
**VIDEOGAME FOCUSED ON THE
AUTISM SPECTRUM DISORDER
AMONG CHILDREN
AND THEIR UNDERSTANDING OF EMOTIONS**



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*This dissertation is submitted for the bachelor's degree of Video Game Design
and Development.*

SUMMARY

This document is a memory for my final project of the degree on Design and Development of Videogames. I will explain the entire development process. from the idea to the final testing.

It consists in a videogame, a graphic adventure, focused on showing children with autism spectrum disorder how to recognise and understand a range of emotions such as happiness, sadness, anger or fear. In this adventure, the player starts a journey, where each different place we come by will be based on one of those basic feelings. I will initially focus on a fully functional game with at least two or three emotions/villages, and then I will expand it. Moreover, it will include some narrative mechanics in order to increase the playability and increase the number of narrative lines.

This game has been developed with Unity3D for computer, and will be playable in English and Spanish. Last but not least, this project is supported on existing scientific work (links added at the end). For instance, I will be using one of the methods described in [2] to visually express emotions, which consists on associating each one to a specific non-verbal code, like colors or symbols, that will be unique for each village. Last but not least, I got a lot of help from the Autism center of Castellón, in regard to collect information and being with children in their activities.

KEY WORDS

- "Social entrepreneurship"
- "Didactical game"
- "Social skills training"
- "Emotion recognition"
- "Autism disorder spectrum"

INDEX

List of tables and figures	(Pg. 4-5)
1. Technical proposal	(6-8)
Introduction and motivation of the project	(6)
Related subjects	(6)
Project goals	(7)
Task schedule	(7)
Expected results	(7)
Tools	(8)
References	(8)
2. Related work	(9)
3. GDD	(10-13)
Story summary	(10)
Game description	(10)
Gameflow	(11)
Game progression	(11)
Mechanics	(12)
Art and Narrative	(12)
HUD	(12)
Instructions	(13)
Sound and music	(13)

4. Development	(14-41)
Idea	(14-15)
Castellón Asperger Center	(15-16)
Initial approach	(17-18)
Start of development	(18-20)
Development from the changes	(21-41)
3D scenarios	(21-26)
Narrative, characters and dialogues	(26-27)
Characters	(28-29)
Storyline	(30)
IA companion	(31-36)
Atmosphere	(36-41)
5. Art	(42-48)
6. Results	(49-50)
7. Project deviations	(51)
8. Conclusions	(52)
9. References	(53)
Appendix	(54-66)

LIST OF FIGURES

Figure 1: estimated hours	(7)
Figure 2: tables of different ideas given by children	(18)
Figure 3: Paper Mario Style	(18)
Figure 4: Super Mario Bros Map	(19)
Figure 4: 3D Map of the game	(21)
Figure 6: Anger desert	(22)
Figure 7: Anger desert (II)	(22)
Figure 8: Snowed mountains	(23)
Figure 9: Snowed mountains (II)	(23)
Figure 10: Forest of thorns	(24)
Figure 11: Forest of thorns (II)	(24)
Figure 12: Plain	(25)
Figure 13: Plain (II)	(25)
Figure 14: Fungus asset	(26)
Figure 15: Fungus flowchart	(27)
Figure 16: Father model (Anger)	(28)
Figure 17: Daughter model (Fear)	(29)
Figure 18: Son model (Sadness)	(29)
Figure 19: Bird AI code script	(32)
Figure 20: Bird prefab parts (I)	(33)
Figure 21: Bird prefab parts (II)	(33)
Figure 22: Bird prefab in hierarchy	(33)
Figure 23: Outter influence area	(34)
Figure 24: Inner influence area	(34)
Figure 25: Influence zones in hierarchy	(35)
Figure 26: Bird attention dialog	(35)
Figure 27: All influence zones	(36)
Figure 28: Skybox determitation volumes	(37)
Figure 29: Anger skybox ambient	(37)
Figure 30: Sadness skybox ambient	(38)

Figure 31: Fear skybox ambient	(38)
Figure 32: Joy skybox ambient	(39)
Figure 33: Skybox change code script	(40)
Figure 34: Feeling zone example prefab	(41)
Figure 35: Skybox blended prefab	(41)
Figure 36: Skybox blended shader	(41)
Figure 37: Downloaded models	(42)
Figure 38: Modeling process (I)	(43)
Figure 39: Modeling process (II)	(43)
Figure 40: Modeling process (III)	(44)
Figure 41: Map construction process (I)	(44)
Figure 42: Map construction process (II)	(45)
Figure 43: Map construction process (III)	(45)
Figure 44: Character modeling process (I)	(46)
Figure 45: Character modeling process (II)	(46)
Figure 46: Character rigging process	(47)
Figure 47: Character animation process	(48)
Figure 48: Bird animation process (I)	(49)
Figure 49: Bird animation process (II)	(49)
Figure 50: Estimated hours vs final hours	(51)

1. TECHNICAL PROPOSAL

Introduction and motivation of the project

This project is based on scientific works that try to find techniques to train children with ASD to improve their emotions processing skills. There are few videogames about this topic, and their target are not children with ASD, but people without it, and they focus on providing information about this disorder. But in my case, I aim to create a videogame that could help those children, so despite the game will be playable for everyone, its main target is more particular. For this purpose, I have been attending classes with children in the age range of 9-12 in the Asperger Centre of Castellón. I got so much information and help, and I have been talking with children about their needs and likes. Besides I can count on them to test this project and adjust it progressively during its development.

Related subjects

VJ 1216 - 3D Design: knowledge about 3D modeling

VJ 1222 - Conceptual design of video games: development of game structure and GDD

VJ 1223 -Art of videogame: treatment of the art of a game from scratch

VJ 1227 - Game engines: extensive knowledge about Unity 3D

VJ 1235 - Entrepreneurship: introduction on social entrepreneurship

VJ 1238 - Fundamentals for the development of didactic videogames: how to develop games with didactic techniques

Project goals:

→ To help children with ASD to improve their knowledge of emotions, using specific techniques to teach them based on scientific articles”

→ To design a graphic adventure, with own art, 2D models, and storytelling, which can be played both in English and Spanish”

→ To create a story, that involves the player in such a way that he could feel part of that world, and NPC’s to empathise with, being free to decide to help them or not, which will have consequences in the adventure.”

Task schedule

Document	20h
Presentation	10h
Art Design	70h
Narrative Design	40h
Implementation and programing	120h
Testing	30h

Figure 1: estimated hours

Expected results

To develop a full playable game to be developed, not too big but useful and enjoyable for children with ASD. While I am going to create all the art, I will try to create a unique style for the game, simple and funny. Also teaching techniques and lessons the game will provide have to be meaningful and suitable for children.

Tools

- Photoshop: art
- 3DSmax: modeling
- Maya: animations
- Unity 3D: game engine for development
- Fungus: unity assets for dialogues

References

[1] <https://www.sciencedirect.com/science/article/pii/S0360131511001710>

[2] <https://molecularautism.biomedcentral.com/articles/10.1186/2040-2392-5-37>

2. RELATED WORK

The development and evolution of the work has been based above all on the help and experience that has been provided to me from the Asperger Center of Castellón. They were sessions aimed at children, and where they would play some activities. Because they are minors, I have not collected photographic evidence. I went to learn with them and to apply what they taught me in the project- I will go applying those teachings in their corresponding sections.

Still, there are two main studies on which I based the initial idea and that at certain moments have served as support when choosing the main elements on which to base the work. They are the following:

Key factors mediating the use of a mobile technology tool designed to develop social and life skills in children with Autistic Spectrum Disorders

In this first study I simply based myself when choosing the type of game and platform to which I would be directed. Mobile technology today is very accessible for children, since almost all have their own mobile or a tablet in their home with which to play or run applications of any kind, without great requirements for implementation

[1] <https://www.sciencedirect.com/science/article/pii/S0360131511001710>

Facing the challenge of teaching emotions to individuals with low- and high-functioning autism using a new Serious game: a pilot study

The second and most important one helped me when determining how to represent emotions within the video game. It is about the challenge of teaching emotions to people within the autistic spectrum using serious games. In this study there is a section in which they explain how to use colors and visual icons for easy recognition of them by users, and this was what I applied to my project. Another clear example and more known that we can see from this, is the animated film Inside Out, in which each of the 5 main emotions is represented by characters with very defined features and also with a predominant color in each of them.

[2] <https://molecularautism.biomedcentral.com/articles/10.1186/2040-2392-5-37>

3. GDD

Story summary

The player will play the role of a traveler whose only rule to enjoy his journey is not to spend much time in one place. He is accompanied by his faithful friend Kino, a bird with blue plumage that seems to hide small secrets, and that has been with him since he has memory.

Our friend finds different people in his adventure, who seem to be related to each other and tell him their problems.

He should discover what kind of relationship there is between them, and the player should help them the best he can, understanding their feelings and empathizing with them.

Game description

It is a graphic adventure that explores the different emotions of the human being by solving riddles, NPC's dialogues and exploration.

Being aimed at children within the autistic spectrum, the goal is to learn to understand how other people can feel and what consequences there are if we act in one way or another. All this through visual icons and colors that identify with emotions easily [2], dialogue with characters that represent different feelings, a narrative that relates them and appeals to empathy and to children strive to put themselves in place of these.

In addition, the player must explore the entire map and find them on their own. However, so that this is not lost or is a very expensive task, he will be accompanied by a small bird that will serve as a guide and will indicate the path to be followed if he sees that it does not advance in the adventure.

Gameflow

The game takes place within different environments the player can visit, based on each emotion. We arrive at this, an NPC presents its problem or concern related to the emotion that the place represents, and the player will look for a way to solve it.

However, the order in which you visit the villages may vary, depending on how the player moves around the map and decide it. In addition, this order will influence a bit in the narrative, which may take into account the areas we have visited previously when arriving at a new one. That is, the dialogues with the NPC's will vary, so that the player can put into practice or take into account the emotions already visited.

Game progression

There are a series of challenges that the player must face throughout the game:

- Main challenge: visit all the places and help every NPC, so all of them would group on the same place and show the good ending.
- Intermediate challenges: find every NPC, complete conversations with them, do whatever they ask you for and help them.
- Atomic challenges: pick up an object, give a correct answer in a conversation.

The main challenge is not completely mandatory. It is if we want to find the correct ending, but because the game is based on how players respond when understanding emotions and helping NPCs, and that this has consequences for both good and bad, not overcoming a challenge will not stop the progress of the game, but it will lead you to another conclusion when the end comes.

Most challenges, especially the first time you play, are explicit, that is, those that arise from the game design. However, when we discover in the end that depending on whether we have overcome the different challenges properly, one end or the other is obtained, an implicit challenge that could arise on the part of the player would be to try to discover all the endings. Or even if we start the game again and the player realizes that by varying the order in which we visit the places, the conversations with the NPCs change depending on the feelings we have already visited, another challenge Implicit could be to overcome the game by visiting them in all possible orders and thus discover all the variations of dialogue.

Mechanics

While the mechanics of the player are very simple, WASD keys or arrows for movement, those of the world are somewhat more complex.

There is an AI which will guide the player along the map. A small bird that will always go before you and move as the player does. In addition, as it is an open world and it is easy to get lost, it will indicate the path to follow, through small checkpoints. These will disappear once their corresponding area is completed, so as not to be repetitive or to guide you to places where there is nothing left.

On the other hand the environment and background landscape will change depending on the areas visited, matching the colors they represent and relate to each emotion, based on the studies and information given by the autism center.

Art and Narrative

Both are an important part of the project, since they will be the main pillars on which the representation of emotions and the treatment of them are based so that children can understand them and try to understand them. They will be clear enough not to confuse them, but not explicit, so that they will be the ones who do a small exercise of understanding and understanding.

The art will be based on a very simple style, with lowpoly 3D models, but that will be colorful and attractive for children.

As for the narrative, it will have dialogues that relate to emotions, and they will be the most natural possible, trying to evoke situations that children can see on their home and they could understand.

HUD

The HUD is very simple. It will display an icon for each emotion, which will get colour if you complete the NPC dialog that correspond to it. Pressing escape key, it will display a pause menu, where we will be able to consult game controls and instructions, change the game language, or exit the game.

Instructions

The game will have a simple instructions that will be presented in the tutorial level and they can also be accessed from the pause screen.

They will explain the basic movements that the character can perform, how to move, collect objects and talk with the NPCs.

Sound and music

The soundtrack will be based on the emotions that each place represents. Fast songs with more rhythms for joy, slower, with violins, for sadness, with a lot of percussion in the case of anger, or wind instruments for calm. All of them belong to the fantastic genre, taking as reference the video games of the style of Ori or Majin.

In addition, sound effects are used to give the game more life, such as:

- Sound of the steps of our protagonist.
- The chirping of Kion, which will vary if you help them with the requirements in a personalized way.
- The NPCs have a motive related to the emotion they represent, which will sound when interacting with them.

4. DEVELOPMENT

Idea

The idea came about thanks to the subject of entrepreneurship. In the group with which I did the practical part, we had to work on social entrepreneurship [3]. This refers to a type of company in which their corporate aim is first to meet the needs of the society in which they operate. Although it is not a typical private company of the capitalist sector, its logic does not fit either in the paradigm of public enterprises of the state sector or that of non-governmental organizations.

Social enterprises [4] are organizations that apply market strategies to achieve a social objective. The social entrepreneurship movement includes both non-profit organizations that use business models to achieve their mission as well as for-profit organizations whose main purpose is of a social nature. Its objective - to achieve objectives that are at the same time social / environmental and financial - is often described as the "triple bottom line": at the same time, achieving social, environmental and economic benefits. Social ventures differ from commercial ventures in that their social or environmental objective is always at the center of their operations.

Instead of maximizing the shareholdings of its shareholders, the main objective of social enterprises is to generate profits to boost their social or environmental objectives. These objectives can be achieved in different ways depending on the structure of the social enterprise: the benefit of a business can be used to support a social objective such as financing the activity of a non-profit organization or the undertaking can comply with its social objective through its own activity employing excluded people or lending its benefits to micro enterprises with difficulties accessing loans from current investors.

Some definitions of companies in the sector:

"Social entrepreneurship is the process by which citizens build or transform institutions or systems to solve social problems. It implies the creation of new equipment and resources that improve the capacity of society to address problems and thus maximize social impact through sustainability and sustainability. "

- Ashoka.

"Unlike traditional businesses, a social enterprise operates for the benefit of serving social needs that allow communities to function more efficiently. Social enterprises provide a necessary framework to address social problems by combining business knowledge with the desire to improve the quality of life. "

- Grameen Creative Lab.

I realized how this type of entrepreneurship fitted perfectly with my ideology when entering this degree and thinking about new games. Games that do not remain only in incredible mechanics or breathtaking landscapes, but that also transmit something, and above all, help other people. And in this case I thought about the children in the ASD.

Looking for information and existing games related to the topic, I saw that among the few which exist, the majority focuses on making others see and understand what it is like to be on the side of people with this disease, and thus understand them better. There are no games that are specifically aimed at them, and that is why I started shuffling several fields in which the game could be directed. The two main ones were social interaction and the treatment of emotions. Because I had come to a standstill in which I could not move forward without first-hand information and help, I decided to contact the Asperger's center in Castellón[5].

Castellón Asperger Center

For this, I sent an email that was answered immediately and with very good treatment. I met with Ana, the coordinator of the center, to tell her first about my project and the ideas I had, and that she could help me to focus it correctly.

In this center, which is located not far from the university, they work mostly with children, of various ages, divided according to the same in small groups that do not take many years, and in which they are working on different aspects, as I have already explained, depending on the age they focus on developing some abilities or others.

Therefore, if I wanted to focus my project on emotions, which are worked on a younger age, or social interaction, which are worked on later, I had to choose the age range in which I wanted to focus.

I started the days with two different groups in the center, one on Fridays in the afternoons from 6:30 p.m. to 7:30 p.m., with ages of 8 to 10 years, and another on Saturday mornings, from 10:00 a.m. to 11:00, with a larger group, from 10 to 12 years old. I will explain briefly the operation of these sessions, and what was my choice after two weeks.

With the first group, the classes were divided into different activities, with the same scheme.

First, we spent 10-15 minutes talking about the things that had happened during the week, things that everyone considered outstanding. This activity supported interaction and paying attention to what a partner was counting, fostering respect and interest in other people's things and that for another person are important. It was also common to use different instruments, such as signs or signs, to respect participation turns or to interrupt whoever has it with respect and asking for permission.

After these introductory minutes, we went to the main activity, which could vary greatly from one week to the next. It was mainly based on games or exercises that deal with a specific topic of the disorder, such as feelings or social interaction.

And to finish, they left a few minutes free to talk about any topic or play in smaller groups according to the tastes and preferences of each.

The group on Saturdays consisted of science workshops. Being a group of older age, the issues already discussed in the group that I explained earlier are already more worked and have greater consistency of them, so here it was to introduce scientific concepts through fun activities and to maintain their attention for a period of time more than acceptable.

After two weeks, I saw clearly that the group that I was going to work with best, and also the one with the best relationship I had formed, was with the first one. So, I started attending weekly every Friday. At first I was simply as a companion, and the guys had not told them about the game, until in a session, after having more relationship with them, I decided it was time, and they loved the idea.

Everyone wanted to do their bit and give their ideas for the game, and that's how the project went through different ideas, until it took a first form, which would change later due to implementation and development issues, and that I will explain in next sections.

Initial approach

The game in a prior version was going to be a 2D adventure with a lot of puzzles, because children with asperger enjoy very much this type of games [7], which stand out for being more mechanical, such as taking into account, adjusting pieces or assemble structures. In addition, they do not like changes in routines, and prefer to be always fixed, for them, the main idea is to keep the same puzzle format throughout the game, so you can easily learn its operation and only increase its gradual form.

In this case, the type of puzzle they decided among all those who were on the board, except for a hole, and who moved with that space to order them in the appropriate way.

On the other hand, the main topic were feelings and their understanding, but I still did not have a clear idea of how to create a story around them that could be attractive. Until in one of the sessions, I saw how a child played a mobile game in which there was a main map that linked villages through the construction of train tracks, and with which he was enjoying a lot.

So, we decided that each one of us could help us solve their problem with the puzzles and dialogues, and that the player could build the points on the map with the help of points or coins. which we get by helping the NPCs or completing the challenges more efficiently.

But what kind of currency could be encased in a game that deals with feelings, and in which something as material as money is left aside? The empathy. We would use this quality to reinforce the fact of helping the characters that we meet, fit perfectly with the narrative of the game, and that there could also be elements for the construction of the tracks.

As it was impossible to put all the existing emotions, and taking into account the advice of the tutors of the center, I decided to use four of the five basic emotions, anger, fear, sadness and joy, discarding the disgust because It could be something more complex to reflect.

The only thing that remained was to relate each emotion present in the game with colors and elements that made them easily recognizable, based on the study that I have spoken in previous sections. Logically I was going to use this study as a base, but since I had the help of the children and wanted to make them a little more involved in the project, I asked them to help me and give me ideas to use, and these were the results:

Ideas from children

	Anger	Fear	Joy	Sadness
Colors	Red	Black	Yellow	Blue
	Orange	Green	Light blue	Purple
Icons	Volcano	Ghost	Smile	Rain
	Fire	Monsters	Sun	Cold
Actions	Shouting	Shivering	Dancing	Quiet
	Hitting	Running away	Jumping	Hidding

Figure 2: tables of different ideas given by children

Start of development

With all these ideas already raised, and after making the first GDD, which I attach as an annex as several approaches changed as the development progressed, and which I will explain in this section.

I started looking for the artistic style of the game, since the idea was to first create the necessary assets to create and implement the scenario. The initial style was to be a 2D game, with simple graphics, similar to those of Paper Mario.



Figure 3: Paper Mario Style

The main map, on which to build the tracks and travel from one town to another, would have a zenith view, like the one we can see in any Super Mario Bros

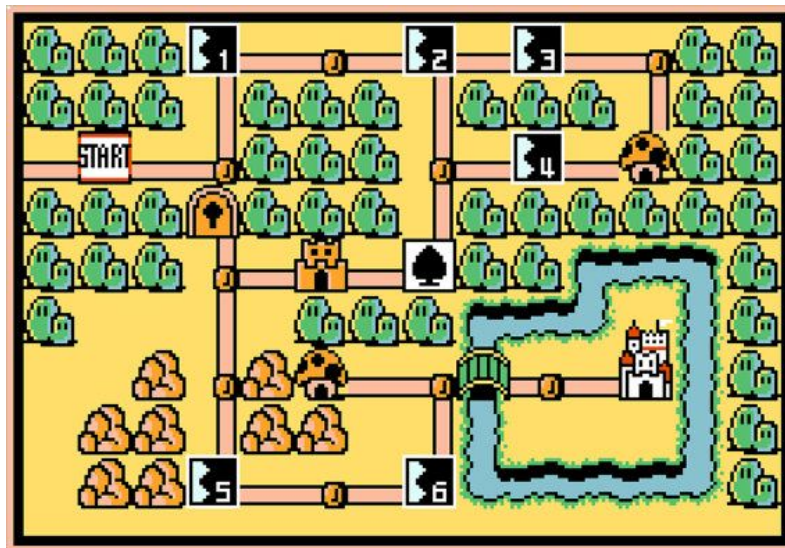


Figure 4: Super Mario Bros Map

As for the screens within the zones or towns, it would be a lateral 2D, like any other platforms of those already commented.

Looking for styles as a reference, I found one that could fit very well with what I was looking for, a very simple but attractive low poly style. I downloaded some assets to try, and I liked how it was, so I started to make variations of them and create some more. The approach remained the same, overhead view for the general and lateral map for the rest, however instead of using 2D elements, a false 2D, known as 2.5D, would be used. This is based on using 3D models but with an orthogonal view, leaving the third dimension fixed and thus pretending that only two are used.

However, after creating all the elements and starting with the assembly, in this case of the main map, I realized that using an orthogonal view in that environment was going to be a waste, due to how good the game scenario was .

Therefore, at this point, I began to rethink some things and introduced the following changes:

- Change from 2D to 3D in the third person
- Remove the main map and the construction of roads
- Focus more on graphic adventure and let puzzles apart
- Deeper and worked-out narrative
- IA companion to guide us
- Play with the dialogues (taking into account what places have been visited)
- Change of the environment depending on the emotion

Development from the changes

3D scenario

As I explained above, due to the choice of lowpoly 3D assets, it changed the stage and the camera, being now a small three-dimensional world in which our protagonist can move freely. The map will have different zones, each of these being one of the emotions chosen to be represented in this game, fear, anger, sadness and joy.



Figure 5: 3D Map of the game

These will be represented taking into account the criteria of the study and the ideas contributed by the children of the Asperger's center, thus creating the following places:

- Desert (Anger)

Arid zone, with dry trees and no vegetation. In addition an active volcano will be present at the bottom of this area, making reference to how to get angry we look like that element, and sometimes it is very easy to end up exploding. It is a simile that the children of the center made reference in several occasions.

The main colors that will be present in this area are red, yellow and brown, the first being the one that most relate to anger.



Figure 6: Anger desert



Figure 7: Anger desert (II)

- Snowed mountains (Sadness)

Quiet place, covered by a lot of snow and with an aura of melancholy. It will have a frozen river and vegetation completely covered by a white blanket. Although the snow is white, the general tone of the place will be bluish, since it is the color that most represents this feeling.



Figure 8: Snowed mountains



Figure 9: Snowed mountains (II)

- Forest of thorns (Fear)

A rocky place, with twisted and parched trees, and plants full of spines of colossal size, thus creating an area that few brave people would dare to enter. Fear was the emotion that was most difficult when choosing a color, so it is based more on the ambience of it, creating a gloomy place rather than basing it on the same range of tones.

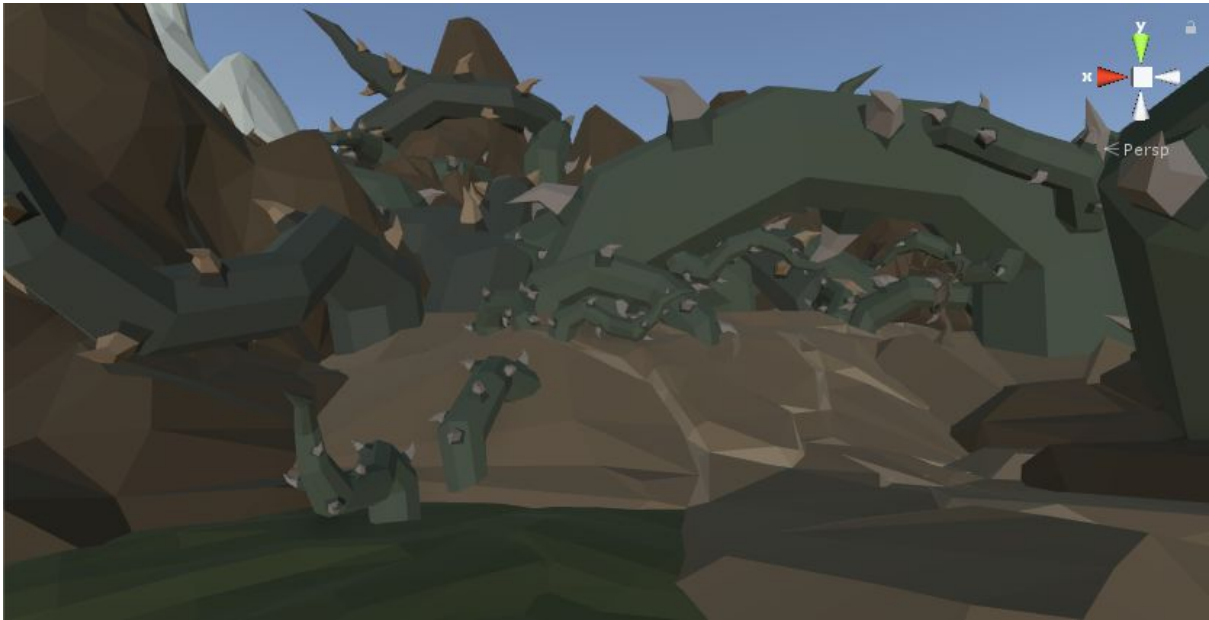


Figure 10: Forest of thorns

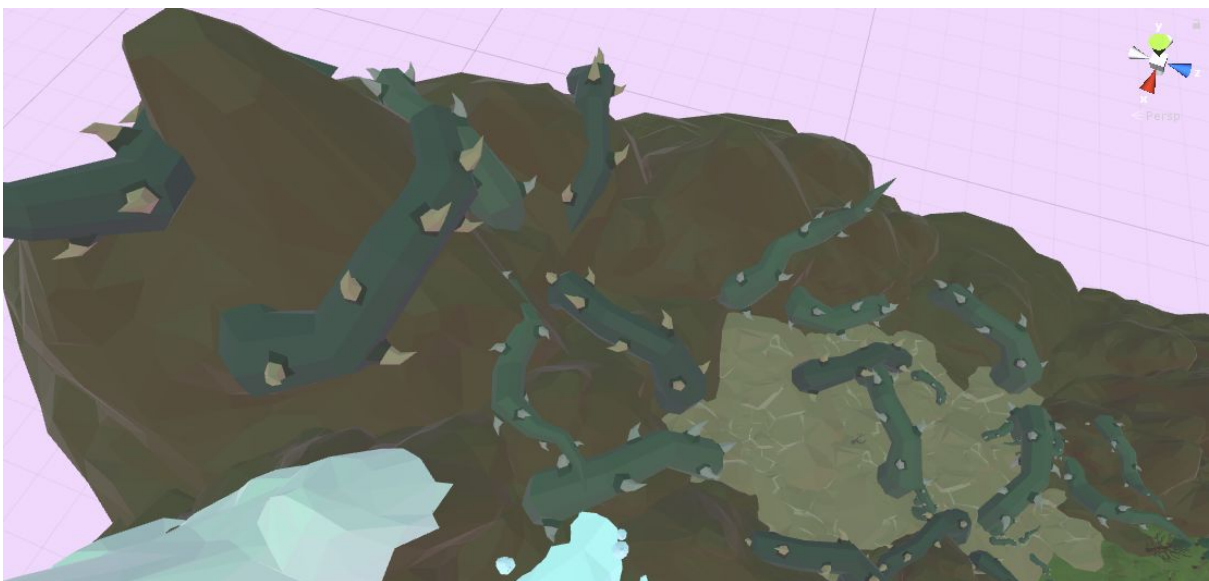


Figure 11: Forest of thorns (II)

- Plain (Joy)

A field full of flowers and a small house is the center will be the elements that represent this place. In addition, sunlight will bathe you once we have completed the story correctly, thus having a strong element that represents happiness. The colors will be alive and warm, counting on a great variation of them thanks to the great amount of flowers.



Figure 12: Plain



Figure 13: Plain (II)

Narrative, characters and dialogues

Due to the omission of the construction mechanics and puzzles, the narrative of this project took even more strength, so I had to rethink it in a way that had greater impact when it was played by the children and will help them even more to understand emotions others and empathize.

There will be two important factors in this narrative, the characters that represent each emotion and the dialogues, with a small mechanics that grants freedom and replayability to the project.

For the latter I have used the Fungus tool, a well-known Asset of great utility and quality and that helps a lot when creating dialogues and narrative lines.



Figure 14: Fungus asset

For there to be more playability with respect to the narrative, I have created several lines of dialogue that will depend on whether we have obtained or visited other characters before. They will be controlled by conditions, and they will send different key messages to the Fungus flowchart, creating a diversity of dialogues, as shown below.

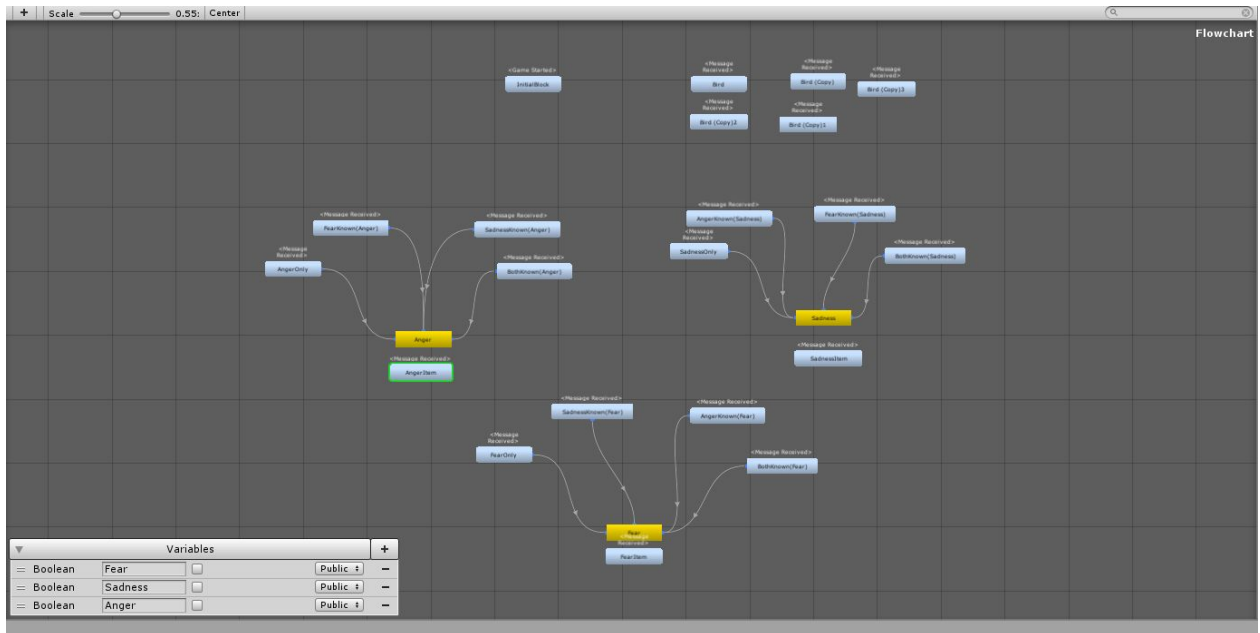


Figure 15: Fungus flowchart

Each blue block represents a different start for the conversation with each character. Depending on whether we have visited one of the other two before, both or none, we will begin the encounter with said NPC in a different way, although then it ends up in the same main block when dealing with their own emotion.

In addition, this tool allows you to add a localization set using an external excel sheet in which each column is a different language. So, I created a file with all the text lines and dialogues present in the game, so the player will be able to change the language between Spanish and English.

Characters

At first, they were going to be people who had no relationship between them, that each one was in the place of the map that corresponded, but alien to the others, without references to other emotions or characters from other places. The only union between feelings would be the small character in which they had to be deposited to get it completed without leaving any.

However, as their design progressed, I realized that relating them and playing with interactions between them could have a great impact, and that is how I came to the next approach.

The characters would be scattered on the map, each one in the place that represents their emotion, but their reason for being at that point would be the same situation. That is, all have been involved in the same incident, but have reacted in different ways, and in them has prioritized a different emotion.

This will help to make children understand something that costs them a lot, and is that people can react in different ways to the same situation, and that the feelings that another person may have about something, do not have to be the same as we have, that is, help them to better understand the concept of empathy.

In addition, the game will play with the fact that three of the four emotions that are represented, are in some way opposed to the fourth. Fear, anger and sadness can be replaced by joy once these have been solved, so it adds more strength to the narrative.

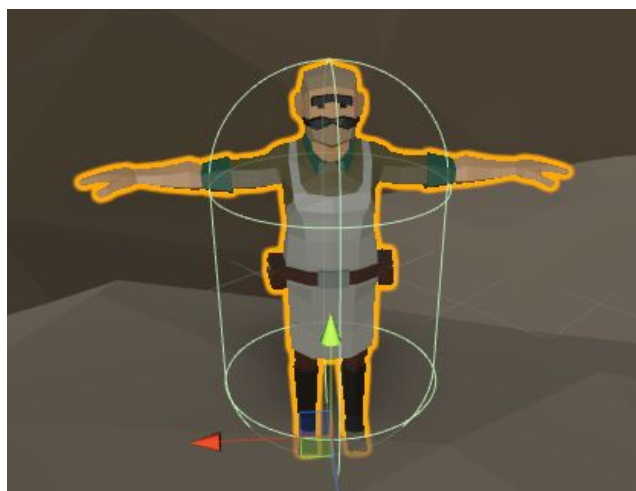


Figure 16: Father model (Anger)

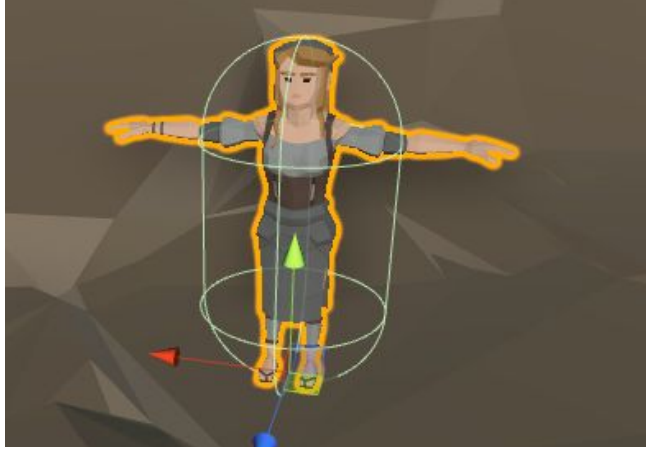


Figure 17: Daughter model (Fear)

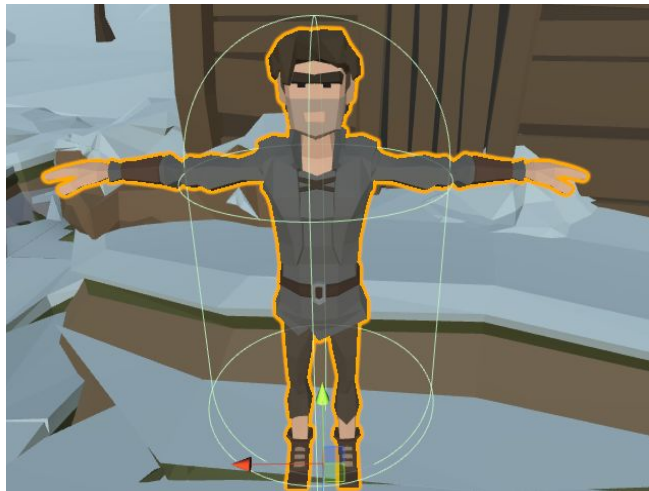


Figure 18: Son model (Sadness)

Storyline

The characters that star in this story are a small family formed by the characters shown in the previous section. A father who lives with his children, in a small cabin in the center of a beautiful plain. However, one day because of a strong discussion, each one decides to leave home, flooded with strong feelings.

The whole incident is due to the children breaking a vase that belonged to their deceased mother while cleaning the house. When arriving, the father gets angry with them, and after a strong discussion, each one goes in one direction, with a piece of the broken vase. However, obfuscated by their respective feelings, they lose their piece of the vase, and the player must help them look for it, and see how they reconsider the situation and decide to return home to solve the problem.

The father, full of anger because his children have broken one of his most valued memories of his wife, can not forgive that and, blinded by anger, ends up in a desert that is at the foot of a volcano.

The son, a very sensitive young man, who is the most affected by arguments, takes refuge in the snowy mountains that are on his home. A quiet and serene place where he does not stop crying and suffering from having broken his mother vase.

The daughter, terrified by seeing her father acting like that, and because she does not know where to go, ends up lost in a dark forest of thorns. However, what scares her the most is having to go home without solving the problem.

Once the player have spoken and helped everyone, you will find them reunited in their home, and he will be able to witness how they leave behind the feelings of anger, fear and sadness, giving way to joy. Joy to get together again, to forgive what had just been an incident and to know that this is what her mother would want.

In the case of having spoken with everyone, but not finding the piece of vase that belonged to them, this final event will not be activated, and you will have to return to the corresponding zone to help whoever is missing if you want to obtain the good ending.

AI companion

The player will have a small artificial intelligence that will help him in his progress through the map. Because it is a wide environment and it could be easy to get lost, besides that as I have explained in another section, it is an open narrative and the player can choose in which order to visit the different points, the presence of at least an element that helps you to guide yourself slightly.

This consists of a small bird that will fly next to the player, opening the path for him, and helping him if he gets lost.

The main idea for the movement of the bird is that it is always in the view of the player, except at some time in which it falls behind, to give it some more realism. Trying several options, I chose to use a navigation mesh for this function. The main problem is that the main use of this Unity tool is for the AI to follow the player, not to go ahead of him.

To solve this I did it in a very easy way, and was to create a prefab that based its movement in following the player (Figure 20&21, red), which we will then remove its mesh so that it is not seen, and put the model of the bird as a son of this game object (Figure 20&21, blue), at enough distance to go in front of the player. Thus, its movement would be the same as that of a navigation agent, but giving the feeling that is the player who follows it and not vice versa.

Even so, the movement of the bird was still very mechanical, so I wanted to add some more functions to it and give it more realism. I got this effect with two mechanics, one of them applying an up and down movement for the bird, to simulate its fly movement, and a rotation mechanic when the player stop, so the bird will look at him, and will look forwards again when the player start moving.

For the first function, create an individual script for the modeling (Figure 19, red), since it can affect all the prefab, could generate conflicts with the navigation mesh. In this case, a sine wave movement is applied taking into account the distance to the ground, so that it was not very abrupt.

As for how to make change its direction and look towards one place or another, I followed the same scheme and applied it only to modeling, to avoid problems. The simplest way was to use the LookAt function provided by Unity, but this time a very sharp turn and the idea was not that. So I used turns with quaternions, applying the lerp function to make them little by little (Figure 19, blue).

Calculating the turn towards the player was trivial, since this was already a game object. But to look forwards again, which should be the player to the player, there was not a function that performed it. To solve this, use the same logic as the problem of how to make the bird move in front of us, and that was another small cube (Figure 20&21 green) in front of it, within the same prefab that had the Navigation Agent , and thus have a point of reference to which to turn, which moved in turn and always to be in front of it.

```
public class BirdFly : MonoBehaviour {  
    PlayerMovement playermovement;  
    GameObject player;  
    public float speed = 3f;  
    public float height = 0.2f;  
    GameObject forw;  
  
    // Use this for initialization  
    void Start () {  
        playermovement = GameObject.FindGameObjectWithTag("Player").GetComponent<PlayerMovement>();  
        player = GameObject.FindGameObjectWithTag("Player");  
        forw = GameObject.FindGameObjectWithTag("Forward");  
    }  
  
    // Update is called once per frame  
    void Update () {  
        if (!playermovement.moving)  
        {  
            float newY = Mathf.Sin(Time.time * speed);  
            transform.position = new Vector3(transform.position.x, (newY * height) + forw.transform.position.y, transform.position.z);  
            //transform.LookAt(player.transform);  
            Quaternion rot = Quaternion.LookRotation(player.transform.position - transform.position);  
            transform.rotation = Quaternion.Slerp(transform.rotation, rot, Time.deltaTime * 2);  
        }  
        else {  
            float newY = Mathf.Sin(Time.time * speed * 0.5f);  
            transform.position = new Vector3(transform.position.x, (newY * height) + forw.transform.position.y, transform.position.z);  
            //transform.LookAt(forward.transform);  
            Quaternion rot1 = Quaternion.LookRotation(forw.transform.position - transform.position);  
            transform.rotation = Quaternion.Slerp(transform.rotation, rot1, Time.deltaTime * 2);  
        }  
    }  
}
```

Figure 19: Bird AI code



Figure 20: Bird prefab parts



Figure 21: Bird prefab parts (II)



Figure 22: Bird prefab in hierarchy

For the help mechanic that this AI bird will use to guide use, there are some areas of influence, composed by two different parts, one to detect that the player has entered it, and another for the AI to address and place in it.



Figure 23: Outer influence area



Figure 24: Inner influence area

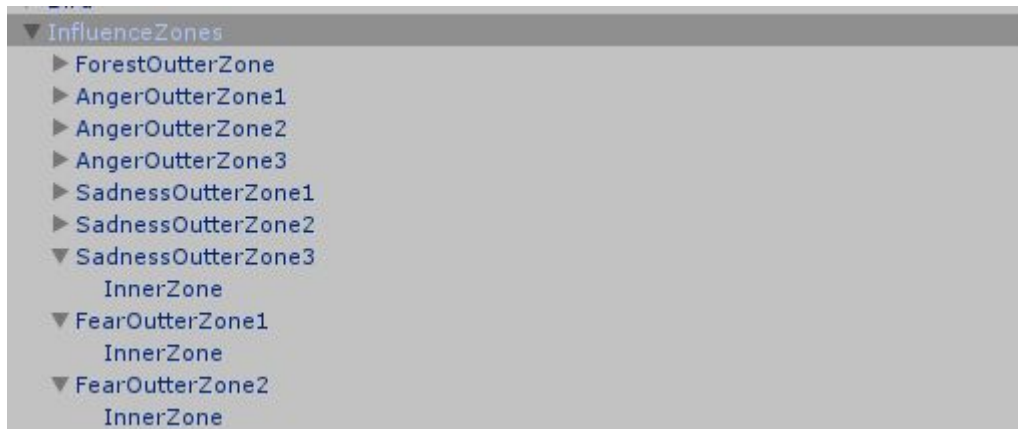


Figure 25: Influence zones in hierarchy

In the event that the player decides to turn around and leave the area of influence, the little bird will fly around again.

The first times this will be emphasized with a small thought bubble to make it more evident so the player can learn these mechanics easily.



Figure 26: Bird attention dialog

As the adventure progresses, those text bubbles will be omitted so it does not become repetitive or cut off the game flow, appearing only at times the player spends a lot of time in the center of the zone of influence or leaves and enters repeatedly.

If the player completes one of the zones, these points will be eliminated, in order to help him efficiently in his advance of the plot and not guide him to points that no longer have any interest for the development of the adventure.



Figure 27: All influence zones

Atmosphere

To help create environments according to the relationships, the game does not only play with the color of the models and or elements that can represent them, also a system has been implemented so that the ambient lighting and the skybox change in execution time, in order to favor said objective.

Each zone will be delimited by an invisible volume, which will detect the entry and exit of the player, as shown below.

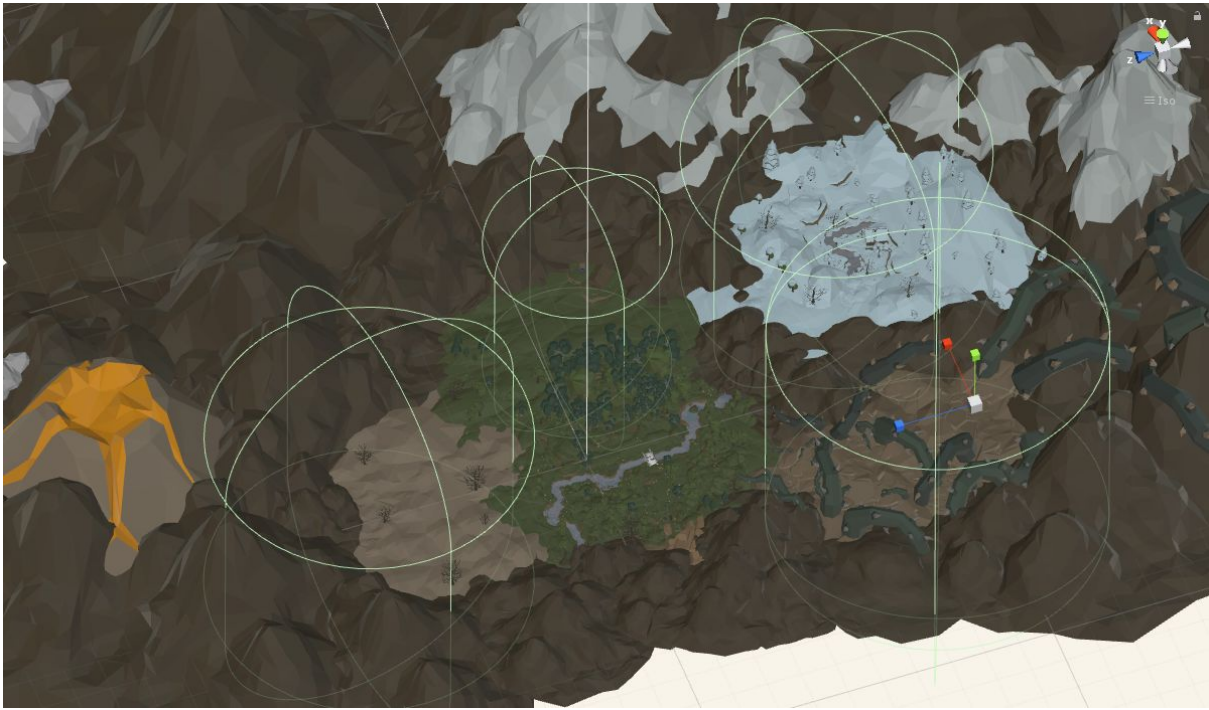


Figure 28: Skybox determination volumes

According to this one in or out, the skybox and the ambient lighting will change, to create a more gloomy, sad, mischievous or happy atmosphere.



Figure 29: Anger skybox ambient



Figure 30: Sadness skybox ambient

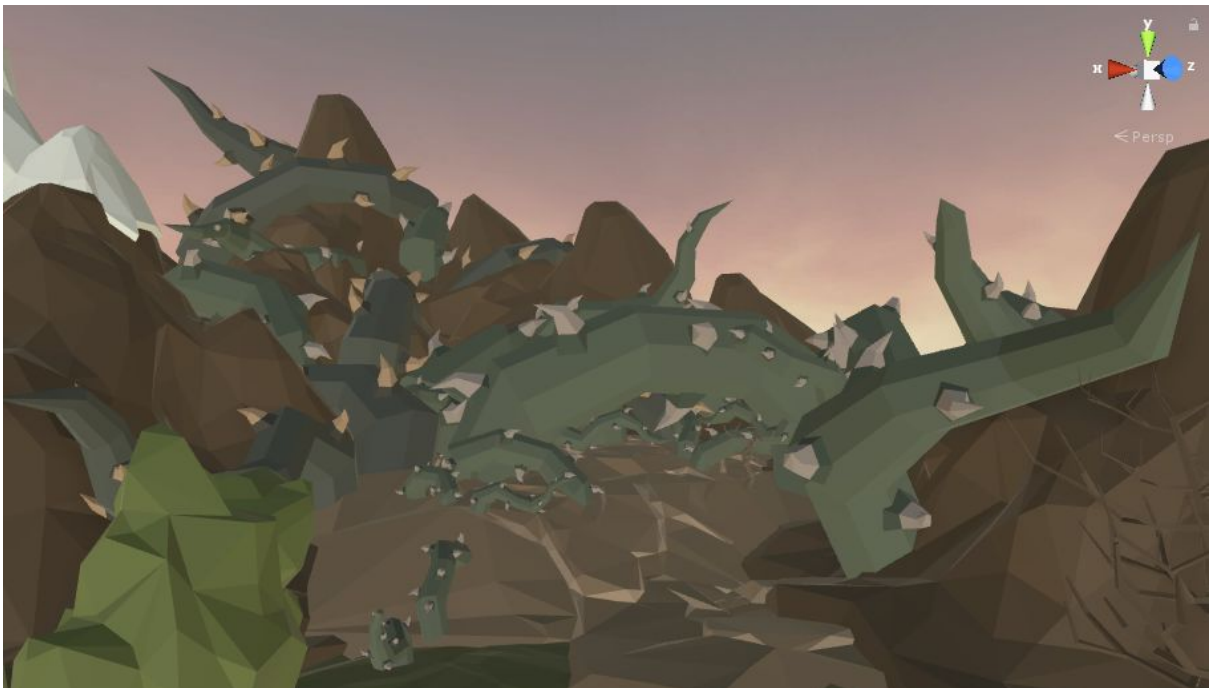


Figure 31: Fear skybox ambient



Figure 32: Joy skybox ambient

As you can see, this gives a big difference to what each zone transmits, with or without this mechanics. In addition, the area of joy will appear only if we duly complete the others.

At first I implemented them in a way that the skybox changed directly, without any transition in between. The downside of this is that it was not very natural, since suddenly the sky changed color, jumping from one skybox to another. I tried to use the Unity Lerp function, which mixes two values, applying it to the skybox, but it did not work, although it did work for ambient lighting and directional light, because it mix colors values. Therefore I started to investigate how to get this function of my game forward.

In the Unity wiki, I found a shader, which can be seen in the first annex of this document, that allowed to mix two skyboxes, dividing them into the six images that form them and making an interpolation for each pair of them. It also has a value of zero to one that allows to adjust the opacity and the transition point of where it is.

However, the problems came when implementing it at runtime, since this shader was designed above all for the interpolation of a single scenario, using at most two skyboxes, not for the change within different zones on the same map. Thus, using the rigidbodies of the zones, and taking into account which player enters, a skybox or another is applied to make the change. This works perfectly at the time of entering its respective area, but at the time of leaving, the onTriggerExit function gives some problems, and there are times when bugs occur and some areas change skybox correctly and others do not. As I said, this is because there are several skybox shaders at the same time in the same scene, and it is very possible that the values between them are mixed incorrectly. So I decided to left the abrupt change of skybox when leaving the zone.


```

void Update()
{
    if (playerIn)
    {
        //tOut = 0;
        if (tIn < 1)
        {
            tIn += Time.deltaTime * 0.3f;
        }

        blendFactor = Mathf.Lerp(0, 1, tIn);
        RenderSettings.skybox.SetFloat("_Blend", blendFactor);

        RenderSettings.ambientSkyColor = Color.Lerp(RenderSettings.ambientSkyColor, skyColor, tIn * 0.5f);
        RenderSettings.ambientEquatorColor = Color.Lerp(RenderSettings.ambientEquatorColor, equatorColor, tIn * 0.5f);
        RenderSettings.ambientGroundColor = Color.Lerp(RenderSettings.ambientGroundColor, groundColor, tIn * 0.5f);
    }

    else if (playerOut){
        //tIn = 0;
        //blendFactor = 0;
        if (tOut < 1)
        {
            tOut += Time.deltaTime * 0.3f;
        }
        /*blendFactor = Mathf.Lerp(0, 1, tOut);
        RenderSettings.skybox.SetFloat("_Blend", blendFactor);*/

        RenderSettings.ambientSkyColor = Color.Lerp(RenderSettings.ambientSkyColor, exitSkyColor, tOut * 0.05f);
        RenderSettings.ambientEquatorColor = Color.Lerp(RenderSettings.ambientEquatorColor, exitEquatorColor, tOut * 0.05f);
        RenderSettings.ambientGroundColor = Color.Lerp(RenderSettings.ambientGroundColor, exitGroundColor, tOut * 0.05f);
    }
}

void OnTriggerEnter(Collider other)
{
    if (other.tag == "Player")
    {
        //blendFactor = 0;
        tOut = 0;
        playerIn = true;
        playerOut = false;
        RenderSettings.skybox = enterSkybox;
    }
}

79 void OnTriggerStay(Collider other)
80 {
81     if (other.tag == "Player")
82     {
83         playerIn = true;
84         //playerOut = false;
85         //RenderSettings.skybox = enterSkybox;
86     }
87 }
88
89
90
91
92 void OnTriggerExit(Collider other)
93 {
94     if (other.tag == "Player")
95     {
96         //blendFactor = 1;
97         tIn = 0;
98         playerIn = false;
99         playerOut = true;
100         //RenderSettings.skybox = enterSkybox;
101         //RenderSettings.skybox.SetFloat("_Blend", blendFactor);
102     }
103 }
104
105

```

Figure 33: Skybox change script

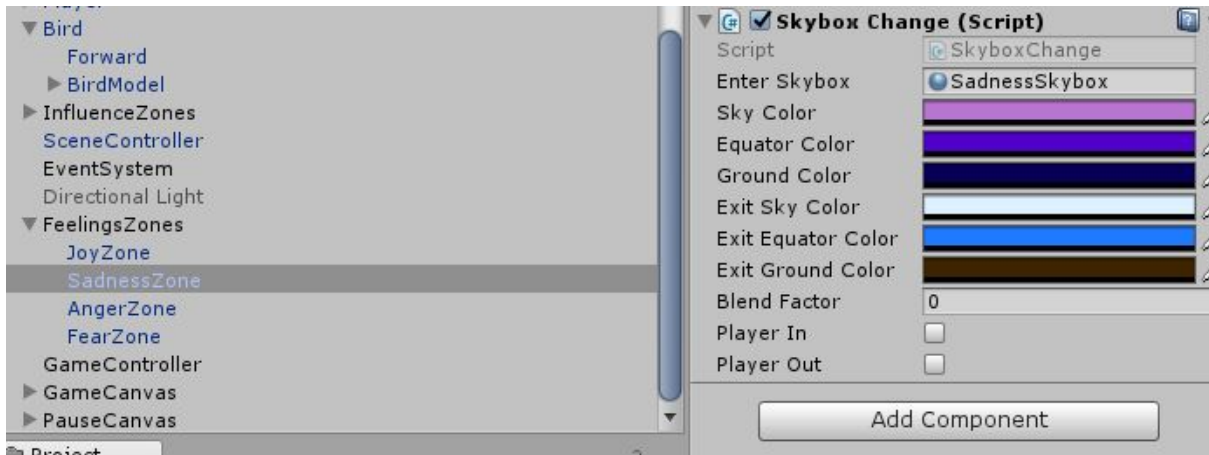


Figure 34: Feeling zone example prefab

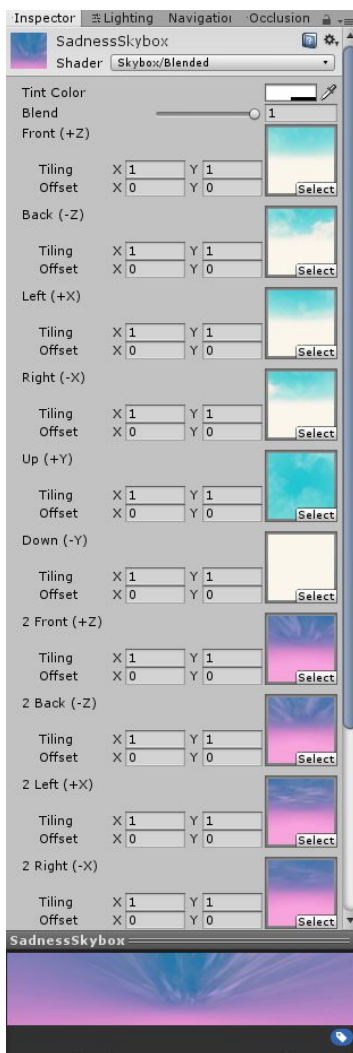


Figure 35: Skybox blended prefab

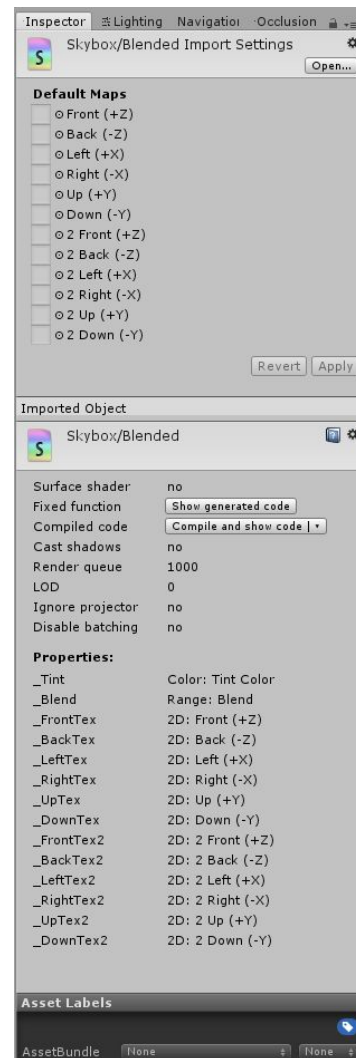


Figure 36: Skybox blended shader

5. ART

In previous sections I have explained how art is a very important part of the project, and how it affects the gameplay and narrative of it, as well as the educational objective sought. However, it is necessary to show the progress and development throughout the working hours.

Thanks to a lowpoly and very simple style that I found, along with downloadable assets, a large part of the game's approach changed. Those models that I looked for and downloaded taking into account that they kept the same style was the following one.



Figure 37: Downloaded models

From them and with the help of modeling programs such as 3DSmax or Maya, I made variations on many of these elements and created some more, to be able to get a greater variety and give them a more personal touch.

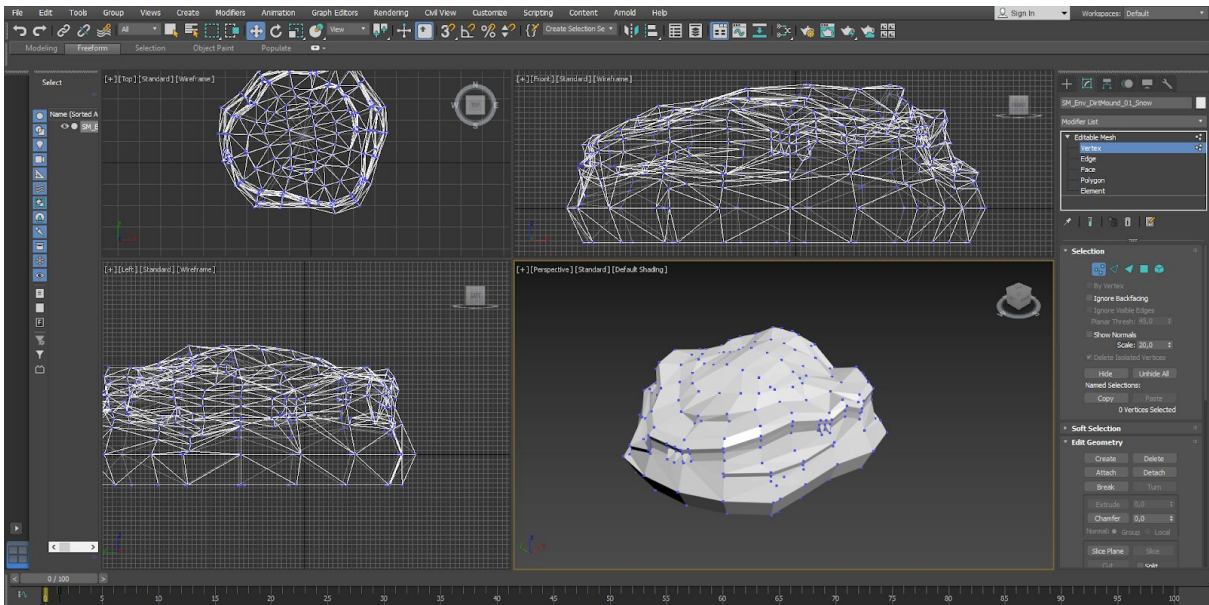


Figure 38: Modeling process (I)

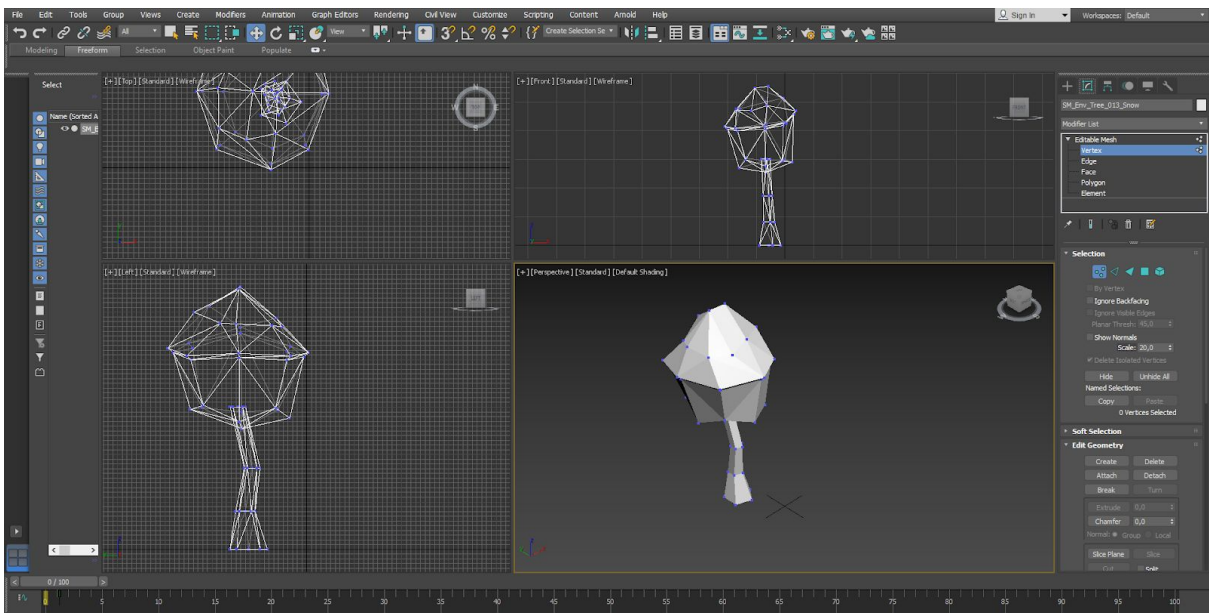


Figure 39: Modeling process (II)

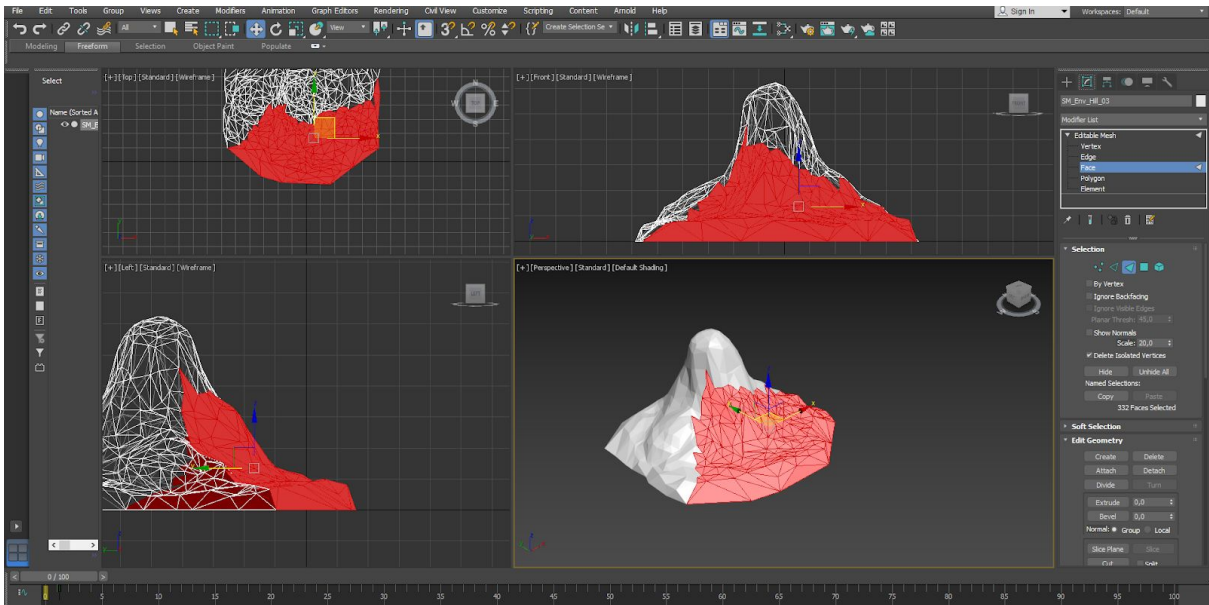


Figure 40: Modeling process (III)

Once I had a sufficient amount and variety, I began the development of the map, going from the general to the detail.

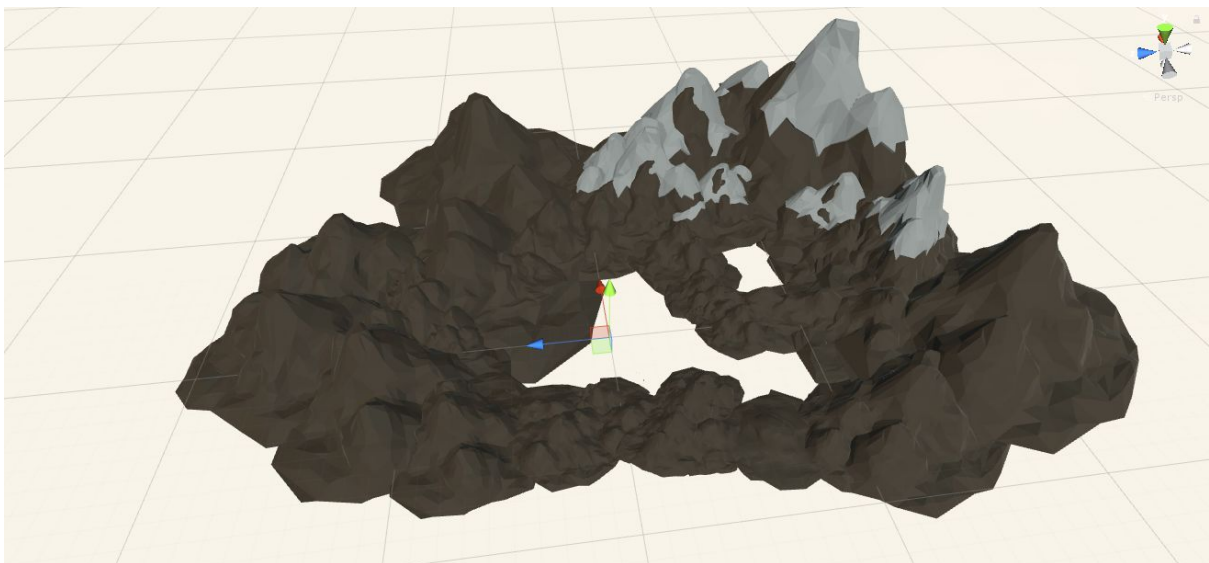


Figure 41: Map construction process (I)

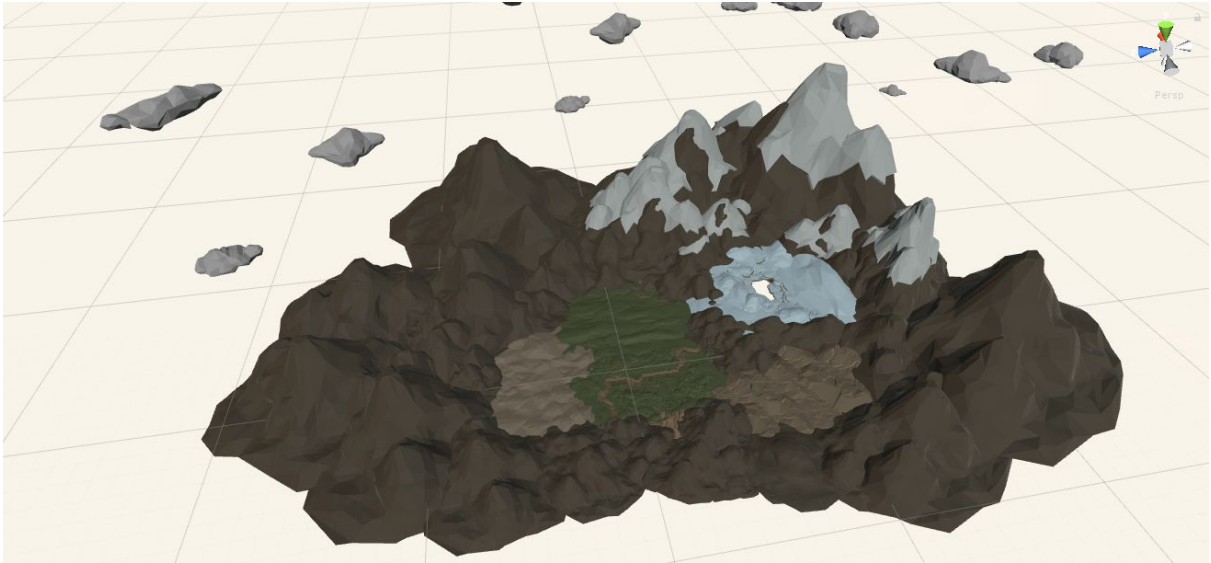


Figure 42: Map construction process(II)

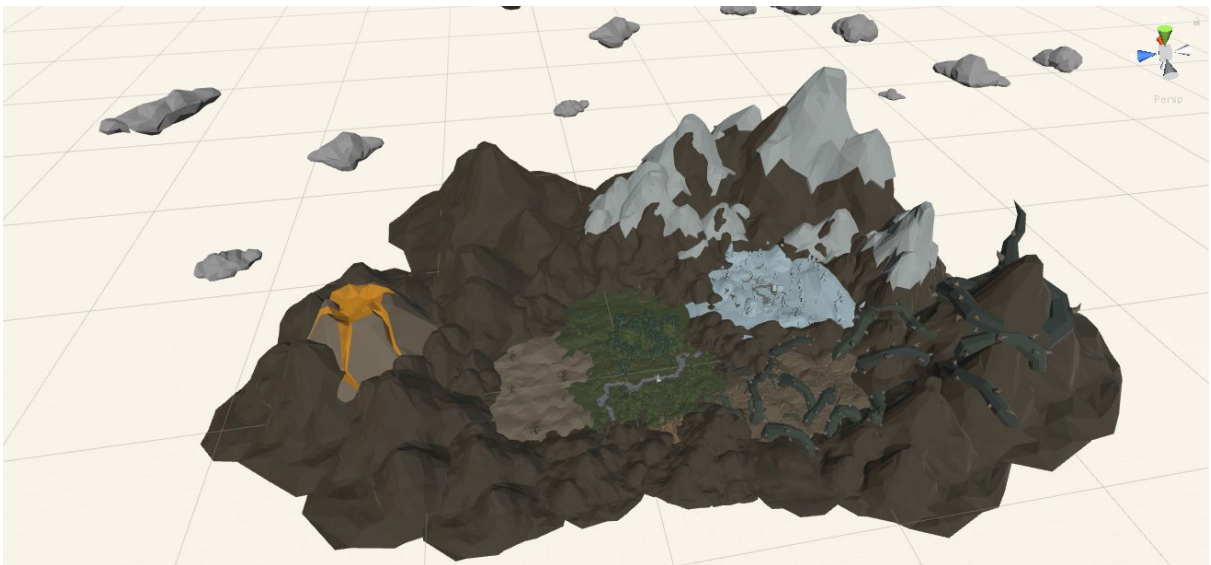


Figure 43: Map construction process(III)

The main characters had a similar development. I based myself on a simple lowpoly humanoid model, to which I varied the proportions according to the character and I added details.

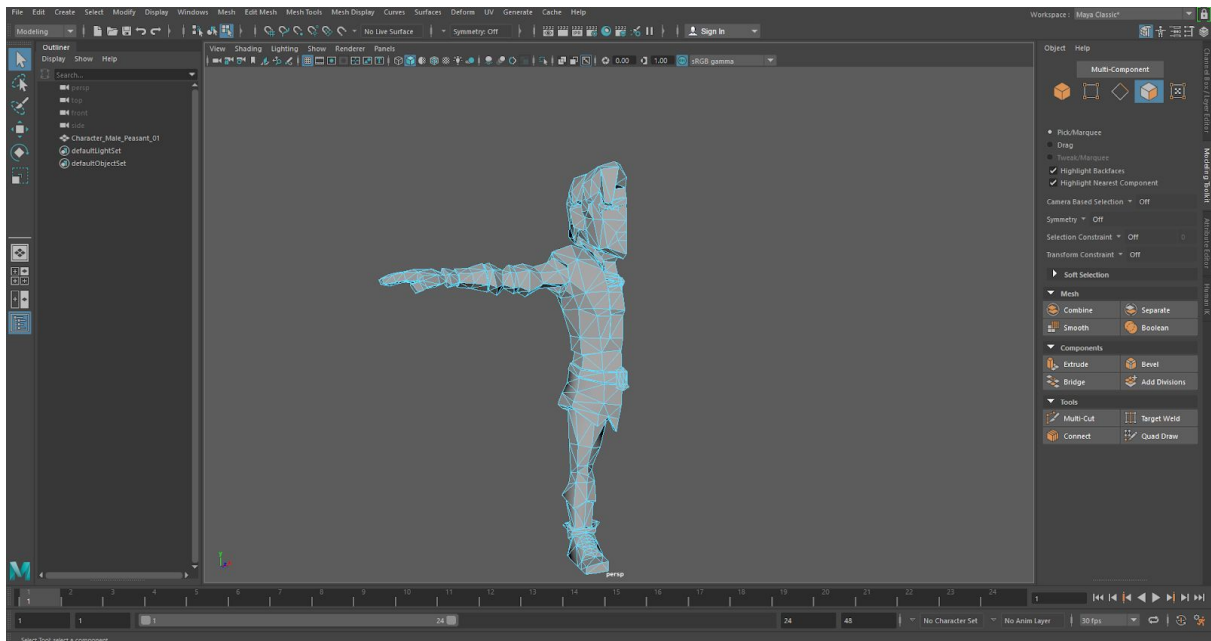


Figure 44: Character modeling process (I)

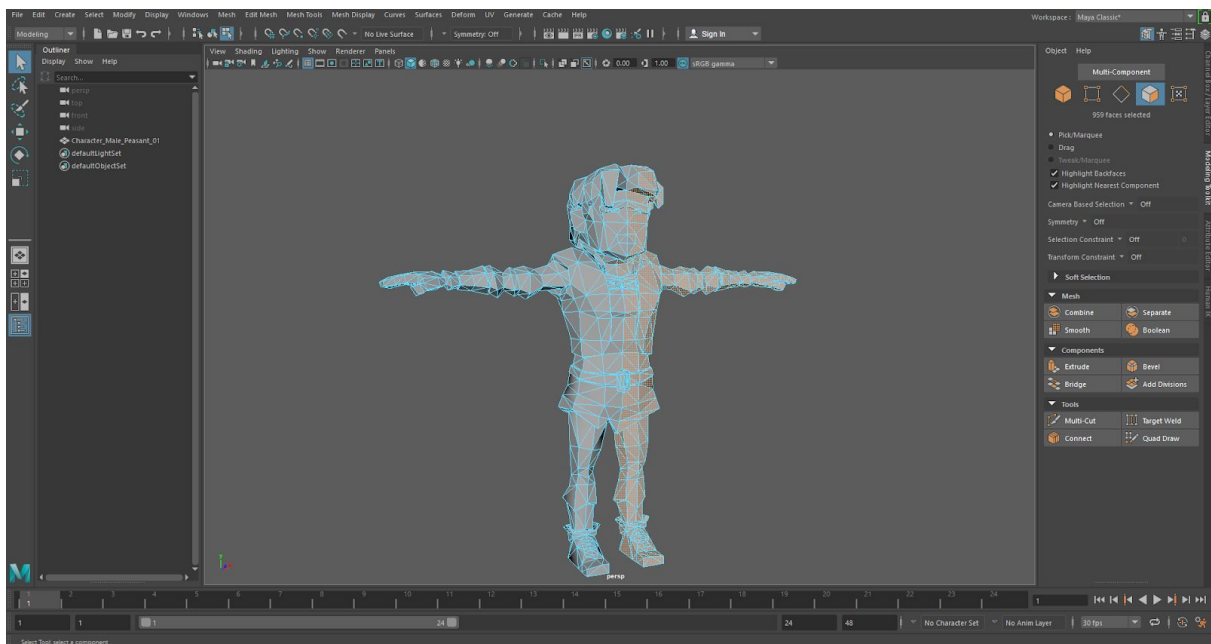


Figure 45: Character modeling process (II)

Also, with the help of Maya, I made the rigging of these characters and some simple animations to give them more attractiveness and fluency.

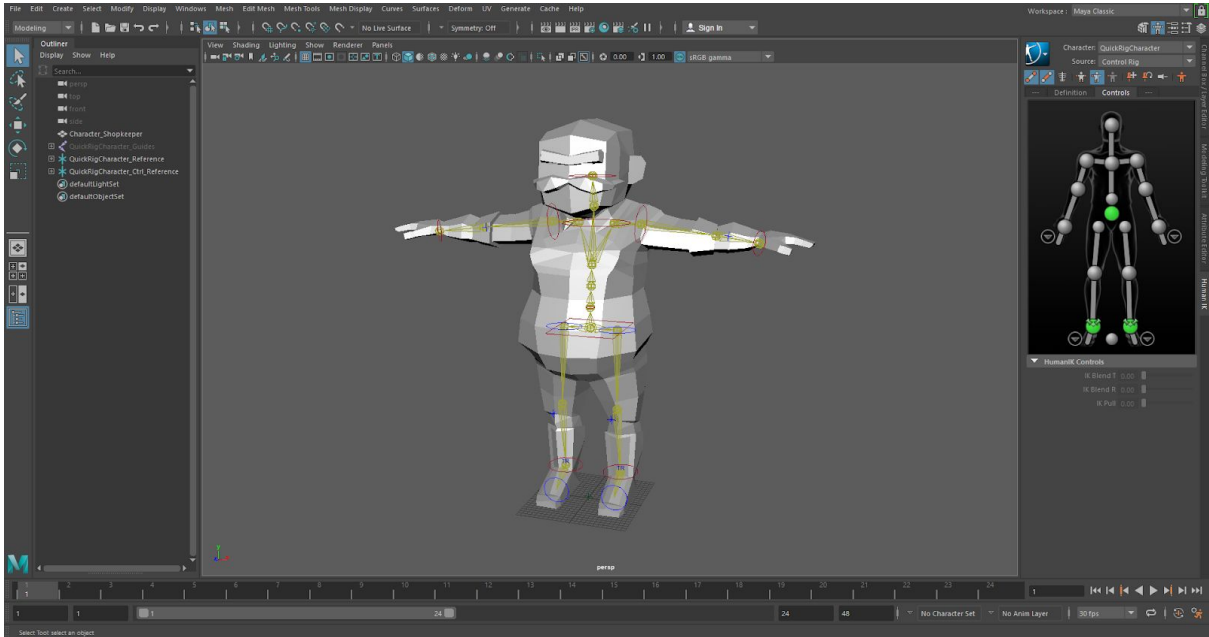


Figure 46: Character rigging process

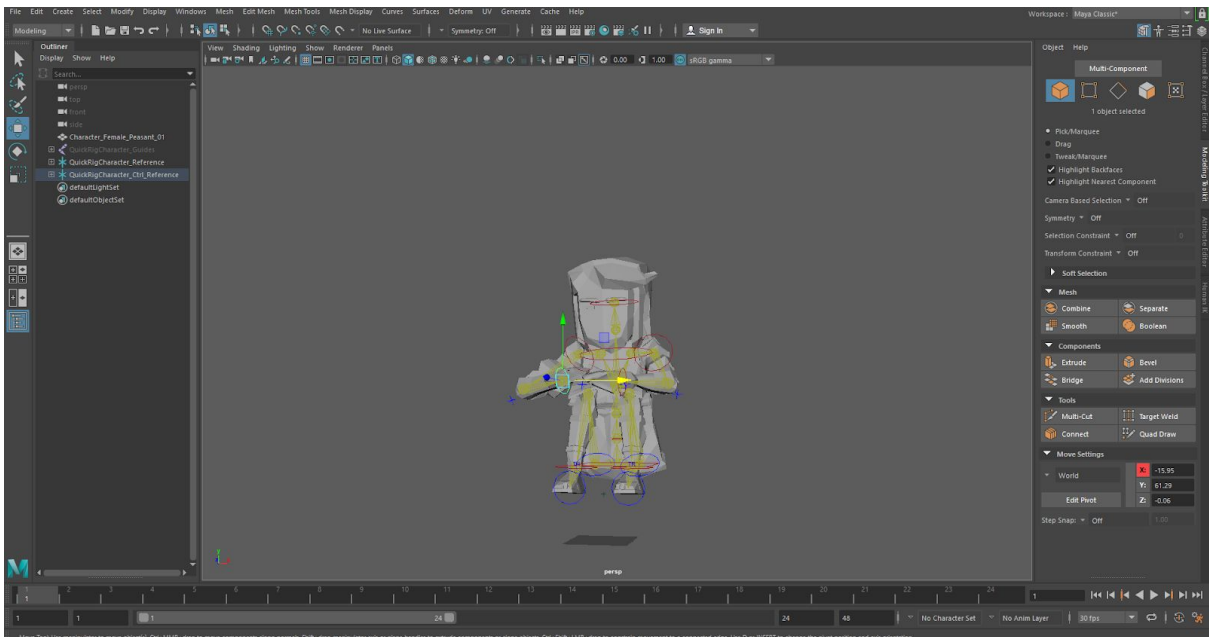


Figure 47: Character animation process

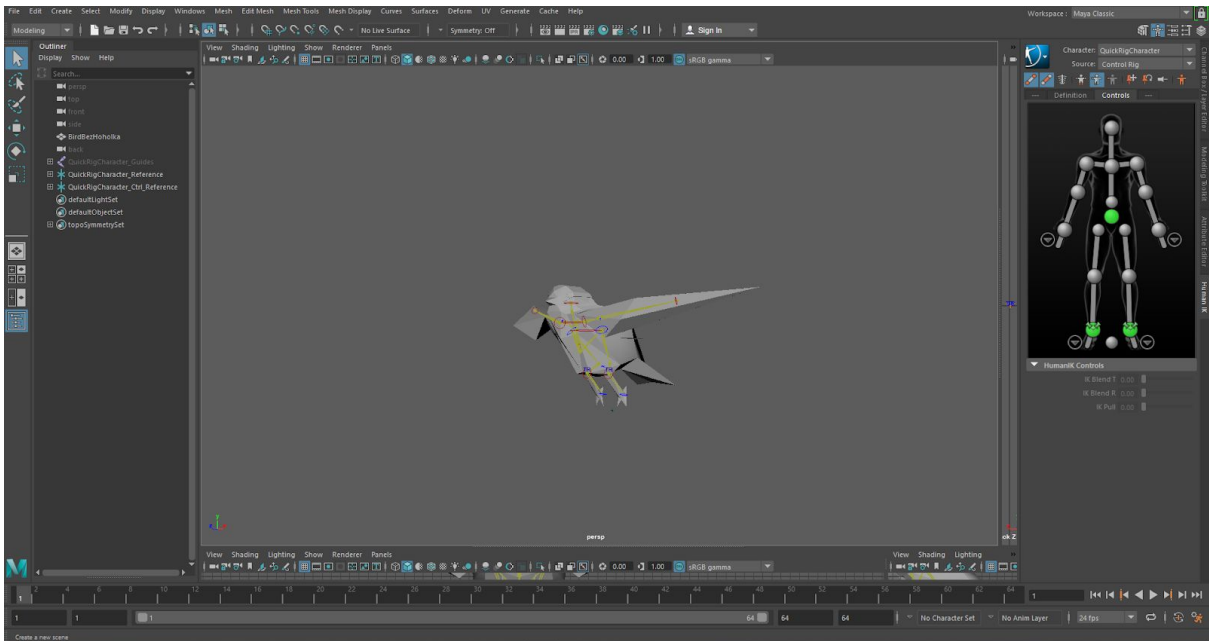


Figure 48: Bird animation process (I)

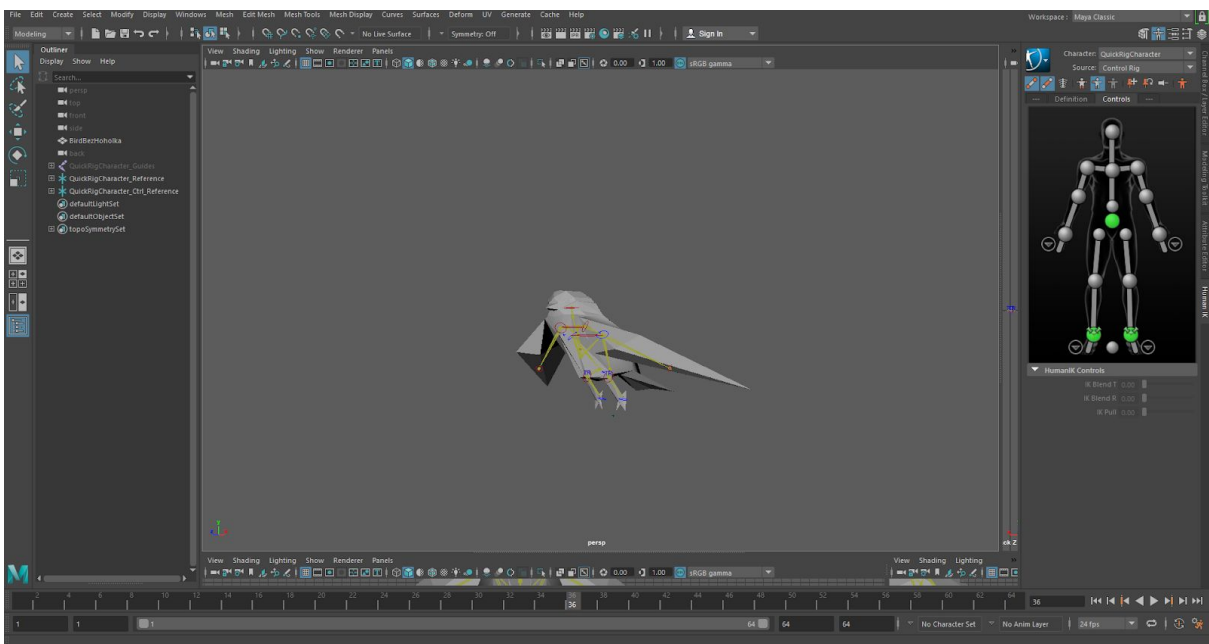


Figure 49: Bird animation process (II)

These animations helped as much as possible to emphasize the emotions of these characters, in a very simple and understandable for children.

6. RESULTS

Throughout the development of the project there have been several changes in terms of style and mechanics, which has influenced the progress and resolution of it. However, the objectives have been achieved mostly.

The result is a game focused on the treatment and understanding of emotions, in a 3D environment, with interaction with its characters, a variable narrative, a small part of collecting objects, an AI that accompanies us during the adventure, and an environment variable in terms of lighting and ambience.

Some details that could not be added and that I wish I could have been a HUD a little more worked, as well as the style of the menus. They are very simple and I have not been able to devote as much time as I would like.

In addition, something that was planned but that has not been possible has been the sound section. Add effects and ambient music would have given the game one more point in terms of ambience.

Finally, although it was not originally planned, it would have been a good idea to implement a saving system. Although it is a short game and easy to complete, it would be a function that would improve the game experience.

This project is available by download from this GitHub repository:

<https://github.com/Kapahala117/Feelings-Traveler.git>

(In addition, both the game's executable and the entire project is uploaded in a Google Drive folder that I shared with all the members of the jury.)

Children's opinon

As for the reception this game has had among the children of the Castellón Autism Center, I asked them some questions to the entire group in one of the sessions where they could try the game almost finished, in the absence of final details. I will comment some of the most relevant answers or that gave me a clear vision of the results that this project has generated.

- What do you think of the game in general?

They mostly liked it a lot. Several commented that they liked a lot the colors and the characters, and that the bird seemed very funny to them by how it moved.

As to whether it had seemed fun or entertaining, there were positive opinions and some that said that sometimes they got bored when it came to looking for the items.

Have you been able to differentiate among all the emotions? What has helped you to do thar?

I paid attention while they were playing and testing the game, and I asked these questions during the progress of the game.

Generally they were aware of the emotion at the same point, depending on each one. In anger, the element that helped them a lot was the volcano. In fear, that change of the ambient light to green and the dark sky, as well as the thorns. The sadness took a little longer, and even not see the character crying many of them did not realize. As for the joy, being the last and that the icon of the sun was the only gray in the HUD, adding the fact that all the NPCs were gathered, it was easy for them to identify it.

Have you learned anything with this game?

At first it was difficult for them to respond in a concise way, some said that to help others, others that people get angry, become sad or afraid when something happens.

By asking more concrete questions, related to the objective of the game, as if they differentiated the emotions or when seeing someone who needed help they gave it, they answered yes, although in some moments of the game they were clearer than in others, and the dialogues helped them a lot.

7. PROJECT DEVIATIONS

Next I show a comparative table between the initial distribution of hours proposed in the technical proposal, and the one that finally results after the development of the project.

	Estimated (h)	Final (h)
Document	20	30
Presentation	10	10
Art Design	70	100
Narrative Design	40	60
Implementation and programming	120	100
Testing	40	50

Figure 50: Estimated hours vs final hours

As I have explained in previous sections, the project had a great conceptual change during its development, due to the artistic style and give greater weight to the narrative part. For this reason it can be observed how much of the hours conceived for the implementation of mechanics based on pure programming, such as puzzles or road construction, have been redirected so much to art, because it is more expensive to make 3D models and animations by simple that they are, and to the narrative design, since I had to give it several laps and take care of it much more until reaching the point that it has at this moment.

8. CONCLUSIONS

The main objective of this project was to develop a videogame focused on a minor social sector, developing it together and with the help of people who belong to it, with the intention of contributing something to it, no matter how small the impact.

The resulting video game has been very popular at the Asperger's center in Castellón, and the children who have tried it have learned a little more in terms of emotions and empathy, while having fun in a small digitally created world.

The experience has taught me how to work together with an entity that seeks social welfare, and how to prioritize and listen to the opinions of the target audience, especially in these cases in which a benefit is sought for it. I have learned a lot thanks to the center staff, about asperger and autism in general, as there are different degrees and they affect in very different ways.

And above all, that despite the fact that the game has been developed focused on children within the autistic spectrum, it must not become a differentiating element, if not the opposite, and that it is a game aimed at everyone and that they feel welcomed and not separated. At the end of the day, their difference with other children is not greater than that of having a different eye color.

On the other hand, regarding the development of the project itself, which has gone through several important changes, it has taught me that not everything ends up as it was initially proposed, but that if the objective is clear, the variations will not affect the same, and that's what happened.

The main mechanics changed due to an artistic choice in the early phases, which is easier than if it had happened once the project was more advanced. These are changes that I have already talked about in the development section and I would only be repeating myself. Simply conclude that although it has gone from a game with components of puzzles to a more narrative and graphic adventure, the topics discussed are those that had been thought at first, and even elements such as empathy and see how the same problem can affect different characters in different ways, and evoke a different feeling in each of them, they gained greater strength thanks to these changes.

9. REFERENCES

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Appendix

Downloaded Assets

- Skybox blended shader

```
Shader "Skybox/Blended" {
    Properties {
        _Tint ("Tint Color", Color) = (.5, .5, .5, .5)
        _Blend ("Blend", Range(0.0,1.0)) = 0.5
        _FrontTex ("Front (+Z)", 2D) = "white" {}
        _BackTex ("Back (-Z)", 2D) = "white" {}
        _LeftTex ("Left (+X)", 2D) = "white" {}
        _RightTex ("Right (-X)", 2D) = "white" {}
        _UpTex ("Up (+Y)", 2D) = "white" {}
        _DownTex ("Down (-Y)", 2D) = "white" {}
        _FrontTex2("2 Front (+Z)", 2D) = "white" {}
        _BackTex2("2 Back (-Z)", 2D) = "white" {}
        _LeftTex2("2 Left (+X)", 2D) = "white" {}
        _RightTex2("2 Right (-X)", 2D) = "white" {}
        _UpTex2("2 Up (+Y)", 2D) = "white" {}
        _DownTex2("2 Down (-Y)", 2D) = "white" {}
    }

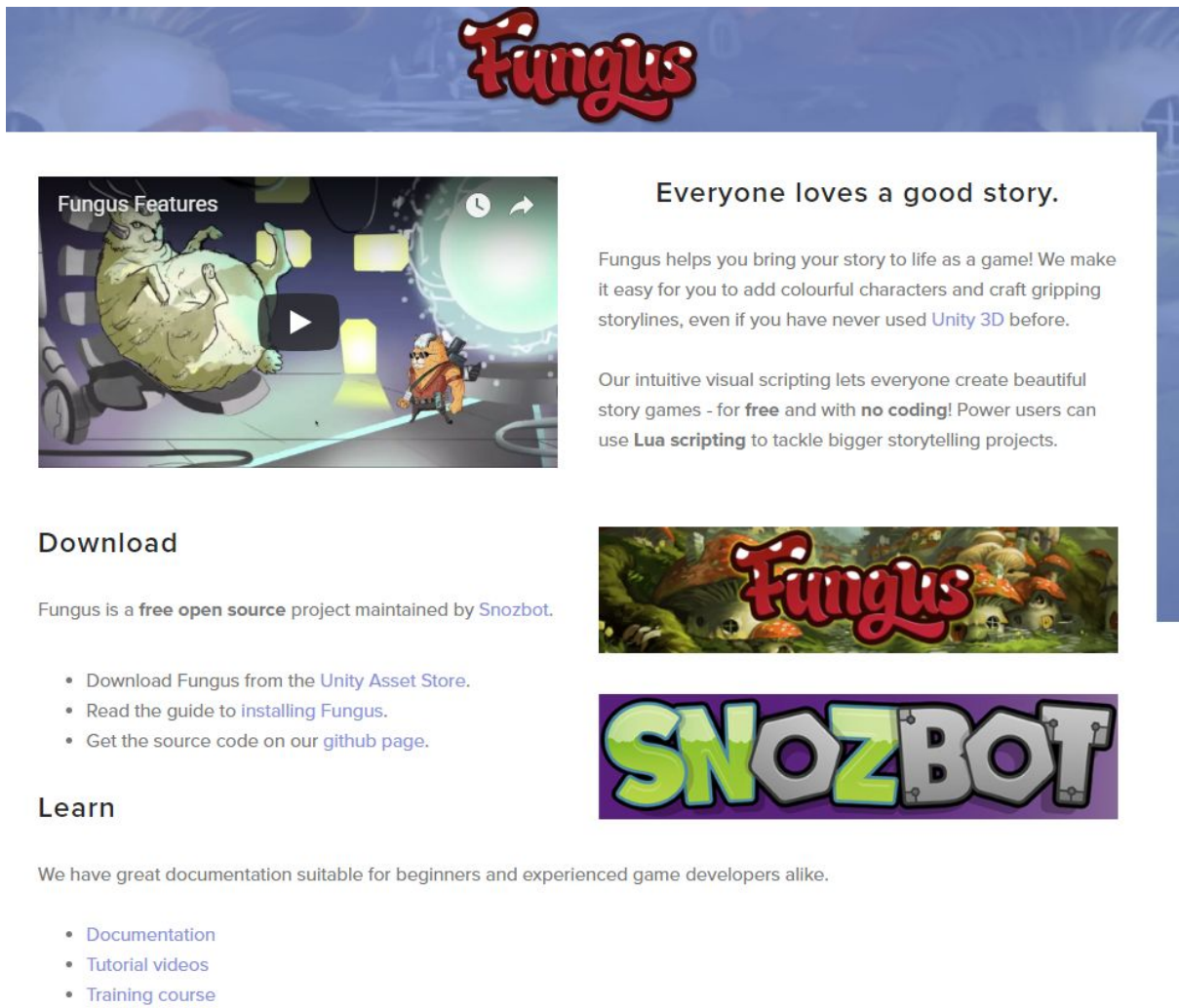
    SubShader {
        Tags { "Queue" = "Background" }
        Cull Off
        Fog { Mode Off }
        Lighting Off
        Color [_Tint]
        Pass {
            SetTexture [_FrontTex] { combine texture }
            SetTexture [_FrontTex2] { constantColor (0,0,0,[_Blend]) combine texture lerp(constant) previous }
        }
        Pass {
            SetTexture [_BackTex] { combine texture }
            SetTexture [_BackTex2] { constantColor (0,0,0,[_Blend]) combine texture lerp(constant) previous }
        }
        Pass {
            SetTexture [_LeftTex] { combine texture }
            SetTexture [_LeftTex2] { constantColor (0,0,0,[_Blend]) combine texture lerp(constant) previous }
        }
        Pass {
            SetTexture [_RightTex] { combine texture }
            SetTexture [_RightTex2] { constantColor (0,0,0,[_Blend]) combine texture lerp(constant) previous }
        }
        Pass {
            SetTexture [_UpTex] { combine texture }
            SetTexture [_UpTex2] { constantColor (0,0,0,[_Blend]) combine texture lerp(constant) previous }
        }
        Pass {
            SetTexture [_DownTex] { combine texture }
            SetTexture [_DownTex2] { constantColor (0,0,0,[_Blend]) combine texture lerp(constant) previous }
        }
    }

    Fallback "Skybox/6 Sided", 1
}
```

Figure 51: Skybox blended shader in Unity wiki

Link: <http://wiki.unity3d.com/index.php/SkyboxBlended>

- Fungus Tool



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- [Read the guide to installing Fungus.](#)
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Figure 52: Fungus website

Link: <http://fungusgames.com/>

Initial GDD

- **Story summary**

_____ is a traveler whose only rule to enjoy his journey is not to spend much time in one place. He is accompanied by his faithful friend Kino, a bird with blue plumage that seems to hide small secrets, and that has been with him since he has memory. In one of its many stops, on the shore of a crystalline lake, they find a small being that looks at the waters as if it were a puppet. His gaze goes beyond being lost, and it seems that it is not the only thing missing in him. They decide to take him with him, intrigued by how he got to that point, and with the idea of being able to help him.

Continuing his journey with a new member in the group, and taking at least a bit of each town they visit from now on, try to breathe some life into this strange being and discover its origin and what or who put him in that state and because.

- **Development summary**

It is a graphic adventure that explores the different emotions of the human being by solving riddles, puzzles and construction.

Being aimed at children within the autistic spectrum, the goal is to learn to understand how other people can feel and what consequences there are if we act in one way or another. All this with fun puzzle mechanics, since they are usually very systematic and enjoy games of the style, as well as construction, minecraft type or the legos, mechanics that will be present in the journey between levels.

Therefore, to be able to go from one village to another, we must build the road with pieces that we obtain at different levels or that we can buy with our basic resource, which will be empathy. They will not be very complicated constructions, but if we have not adequately resolved the level, we will have no other option than to buy them, and therefore be careful not to completely spend this peculiar currency, which we can respond appropriately to the inhabitants from each village.

- **Gameflow**

The game takes place within the cities or towns that we visit. We arrive at this, an NPC presents its problem or concern related to the emotion that the place represents, looking for a way to solve it and we will also face the corresponding puzzle.

However, the order in which you visit the villages may vary, depending on how the player builds the roads and the pieces available for it. In addition, this order will influence a way in history, which may take into account the areas we have visited previously when arriving at a new one. That is, the situations posed by the NPC's will vary, so that the player can put into practice or take into account the emotions already visited.

- **Game progression**

There are a series of challenges that the player must face throughout the game:

- Main challenge: visit all the villages and get to fill the little being we found at the start of the adventure with all the emotions.
- Intermediate challenges: overcome the puzzle that is presented in each town, complete conversations and build the roads.
- Atomic challenges: pick up an object, give a correct answer in a conversation, place a piece of track optimally.

The main challenge is not completely mandatory. It is if we want to find the correct ending, but because the game is based on how players respond when understanding emotions and helping NPCs, and that this has consequences for both good and bad, not overcoming a challenge will not stop the progress of the game, but it will lead you to another conclusion when the end comes.

Most challenges, especially the first time you play, are explicit, that is, those that arise from the game design. However, when we discover in the end that depending on whether we have overcome the different challenges properly, one end or the other is obtained, an implicit challenge that could arise on the part of the player would be to try to discover all the endings. Or even if we start the game again and the player realizes that by varying the order in which we visit the villages, the conversations with the NPCs change depending on the feelings we have already visited and collected in the previous areas, another challenge Implicit could be to overcome the game by visiting them in all possible orders and thus discover all the variations of dialogue.

- **Checkpoint system**

Being a game in which the main character can not die, checkpoints are not required as such, and there is the possibility of saving at any time.

However, there is a series of checkpoints more focused on that, in case the device is turned off or there is any problem, do not lose all the progress if we have not saved previously. Those points are the following.

When completing a puzzle as it could be very tedious for the player to have to repeat one that has already resolved, and more in advanced stages of the game where they are more difficult, and this could make you lose the desire to continue playing at that time . It will also be automatically saved with the same reason when you arrive in a city, go to the road screen and get a new emotion.

- **Resources**

There are two main resources to be able to advance correctly in the course of history, and it is the points of empathy and the pieces of way to form the path.

The first, apart from being an explicit marker of how we are doing, as we will gain more if we understand the feelings of the characters and help them properly with their problem, will be useful when buying extra road sections in the case We are a bit scarce when it comes to completing a new route and we want to reach a town that is further away. In addition, as they will not be used to buy tracks, another of the resources with which it counts.

As for these pieces, getting more or less will depend, leaving aside the purchase with the method I just explained, the speed with which the puzzles are solved. If you get down certain timestamps we will get extra pieces.

On the other hand, in many occasions, to solve the problems of the inhabitants of each town we must find some object that is in that same level, hidden, or that we have achieved in a neighboring village. As I mentioned in the section on mechanics, the resolution of the puzzles will give us a clue what it is and where to find it. This resource, if we get it and give it to those who need it, will make us follow the correct course of the story, get all the emotions and thus reach the appropriate end.

In relation to the puzzles and the search for objects, the player can choose to buy tracks

with empathy points. It is a minor resource, but in case the player gets stuck he will be able to choose him and thus facilitate the progress.

- **Economy**

The economy that the game presents is very basic, but it is designed to be consistent with the theme of the feelings and the narrative of the game.

Players gain empathy points according to how they decide to act with the NPCs they encounter throughout the adventure. The more you can understand the feelings of these, and therefore act according to the situation, more points will win. Later they will be able to use them both to buy extra pieces if they have not obtained the necessary ones to build their way, as well as to spend them on tracks that facilitate the resolution of the puzzles in which they get stuck.

It is thus integrated into the narrative because the better we behave with others and the more empathy we demonstrate, the easier it will be for us to move forward and get more elements to help us do so.

- **Rewards**

Both empathy and road pieces are also rewards. The first for helping different characters and the second for the resolution of puzzles, getting more if we do it in less time.

However, the main reward we get when we overcome each level, that is, each village, is the emotion that it represents and that is introduced into the small being that accompanies us from the beginning of the trip, and that is ultimately the reason for what we are doing.

In case of not getting all of them, because we have not correctly passed the corresponding zone, we will not be able to see the good ending or discover the whole story behind the loss of emotions of our new friend.

In addition, in some cases, apart from the excitement, the NPCs will be able to give us a kind of object that we find on the map, which may help us with other characters.

- **Items and collectibles**

The objects that we find or receive have the same way of use. We can collect them from the ground or they will be added directly to our inventory when the NPCs give them to us, and we can decide to deliver them or not to other characters when they ask for it. They symbolize the need for these characters, and although they are related to a particular feeling, they can serve to help someone who represents another, especially in the case of opposites, such as joy and sadness.

As for the collectibles, throughout the trip we can take screenshots of the places where we are, which we will be given the option to add to our travel diary, which I will talk about in the gamification section. In addition, if we correctly overcome a village, we will be stamped on the corresponding journal page, which we can accumulate to look back at the end of the adventure.

- HUD

The HUD will vary slightly depending on whether we are in the main level or in one of the villages.

Within them, the HUD will display an icon for the pause menu, from which we can access the inventory, the game's start screen or the instructions. A counter will also appear for the empathy points and another for the road pieces that we have. There will also be an icon for each of our companions, both our Kino bird and for being empty, and by clicking on them we will display dialogues that will give us clues.

Outside, in the general map, in addition to showing the number of pieces we have, next we will have an icon that will not take to the store to be able to buy more of them. The empathy counter and the menu button will be the same as within the villages

- Levels, design and composition

The levels are divided mainly into two in terms of their structure. We find on the one hand the travel map where we can build the roads to the villages, and on the other the villages themselves seen from the inside.

The first will consist of a map seen from above, formed by a grid, where the villages will be located in certain squares, and can place the pieces we get to overcome the puzzles of each area. The position of the player will also be displayed at all times, with a small icon of the character's face.

The first time we see this level, as there will be no road located, and the necessary parts to visit the first of the villages will get them in the tutorial. In addition, it will be briefly explained how they have to be placed to reach the first village.

In addition, the position of the villages will not be linear, as for example in the classic maps of Mario Bros, but they will be scattered throughout the map, and the player will be at the beginning in a central area, in which he has done the tutorial and he has found his new travel companion. From there you will have more than one option with the pieces received in that level, and you can choose which one you prefer. Also, after completing any village, you can decide to build the road from it or return to the central point and create a new one from there.

The tutorial level will be a 2D stage in which we start walking quietly with Kino, our blue bird, and after advancing a few steps, we find a strange stone. Above it will appear the button that we must press to interact with it, and after this another screen with the first puzzle will be superimposed. After some dialogues with Kino about what this strange rock is, and how it can work, which is used to show the player how it is done, he will be left to solve the puzzle alone. Once done, the stone will break and a small forest spirit will appear, a tiny white being that will run away. When we follow him, we will reach the shore of a lake, where we will find seated and looking with empty eyes at a strange being. When we talk to him, we will not get an answer, and after talking with Kino, we decided to take him with us to try to help him and understand what happened to him.

The overall design of all the villages will be similar to the tutorial level. Each will be differentiated from the others by the environment and the theme, depending on the emotion that corresponds, but in terms of structure will be very similar.

When entering them we will advance investigating the place, until we meet with the NPC that lives in it. When talking with him and listening to his problem, we will have to solve the puzzle, which will give us a clue what we should look for to help him. Once solved, we will look for the map that object, we will use the same button to interact with it and pick it up, and after that we will give it to the character that requested our help. After listening to your response and a little advice related to the feeling it represents, and on occasion give us another object that may serve us later, we will continue our journey and return to the main level.

- **Player mechanics**

Within the villages

The player has basic movement mechanics in 2D. It will be able to move both to the left and to the right, until colliding with some element of the terrain. There is no jump or attack mechanics like on platforms because the idea of the game does not require it.

When we find an NPC or an object, the button that we must press to interact with them will

appear on them. If it is a character, doing so will start a dialogue with him. If on the contrary it is an object, its name will appear on it and it will be added to our inventory.

Main map

In this case the map is seen from above, so the player can move in four directions. However, his movement will be limited to the path formed by the tracks, he will not be able to leave it or walk freely on the map.

To place the pieces you will select them by clicking on the icon that will also mark how many we have. Once pressed, will move the piece to the point of the grid that forms on the map where you want to place it. Once located in a possible place, that is, connect with the central point, another piece of road, or a town that has previously been connected, this can be moved by dragging, turning it by pressing once on it, or delete it if you press two times.

- General mechanics and specific types

Within the villages

In the dialogues with the NPCs, there will come a time when we must fulfill the request they ask us, that is when the puzzles will appear to give us an initial clue. They are of the format in which the pieces can only be dragged, and there is only one hole. That is, if the puzzle is 3x3, it will be 8 tiles and a hole. In them, the player can move one tile at a time, and only if there is a space available on one of its sides. If at any time you leave the puzzle for any reason, the next time you start the pieces will be placed again randomly. At the moment in which each one is in its place, they will form the image that helps the player and the puzzle will be considered resolved.

We will get 3 pieces of road in any puzzle. To these will be added one for each level of increased difficulty, that is, if the puzzle is larger, and in turn, if we solve it before certain timestamps, established for each puzzle and difficulty, we will get from one to 3 pieces extra.

In addition, during the resolution of the puzzles, the player can buy tracks. These will cost empathy points, and they will subtract extra pieces that they can give us at the end of the puzzle. There will be two types. On the one hand, they can tell us the pieces that we already have well placed at the time we use them, or, select two pieces of our choice and fix them in their final position on the map. Both types will cost 100 points of empathy each, and we can only use one of them per puzzle.

On the other hand, one of the most important mechanics of the game and the type of

progression, is that of the dialogues and the answers that are given.

In each conversation, there will be two moments in which we must answer, and in a text bubble there will be three options to choose from. Depending on which player you choose, the story will take one course or another. We can get to the good end, where we discover the complete story, the middle end, where we have only achieved some of the feelings, or the bad one, if at no time we have given help to the NPCs and our responses have always been negative .

This will also be reflected in the points of empathy that we have, since the better our responses, the more we will win. If we have chosen the good one we will be awarded 500, if we have chosen the average 200, and if we have answered badly, only 50. In addition, if within the same town we chained several answers of the first type, we will receive a bonus of 100 points of empathy to the leave him.

In addition to this, we have another mechanic of progress, and that is that the person we have collected, as we add emotions, we can count on small comments or dialogues, what happened. It will also depend on what and how many feelings you have inside. Which will influence as to how we tell it, if sad, angry, happy, etc. And how many for the amount of information or history that you can tell us, in order to distribute it gradually.

Another of the mechanics available and that will help the player, are the clues that our dear bird Kino will provide us. If it detects that we spend a time without moving, 10 seconds, or if we directly click on the icon of its face that will be in the HUD, it will move towards our next objective, flying over it briefly and chirping in a different way than usual, more intense, so that we realize.

Main map

The towns will only be accessible if they are connected by a road that leads to the central point or to another town that does it. It can not be the case where we run out of pieces or points of empathy to buy them, and that there is no new town within reach with some possible combination. The game is raised and balanced so that this never happens.

In addition, a mechanics that is thought but could not be designed completely is that depending on the order in which we visit the towns, since it is not done in a linear way, the objectives, dialogues and objects may vary slightly, to make reference to the that we have already visited and we know.

Once all the emotions are recovered, or all the towns are completed, whether in the right

way or not, the central zone will begin to shine and we will have to go to it to contemplate one of the three available endings, depending on how we have done it.

- Rules

Within the villages

The player can explore everything he wants or return to the road screen. Once a zone is completed, you can return to it even if you have completed it 100% even if this does not bring you anything new.

In conversations with the NPCs, when you have to choose between several answers, once the choice is made it is not possible to change or go back. Because this influences the course of history, to be definitive.

When starting a puzzle, if the player decides to leave because it is stuck, it will restart and the next time it will start from the initial state. The pieces move one by one, they can not be exchanged between them and the image that is formed has to be complete, otherwise the puzzle will not be considered resolved.

Main map

You can not visit those villages that are not connected by at least one piece of road to the main route.

Once a town is connected and visited for the first time, the pieces of road that lead to it can no longer be changed. This avoids that with few pieces can be remade roads to different points, thus saving having to win the pieces or points of empathy in an appropriate way.

The pieces have to be placed one at a time, and they must always be attached to the existing path, the isolated pieces will not be valid.

- Instructions

The game will have a simple instructions that will be presented in the tutorial level and they can also be accessed from the pause screen.

Depending on which screen we access, if inside the town, on the road or when we are completing a puzzle, some instructions or others will appear.

Inside the village they will explain the basic movements that the character can perform, how

to move, collect objects and talk with the NPCs.

Outside we will explain how we can place the pieces of road to advance to other towns.

If we access during a puzzle we will be shown the basic movements that we can do and an example of how the puzzle should look to be considered solved.

- **Sound and music**

The soundtrack will be based on the emotions that each place represents. Fast songs with more rhythms for joy, slow and slow, with violins, for sadness, with a lot of percussion in the case of anger, or wind instruments for calm. All of them belong to the fantastic genre, taking as reference the video games of the style of Ori or Majin.

These topics will accelerate a bit when it comes to solving problems, so that we can add something more to the front and faster.

The music they reproduce when they are seen on the screen between levels, in which the roads are built, are themes that invite adventure, such as the soundtrack of The Lord of the Rings.

In addition, sound effects are used to give the game more life, such as:

- Sound of the steps of our protagonist.
- The chirping of Kion, which will vary if you help them with the requirements in a personalized way.
- The NPCs have a motive related to the emotion they represent, which will sound when interacting with them ..
- When we manage to introduce a new feeling in our companion, a small theme will sound when a chest is opened in Zelda, also depending on what emotion it is.
- Move the pieces of the fists have a sound that simulates that we drag.