as well.

#### 4.2.5 Passing the bear

Passing the bear in the demo for Arrival of the Punnu is an active gameplay area already. This emotional trigger point is something that shows the player the fun side of the protagonist through his facial expression. The design doesn't dive too deep into the boy's mental layers at this point yet but shows that there are other sides to him. He fears the bear and the bear, being a cute creature, is

also a threat to the boy. In the image (Fig5) we can see the scared expression of the Protagonist while he is hiding behind a rock while the giant bear is looking right at his direction.



Figure 4.

Player passes a giant bear in demo (Arrival of the Punnu).

This trigger point is to bring the player into the *flow state* of the gameplay by offering a *sub-goal* in the whole process. Passing the bear without getting caught is a *Challenge*, while the underlying main *goal* is to retrieve the first engine part from a nearby lake.

The emotional response in this trigger area should be quite *neutral*, allowing them to focus on the task while feeling *joyous* about the fun side of the seen characters.

#### 4.2.6 Final challenge, saving the ringed seal

Upon approach to the *Challenge* area at the end of the demo for Arrival of the Punnu, the player is shown a cinematic where the images are invoking sympathy towards the helpless creature, captured in a net by the actions of humans. This area is designed to provoke a sense of *pressure* to save the seal and anger for the human indifference that has captured the seal. The latter is possible only if the player is aware of the reality that ringed seals and especially their pups are drowning to the fishing nets at Saimaa. In the image (Fig6) the Protagonist is standing right next to the trapped ringed seal.

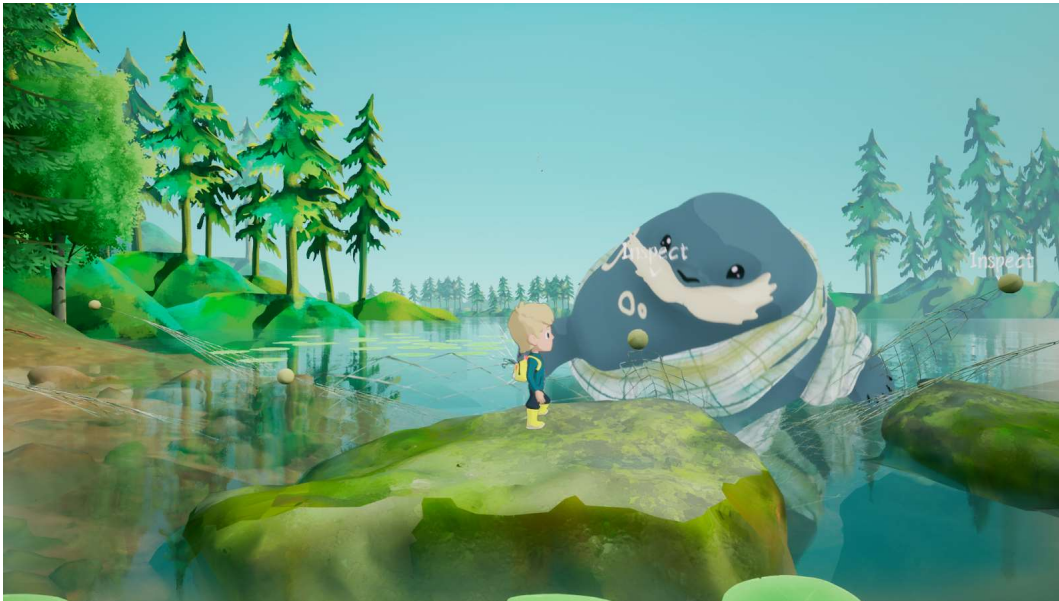


Figure 5. At

the end of the demo player needs to rescue a ringed seal (Arrival of the Punnu).

We humans easily feel *anger* when something cute and harmless is hurt by the actions of other humans, for example in this case the fishing net is hurting the adorable ringed seal. A deep and underlying emotion is also *guilt* and *shame* for being a human. These feelings are not obvious, but they are meant to be tied to the events in the real world.

In the example of the creature in the *Black and White: Creature Isle* played by Will Wright the *guilt* was due to direct actions as in this case the feeling of *guilt* is invoked through actions of others. Being the same species, knowing that this is happening, but also understanding the reasons that the fishermen are fishing as their livelihood creates a complex emotional experience.

This entire scene is also meant to encourage the *Fellowship* in the experience. The boy and the Punnu are together when the ringed seal is saved. Feeling the *pride* and *success* of doing the right thing as they also pull the player to the *flow state* are designed to invoke the want to share that *accomplishment* and the Punnu are there to share it with the player.

#### 4.2.7 The teleportation device, rewarding the player

The reward to the player is boosting the *flow state* again by giving direct means to access a completely new content and areas to explore while the narrative takes the player forward. This final image is accompanied by music and the text is appearing in pieces to almost tease the player that there is *Exploration* ahead. The imagery itself is again supporting *Fellowship* as the Punnu and the boy are together entering the adventure ahead. In the image (Fig7) we see a screenshot of cinematic part of the game, where the Protagonist and the Punnu are in the middle of a vortex. The text

describes the picking up of the Teleportation device and how the portal is pulling the heroes deeper into the adventure. This image (Fig7) is the last one the player sees in the demo.

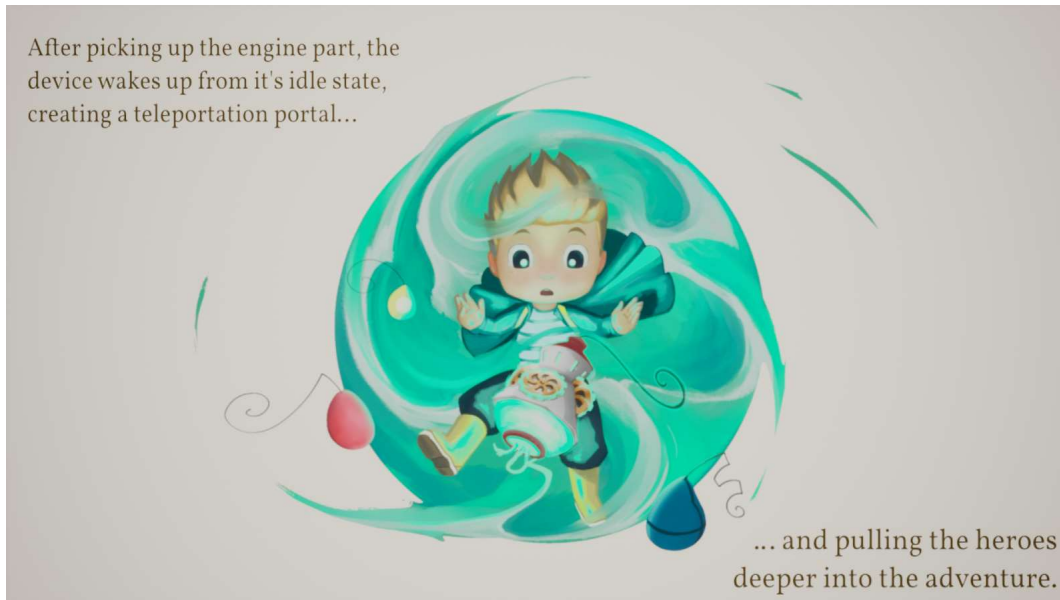


Figure 6. Final screen in demo (Arrival of the Punnu).

#### 4.3 The characters, building Fellowship

As described before, the Fellowship between virtual characters and the players is the core of this research. In this part the characters and their designed personalities are presented with the assumptions of the emotional relationship between the player and them.

#### 4.3.1 The protagonist: the boy

The boy (Fig8) is the protagonist in the game. In the design it is determined that the player should feel *familiarity* towards this character.



Figure 7. The Protagonist. (Arrival of the Punnu)

The boy is small and should invoke a sense of *fragility* in the player. He represents the inner child in all of us. The player has the need to also grow as a hero, protect the Punnu so they should also have *expectations* towards the boy as well as *insecurity* if

this small child can live up to the task. These emotions can be found from each of us towards ourselves and the character of the boy is designed to tap into that side of the player enabling them to *relate* to the boy.

### 4.3.2 The red Punnu



Figure 8. The red Punnu (Arrival of the Punnu).

The red Punnu (Fig 9) is in the demo of Arrival of the Punnu the most *neutral* character. Its color is provoking, but otherwise it is in a sense a “normal” Punnu without any special attributes. The size and look of the character is designed to invoke the player to feel *protective* and *curious* about the character.

### 4.3.3 The blue Punnu



Figure 9. The blue Punnu (Arrival of the Punnu).

The blue Punnu (Fig 10) is the biggest of the Punnu and also the only one that has a puzzle-mechanic of their own. Blue is designed to have a mechanical feel and the player should feel most *distant* towards this character. In the roadmap of trust (seen in part 5.2) we can see that in the design each character is forming their relationship towards the boy at their own pace. Blue is the wisest of the three thus the player should *not feel* as *protective* of this character as they would of the others.

#### 4.3.4 The yellow Punnu



The yellow Punnu (Fig 11) is designed to be the *easiest to approach* for the player. This is accomplished by giving it a color yellow, a color that is in various contexts associated with the feelings of *happiness*, *warmth*, and *comfort*. The yellow Punnu is also the smallest and the only one that can perform a double jump and turn on a light in dark places, giving it *happy* characteristics thus making it easy to like.

In the design the yellow Punnu is the character the player should feel immediately most *protective* and even experience *friendship* towards it. In the *roadmap of trust*, this character is designed to form *friendship* and reach the highest point of trust

Figure 10. The yellow Punnu. (Arrival of the Punnu with the boy first.)

#### 4.3. Methods of research

Players are given the demo for Arrival of the Punnu to play and a questionnaire with the earlier presented trigger points to observe. Players need to evaluate their feelings at these points.

Before they answer the questionnaire, players are asked about their game preferences, likes and dislikes and how they evaluate the effect of different aesthetics on their gameplay.

Players will evaluate their emotional attachment to the characters, aesthetics separately and their overall experience after the demo.

#### 4.4 Artifact description: Demo for Arrival of the Punnu video game

Arrival of the Punnu is a game that tells a story of three little creatures called Punnu that crash land on a small planet called Earth. They encounter a little boy who agrees to help them repair their spaceship. During their adventure around the planet, they notice that contamination is spreading from under the crust of Earth, polluting the hearts of animals and humans. The mission to repair a spaceship turns to saving all life on Earth, and a great secret hidden for thousands of years is revealed.

The demo, artifact in this research, is a three-map long part from the very beginning of the game. Player will take the role of the little boy, and in the demo, player will learn about the crash, encounter the Punnu, recover the first engine part, face enemies and challenges.

## 5 INTRODUCING THE GAME

### 5.1 Presenting the game design

In the demo for Arrival of the Punnu a combination of two frameworks has been used. The MDA and the flow theory.

First the story was written. The goal was to make the player relate to the protagonist (the boy) and feel intrigued by the Punnu by talking about the crash and the reason for the crash. The story in the demo of Arrival of the Punnu is short and aims to familiarize the player with the characters and pull the player into the adventure.

Based on the story in the design the aesthetics were designed first to invoke *Fellowship*, *Discovery*, *Narrative* and *Challenge* in the demo. *Discovery* being the first we lead the player into the path to find the Punnu and explore the surrounding world. Providing enough details with visuals and sounds the player can deduce their location and discover the Punnu at the end of their path. Continuing with the path of *Discovery* the protagonist together with the Punnu continue attempting to find the first engine part. Leading to the *Fellowship*, *Narrative* and *Challenge* right after the Punnu joins the party, the player travels together with the Punnu as a group, *Narrative* as the story really starts; where will this adventure lead them and the *Challenge* from the obstacles and problems to solve. The *Challenge* and the *Fellowship* are intertwined in the story and design since the Punnu are an essential part in solving the problems the player encounters, giving the sense of companionship. Player is not alone in their adventure.

Following the MDA framework, the aesthetics are implemented in the dynamics with sounds, art, animation, cues and gameplay. For example, the Punnu are not static creatures only to be carried around but an active part of the experience. Player needs to switch to Punnu and can observe the cute animation of their movement, making the boy at times a spectator to the activities the Punnu are doing. The world in the demo is bursting with natural elements that the group the player is leading ahead invoking *Discovery* and external threats amplifying the sense of *Fellowship* as the protagonist needs to also protect the small Punnu.

The player needs to feel also that the world is alive around them so according to the story there are creatures to save in the game. In the aesthetics of the character Pullervo (a ringed seal the player saves at the end of second map) the character itself is adorable and invokes in the player the want to save it. Here also again the *Fellowship* can be endorsed, the whole group is needed to save the character. Following dynamics, the interaction points for the Punnu and the boy are scattered around the ringed seal and in the mechanics the action to switch pressure between the characters to save

the seal. *Challenge* here is that there is a time pressure and the order for the interactions must be solved beforehand.

In the mechanics phase the control and actions were implemented making sure that the dynamics or aesthetics are not compromised. During the development process one compromise was made that will be remade in the future: in the original gameplay the player could switch to Punnu at any time and the rest of the party kept always following. In the current version however the Punnu are traveling in the backpack the boy is carrying and jump out in the defined zones where they are needed.

According to the eight elements presented by researcher Csikzentmihaly the goal of the design is to accomplish the state of flow already in the demo to make the players wish for more. Following the checklist of the eight factors of the flow method we can go through the intended design to see if all the factors are considered in the final design.

*A challenging activity requiring skill* is implemented not only in the problem-solving areas of the demo, but also “*parkouring*” giving the player a variety of *Challenge*. The difficulty level also increases as the player proceeds.

*A merging of action and awareness* can be seen in the balance of challenges, encountering the external threats and tasks, protecting yet depending on the Punnu and providing a clear path for the player.

*Clear goals* are communicated to the player by providing the high-level task to repair the spaceship and sub tasks to recover the engine parts.

*Direct, immediate feedback* comes through the gameplay. In combat situations and in problem solving as the obstacles are cleared. The completion of subtasks is always immediately rewarded; find the Punnu, player gets a weapon or find the first engine part, player is immediately teleported to the next level and provided with a new skill (wall jump).

*Concentration at the task at hand* for the player comes through the linear path and clear challenges. The focus of the goal is reminded through story, rewards, and the simple presence of the Punnu.

*A sense of control* is given to the player not only in combat situations and the “leadership” of the group as the boy is the only one who can wield the weapon, but also that they have the control to switch characters, perform certain puzzles in their selected order and that the goal can be only accomplished by them.

*Loss of self-consciousness* comes from the immersiveness of the gameplay. The visuals, music and the story are designed to pull the player deep into the adventure.



other Punnu can do and what kind of tasks will be seen? Right after this the player is shown the light Punnu's ability to light dark areas, giving them a knowledge that dark areas can be explored supporting *Discovery*.

The player will encounter after the dark cave a bear they need to sneak by. This part is raising the feeling of *frustration* but turned into *relief* after passing and they will be rewarded with the first moving enemy.

First time the player gets to really use the blue Punnu a whole new type of game within the game is revealed. A puzzle, *Challenge* the player needs to solve to proceed. Since it takes quite a while for the player to see what talent the blue Punnu has, rewarding them with a new gameplay element opens yet another layer to the game for them supporting *Challenge* and *Discovery*.

After saving Pullervo, as presented previously, the player is rewarded for the finding of the first engine part by delivering them to another "world" opening a completely new type of surroundings.

Watery paradise world with new enemies, new obstacles, new skill and new challenging gameplay style leads the player forward keeping them focused and driven to move forward in the game.

In the beginning of this new map the player sees a cute frog and in a cinematic cut they can see that something is happening to the frog. Visual cues like its eyes turning red and its body getting painted with a black color invokes *curiosity* in the player. Something is off in the world.

After the player has completed a series of challenging obstacles, they are rewarded with yet another layer to the game. A monster they need to battle in a boss fight. There is an additional element to this enemy. Not only being a formidable opponent but visually showing something completely new: the player gets their first opponent that has no real-world basis. It is not an animal nor humanoid, but a monster. The same kind of contamination as in the frog in the beginning of the map, but in a much more extensive way and the surroundings of the monster are also covered with this contamination.

Supporting the need for *Discovery* and providing the *Challenge* with the monster-boss leads to the end of the demo showing a flooded path and an alternate path towards a high mountain yet again invoking *excitement* and *Discovery* for the player. This is however the end of the demo, leaving the player wanting more.

## 5.2. Development of the game

The design process and story writing for Arrival of the Punnu started back in Spring 2020. The story was constructed by outlining the key goals and factors that make the story. During 2021 the story was revisited and revised to what it is today.

Aesthetics were the first to be implemented, tested, and revised several times. In the design a certain mood was outlined, and the visual style took months to refine to meet this goal. Easily approachable, cute, and lovable style to make sure the desired emotions match the feel and gameplay in the demo. Music in the demo is an important element in aesthetics. There have been original compositions for this game specifically.

To achieve the correct feeling the written story (a novel version) of the maps in the game were given to artists to study. The goals for what emotions we are trying to achieve in the player were discussed and analyzed and actions on how to achieve the desired emotional state in the player were designed.

At first in early 2021 we had a demo that had very little Mechanics added, but a lot of Aesthetics and Dynamics were in place. After the balance was right, the technical work was started to make the gameplay itself as good as possible.

In April 2021 a very early version of the demo was released to Steam for a while to get test results and to understand what could be improved. At that time, it was clear that some important factors were still missing to get the players into the *flow state*: There was not enough challenge, and the goals were not clear.

The demo was vigorously tested, and the design was revisited. The implementation of combat was meant to come at much later time in the game in the original plan, but it started to make sense to give that ability to the player earlier. It was decided to rewrite the story to support the decision to provide the challenge at an earlier time and to redesign some of the activities to improve the flow.

While the development work continued to apply combat and improve the existing features, the design of the last map in the demo was near completion. During Summer 2021 the prototyping of the new map started and by November 2022 a completely revisited demo with Aesthetics, Dynamics and Mechanics were matching the design of the game.

Music, visuals, and actions were balanced, and the feel of the gameplay was satisfactory. All eight factors from Csikszentmihalyi's list were met.

## **Dynamics & mechanics**

The core gameplay in *Arrival of the Punnu* is a sidescroller platformer with elements from metroidvania games such as gaining abilities, epic boss fights and a charm system the player can utilize freely to improve their gameplay.

To support *Fellowship* according to the MDA framework in *Arrival of the Punnu* one of the unique mechanics is the usage of the Punnu during gameplay. The Punnu, like the boy, gain abilities during

the whole gameplay. The gain of these abilities for the Punnu are based on the roadmap (Fig 13) of trust between the Punnu and the boy.

TRUST BUILDING BETWEEN BOY AND PUNNU, MAKING OF FRIENDSHIP.											
Building trust and friendship BOY and PUNNU	PT1, Saimaa	PT2, Piltvice	PT2, Bossfight	PT3, Norway beginning	PT3, Punnucity	PT4, Outskirts of jaipur	PT4, Throne room	PT5, Atacama desert	PT5, The maze	PT5, The temple and Dune worm	PT6, Attack to Punnu city
Boy	Loves the Punnu, is so shy, never home alone. Wants to know Punnu better.	Even he gets pulled to adventure without his opinion, he is happy to work with the Punnu.	Boy is ready to defend the Punnu. He wants to keep his new friends safe.	Boy is confused about the cold. It is dark and he fears his lost. Some regret.	Suddenly the friendship has too. The one who together and adventures the part of something together together.	Adventure continues with friends, whom he trusts now completely.	Defending friends is now the most important thing. The boy is going to die for them.				
Yellow Punnu	Is curious but cautious about the boy.	Starting to enjoy Boy's company. Gets scared when boy is hurt.	Is really happy now. Boy is strong. Considers him a friend.	Getting closer to the boy. Wants to understand the boy.	All is well now. There are other Punnu too!	The boy helps living creatures and delivers them jumper on his shoulder occasionally.	Red makes an attempt to help the boy. The boy is not sure if he can help.				Offers to join the boy to dark world even when it poses a risk to itself.
Red Punnu	Is neutral about the boy.	Accepts boys help and becomes about them.	Is impressed that boy is defending them. Starts to like boy even but, team rules for handling better.	Is openly happy about the boy and that he is along this trip.	It feels a bit awkward to have brought a friend to the Punnu. This one can be trusted. Comes closer during puzzles.	The boy is still with the Punnu. This one can be trusted. Comes closer during puzzles.	Follows behaviour in surprising and not wants to wonder if it could also help somehow.		Red is more ready help. It offers to carry the boy to higher places even when it is going to.		Sacrifices itself to save the boy.
Blue Punnu	Professional. Polite, trusting but distant.	Accepts the boy as a companion. Starts to share a bit about Punnu history.	Approves the fact that the boy is there for the Punnu. Not emotional but approving.	Usually helps and is open to new technologies and larger mission - gets like to them as well as work.	Proud to present its human friend. Openly shares their adventure to the other Punnu.	The boy is a friend to Blue. Someone it is ready also to help and defend if needed.	Complete trust has been built and Blue feels that they are true friends now.		Provides a short term credit for the boy in the forest. It defends a friend in need.		Offers to join the boy to dark world even when it poses a risk to itself.

Figure 12.

The roadmap of trust between the protagonist and the Punnu (Arrival of the Punnu design documentation).

The Punnu have different skills as presented before in this research, such as the blue Punnu puzzle and the yellow Punnu's ability to bring light to dark areas. These abilities are not chosen by random but are based on their personalities.



Figure 13. Red Punnu leaping to the tree (Arrival of the Punnu).

As part of the Dynamics and the Punnu Mechanics are supporting Aesthetics to

create the emotion of companionship in the player. In the image (Fig 14) above we see the red Punnu climbing a tree with a whole the Protagonist could not fit in and the next image (Fig 15) shows the yellow Punnu turning a light on so that the group can proceed to a dark area.



Figure 14.

Protagonist and the Punnu entering a cave (Arrival of the Punnu).

The protagonist in the game is the boy and to add *Challenge* to the game, the boy's abilities need to evolve as the player is progressing to keep the gameplay interesting, to maintain *flow state*. At first the boy does not have anything more, but the base movement until he meets the Punnu. The gain of combat skills after encountering the Punnu again supports *Fellowship* in *Aesthetics*. The combat is kept in the demo simple, only basic 2-step hits are given to the player, and they need to defeat all the enemies in the demo, including the boss at the end of the demo. This is to teach the player and make them confident with only the simplest mechanics. Raising the challenge, but not giving anything extra is meant to be simple practice for the player. After they have completed the area in the demo, later in the game the player is rewarded with a new ability and more combat options, but then again, the *Challenge* is increased to keep the *flow state* balance. In the image (Fig 16) we can see the boy attacking a dangerous entity.



Figure 15. Protagonist fighting an enemy (Arrival of the Punnu).

This same goes with all the abilities for the boy. It is on purpose that some of the enemies require multiple attempts, to increase player skills, but also as a hidden agenda, to support the *Narrative*. Since the protagonist (the boy) needs to grow as a hero and protect the Punnu, they need to increase their skills. The *frustration* and *relief* of accomplishing also helps the player immerse deeper into the role of a hero.

## Aesthetics: Graphical design

The visual world in *Arrival of the Punnu* is drawing a lot of inspiration from Ghibli to make the game easier to approach, but also to give room for the fantasy elements and *Narrative* in the game. To explain this better, we need to look at the message behind *Arrival of the Punnu*.

The hidden agenda for the game is to show the incredible diversity of life on Earth and it was chosen to use this specific art style since Ghibli films are known for a quirky realistic fantasy. Consumers already expect the unexpected and don't find an oversized bear unbelievable as seen in the image (Fig 17)



Figure 16. Protagonist passed the bear (*Arrival of the Punnu*).

To invoke the *Discovery* in the game, the game world is designed so that there is enough to see and wonder as shown in the image (Fig 18)



Figure 17. The tree area in the second area in demo (Arrival of the Punnu).

The emotional triggers in *Arrival of the Punnu* can be visibly seen in the cinematics and the world when encountering certain areas.

## Technical work to create the game.

*Arrival of the Punnu* is being developed in Unreal Engine using blueprint coding. As the game is a 2.5D sidescroller with the base mechanic being a linear movement the Punnu are following the same mechanic with a difference to their physical attributes. In this part we go through these mechanics from the technical point of view.

All the playable characters are originally based on the Unreal Sidescroller template. The character is constructed with the Character Controller that contains all the physical attributes that are modified so that they match the feel of the gameplay the best.

Each character having unique abilities have their own Blueprints that inherit the Sidescroller Character Controller.

All the characters also utilize a Punnu\_PlayerController blueprint that gets all needed actions from a base action blueprint. This is created because there are massive amounts of different actions also varying based on which character the player has and to avoid any overlapping actions that might break the gameplay. For example, we don't want to climb or crouch and fight at the same time.

All characters also utilize the BP\_Interactive that is an input-trigger in the game. This trigger initiates most of the time a Level Sequence, for example the tree area right after the Punnu joins the party, and red Punnu jumps up to the tree. Also, the BP\_Interactive lets developers define which character is allowed to use that interactable trigger.

All the characters also have an animation blueprint for base movement, such as walking and jumping, but most of the animations are triggered by calling the uniquely created Animation Montages from blueprints on runtime.

### **The protagonist - Boy**

The boy is the main playable character with the most variety to the mechanics they have. The boy can climb and fight, which the other playable characters cannot, so this was created in the unique BP\_Boy blueprint. The boy being a unique character also with the upcoming charm system, the selected powers do not affect other playable characters.

### **The Punnu**

The Punnu have different physics and abilities, like the boy. They all have their unique Blueprints defining these unique characteristics. For example, the blue Punnu cannot jump as high as the others, but the yellow Punnu can do a double jump. This is done using the unique blueprints for each character.

### **The obstacles and puzzles**

All the obstacles and puzzles are unique thus they are constructed separately to their own blueprints. The only common thing they share is the usage of BP\_Interactive and checking the unique character blueprints.

### **The enemies**

All enemies use an BP\_Enemybase blueprint that lets developers define basic values such as health points or damage they inflict.

Each enemy however has their own blueprint where their unique characteristics such as attacks, sounds, effects, and animation blueprints are defined.

### **Audio Control**

There are 3 different audio types in Arrival of the Punnu. Environmental, Action based sound effects and music.

Action based sound effects are triggered with Play 2D Sound on runtime directly from animations or actions, for example when the boy wields his spear and hits an enemy a specific sound is created and played.

Environmental sounds, the ambience, is created with a trigger area placed directly to the game world. It detects the distance of the player and starts playing the ambience when the distance is less than a defined value. For example, in the cave where we hear the water dripping a sound area is placed and defined so that the dripping is not heard outside the cave.

Music is controlled by BP\_AudioControl. This blueprint is placed in each level and can be called from anywhere. Most times the BP\_AudioControl is triggered from within the Level Sequences using Event Triggers so that we can change the music at a specifically defined time.

## 6 RESULTS

7 Players in total answered a questionnaire regarding emotional responses to different aspects of the demo from Aesthetics to emotional responses to the characters. In the beginning of the questionnaire the players were asked to answer few basic questions about their gaming habits to determine their player persona.

### 6.1 Player persona

The players were very different, but most players enjoy playing rpg (Role Playing Game) games with open world and action. All players had in common in their favorite games that they all have combat as an important mechanic, but also their aesthetics are in an important role. Few examples of the games mentioned were The Legend of Zelda: Breath of the Wild, Horizon Forbidden West and Witcher 3.

In the questionnaire the players were asked what excites them the most in a game and almost all answered Beautiful World. Second most popular options were Exploration, Characters and Boss Fights. None of the players selected Rapid Combat in this question.

Most irritation and/or frustration the players were almost unanimous that Poor Graphics are the most frustrating thing in a game. Second choice was Too Slow combat. The rest of the answers were somewhat scattered, but none picked Too Fast Combat, Not Enough Loot or Too Much Freedom to Customize.

When asked what influences their game experience, players selected Mechanics and Aesthetics, art style and music.

### 6.2. Answers to Arrival of the Punnu Aesthetics

Most players stated that the Arrival of the Punnu art style reminded them of anime, especially Ghibli style and that it was cute. The first impressions were Inspired, Happy/Joyous, Interested and Nostalgic (1 answer).

The art style matched the gameplay very well according to answers. All subjects felt the art style was good, even the mechanics needed a lot of improvement.

Same answers applied for music. The art style was coherent and consistent while the music supported the experience well. None of the players would change anything in Aesthetics.

### 6.3. Interactions and experience in Arrival of the Punnu

Favorite interaction in the game among the players was to play with the Punnu and simply admire the beautiful world. Least favorite interactions were affected by bugginess in the game itself, that caused different answers from all. The lack of challenge and some confusion on “what to do” were the biggest let downs. The favorite moments were also divided, but similarity in answers came from encountering different points of interest. There was always something new whether it was the encounter of the Punnu or the bear.

The players were also asked, if they had a magic wand and they could change anything, what they would change. In all answers there was a wish for more freedom to explore and to play more with the Punnu character. 1 answer stated that they would change the Narrative.

When asked about similar games, the players had very different games they felt similar. One game was mentioned by 3/5 players: Trine. Also, Little Nightmares was mentioned by 2/5 players. One couldn't remember any similar games and 2 didn't answer this question.

The extent of losing track of time was between 5-8 (average: 7) on the scale 1 to 10. The game was not very challenging to any of the players as they rated it between 2-6 (average: 4) on the scale 1 to 10.

Best remembered part of the game was the encounter with the bear and meeting Pullervo at the end of the demo.

Overall feelings about the game were positive, most of the players thought it was cute. All the players stated that they enjoyed playing the demo for Arrival of the Punnu.

### 6.4. Images shown from the game

The players were shown screenshots from the game and asked what they were feeling at the time. Most answers collected options for these images were:

First Image the players were asked to state their emotional response to be the beginning cinematic image of Planet Earth. Most players selected Optimistic. Other answers were positive feelings as well. None selected any “Negative” feelings, such as anxious, disappointed, or bored.

In the Second Image (*Figure 2*) an image of the Boy (Protagonist) is running in the forest. For this image most of the Players responded their emotional response being Peaceful and the rest of the answers were in the Positive emotional range.

In the Third Image (*Figure 3*) the crashed spaceship and meeting of the Punnu invoked Excitement in a bit over half of the Players and the second choice was Optimistic. All emotions in the responses were placed to the Positive emotional range.

Fourth Image (*Figure 4*) was an image from the area where Players were introduced to the ability to play with the Punnu. The majority of responses were divided to Joyful and Excited. All other responses were placed in the Positive emotional range.

In the Fifth Image (*Figure 5*) Players were shown an image from the passing of the Bear. The answers were very scattered between Scared, Optimistic, Anxious and Excited.

In the Sixth Image (*Figure 6*) there was the Ringed Seal captured in a net with the Boy standing next to it. Answers from the Players to this image were mostly in Optimistic and other responses were in the Positive emotional range as well.

Seventh Image (*Figure 7*) was from the very end of the demo, a static 2D image of the Boy and Punnu in a vortex. Majority of Players answered that they felt *Optimistic* to this question and the rest of responses were in the Positive emotional range.

## 6.5 Feelings towards the Characters

First character was the boy, and Majority of the players felt *Protective* towards this character.

Towards all the Punnu majority of the Players answered that they had *Neutral* feelings. There were few answers placed in *Companionship*, *Distant* and *Protective*, but the most common answer was *Neutral*.

## 7 DISCUSSION

In this part the results from the questionnaires are presented and the intended design is compared to them. The causes that might have caused the differences between the design and results are analyzed at the end of this part.

### 7.1. Overall emotional responses and conflicts between design and results

All the players felt very positive about the gameplay, and even though the number of answers were only a few there was a pattern visible in the results. All the players felt very comfortable, positive and overall relaxed during their gameplay and didn't really feel any challenge, anxiety or any intense feelings. The whole experience was somewhat bland even though the Aesthetics were met with high praises.

Even though all players felt very Neutral about the Punnu, they stated in the Magic Wand question that they wish to use the Punnu more. The original goal for the design was to incite the feeling of Companionship towards the Punnu, but the result left much to improve on that matter. However, as the players stated that they wished more interaction and playtime with the Punnu, this might also raise the emotions of Companionship? The passive presence of the Punnu, traveling in the backpack of the Boy, who raised Protective emotions in players, might reduce the feeling of friendship and their invisibility during most of gameplay might make the players forget the Punnu are there.

Another interesting observation was that the obvious disappointment towards the Mechanics still didn't reduce the players positive emotions towards the whole experience. This might be the result that all players valued the Aesthetics above other features in games as the most irritating attribute in games was poor graphics.

Based on the result, the desired flow state in the demo was also not reached since players felt too comfortable during gameplay. Too many positive emotions result in a stable satisfaction state and the lack of challenge just keeps players so happy which leads eventually to boredom. The intense emotions were lacking and even though the players felt somewhat rewarded and excited about the new points of interest that they encountered throughout the game, the intended result determined in the design was not accomplished.

In the questionnaires the players answered that they lost track of time on the average of 7 on the scale of 1 to 10, so even the Challenge was very low, only 4 on the scale of 1 to 10, they were somewhat engaged in the Gameworld. Players stated that they would have wanted to explore the

world more and were caught in the Aesthetics during gameplay. Also, the progression and finding out what is coming next seemed to be interesting to them.

According to the Flow State theory, the player must be kept in the fine balance of intense emotions and the satisfaction of reward and progression. This was not happening according to the results of the questionnaire, but the players simply progressed through the map. As a positive notion, all players were left wanting more and they felt that they would have wanted to keep playing after the demo ended.

## 7.2. The Responses to the Images

*Figure 1*, an image about Earth, was intended to invoke *Excitement* and *Optimism*, but also encourage *Exploration*. The triggering aesthetics in this scene was the music and the visuals that were building up, according to the design, to an epic moment of seeing the “playground” of the game. The players chose in the questionnaire as the top emotion *Optimism*. As few also selected *Excitement*, it can be determined that the aesthetics in the demo succeeded in creating the correct emotional response during this scene.

*In Figure 2*, the players were asked to describe their emotions, the desired emotions in this trigger area were designed to be *joyful* and *optimistic*. The answers indicated that the strongest emotion present was *peaceful*. The reason for this might be that the cinematics, that are from the player perspective very passive, are somewhat *relaxing* the player and not inducing *excitement* or *optimism* about what is coming. Another reason for the *peaceful* emotion could be the surrounding Aesthetics. The music in this section is very calm and the lush vegetation and bird sounds are *peaceful* and do not invoke expectation or exploration. Also, the starting point, the house, a home, creates a feeling of a safe environment. All these things in combination are conflicting with the intended design and working against the desired emotions.

*In Figure 3* there is a scene where the boy has just encountered Punnu by the crashed spaceship. In the design this moment is planned to make the player feel *Amazed* and *Excited*. The results from the questionnaire state that players were feeling *Excited* and *Optimistic*. Partially the design has been working in this section, but the feeling of *amazement* is lacking. The emotion *Amazed* could be too early for this stage of the game and the design should not be changed in this part of the game, since *Excitement* is present, and the surroundings do invoke *Optimism*. *Amazement* is a very strong emotion and usually present in tipping points of the story and this section in the game is just the beginning.

In *Figure 4*, it was intended to create the first important point in invoking Fellowship and Exploration by surprising the player with their ability to switch characters. This trigger point is designed to invoke *joy, optimism, amazement* and/or *excitement* in the player. The emotional response is not meant to be very intense at this point of the game, so *peaceful* is a desired emotional outcome as well. In the questionnaire the players answered that their emotional response was on the positive side, *Joyful* and *Excitement* got most answers. The trigger worked as intended in this case as none of the players were selecting any negative emotions.

*Figure 5* shows an area that is a trigger point meant to bring out the *Challenge* and *Courage*, but not dive too deep yet. The area is not meant to be particularly exciting or intense. The emotional response for the player in this trigger area should be quite *neutral*, allowing them to focus on the task while feeling *joyous* about the fun side of the seen characters. The players however responded in completely different ways, answering with negative emotions such as *Scared* and *Anxious*. Some also chose *Joyous*, but for the most part the results were highly inconsistent.

In *Figure 6*, players were asked about their feelings towards the area where they met and saved the Ringed Seal. This area was meant to invoke *Anger* towards a cute creature being harmed, but also to encourage the *Fellowship* by the joint experience with the Punnu when they saved the Seal. This part after saving the seal should also invoke *Accomplishment*.

Majority of the Players chose Optimistic and other emotions were in the positive range as well. The difference between the intended design and the result are probably due to the setup of the area, character appearance and the mechanics of this particular point.

The setup of the area is problematic in creating enough Excitement or Anxiety in a situation to save the Seal to really invoke Accomplishment afterwards. The Seal is always not visible, and the background is just a big, calm body of water that generally invokes *Peaceful* in the players. There are a lot of smaller details in the setup that are also not supporting the intensity required to create feelings of *Accomplishment* that would boost then *Fellowship* in vegetation, colors, and the overall feeling of the area. Changes in the music in this area would also assist in invoking these emotions, since currently there is no difference to the normal gameplay.

Character Appearance is also an important factor to invoke Anger in the Player about the mistreatment of an animal. The facial expression and body language of the Ringed Seal is not really communicating distress, instead it almost looks like it is smiling and dancing which understandably would not emphasize the urgency of the situation or invoke intense emotions in the Player so that they would feel like they really saved the animal.

Final part of the difference in design and result for this area are the actual mechanics. The activity in this area is slow-paced, not really pulling the Players properly to the flow state or providing enough challenge to invoke *Accomplishment*.

In *Figure 8*, the cinematic 2D image is meant to invoke *Exploration* and support *Fellowship*. The emotions designed here are in the positive range. Players answered in the questionnaire with *Optimistic* and other emotions in the positive range, so this part of the game worked as intended.

### 7.3. Emotional responses to the Characters in the demo

Players were asked in the questionnaire about their emotions towards the different characters of the game.

In *Figure 8*, an image of the Boy (Protagonist) was shown to them. In the design the Players should feel *Familiarity* towards this character. In the results, Players answered that they felt *Protective* towards this character.

The difference between the intended emotion and the result might have been the cause for the Protagonist being very young and small. The Players cannot relate to him, since the Boy is not "Target Group", meaning that he is many years younger than the Players. Giving the Boy more years and maturity might invoke the *Familiarity* easier. Also, the lack of expression and liveliness in the animation and overall model might also be the result for the difference, since it might feel for the Players that the character is "frozen" out of fear.

The Punnu (Figures 9, 10, 11) were all meant to invoke very different kinds of feelings. Red Punnu should have had more *Neutral* responses, Blue Punnu should have felt somewhat *Distant* and the Yellow Punnu should have invoked *Protective* emotions.

The Players felt very similar towards all the Punnu, which is not coherent with the original design. This might be happening since the Punnu have no expressions nor their body language is really communicating anything. The Punnu are fun to play with but offer no depth or layer in the emotional spectrum for the Player.

### 7.4. Overall differences between the design and results

The differences between the design and result were mostly due to the lack of elements that would support the intended emotions. Adding more depth to the interactions between the Boy and the

Punnu and changing the overall feeling of setups in the trigger areas might enhance the experience and invoke the emotions determined in the design.

Currently the emotional experience in the demo left the Players generally to the positive range, but the intense emotions were left out from the spectrum. The result for the lack of the negative emotions did not boost *Fellowship*, *Accomplishment* or pull the Players enough to the *float state* that is crucial in an *Exciting* and engaging experience.

## 8 CONCLUSION

This thesis presented the theory of Mechanics, Dynamics and Aesthetics and established a goal to compare how determining emotions in game design would align with the actual emotions of players during gameplay. Players were given the demo of Arrival of the Punnu to play and after gameplay they were asked to fill a questionnaire that asked about their player persona, responses to emotional trigger points according to game design and their feelings towards the different characters in the game.

This comparative research about design and gameplay resulted in positive feedback from the players towards *Aesthetics* and even the *Mechanics* left much to improve on, the result was still good. It is important for the players to interact and play with the Punnu and this is something that in the future design work needs to be considered, since the players felt very *Neutral* towards them.

The lack of Challenge in the gameplay also made the players feel too *Comfortable*, *Peaceful* and *Relaxed* during gameplay, which might also result in feeling *Neutral* towards the Punnu since there is no danger to protect them from. Keeping the player in the *Flow State* by introducing changes in atmosphere, music and *Mechanics* might be the solution to this problem.

The *Aesthetics* in the demo for the Arrival of the Punnu were somewhat successful according to the results, but several key points need to be revisited and *Mechanics* resulting in better *Dynamics* needs to be changed to achieve the intended results.

However, the points of interest were rewarding to players, and they were compelled to continue the game in their desire to see what was coming next.

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