

AGE OF DUNGEONS

Human Computer Interaction University Project

Documentation



UNREAL
ENGINE

SAPIENZA UNIVERSITY, MASTER OF SCIENCE IN ENGINEERING IN COMPUTER SCIENCE

[Click Here to GitHub repository](#)

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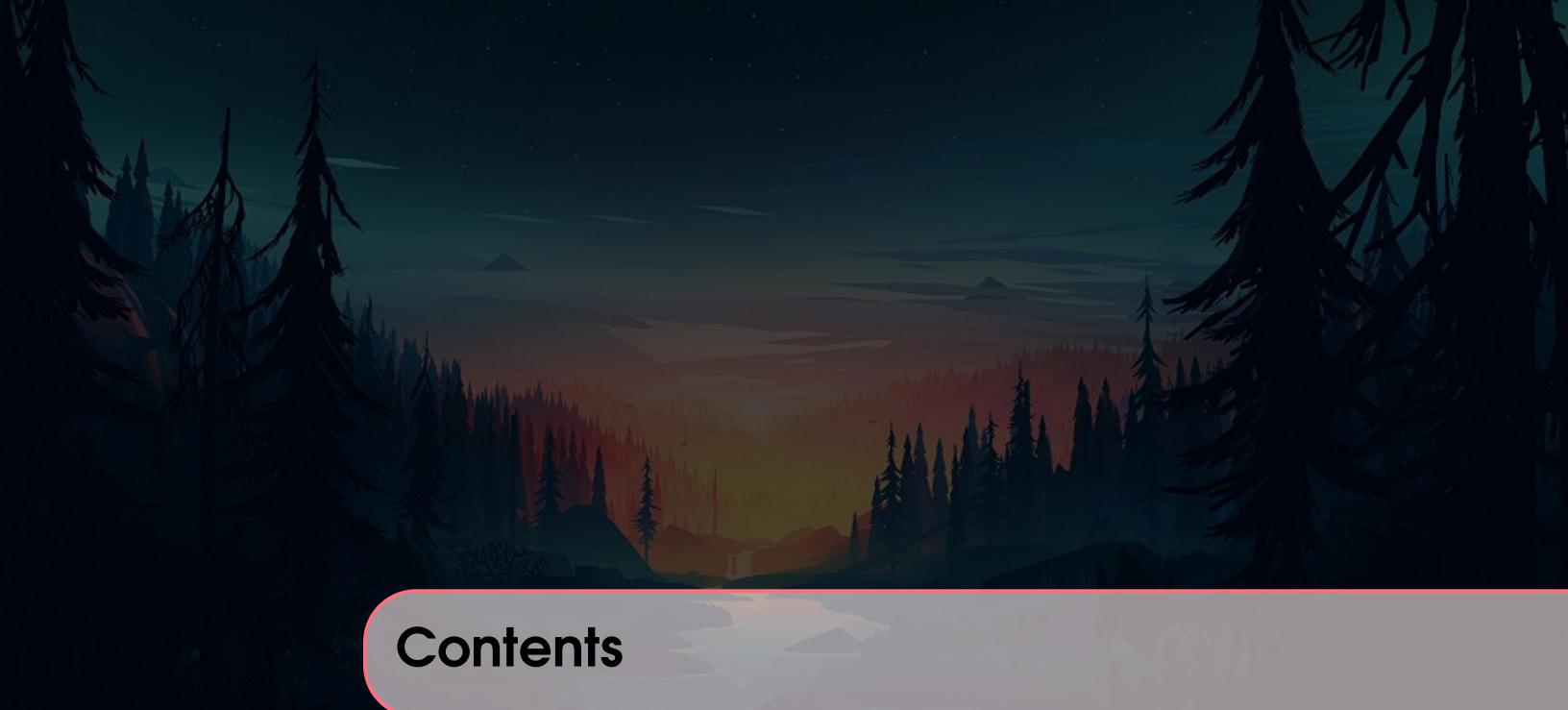
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1. Introduction

Age of Dungeons is a dungeon crawler RPG , an innovative type of game that push towards things already seen in other games and a few innovative features. As a main goal, exactly like all other video games, it (should) help people to relax and have fun. During the game session you will be able to explore a randomly generated world,going through rooms and levels, in which you can live again the most famous Human Eras. AoD is developed in Unreal Engine, the world's most open and advanced real-time 3D creation tool. At the moment we have developed only a demo version, that shows some of the features that the final product will offer. We hope that you will enjoy this game, so it's time to collect some stars, find some brand new weapons and at last but not least , remember....Slay Everything!

1.1 Features

- Randomly generated rooms
- Quest system
- Scoreboard system
- AI implemented for enemies
- Skin system
- Minimal UI
- Various types of weapons, skills and items

1.2 Category of the Game

A dungeon crawler is a type of scenario in fantasy role-playing games in which heroes navigate a labyrinth environment (a "dungeon"), battling various monsters, avoiding traps, solving puzzles, and looting any treasure they may find. Despite the similarity to roguelikes, including the presence of labyrinths known as dungeons, these video games are characterized by the fantastic setting with the presence of mythological creatures and magical spells.

2. Requirement Analysis

Requirements Analysis is the process of defining the expectations of the users for an application that is to be built or modified. It involves all the tasks that are conducted to identify the needs of different stakeholders. So we analyze, document, validate and manage software and system requirements.

2.1 Competitors Analysis

Competitor analysis is one of the first requirements analysis to be done, since a system needs to compare itself with what's already on the market, both in the pros and in the cons, so that one can add something that is new, innovative and valuable to the user. Our main competitors are:

1. *Binding of Isaac*

The Binding of Isaac is a top-down dungeon crawler game, presented using two-dimensional sprites, in which the player controls Isaac or other unlockable characters as they explore the dungeons located in Isaac's basement.

Advantages

- Procedural Rooms
- AI for enemies
- Minimal User Interface

Disadvantages

- No Scoreboard System
- No skins System
- No Quest System
- No weapons and abilities from power-up.



2. *DIABLO*

Set in the fictional Kingdom of Khanduras in the mortal realm, the player controls a lone hero battling to rid the world of Diablo, the Lord of Terror. Beneath the town of Tristram, the player journeys through sixteen randomly generated dungeon levels, ultimately entering Hell in order to face Diablo.



Advantages

- Quest System
- AI for enemies
- Various Weapons and skills
- Procedural Rooms

Disadvantages

- No skins System
- No Scoreboard System
- Chaotic User Interface

3. *Death's Door*

Death's Door is a 3D, isometric, action-adventure game. The player takes on the role of a small crow who works as a "reaper" collecting souls for the Reaping Commission Headquarters, an office-like bureaucratic afterlife.



Advantages

- AI for enemies
- Minimal User Interface
- Quest System

Disadvantages

- No Procedural Rooms
- No skins System
- No Scoreboard System
- Limited weapons and skills

To summarize:

Features	The Binding of Isaac	Diablo	Death's Door	Age Of Dungeons
Procedural Rooms	Yes	Yes	No	Yes
Skins System	No	No	No	Yes
Scoreboard System	No	No	No	Yes
Quests System	No	Yes	Yes	Yes
AI for enemies	Yes	Yes	Yes	Yes
User Interface	Minimal	Chaotic	Minimal	Minimal
Graphics	Pixel Art	Dark Cartoon	Cartoon	Cel Shading
Weapons and Skills	Abilities from power-up	All of them	Limited	All of them

Figure 2.1: Competitors Table

2.2 User Requirements

User Requirements are the functions that a certain software must have in order to meet the needs and solve the problems of its end user; or, more simply, it is what a software is expected to be able to offer to those who use it in terms of functionality of use. They are requirements set by the end user. These requirements express how a facility, equipment or process should perform in terms of the product to be manufactured, required throughput, and conditions in which product should be made.

2.2.1 Questionnaire ([Click Here](#))

To better understand users's expectations, we decided to build a questionnaire and analyze the results.

General Questions

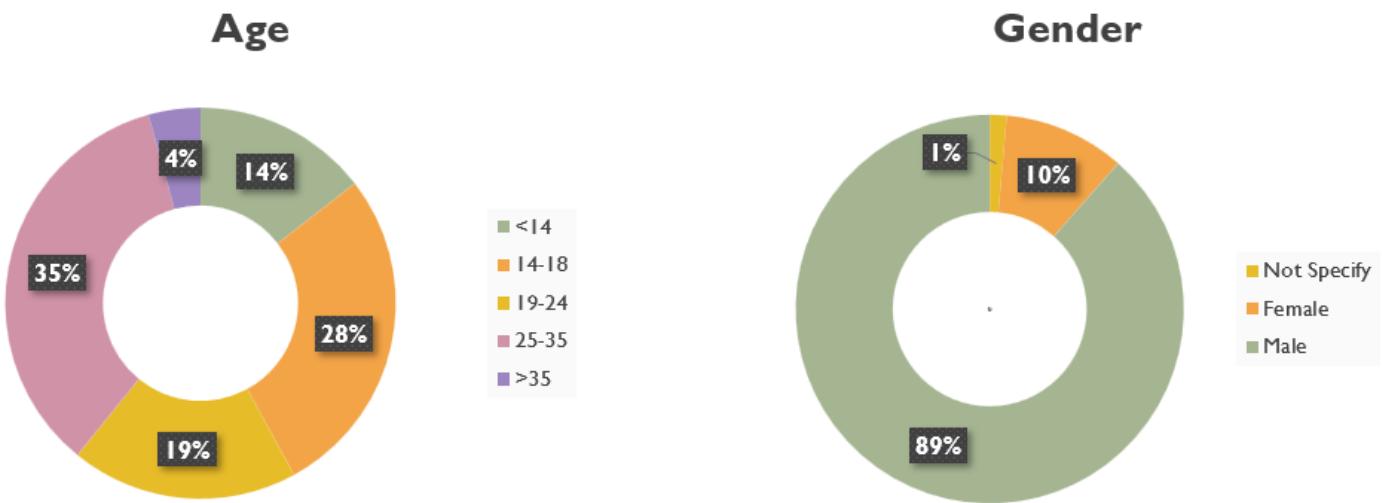


Figure 2.2: From the Questions about age and gender the conclusion is that most people who play video games are between 25-35 years old and they are mostly males

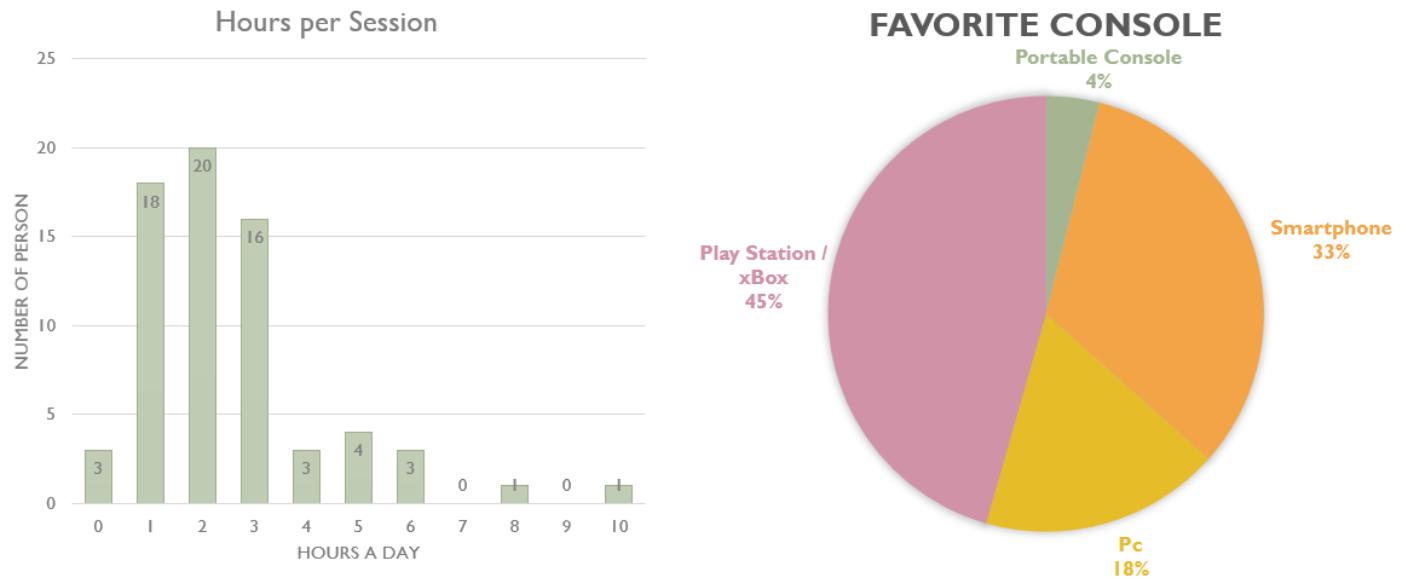


Figure 2.3: The daily average of hours played per user is of about 3 hours and the most used console is the home console, such as Playstation or Xbox

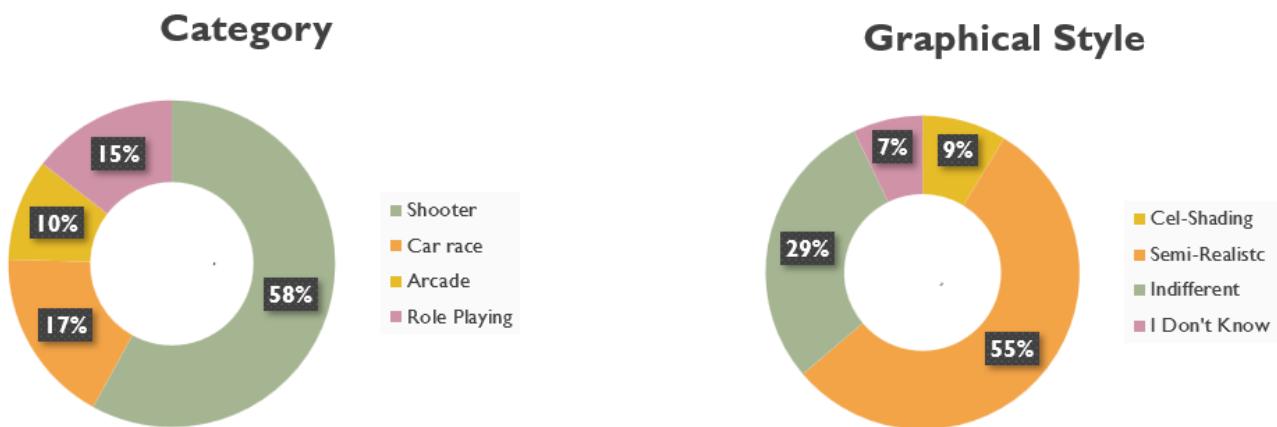


Figure 2.4: The favourite Game category for our users is Shooter, With a cel-shading Graphical style (for example Fortnite)



Figure 2.5: Our user prefer the first person perspective, and for they is very important the customization of the character

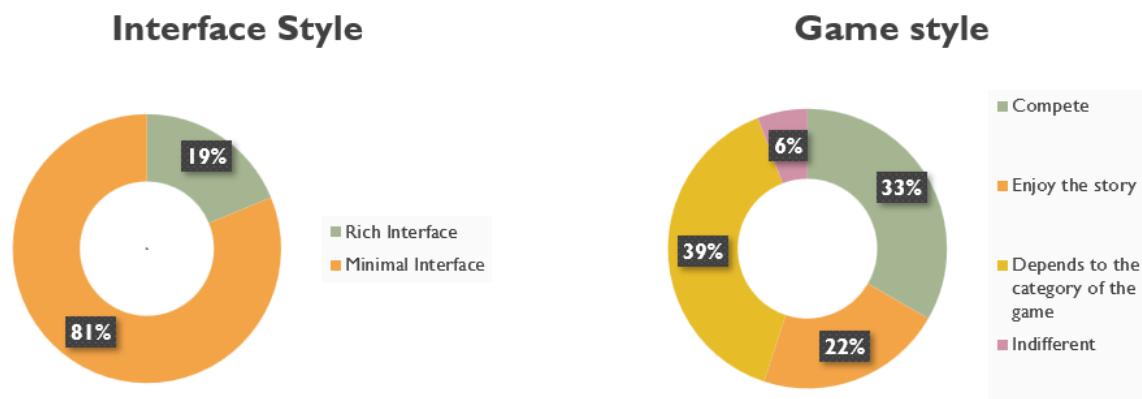
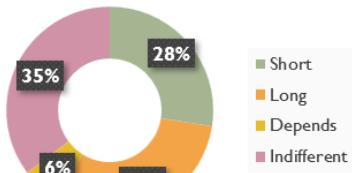


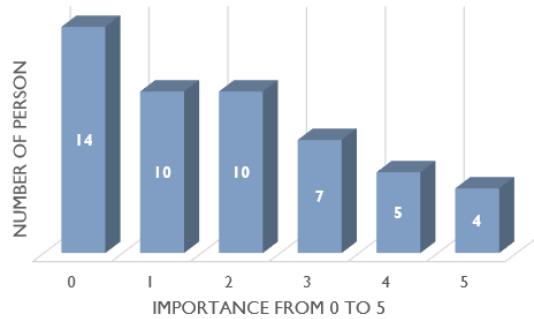
Figure 2.6: Users prefer a leaner interface than a full one and during the game they prefer to compete but however it depends on the category of the game

Smartphone Players

Duration of Game Session



GYROSCOPE



In-Game User Interaction

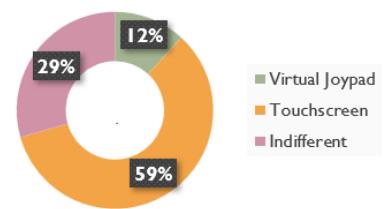
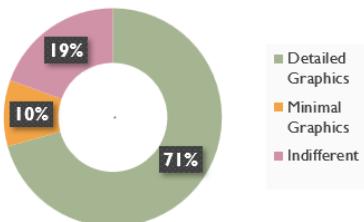


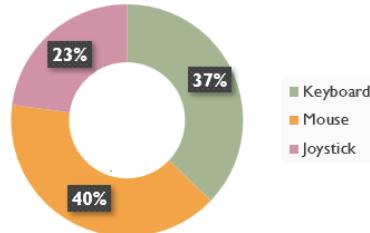
Figure 2.7: The dedicate section for Smartphone Players show that our users don't like the use of the gyroscope and most of them prefers play with the touchscreen as compared to the virtual Joypad. As regards the duration of the sessions, the opinion is indifferent.

PC Players

System Requirements



Input Controller



External Interaction

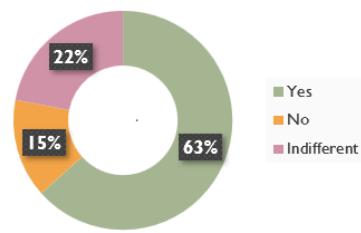
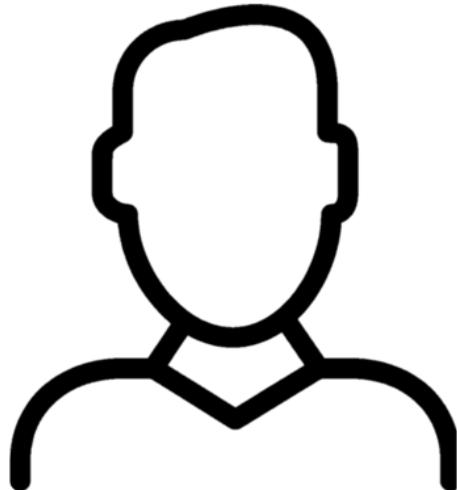


Figure 2.8: For the home-console players the results of the questionnaire are that the users prefer detailed graphics, they play mainly with the mouse and they like interaction with other applications such as Spotify or Discord

2.2.2 User Profile

The User profile is a collection of information associated with a particular user and It can be defined as a detailed description of users' attributes. Analyzing the results of the questionnaire it was possible for us define a good user profile:

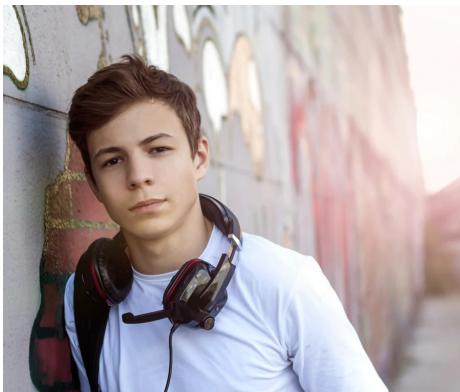


Age	15-30 years
Gender	Any
Occupation	Student or/and Worker
Education	High School or University
Location	Any
Technology	At least one computer (portable or not)
Family	Both single or engaged/married

Figure 2.9: Our target of users is young, of any gender, that have at least one personal computer.

2.2.3 Personas and Scenarios

Personas are fictional individual created to describe the typical user based on the user profile and they have the purpose to represent a group of end users during design discussions, and keep everyone focused on the same target. Scenarios are stories that describes how a particular persona completes a task or behaves in a given situation. They have the purpose to bring our users to life, test to see if our product meets the user needs, and develop artifacts for usability activities.

PERSONA: Lorenzo

Lorenzo is 17 years old, lives in Rome and is in his fourth year of Scientific High School. He really likes studying science subjects such as math, science and computer science. He likes competitive sports, in fact on Mondays and Thursdays he does rugby training, while on Wednesday and Friday he plays basketball. In his spare time, he loves to listen to music and play video games on his PC assembled by himself.

SCENARIO:

It's Wednesday afternoon, and Lorenzo is coming back home from school. He is too tired to go to play basketball so he decides to stay at home and turn on his PC because video games relax him. One of his friend suggested him to play to a new game called "Age of Dungeons" so he decide to install and try it.

PERSONA: Lisa

Lisa is 26 years old, she comes from Rome in Italy and she has a master's degree in marketing and economics and now she lives in Brussels, where she works as business analyst in an important international company. She moved to Belgium only two months ago but her boyfriend is still in Italy due to his job, so Lisa is alone and she works many hours, but luckily her two Spanish roommates are trying to help her move to Brussels. She really likes to keep fit, in fact she takes a Cross-Fit course twice a week. When she has some free time, she only want to do relaxing activities like play video games.

SCENARIO:

It's Friday evening, and Lisa is coming back home after 10 hours in the office and she also have an argument with her Boss. She tried to sleep but she can't because she is very stressed. So she decides to turn on her Portable Computer and Play to "Age of Dungeons" to vent her anger.

3. Task Analysis

The Task Analysis is needed to examine user activities to better understand what they need from the system and how the interface should work. This in fact describes the activities and secondary activities at a detailed level. It consists in:

- Hierarchical Task Analysis (HTA) that is a technique for task decomposition, in which each task is split and structured in a hierarchy of ordered tasks and sub-tasks.
- State Transition Networks (STN) which are diagrams that describe the behavior of a system in a particular function highlighting for each user action, the system response.

For our project we have implemented one general STN for the whole game, and four HTA and relative STN about four tasks.

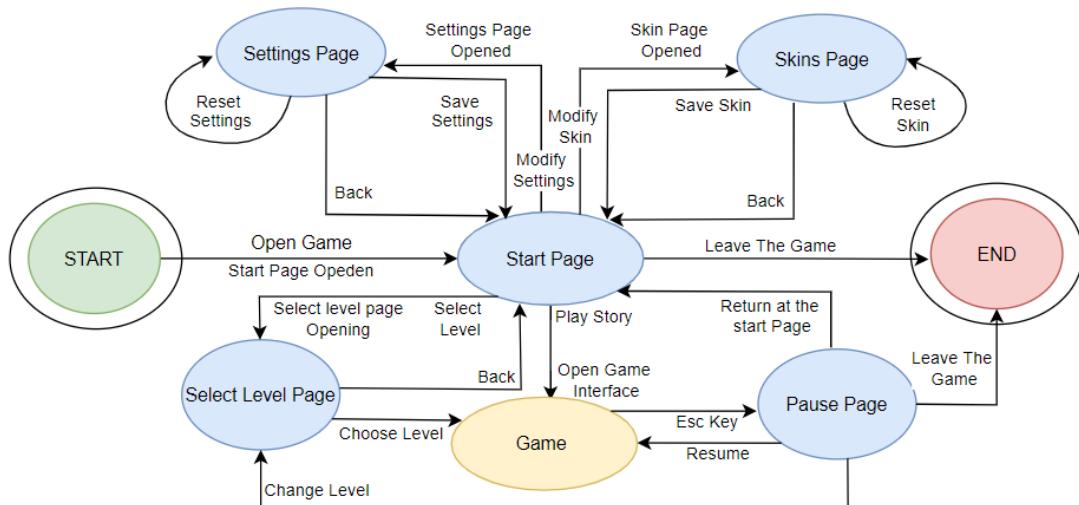


Figure 3.1: General STN for the whole video game

3.1 TASK 1: Modify the Music Volume

The first task we have analyzed is the action of changing the volume of the music. It is very common in fact that users want to customize the volume settings in order to have a more enjoyable gaming experience and more suited to their needs.

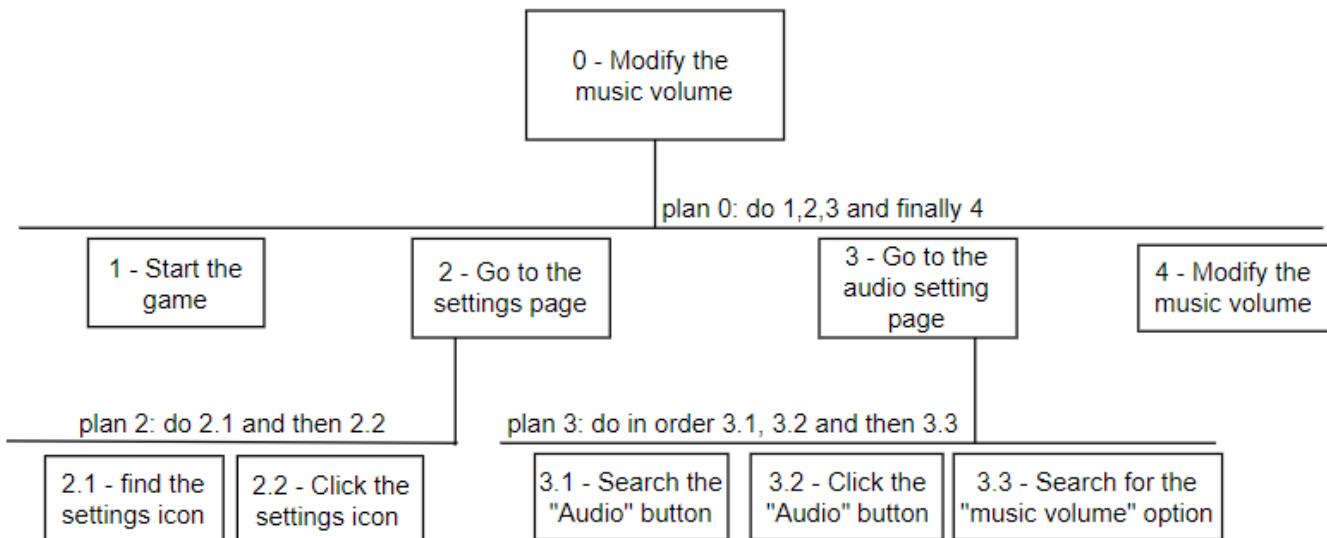


Figure 3.2: The HTA Diagram for modify the music volume.

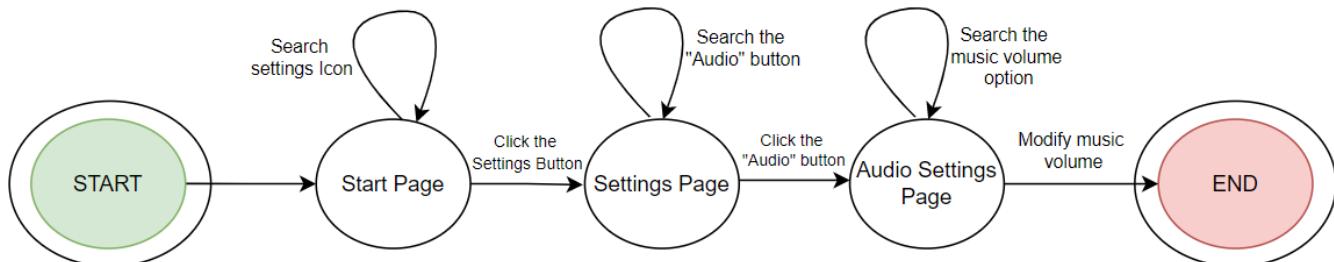


Figure 3.3: The STN Diagram for modify the music volume.

3.2 **TASK 2: Exit from the game**

Another important task to analyze is "exit from the game". This task may be simple for a user who has experience with video games, but slightly more complex for a user who has never played a video game. For this reason, in the following diagram we will see that to exit the game, if necessary, the user can consult the help page, otherwise he can directly proceed with the execution of the other steps.

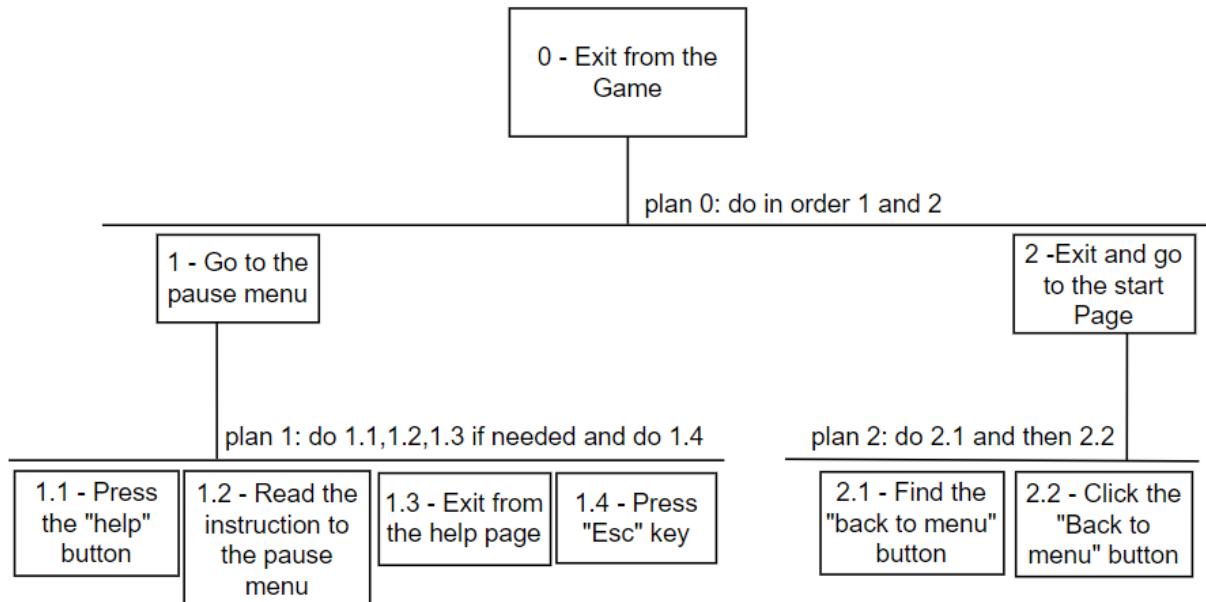


Figure 3.4: The HTA Diagram for exit from the game

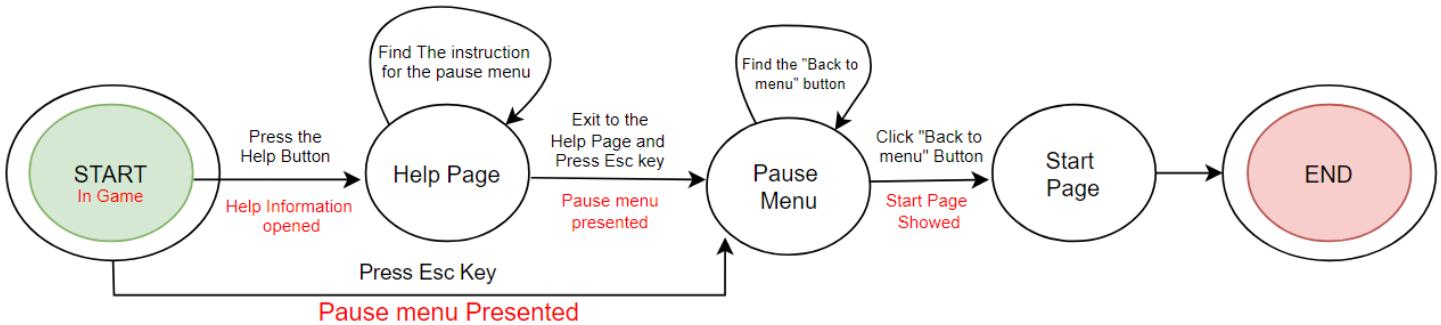


Figure 3.5: The STN Diagram for exit from the game

3.3 TASK 3: Choose Level and Play

The third task we have analyzed is to choose a level and play. We have given importance to this action because we have considered that a user who does not have much time available, or has finished the game and would like to play again only the levels he liked, must be able to choose the mode he prefers based on his needs.

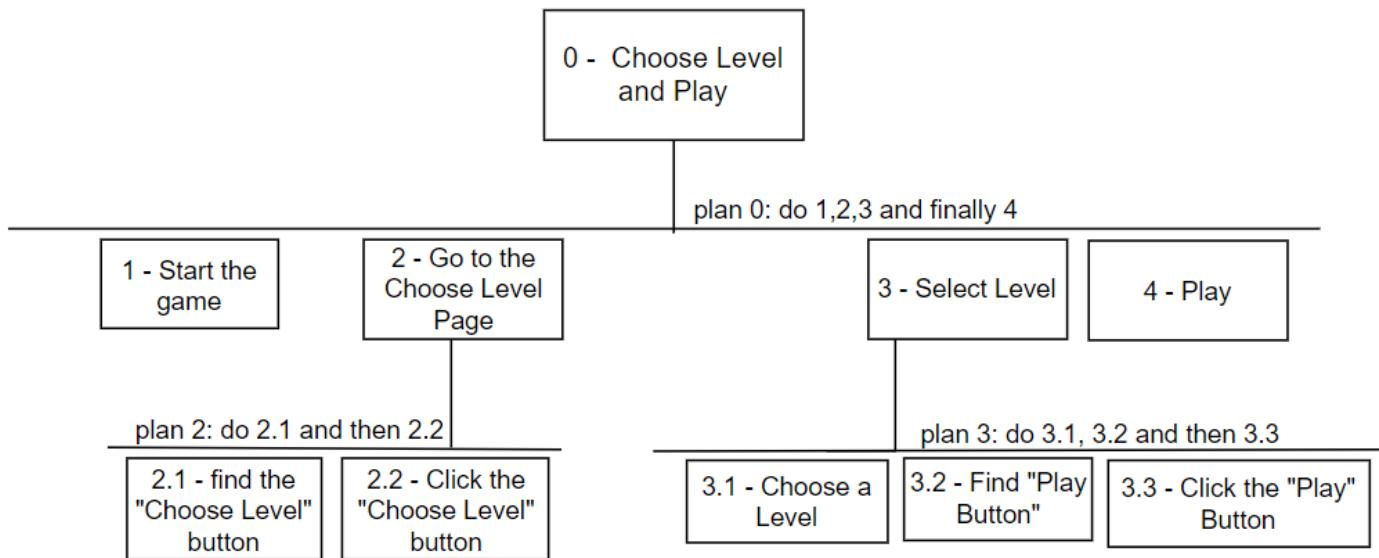


Figure 3.6: The HTA Diagram for Choose Level and Play

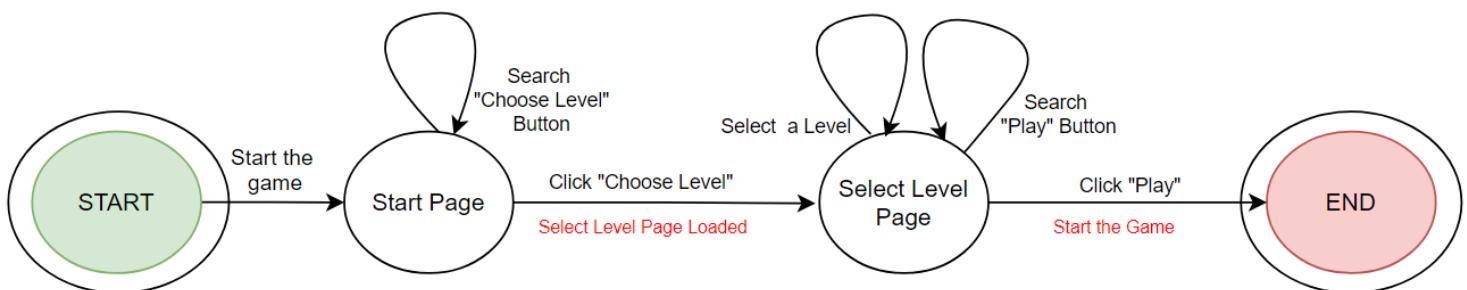


Figure 3.7: The STN Diagram for Choose Level and Play

3.4 TASK 4: Reset Skin

The last task we analyzed concerns the personalization of the character, which from the results of the questionnaire is very important for users. In particular, this task describes the action of returning to the default skin in case the user does not like the one chosen previously.

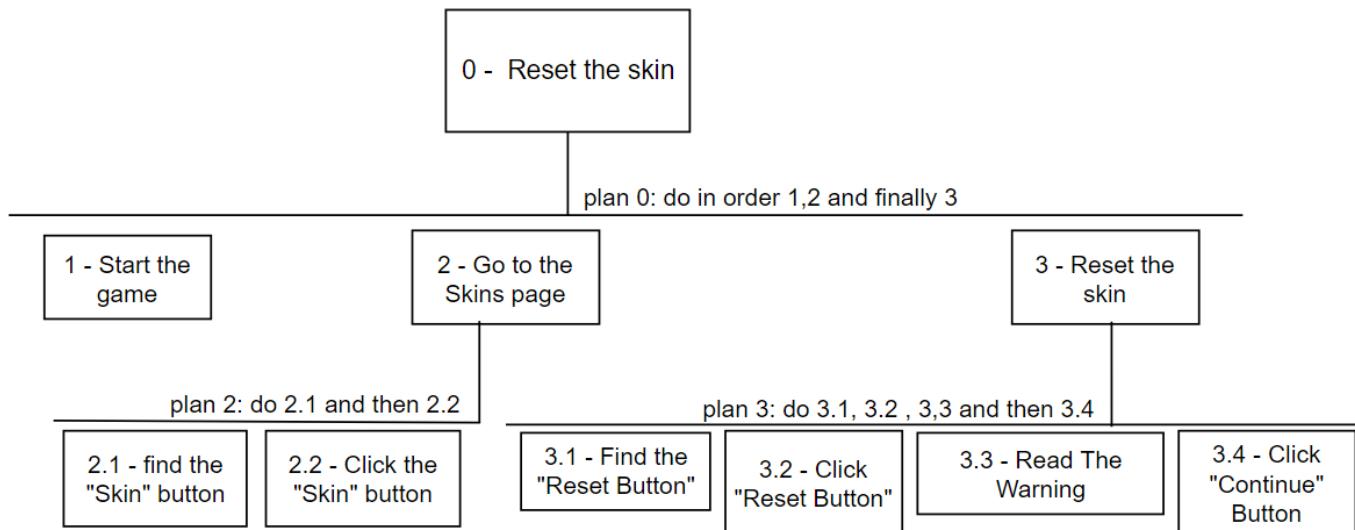


Figure 3.8: The HTA Diagram for Reset Skin

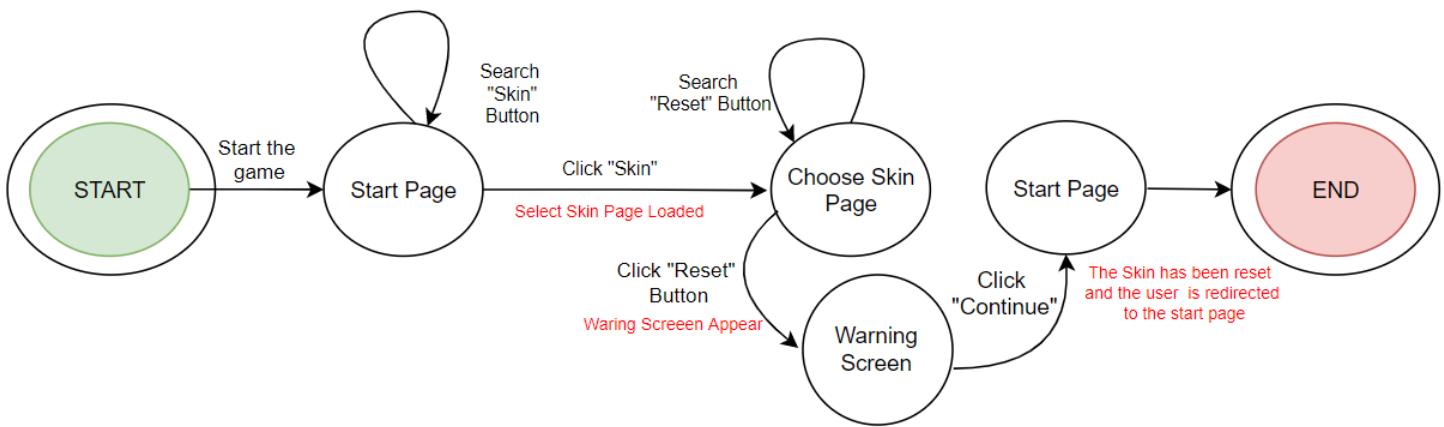


Figure 3.9: The STN Diagram for Reset Skin

4. Prototype 1

After having collected all the necessary requirements, we began to build the first prototype of the game. In particular in this first phase of design we decided to implement only the design of the main screens with which the user interacts in order to choose the game mode, change the settings or change the skin of his character.

4.1 Main Features

4.1.1 The starting Page Interface

The main page is a simple screen that contains the game title, three main buttons (Story, Choose Level and Skin), one secondary button (Exit) and one icon (Settings). We have tried to create a minimal, simple and intuitive interface so that the user can easily carry out any action he wants but also complete and unique. Exactly for this reason we have chosen our main color following a study on the psychology of color and on the emotions that colors transmit.

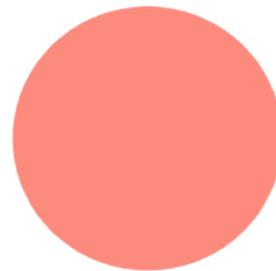


Figure 4.1: Main color is a gradation of red which range over pallid pink to the brilliance of orange.



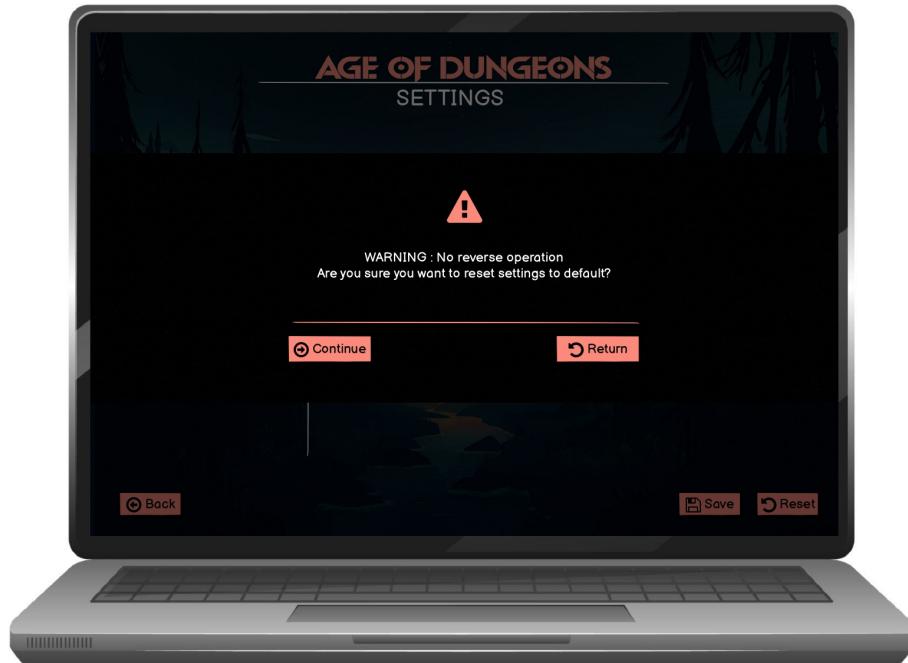
Figure 4.2: Starting page

- Orange is the symbol of positivity, energy, and enthusiasm and is used to attract the user's attention, but specially to involve him and to seek interaction. Pink instead transmit empathy, mystery and creativity.
- The main goal of the main image is to transmit to the user a feeling of discovery, a sense of adventure like if a journey is about to begin.
- For the button displacement we took inspiration from several games and combined the solutions that we liked more.

4.1.2 Settings Page Interface







4.1.3 Choose Skin Interface



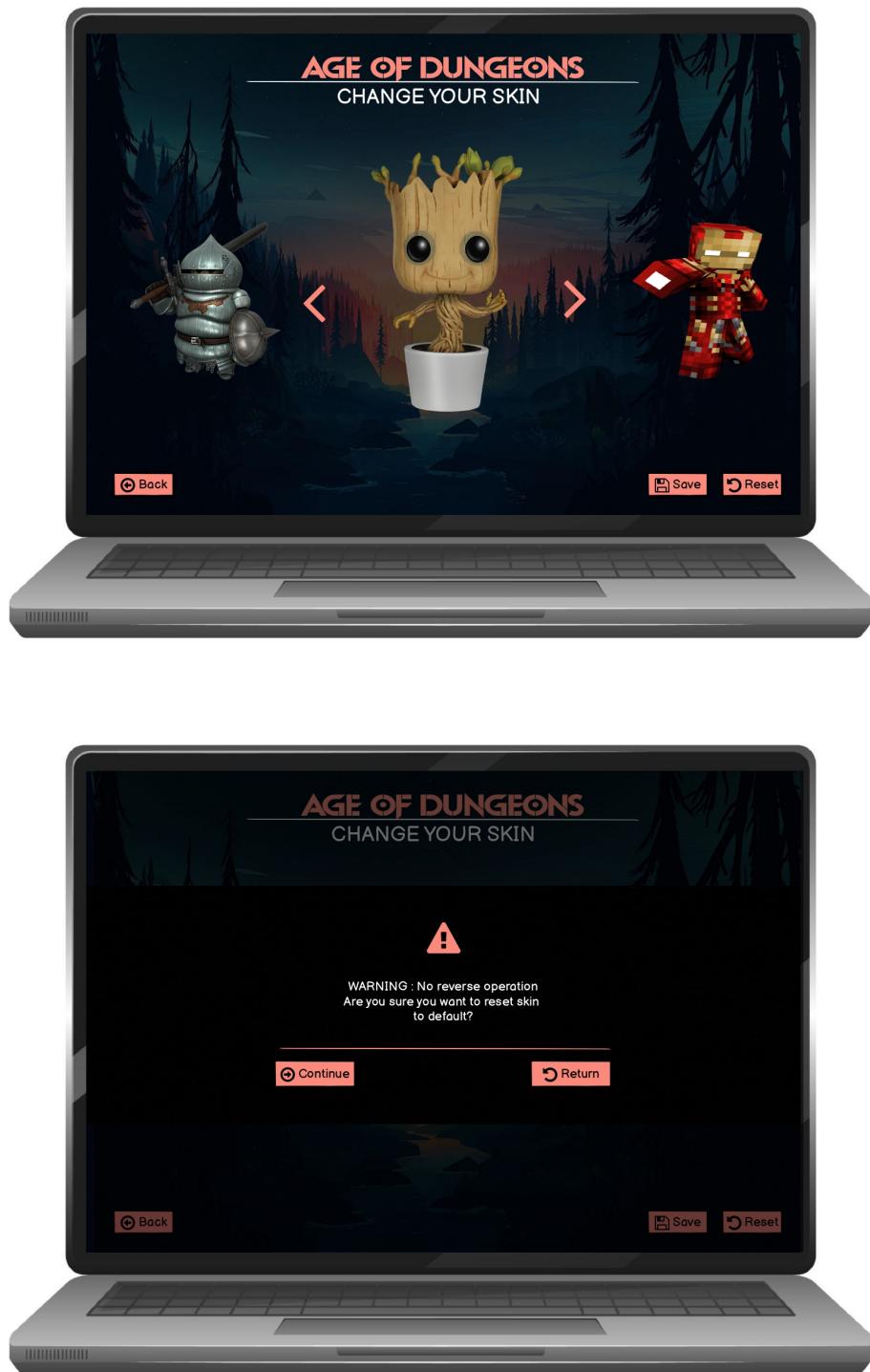
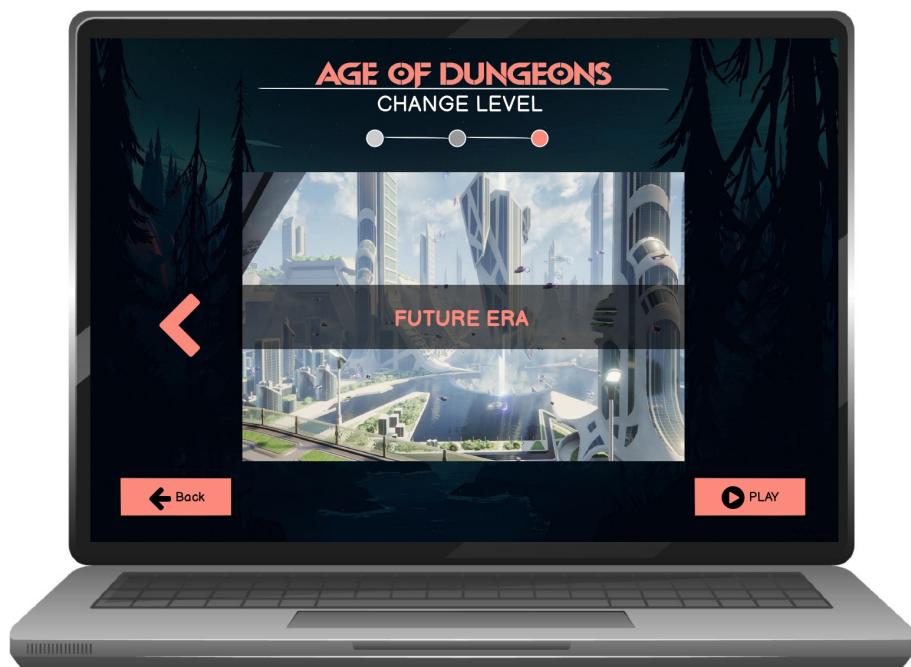
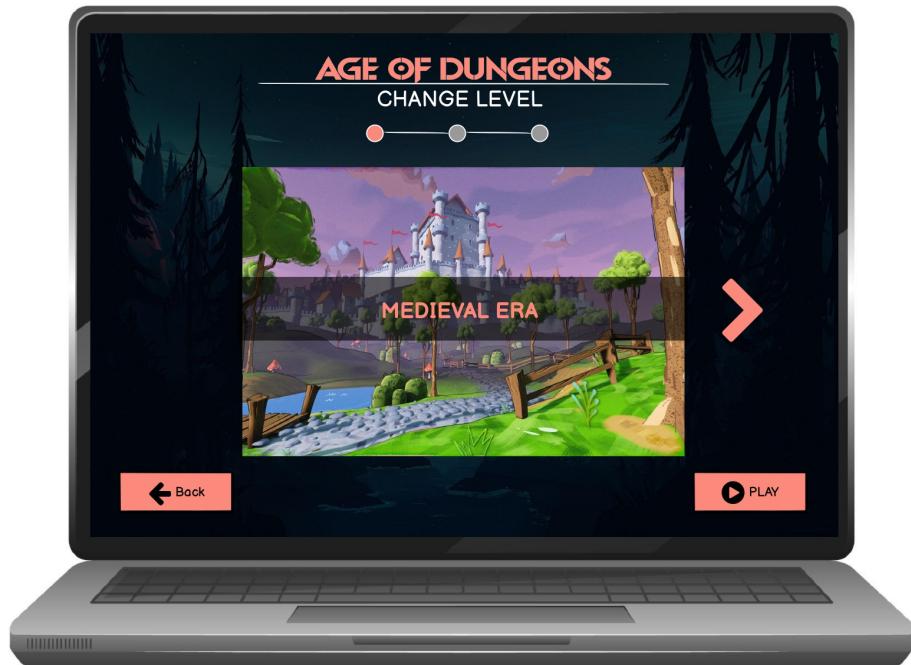


Figure 4.3: Warning of button reset skin

4.1.4 Choose Level interface



5. User Based Evaluation

5.1 Controlled Experiment

A controlled experiment is simply an experiment in which all factors are held constant except for one: the independent variable. A common type of controlled experiment compares a control group against an experimental group. All variables are identical between the two groups except for the factor being tested. The advantage of a controlled experiment is that it is easier to eliminate uncertainty about the significance of the results.

5.1.1 The Problem

Initially on the home page we inserted a clickable icon that redirects to the settings page, later, however, we thought that it was not very intuitive and if it was better to insert a button with the words "settings".

For this reason we asked twelve users, all consistent with our user profile, to test two different screens to understand which was the optimal solution:

- Six of them the one with the icon.
- Six of them the one with the button.

Here the mockups of the two Interfaces:



Figure 5.1: Main Page with the settings icon



Figure 5.2: Main Page with the settings button

5.1.2 one-way ANOVA

Analysis of variance, ANOVA, is a technique from statistics that allows us to deal with several populations. In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are equal, and therefore generalizes the t-test to more than two groups. One-way ANOVA is based on the F-test which is used for comparing the factors of the total deviation. For our experiment we have defined:

- **The users:** All the users involved in our experiment respect our user profile, in fact all of them are between 15-30 years old of which seven are boys and five are girls.
- **The Variables:** The independent variables are the two different interfaces and the dependent variable is the time in seconds in which the users can achieve the goal.
- **The Hypothesis:**
 - Null Hypothesis: The two interfaces are equivalent
 - Alternative Hypothesis: The interface with the button is more efficiently and easy to understand.
 - Significance level alpha = 0,05
- **The Experiment:** The task that the users have to complete is: "Go to general commands settings" from the starting page.

To do the experiment we used the fully navigable mockups of our interfaces, developed with Balsamiq, and we asked to the users to do the task. During the attempt we measured with a chronometer how long each of them spent to finish the action and these are the results:

Interface with Icon	3,02	4,57	2,90	5,98	3,24	4,10
Interface with Button	2,99	3,45	4,93	2,30	5,52	3,78

Figure 5.3: The Results of the experiment expressed in Seconds.

5.1.3 Data Analysis

SUMMARY					
Groups	Count	Sum	Average	Variance	
Interface with Icon	6	23,81	3,968333333	1,399456667	
Interface with Button	6	22,97	3,828333333	1,451896667	

Figure 5.4: ANOVA: Single Factor - Summary

ANOVA						
Source of Variation	SS	df	MS	F	Significance Value	F crit
Between Groups	0,0588	1	0,0588	0,041243573	0,843141223	4,9646027
Within Groups	14,256767	10	1,425676667			
Total	14,315567	11				

Figure 5.5: ANOVA: Single Factor - Results

The Results are split into three rows:

- **Between Groups:** The total variation between each group mean and the overall mean.
- **Within Groups:** The total variation in the individual values in each group and their group mean.
- **Total:** Sum of SS and df for the first two rows.

The six columns have the following meaning:

- The **SS** column refers to the **Sum Of Square** and quantifies the variability between or within the groups of interest.
- The **df** column refers to the **degrees of freedom** and it is for the Between Groups row equal to $Number\text{OfGroups} - 1$ and for the Within Groups equal to $Number\text{OfObservation} - Number\text{OfGroups}$.
- **MS** refers to the **Mean Square** and it is the average variation and it is equal to SS/df .
- The **F Statistic** is the test statistic in the one-way ANOVA. It consist in comparing the F value with the **F crit**. if $F > F Critic$ the test is significant.
- The **Significance Value** is the p-value.

5.1.4 Conclusions

The adjusted p-value represents the smallest family error rate at which a particular null hypothesis is rejected. If the adjusted p-value is less than alpha, we reject the null hypothesis and conclude that the difference between a pair of group means is statistically significant. However in our case p-value is greater than 0.05 so we can reject the alternative hypothesis and consider the null hypothesis therefore there is no difference between the means of our two groups. This means that each group on average performed more or less the same on the test.

This result is confirmed by looking at the values of F and F critic, in fact F is much smaller than F critic, so the test can be considered insignificant.

The anova test made us understand that between the two interfaces there is no significant difference for users so we decided to use the interface with the icon for a purely stylistic and design factor.

5.2 Think Aloud

To test our first prototype we have decided to do a Think Aloud (TA) Session. During a TA session the user is observed while performing the activity and he was asked to describe what he is doing and why, what he thinks is going on etc. This type of evaluation is simple, requires little experience and can provide useful information. But it is a type of evaluation subjective and the act of describing can alter the performance of the task.

- **The users:** The users we have chosen for this session are five, three males and two females, all respect our user profile.
- **The methodology:** To better gather all the necessary information, we decided to meet the users in person and film them while they do the tasks.
- **The technology:** All users used the fully navigable mockups developed on balsamiq.

Before the session we explained to our users who we are, what is our project and why we have to do this type of analysis. After explaining that we have implemented a PC video-game they had a very good reaction and they were very happy to try it.

We also specified to our users that they can quit at any time, that we won't be able to help them and that they have to explain what they are doing during the test.

The Tasks:

- Change the master volume of the game and save
- Change the skin of the character and save

5.2.1 The results

1. *Change the master volume of the game and save.*

During this task all the users easily found the Settings, three of them gone directly to the audio settings page but two of them search the master volume first in the general commands page and then go to the Audio settings page.

Incidents	Priority of the incident (1-4)	Description of the incident
1	4	Two of five users searched the general volume on the "General Commands" page before clicking the "Audio" section.
How the incident was found	good or bad	potential solution if bad
The incident was found in the Settings Page.	good	none

Figure 5.6: Analysis of the findings

We not consider this incident a serious usability problem because despite this all users were able to complete the task in a short time.

2. *Change the skin of the character and save.*

All of our users managed to complete the whole task in a short time, without any problem. Users reported that the page was very nice and clear and also the arrows for navigating in both direction was very appreciated.

5.2.2 Conclusions

To our great pleasure, the result of the Think Aloud session gave a positive result because our users did not find it difficult to carry out both tasks.

6. Prototype 2

6.1 Main Features

6.1.1 Game Interface

After defining all the external screens we built the game interface. Respecting the answers received from the questionnaire, we opted for a minimal one instead of a full one because clean and intuitive.



Figure 6.1: Minimal Game Interface

In the game interface there are only the strictly necessary components, such as the life bar, the weapon slot and a mini map. The disposition of these components has been chosen similar to other video games so that an experienced user finds a familiar environment, and a less experienced user does not find difficulty to understand their function.

6.1.2 Pause Page Interface

Another key feature for a video game is the pause screen. Also this is designed to be simple and intuitive, it has four main buttons:

- **Resume** → return to the game
- **Settings** → Options of the game
- **Back To menu** → return to the game
- **Quit** → close the game.



Figure 6.2: Pause Page

6.1.3 Help Interface

Thinking about the users who approach a video game for the first time, we have created a button inside the game screen, which is activated through the H key of the keyboard, and shows dynamically on the screen all the fundamental indications to be able to play. The user can consult the help page at any time, in fact when the H key is pressed the game automatically pauses, and by pressing the H key again one can return to the game. For this greater flexibility we have opted for a dynamic help page and not for a tutorial level.

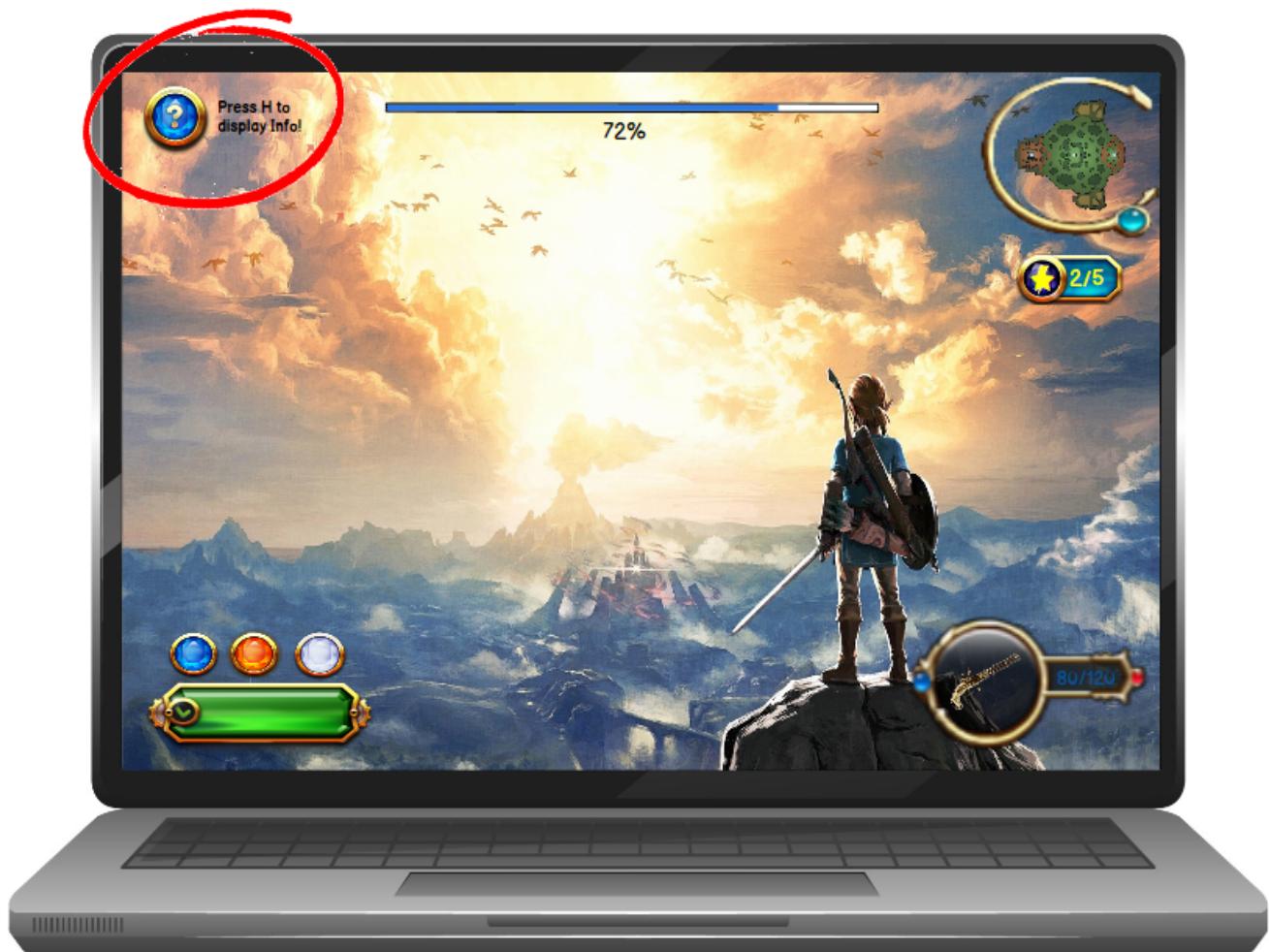


Figure 6.3: Help Button

6.1.4 interviews

At the beginning we implement two different Help Page. The first was a page in which all the necessary information appeared statically on the screen in small boxes, filling the entire interface. Through this typology the user could immediately have the answer to his question but paying the price of a confusing screen.

The second instead dynamically shows one help at a time. This made the screen cleaner and more elegant but the disadvantage for the user is that in this way it can take a longer process to arrive at the desired answer.

We asked 11 users for an opinion, all of which matched our user profile. Four of which were completely inexperienced in video games and seven had experience. We asked everyone to decide which help they would like to find and, after trying both versions, decide which of the two ways they prefer to view the information. The outcome of the interviews was 3-8 for the second version. In fact that was the most enjoyable though not being as immediate as the first.

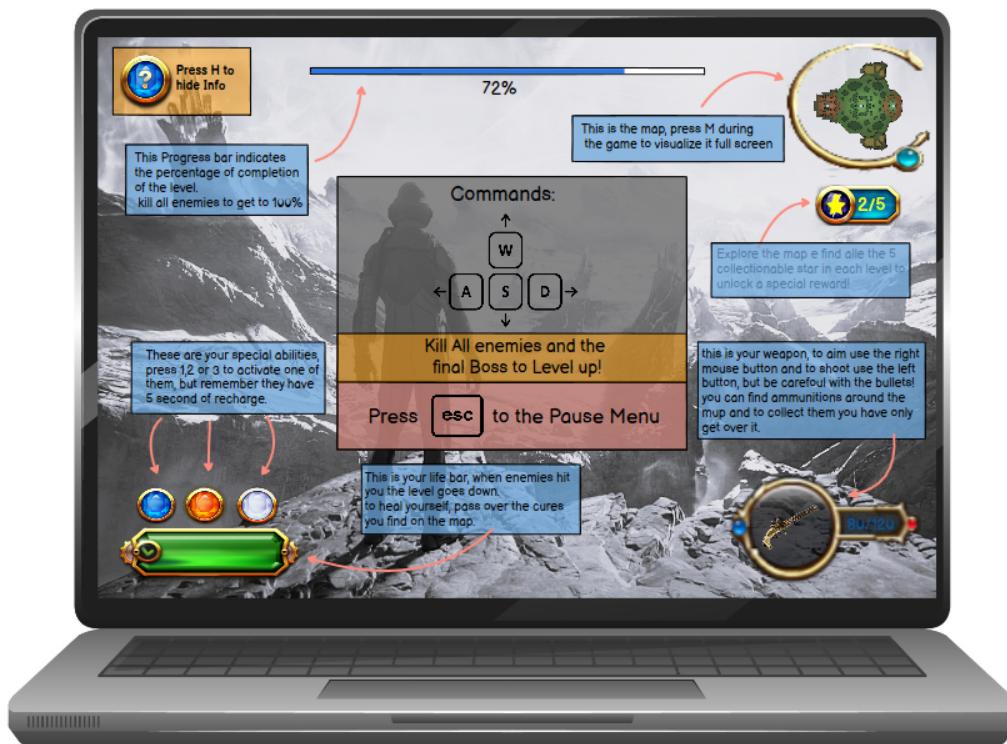
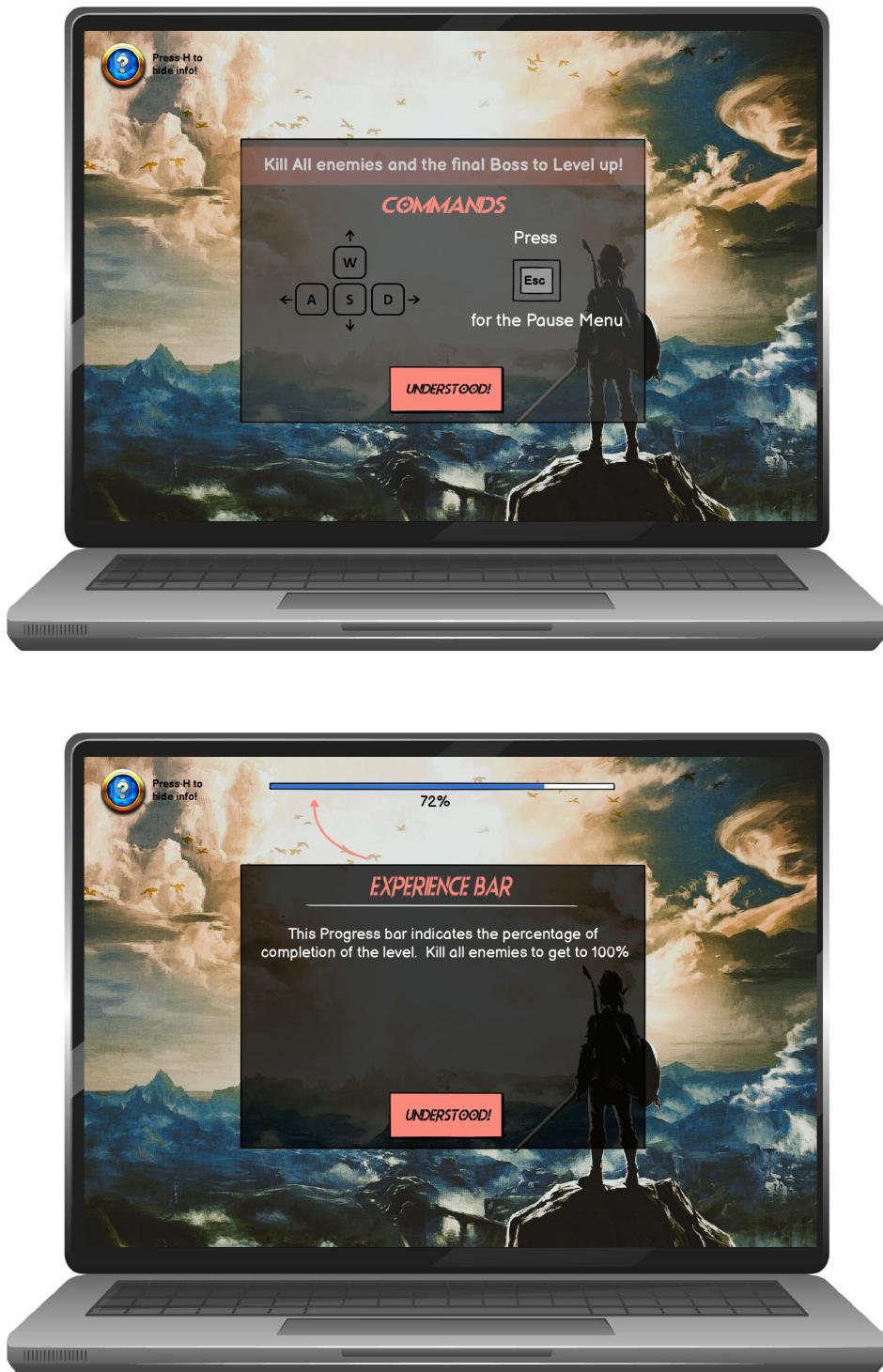
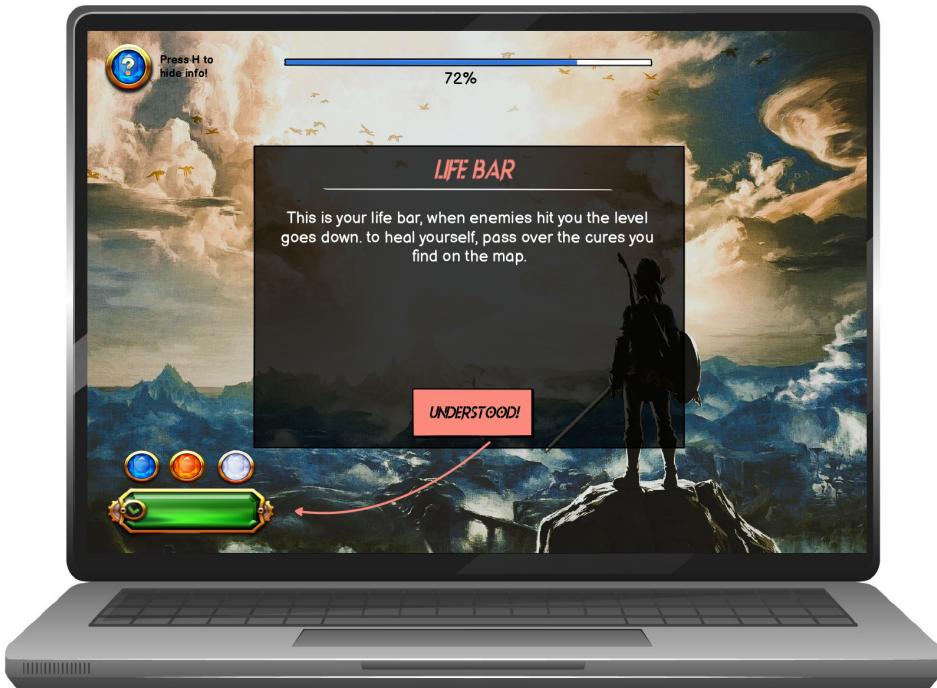
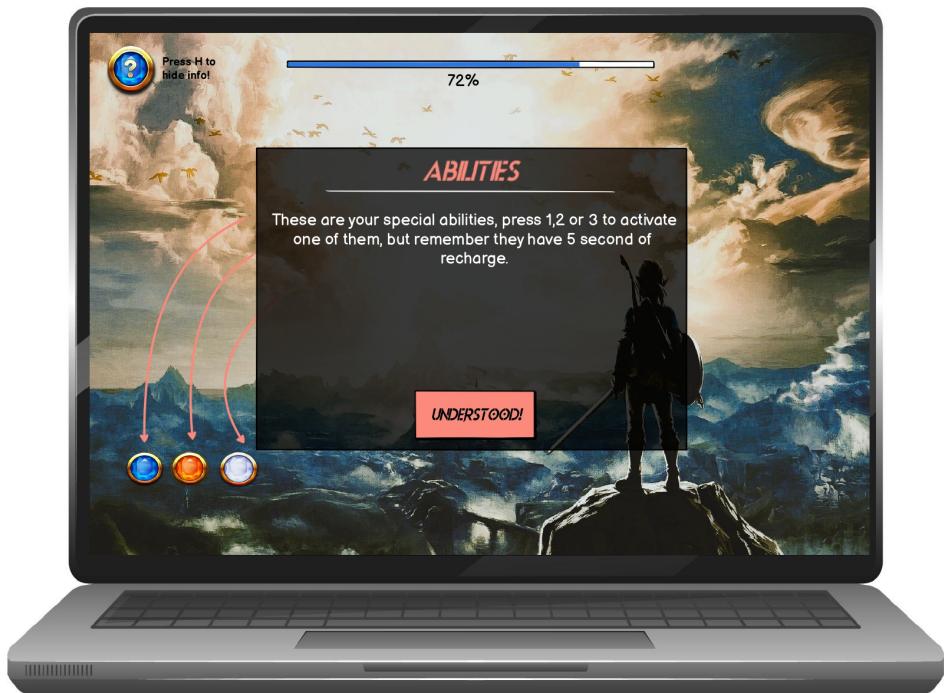
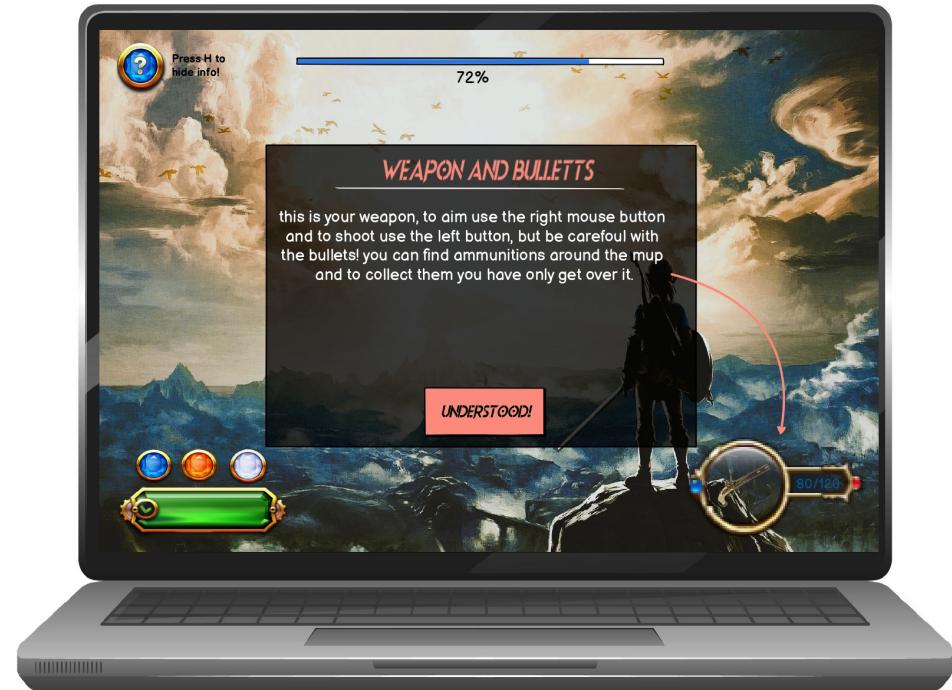


Figure 6.4: First Version of The Help Page

Figure 6.5: Second Version of the Help Page







6.2 Think Aloud

To test our second prototype we have decided to do another Think Aloud (TA) Session. **The users, the methodology and the technology** are the same of the previous session.

The **task** is: Play the game and go to the pause menu.

6.2.1 The Results

During this session all of the users can easily find the button "Play" on the start page. After the start of the game, when we asked them to go to the pause menu all of them first gone to the help page to find the information about that. They found the information in the first help but they still had to finish the whole dynamic screen to get out of the help page. After this steps all of them press the "Esc" key on the keyboard but we have done the test on the navigable mockups this only resulted in the closure of the presentation.

Incidents	Priority of the incident (1-4)	Description of the incident
1	2	The users have to finish the whole help page even if they have found the information they needs.
2	4	All the users press the "Esc" key on the keyboard to go on the pause menu but this action close the mockups presentation.
How the incident was found	good or bad	potential solution if bad
Help Page	bad	Insert the possibility to exit the help page at any time.
Game page	good	none

Figure 6.6: Analysis of the findings

6.2.2 Conclusions

After this Think Aloud session we have added the option to close the help page at any time in order to facilitate the user and make the experience more enjoyable. Instead, the fact that users pressed the esc key on the keyboard was a confirmation for us that we had communicated the information in the right way.

7. Expert Based Evaluation

Evaluation tests usability and functionality of a system, analyzing the design, the implementation, the effect of the interface on user and to identify specific problems. The expert who performed the Heuristic Evaluation is Prof.ssa Valeria Mirabella.

7.1 Heuristic Evaluation

Is a method for structuring the critique of a system using a set of relatively simple and general heuristics which are called the Nielsen's 10 Heuristics:

1. Visibility of system status
2. Match between the system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose and recover from errors
10. Help and documentation

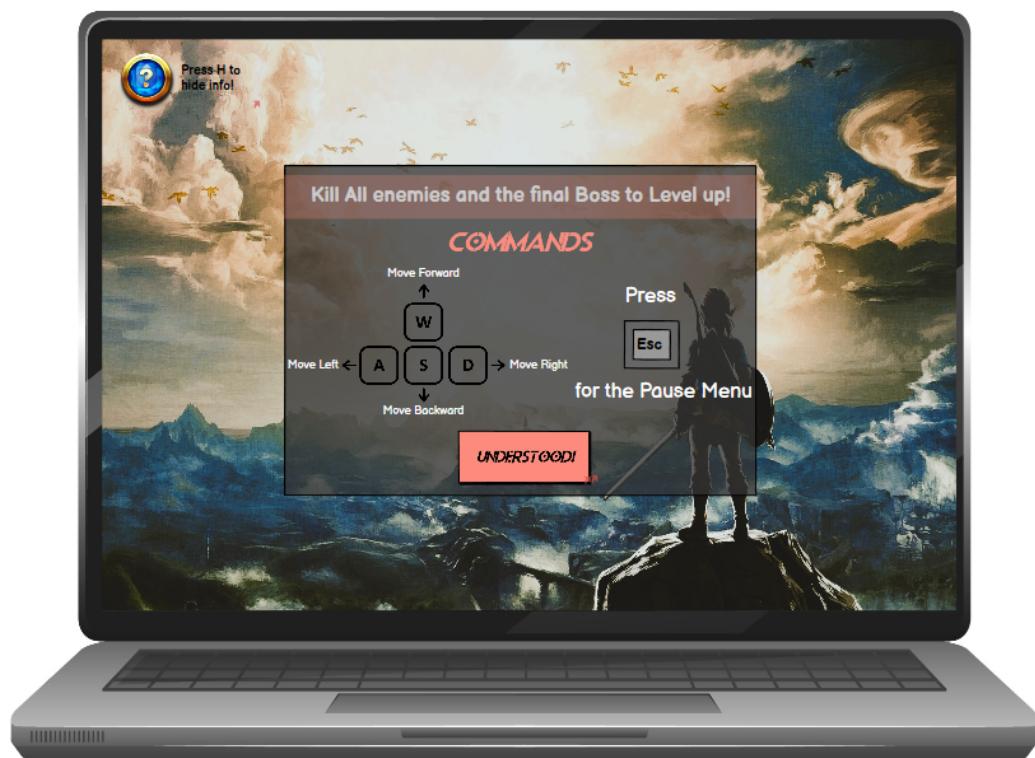
In our case, the expert performed a HE on the mockups, coming up with the following list of violations:

Frame	Heuristic violated	Severity	Description / Comment
Settings- General commands	Recognition rather than recall	3	Explain the meanings or include a reference to help pages to explain letters (WASD) and numbers.

where :

- 0 = I don't agree that this is a usability problem at all
- 1 = Cosmetic problem only
- 2 = Minor usability problem
- 3 = Major usability problem
- 4 = Usability catastrophe

Based on the heuristic evaluation we decided to modify the help of the commands in such a way that they are clearer even for a less experienced user:



8. Demo Implementation

After defining all the requirements we started making a demo of the video game. To manage the workflow and manage resources in the best way, we decided to use a shared repository on GitHub and Unreal Editor's built-in support for source control packages. We used it to manage code and data changes over time, and it allows our team to coordinate game development efforts. The workflow was divided into four main phases:

8.1 1° phase

In this initial phase it was important to build solid foundations on which to work and from which to start for the implementation of more complex functions and features. In particular, we have implemented:

1. **Folder file system** creation for a better organization.
2. **Game Instance creation:** high level manager object for a running game instance, that means it will be created when the game is running and destroyed when the game session ends. The game instance is a manager class that is not destroyed when changing levels in your game. This means that the data is kept as long as the game is running. We have defined also a set **useful functions** during the whole instance of the game such as spawn of the main menu, spawn of the exit menu, spawn of the settings etc..
3. **Initial Level:** Creation of blueprint widgets for displaying the main menu and for the options menu (which required the inclusion of "save-game file". Files used to save state about the game). In order to guarantee the best performance at first launch we used a little trick: we defined on **GameUserSettings.ini** the minimum settings that we load and save on the save-game blueprint on the first start.
4. Creation of a **Widget for the 3d visualization of the skins** which has been implemented the interaction with the mouse of the user who will be able to move the character around the y-axis (yaw).
5. Creation of the **widget for the HUD** of the character **and for the in-game tutorial**.

8.2 2° phase

During the second phase we focused on implementing the Game play level, and in particular we focus on:

1. The **character creation**: character creation was achieved by importing assets from Epic Games store (skeletal mesh). The first assets we imported were too much complex and each of them had a particularly bone system. This caused us problems for the management of the animations. To solve these problems we decided to change them with less complex assets and with the characteristic of sharing the same hierarchical set of bones (skeleton mesh). In this way we were able to apply the same animation on more characters. By this we obtained a noticeable improvement in terms of performance.
2. The **implementation of the Animation Blueprint with its AnimGraph** and logics. This point is very important for the management of the animations.
3. The realization of **Weapons** and **Bullets** created through a blueprint which has editable parameters. In order to have a better management of different weapons and bullets we simply create a system of inheritance. Furthermore we implemented in the same way the blueprints about the pick-up system.
4. Adaptation of **character movement** and **camera settings**.
5. Creation of the **interface between the pawn and the human player** interact via Player-Controller. Assign a command that will be given to the Pawn (Character).
6. Define some **collision** in order to recreate a real **physics** of environment items, and all other gameplay stuff.

8.3 3° phase

In this third phase we have defined the main actions of the gameplay, like battle and fight with enemies.

1. The **assets of enemies**, mobs and bosses and relative system of **animations**
2. A **basic AI logic for mobs and bosses** via blackboard and behaviour tree which has our implemented services and tasks. The AI use a different blueprint component to have a better perceive of the character, this is gain through AI-senses (build with our parameters). When the mob or boss discovers that there is an enemy, he runs toward the character and if he is at close range he attacks.
3. The management of the **damage mob/boss-player** and the **logic of death** made entirely through blueprints.

8.4 4° phase

Implementation of the main class that handle information about the game being played: Game mode. We defined the rules for the game logic such as how players enter in the game (spawn) and restart player. After that we start our test using the console and the development tools given by UE. An example is use the tool's statistics which display the total amount of texture inside the level so we can modify with "bulk editor via property matrix" the size of oversize textures.

The game is ready to be played via standalone mode.



9. Conclusions

Working on this project, focused on the Human Computer Interaction, we discovered a new world. In our past projects we started working on “The idea” and then we continued on the same way until it’s finished, never considering other factors, like users, that clearly are the central element of every application, video games and so on and so forth.

In this project we adopted a different approach, we started from a very basic concept and we asked everything to the users in different forms such as interviews, questionnaires and other powerful tools. We developed the entire game based on the feedback received by the users, on what they really want and what is really useful in terms of Quality of Life and together with the previous ones another important aspect that we focused on is the collaboration with the experts that provided us not only personal feedback but more importantly professional feedback on all the aspects of the game.

Working on this project was a lot funny, we improved our technical skills working with Unreal Engine and discovered a new way of working in a User Centered Design that we will consider in all the next projects that we will develop but not only, also in a lot of other fields, not strictly related to the IT. Today the product is not completed but we developed a fully playable demo mixing all the important things. We plan to continue the development of AoD, so probably, we will release a complete version of the game in the Epic Game Store.

9.1 Future Development

For the future we plan to add several things to our game, the main features that we plan to add are:

- **Gameplay**

- Different Scenario(Based on current Era)
- Other weapons Archetypes
- Randomly generated Rooms
- A lot of other skills that we already have in mind
- Permanent items
- Quest and side-Quest system
- Scoreboard system
- A more dense of event map
- MultiPlayer!!!
-And we don't want to spoil everything now!

- **Graphics**

- Add more complicated meshes and polygonal objects
- A more accurate and clean graphics
- New kind of animations
- New skins
- Different mobs and Bosses

And that's all, thank you!