



VR SOUNDSCAPE

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Statement Of Originality

This report is submitted as part requirement for the degree of Games and Multimedia Environments at the University of Sussex. It is the product of my own labour except where indicated in the text. The report may be freely copied and distributed provided the source is acknowledged. I hereby give permission for a copy of this report to be loaned out to students in future years.

Abstract

In this dissertation, I have investigated VR soundscapes and how to make them accessible to the average person. The research in this paper examines ways to make a soundscape more immersive and discusses tools and Unity engines for developers. As for the answer to the problem, I have created a medieval village that can be experienced on a browser with mouse, keyboard, and VR headset. The experience stayed true to real history and is educational.

Introduction

Virtual Reality is a technology that can upgrade the immersivity and interactivity of the simulated environment with the usage of head-mounted hardware and controllers. It's the next step to the monitor and mouse which has limited visual space and interactivity and have hard limits on the user.

The recent developments of low-cost VR hardware such as Sony PlayStation VR, and HTC Vive has kickstarted an interest in this field. Although the hardware exists the developers are still hesitant about optimizing their products to this new platform because of the lack of an audience and accessibility hence the audience also avoids the platform because they are unable to access the product and recognize what experience makes VR distinguish from a normal pc.



Figure 1: Sony PlayStation VR

Therefore, this project and report are focused on why an average user should use VR technology by creating an easily accessible software that can be experienceable with a monitor, keyboard, and mouse as well as a VR. Both experiences will deliver a different style of audio, visuals, and interactivity to distinguish their characteristics from one another and communicate their differences to the user.

Objectives and problems

A game requires time, resources and a combination of different elements working together to create an experience which is usually handled by different people with different skillset although there are lots of projects developed by only one person such as Stardew Valley. In this chapter required fields for a game on the design level, technical level and how they will interact with each other will be covered.

- **Design and Inspirations**

- **Sound Delivery**

One of the elements that make the experience unique is how the sound is delivered. The sound is crucial for the game as it can manipulate player's emotions by giving them excitement during an action scene or can make them tense by putting creepy ambient noises furthermore can communicate the things that are happening in the environment on the technical level without visuals such as the iconic sound of Metal Gear Solid's "you have been spotted!" is a perfect example for this as it gives the player the feedback of they are in danger and creates a tense environment by playing fast-paced music in the background. This kind of iconic sound design gives the experience characteristic and rememberability of the experience and can create nostalgia in the player whenever they hear that sound or music.

- **Visuals**

The game visuals are also helping the characteristics of the game. the visuals can be photo-realistic or cartoonish as long as they represent some kind of characteristics and sense of familiarity. As an example; Persona 5 does not have realistic graphics or doesn't push the hardware to its limits. but the concept of entering people's subconscious minds and seeing how they perceive the world without needing a single sound or dialogue is a perfect example of this. Visuals include more than graphics such as UI design and environment design on a technical level. UI gives feedback to the

player to see how much health they have left or whether they can interact with an object.



Figure 2: Persona 5

- **Gameplay**

As technology advances and genres started to have repetitive gameplay, a new genre called walking simulator has immersed. This new genre lacks puzzles, enemies, obstacles and even a jump button. It encourages the player to explore through its level design, story and environment and all you can do is walk and sometimes make choices. The Beginner's Guide is the perfect example of this as the player walks around some inexperienced game developer's levels and the narrator gives a psychological analysis of the developer and an explanation of design decisions.

- **Story**

The story is the most important part of the video game as all of the player's struggles or exploration is meaningless without a goal to achieve or having some kind of reward at the end of the game. In the Super Mario franchise, Peach is kidnapped 26 times since the first game, but it takes the player's attention, establishes the enemy, and gives an objective to the player to achieve and a reward at the end without any dialogue nor deep back-story.

- **Technical Information**

- **Engine**

To accommodate these design objectives a game engine has been required so I chose the Unity engine because of its VR support, pre-built packages for spatial sound and for its asset store. It makes the development process easier because the developers can work on the project without using a VR headset or emulate the VR experience with some tweaks on the engine. Furthermore, can build the project on a browser using WebGL which is accessible and playable with just a click of a link and without much of a sacrifice from the desktop version.

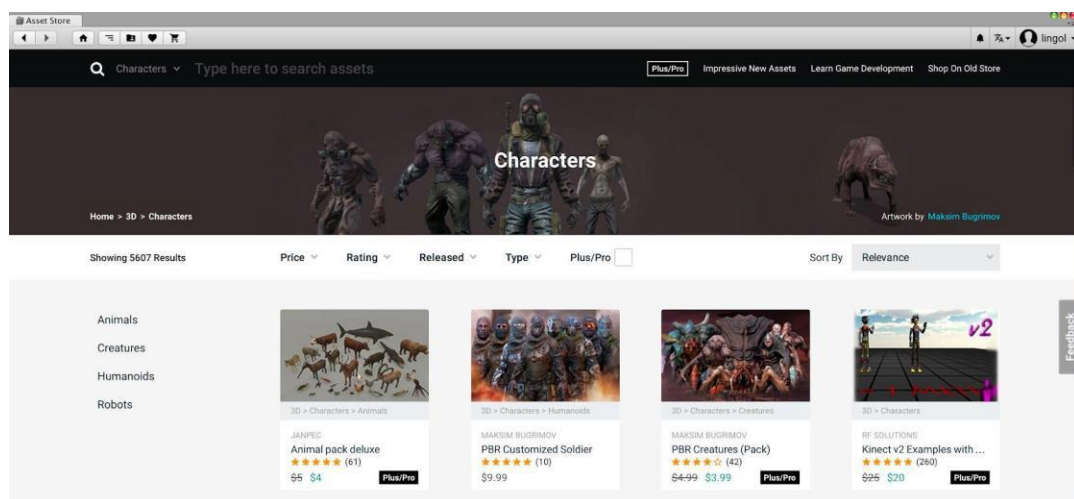


Figure 3: Unity Asset Store

- **Platform**

To make the project accessible from anywhere, using the browser to run the project is decided although it comes with a limitation which is it is only playable on Mozilla Firefox. So only %3 of the browser users will have direct access to the project without installing 3rd party software. Even if the browser limits the user from accessing the product the project will be playable with a mouse and Keyboard as well as VR which gives the player more flexibility in the way they play.

- **Coding**

Unity uses a modified version of C# coding language which is like Java furthermore it has pre-built packages for camera, graphics, physics etc. which lifts off some of the hard work. The game won't require much coding because the VR platform already has

a pre-built package and the player will have limited movement such as walking around and pressing the action button to interact with the objects around them. In the later stages, some event triggers can be added which will result in the action event being turned on without the player interacting with an object.

- **Visuals**

Visuals will be the most time-consuming part in these parts discussed because the game won't have much gameplay so the player will focus on the environment as well as sound and will expect high immersivity to feel the atmosphere. To make the development much faster and more agile 3D modelling tools Cinema 4D will be used because of its compatibility with unity and easy-to-learn Interface. Although modelling is only for the most important objects in the game, all other models will be downloaded from the unity asset store. And to make the environment more interesting shaders can be used which is a way to animate the textures on the model to make them more interesting such as moving the water on the surface of the sea.

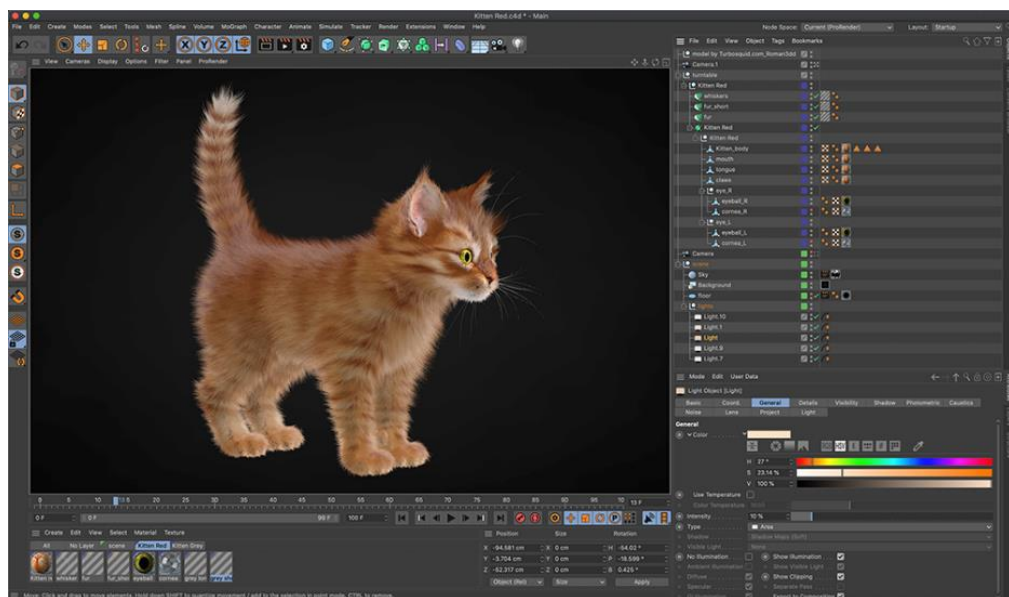


Figure 4: Cinema 4D

- **Sound**

The sound will be the most interesting and innovative part to develop as the game will use spatial sound for the environment and objects which enhances the immersivity and makes the localising of the sound much easier for the player. Unity has built-in audio spatializer SDK which helps the developers to attach the sound files to objects

and makes the development process for audio much easier. Although converting stereo sound files to spatial sound is crucial, mixing and creating these sounds is also important. For the creation and mixing of music and sound effects, there are Digital Audio Workstations (DAW). For this Project, Reason 11 Lite is chosen because of my experience with it. In the long term, the sound and visuals must complement and balance each other to create the atmosphere of the game thus, it will be my biggest priority for the development.



Figure 5: Reason 11

- **Gameplay**

The game will be a walking simulator so there won't be any obstacles, enemies or dying. The Player's only objective will be to explore their surroundings and interact with the objects. So, this makes the visual and sound delivery the most important aspect of the game to keep the player engaged and make sure they have fun while playing. Meanwhile, the game's aim is going to be to educate the player about some subject. Three themes for the game have been considered history, geography, and philosophy.

To push the development in a more abstract and theory-based direction philosophy was considered. A typical environment for this topic would be a philosopher's theories represented visually in an abstract way as an art form to educate the player. Kid Amnesia: Exhibition is the best example of this as it gives an abstract visual representation of Radiohead's songs in an exhibition and can be explored in any direction with lots of secrets to be found. Although this sounds exciting in VR, down-

side of this theme would be lots of research about philosophy and thinking about how to represent them in a way that can communicate the idea to the player would be time consuming



Figure 6: Kid Amnesia: Exhibition

Thus, combining geography and history has been decided as it's a fact-based theme and there are already lots of assets already made which shortens the development cycle. For the project designing an open-air museum is decided as it combines all the elements required. As an inspiration for the project, I choose the oldest open-air museum in the world, Swedish Skansen which is a town from Middle Ages that have a zoo with local Nordic animals. As a country with rich history, habitat and architecture Poland is chosen for my personal choice.

For the gameplay, the player will explore a town from Poland-Lithuania Commonwealth with a zoo inside of it. The player can walk in any direction they want and turn back to the previous locations they visited like real life museum experience. They can also read information about the animals and hear the noise they make in spatial audio format. Finally visit the houses, and workshops and learn which profession played which role in the empire.

Professional and Ethical Considerations

BSC Code Of Conduct

- **Public Interest**

- **have due regard for public health, privacy, security and wellbeing of others and the environment.**

The game does not store any data about the player and does not contain any distressing images or other elements to risk the user's or others' well-being.

- **have due regard for the legitimate rights of Third Parties.**

The game has limited usage of third-party content and when used, it fulfils the licence criteria, and the creator is referenced for their content.

- **conduct your professional activities without discrimination on the grounds of sex, sexual orientation, marital status, nationality, colour, race, ethnic origin, religion, age or disability, or of any other condition or requirement.**

The game does not contain symbols, language or trait that discriminates any group

- **promote equal access to the benefits of IT and seek to promote the inclusion of all sectors in society wherever opportunities arise.**

There will be efforts put into the project to include people with special needs.

- **Professional Competence and Integrity**

- **only undertake to do work or provide a service that is within your professional competence.**
- **NOT claim any level of competence that you do not possess.**
- **develop your professional knowledge, skills and competence on a continuing basis, maintaining awareness of technological developments, procedures, and standards that are relevant to your field.**

The project is parallel to my course, and it's within my competence

- **ensure that you have the knowledge and understanding of Legislation* and that you comply with such Legislation, in carrying out your professional responsibilities.**

I will make myself familiar with the legislation and will not do anything to break it

- **respect and value alternative viewpoints and, seek, accept and offer honest criticisms of work.**

I will respect my supervisor and other people's honest and constructive feedback to improve the project

- **and avoid injuring others, their property, reputation, or employment by the false or malicious or negligent action or inaction.**

I will not do anything malicious to harm someone else's reputation or property

- **reject and will not make any offer of bribery or unethical inducement.**

I will reject and discourage bribery and unethical inducement

- **Duty to Relevant Authority**

- **carry out your professional responsibilities with due care and diligence in accordance with the Relevant Authority's requirements whilst exercising your professional judgement at all times.**

I shall carry out my professional responsibilities with care and in accordance with the university's requirements while exercising my professional judgement

- **seek to avoid any situation that may give rise to a conflict of interest between you and your Relevant Authority.**

I shall avoid any situation that may cause conflict between me and the university by following the project plan, objectives and requirements of the university.

- **accept professional responsibility for your work and for the work of colleagues who are defined in a given context as working under your supervision.**

I accept all the responsibility for my work and the project as it's chosen according to my competence

- **NOT disclose or authorise to be disclosed, or use for personal gain, or to benefit a third party, confidential information except with the permission of your Relevant Authority, or as required by Legislation**

I shall not disclose any sensitive and confidential information and refuse to do so without any permission outside of the relevant authorities and by legislation.

- **NOT misrepresent or withhold information on the performance of products, systems or services (unless lawfully bound by a duty of confidentiality not to disclose such information), or take advantage of the lack of relevant knowledge or inexperience of others.**

I shall share all the progress and information about the project with the relevant authority according to my knowledge and shall not take advantage of others because of their inexperience.

- **Duty to the Profession**

- **accept your duty to uphold the reputation of the profession and not take any action which could bring the profession into disrepute.**
- **seek to improve professional standards through participation in their development, use and enforcement.**
- **uphold the reputation and good standing of BCS, the Chartered Institute for IT.**

I shall accept my duty to improve the standards during the development of the project and follow the BSC Code Of Conduct rules.

- **act with integrity and respect in your professional relationships with all members of BCS and with members of other professions with whom you work in a professional capacity.**
- **encourage and support fellow members in their professional development.**

I shall respect my professional relationship with all members of the BSC and the members of the university and encourage their professional development.

Requirements Analysis

- **Usability**

Video games are playable with different age groups with different hardware settings. This project will be a walking simulator and its aim is going to educate the population thus will not require much effort to learn the controls and will not have any obstacles to overcome hence it appeals to all the age groups that are interested in this subject. And for the recommended system the game won't appeal to hardcore gamers which means it will not require high system settings, so my laptop (Lenovo Y520) can be the baseline for the recommended hardware.

- **Gameplay**

The game is set in a village so all the key locations must look and feel different from each other. And animals' sounds should be distinguishable from each other and easy to locate as this is where spatial sound has the most important part. Furthermore, the player can hear different things in different parts of the map so even the town visually feels the same, because of the sound it will have a different atmosphere and cause less boredom for the player and enhance immersivity.

- **Accessibility**

As the game is playable for every age group people with special needs should not be ignored especially people with learning disabilities. People with autism spectrum disorder tend to get lost in large environments and feel overwhelmed by the number of options. They are more prone to audio queues rather than visual although the amount of noise shouldn't overwhelm them. Visually the game will not overwhelm autistic players so there is no need to implement anything for it. And finally, for dyslexic users, a narrator option can be included. As this is an educational game at least one accessibility setting must be included in the game.

- Requirements
 - **Mandatory**
 1. The game shall be developed on the Unity engine
 2. The game shall support VR controls
 3. The game shall support a mouse and keyboard
 4. The game shall work on the browser
 5. The game shall have an average of 30 frames per second while playing on the recommended hardware
 6. The game shall not crash
 7. The game shall have first person view
 8. The player shall walk around
 9. The player shall not encounter any obstacles, enemies or puzzle
 10. The game shall have 10 unique animals with 3D models and spatial sounds
 11. The game shall have 5 unique buildings with 3D explorable interior
 12. the buildings shall have information about their purpose
 13. The town shall have multiple paths to reach every key location
 14. the game shall have folk background music
 15. the game shall have sound effects for the objects
 16. the game shall have realistic history
 17. the game shall have a map
 - **Desirable**
 1. The game should have a Windows version
 2. The game should have a Mac version
 3. The game should have max 60 frames per second while on the recommended hardware
 4. The player should be able to interact with the objects
 5. The game should have 15 unique animals with 3D models and spatial sounds
 6. The game should have 10 unique buildings with 3D explorable interior

7. The town should have people with stories about their daily lives
8. The game should have a remappable control scheme
9. The game should put a tick on the map for the locations already explored
10. The browser site should look unique
11. The game should implement a linear path option in accessibility settings
12. The game should have a narrator option in the accessibility settings
13. The game should have audio queues that call the player to the key locations in accessibility settings
14. The game should have a "press buttons to activate the sound effect" option in the accessibility settings
15. The game should have a colourblind option in the accessibility settings

- **Implementation**

- **Introduction to the scene**

The scene consists of a medieval Poland-Lithuania village with realistic history and animals. The player can walk around the scene, explore the interior of the buildings, listen to animal sounds, and enjoy the nature on browser without downloading any files. This part of the report will discuss Project Planning, some technical aspects of the project, did the project satisfy the requirements, how to improve it and a summary to wrap everything up.

- **Project Planning**

The project has been started by creating a VR project on Unity and putting it into a GitHub repository to have version control so I wouldn't lose my data because of hardware issues. Then once I finished setting up GitHub, I created a project table there to keep track of my progress in the scene. For the last part, I started looking for licence-free assets and sounds for the project. I found Poly Haven for the textures and Sketchfab for my assets and Freesound for licence-free audio samples. Although when I thought I was done with project planning later I realised my project was getting bigger and GitHub only had 100 MB available space for each project. So as a solution, I had to migrate my project to One Drive and Trello.

- **Blueprint of the scene**

As discussed in the chapters before a map of medieval a village in the Poland-Lithuania Commonwealth has been decided for the scene. As my reference point villages and buildings in an official Polish government website have been used to have realistic history in my scene. And with inspiration from the website, the blueprint of the scene has been drawn. I have drawn a straight road like the road leads to a big city and this is the entrance.

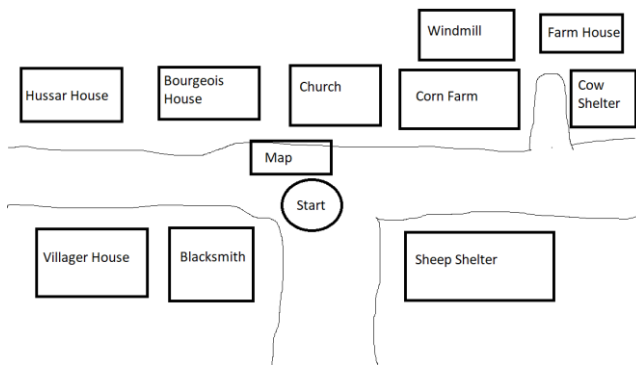


Figure 7: Map Draft



Figure 8: Polish House

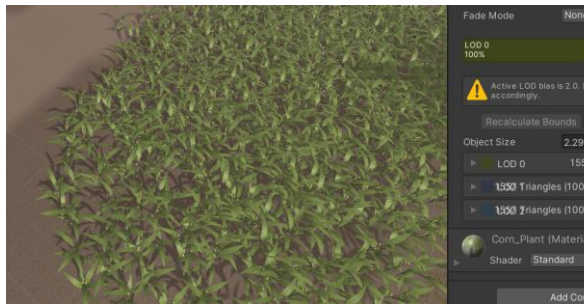


Figure 9: Crops



Figure 10: Terrain

The development of the scene started by creating a terrain then using terrain tools to sculpt the ground then I applied textures to it. Finally put trees and grass into the scene. But when I put the corn farm into the scene the crops were disappearing because of LOD (Level Of Detail) and they had purple textures so I overcame this problem by adjusting the LOD of the object and adding standard shaders to them. Finally, my terrain was complete, and I was ready to model the buildings.

Figure 10: Blacksmith



Before the modelling started, ProBuilder and ProGrid plugins were installed. As mentioned in the previous chapter, Cinema 4D has been decided for the modelling part but since the game will be on the browser and resources are limited, changing to ProBuilder for modelling has been decided. Their differences will be covered in detail in later chapters.

Blacksmith and a House are Built with Pro Builder. The most used tools were extrude and loop cut for the design of the house. For the measurement system, ProBuilder's default textures were used which is 1 meter per tile. To finish my design, I put license-free textures I found online and free furniture assets from the asset store. Some buildings such as the bourgeoisie house and sheep shelter in the village are downloaded from the internet but that's when I discovered there is serious work to bring historical items and buildings to the virtual environment and make them licence free to use. And as for the final touch animals have been added and put around the map.



Figure 11: Villager House



Figure 12: Bourgouse House

○ Movement

Keyboard Movement is handled by “Starter Assets – FPS Controller” found on the Unity asset store. This movement asset satisfies the basic need of a project like mine and is one of the things required to kickstart projects for fast prototyping. It gets inputs with Event Handler from Keyboard like walking around, jumping and interacting with the objects. And gets camera controls with Cinemachine from the mouse. Furthermore, it's customisable for new scripts and controls for every genre.

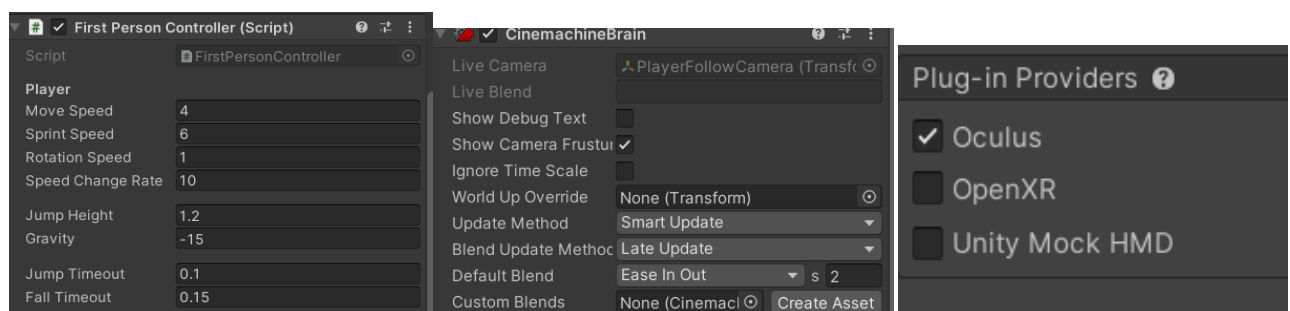


Figure 13: Unity Settings

Just like Keyboard Movement, VR movement has its controller on the asset store as well furthermore plugins to export it to WebGL with a playable condition, All scripts are handled by “WebXR manager” and that’s all a developer needs to know. Although the developer must activate Oculus and OpenXR from settings for VR to work. It has a built-in interaction system and movement system so players only need to plug in their headset and use it without additional work

○ Sound

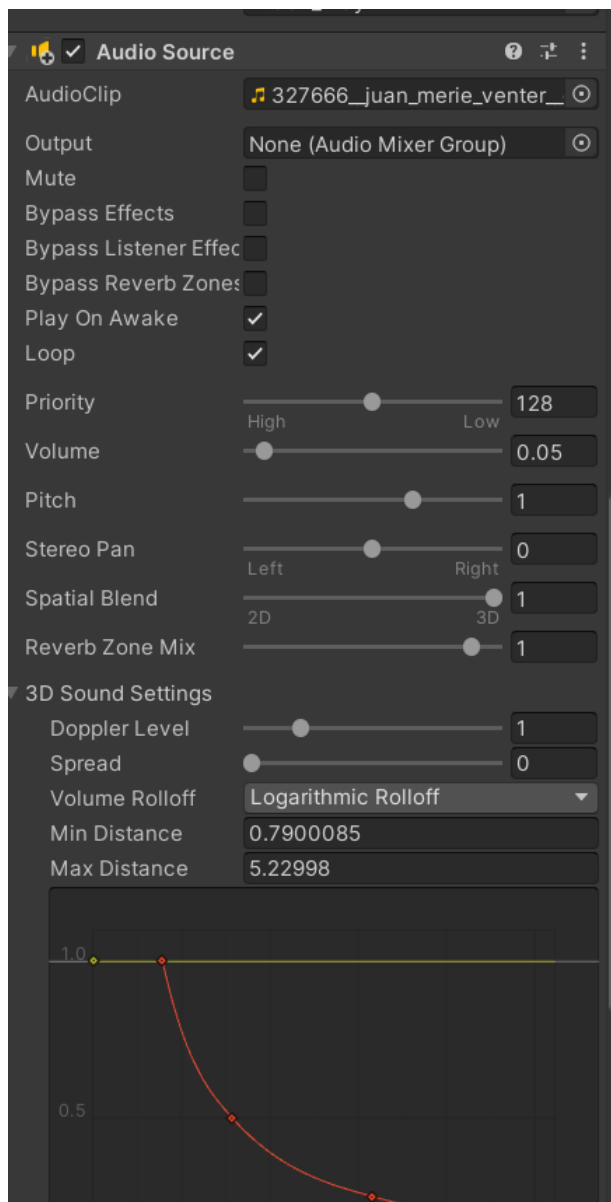


Figure 14: Audio Settings

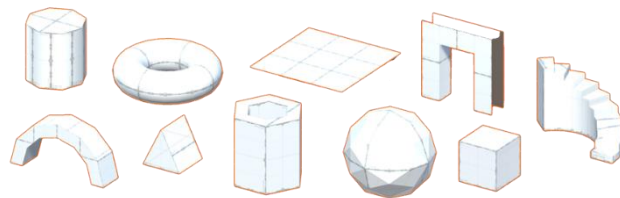
Audio in Unity is handled by Audio sources and there are different ways to manipulate the sound such as increasing its pitch, making it 3D, and adjusting the minimum distance and maximum distance it would be heard. As mentioned in the previous chapter Reason 11 Lite was going to be used for Audio mixing and producing but Unity gives a satisfactory amount of manipulation techniques to the audio sources furthermore the developers can write scripts to expand upon them, so using Reason 11 Lite was scrapped. The audio was put into the animals by drag and drop then to make it sound realistic 3D sound has been activated and the distance it would is adjusted.



Figure 15: Min-Max Distance

- **ProBuilder vs Cinema 4D**

ProBuilder is one of the most well-known modelling tools for Unity. It offers to create mesh creation such as cubes, cylinders, arch, stairs etc. furthermore manipulating their vertices with extrude, bevel and loop cut. This powerful tool also helps customise materials and make them look realistic but the thing it lacks is that the models it creates allow a cube-like look and details and can't be added so this plugin can only be used for fast prototyping and for games that require not much resources. Although the models can be exported into modelling software to include details later. Because Cinema 4D models would be resourceful for a browser to run ProBuilder models have been used in my game.



- **Importing the project to WebGL**

Before The development of the project started the Virtual Reality (VR) template has chosen which provides VR plugins and controllers. Unity has advanced compiling and building systems for projects which can change platforms such as Windows, Mac, and Android smoothly and without crashing. Although the project was going fine according to the plan later, I found that Mozilla's WebVR controller assets were giving me compiling errors and when I looked for the reason for the errors, I found that despite the VR template's purpose was to provide basics for VR development environment it was much easier and better to avoid errors. As a solution, I had to change my template to a 3D environment and VR controls manually. Then finally I changed the building platform to WebGL to finalise the development of the platform, but when I did that all my graphics settings were gone. After I investigated it, I found that WebGL was only allowing Gamma colour space instead of linear. To finalise my project, I put it onto University servers and it was ready to play on the browser.

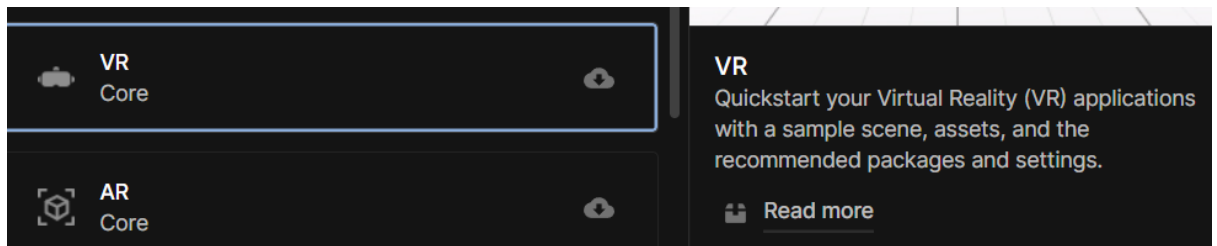


Figure 16: VR template

- **Requirements Review**

The following tables demonstrate requirements that are met, partly met or not met for the development of the game.

Example	
The Requirement is Successful	Note
The Requirement is partly successful	Note
The Requirement is not met	Note

Mandatory Requirements	Note
The game shall be developed on Unity Engine	The game is developed on Unity 2021.3.18f1
The game shall support VR controls	The VR version has been added but due to the lack of a headset testing couldn't be done
The game shall support mouse and keyboard	The Game works perfectly on the mouse and keyboard
The game shall work on the browser	The Game works perfectly on Mozilla and Chrome
The game shall have an average of 30 fps on the recommended hardware	The game's browser version has of 25 fps average but is still playable
The game shall not crash	The game works perfectly without crashing
The game shall have first person view	The game has first person view

The player shall walk around	The player can walk around and run
The player shall not encounter any obstacles, enemies or puzzle	The player can experience the walking simulator without any game mechanics
The game shall have 10 unique animals with 3D models and spatial sounds	The game has dog, bear, rabbits, pigeon, robin, chicken, cow, cat, horse, sheep
The game shall have 5 unique buildings with 3D explorable interior	The game has an explorable villager house, hussar house, bourgeoisie house, farmhouse, sheep shelter, cow shelter
The buildings shall have information about their purposes	The game has text next to every building explaining its purpose
The town shall have multiple paths to reach every key location	The game takes place on a single road and player can visit them after walking in the forest
The game shall have a folk music background	The game has folk music in the hussar house instead of attached to the player because the music surpasses the animal voices
The game shall have realistic history	The game has a realistic history with realistic assets
The game shall have a map	The game has a map of the scene in front of the church
The game shall have sound effects for the objects	

Desirables	
The game should have a Windows version	The game works on Windows
The game should have a Mac version	The game has a Mac version but isn't tested
The game should have 60 frames per second on the recommended hardware	
The player should be able to interact with the objects	

The game should have 15 unique animals with 3D models and spatial sound	
The game should have 10 unique buildings with 3D explorable interior	
The town should have people with stories about their daily lives	
The game should have remappable control schemes	
The game should put a tick on the map for the locations already explored	
The browser site should look unique	
The game should implement a linear path option in accessibility settings	
The game should have a “press button to activate the sound effect” option in the accessibility setting	
The game should have a colourblind option in the accessibility settings	
The game should have audio queues that call players to the key locations in the accessibility settings	

- **Conclusion**

This report whether how VR can be used for educational purposes and ways to make it more accessible for an average user has examined. Throughout my research, I found out there are already lots of projects in this field such as Virtual Museums, walking simulators furthermore and many other projects from official museums to bring historic artefacts to 3D environments and all of them are licence-free and open for non-commercial use.

To bring my historical village to life Unity engine has chosen. Unity is a powerful engine for offering such different tools for sound mixing and modelling for fast development, but throughout the development of the project I found that VR development tools were not compatible with VR controls, and it was recommended to start from scratch furthermore importing VR projects to WebGL is not supported without external plugins and assets. So, in its current state VR template for Unity is not recommended for development.

Overall, the project achieved the objectives and completed mandatory requirements and it is fully playable on the browser by users, although due to time limitations desirable requirements are not completed. The project and the environment also stayed true to real history and achieved their purpose to be educational and immersive. In my final thought Experiencing VR on the web is still in its early stages but with time and development, hopefully soon it will be achievable by everyday devices.

- **Links**

<https://users.sussex.ac.uk/dh374/Soundscape/index.html> - Mouse and Keyboard

<https://users.sussex.ac.uk/dh374/Soundscape-VR/index.html> - VR

Project Plan

- Gantt Chart

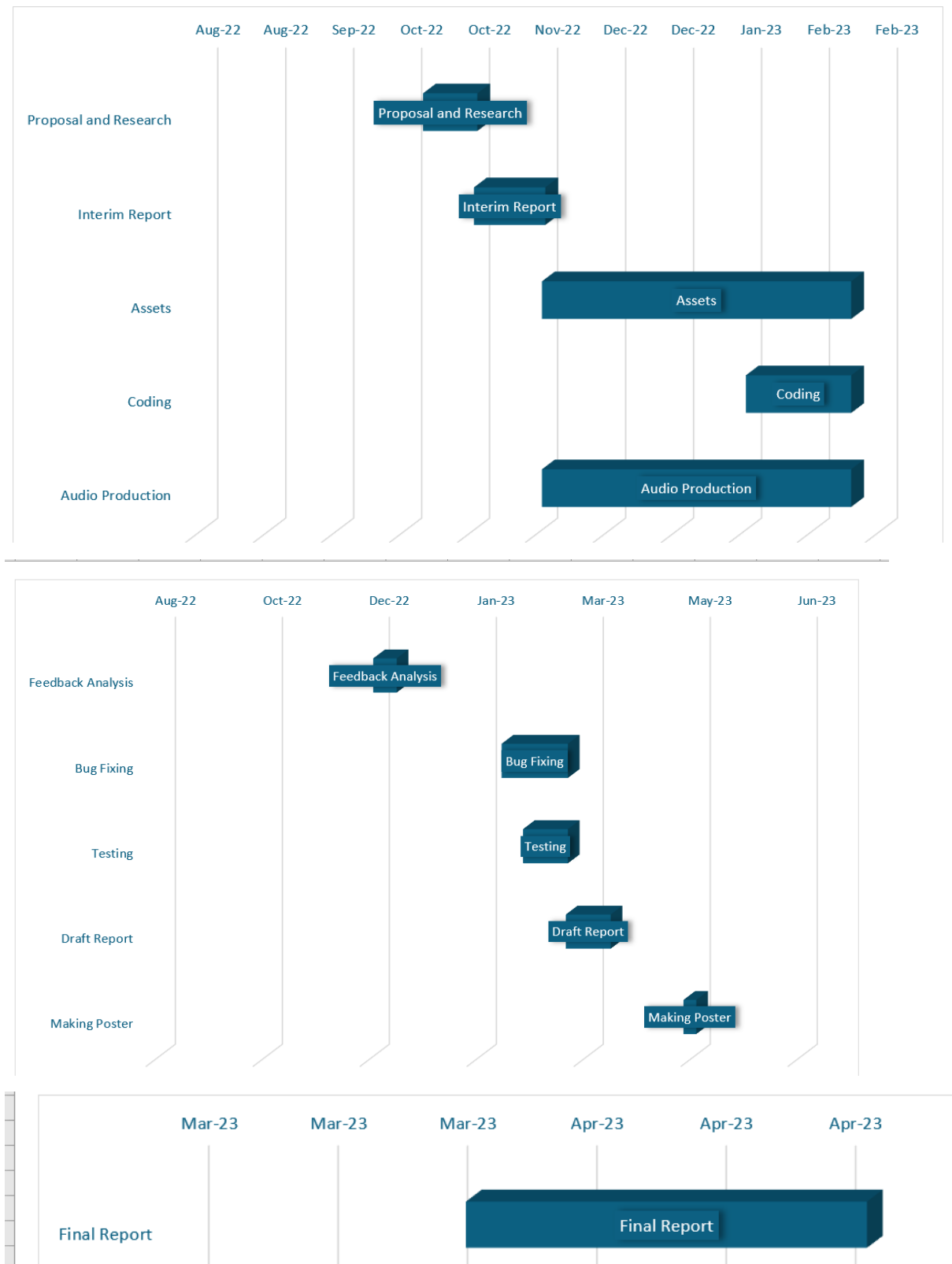


Figure 7: Gant Chart

Referenced Games

Title, Developer, Publisher, Year

Metal Gear Solid, Konami, Konami, 1998

Stardew Valley, ConcernedApe, ConcernedApe, 2016

Persona 5, Atlus, Atlus, 2016

The Beginner's Guide, Everything Unlimited, Everything Unlimited, 2015

Super Mario Bros., Nintendo, Nintendo, 1985

Kid A Mnesia, Arbitrarily Good Productions, Epic Games, 2021

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Appendices

221849

Dr Gianluca Memoli

Virtual Soundscape

Aims

The project aims to create a virtual reality environment that uses spatial sound to enhance immersivity and to make it easily accessible from other platforms.

Primary Objectives

- Research on the effects of using spatial sound in a VR environment
- Examine what makes a VR environment graphically immersive
- Decide which 3D modelling tool will be used to create objects and the environment
- Decide which Digital Audio Workstation (DAW) will be used for sound design
- Decide which game engine will be used
- Inspect how a virtual reality environment that inherits sounds can be developed in a game engine
- Explore how to export the project to the browser and make it playable

Extension Objectives

- Making the objects interactable
- Writing a story to make the player feel emotionally connected
- Creating a website to run the game and improve the presentation
- Make a desktop version

Relevance

Because of growing interest in VR-related technologies, (Metaverse, HTC Vive, Playstation VR) need for developers that are knowledgeable about Virtual Reality has

immersed. Though the technology is still in its early stages, soon it might have a similar boom as smartphones when it becomes affordable, lighter, have more developers and more content. As the demand rises, an average developer for social media, games or smartphones might have to consider the VR platform for their products. thus at least a basic knowledge about this new technology is a must to learn.

The course I am taking is hard to put in a few words as all modules are different and diverse from one another and values creativity so this project is the perfect opportunity to demonstrate the skills I have learned such as 3D modelling and programming throughout my studies, meanwhile still learning new hardware technology and new ways express my creative ideas by focusing on the sound, furthermore still keeping it on a technical level and still staying relevant to the current and far ahead technology.

Resources Required

- Professional Headphones – to test spatial sound
- VR headset
- Game Engine
- 3D modelling tool
- Digital Audio Workstation

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Timetable

	Mon	Tue	Wed	Thur	Fri	Sat	Sun
09:00	Human Computer Interaction	Work	Work	Individual Study	Work		
10:00							Individual Study
11:00	Individual Study						
12:00							
13:00				Visual Effects			
14:00	Programming For 3D			Visual Effects	Programming for 3D		
15:00							
16:00							
17:00							
18:00							
19:00				Human Computer Interaction			
	Lectures						
	Labs						
	Work						
	Individual Study						

Interim Log

13/10/2022

Talked about the scope of the project and established the priorities

17/11/2022

Talked about the outline of the interim report