

VR Depression Experience



PROFESSORSHIP ETHICS & TECHNOLOGY
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PREFACE

This thesis covers the design process of the “Kijk met mijn ogen” VR experience. This project is an ongoing project done by the Saxion lectorate of Ethics & Technology in collaboration with Ziekenhuis Groep Twente. The project started in February and is still ongoing. This document is the process of 5 months of work that started in February 2023 till June 2023.

I am a fourth year Creative Media & Game technology student that follows the design track of this study. I focus myself on serious game development within this study. So, this project is a perfect fit for me. I got introduced to this project by Afra Willems via Hester van der Ent. The freedom of the lectorate and the topics that they explored matched with my interests of serious gaming. The project is about depression and this is something I have great interest in. After the first meeting with the lectorate this topic was mentioned, but not set yet that I would be working on this project. After a few days it became clear that this was the project I would be working on with Eva Grootsholten who is a 3D artist. For a long time, I didn't know someone who took their life because of depression until I did a few years ago. So, this project is of great importance to me.

Now comes the part where I would like to thank the people in the study that helped me through it all. First of all, my first study coach Leontine Kamphuis who always had time to listen to my thoughts. Thank you Hans Wichman for coaching from year two and through the pandemic and all the other years. Thank you Egbert Siebrand and Anne Bonvanie for the coaching from the lectorate. Thank you to the lectorate for this opportunity and great project to work on.

Finally, thank you Hester van der Ent for the great coaching through this graduation semester. Your guidance has been great and your feedback was fantastic to help me through this period.

Max Manenschijn
Enschede
18th of June 2023

ABSTRACT

This document shows the research and development that has gone into making an immersive VR experience. It shows what it is like to live with depression and how the simplest tasks become a whole workout. The game takes place in a normal house, where the player wakes up from their sleep and must leave the house. The depression is visualised with visual effects to make the depression more visible. Using VR technology, this game aims to create a relatable medium for depressed and non-depressed people. With this experience the hopes are that empathy towards these people is increased. This is needed as people close to these depressed patients can help with the treatment of said patients. With VR you can immerse the player better and show them what it is like to live with this mental disease. It is not the goal to make this game fun or entertaining, but rather informative.

The main problem statement is as followed: The current stigma around chronic depressed people is they do not have a lot of empathy from their surroundings. This is vital towards their recovery as they are the closest people to them. In order to gain empathy a VR experience will be created. Within this experience they can make the choices of depressed people to look through their eyes.

With this in mind the main research question was formed into: How to audio visually display a daily routine of depressed people to close friends, with a VR experience to enable them to empathise.

This research question is sub divided into the following sub questions:

1. How to make an immersive VR experience that accurately portrays depression?
2. What types of serious games and other media are present in the field of mental illness and how is depression displayed?
3. What kind of design works best for a VR experience with due regard for motion sickness and other VR side effects?

These research questions will be answered in this document with research combining of surveys and field research. The last sub question is answered with field and desk research in combination with the prototype.

The results of the testing were positive and the play testers understood that this experience was about depression. The visuals, audio and general mood conveyed depression so that answers the research question. With more time this prototype could be turned into a true experience about depression and what it is like to have depression with a full day.

Other mediums could have been better explored. In hindsight VR is already fun to be in, so a serious topic like depression could become fun in VR as two play testers found this to be the case.

Keywords: Depression, Virtual Reality, Experience, Empathy.

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0. INDEX OF WORDS

Full word	Abbreviation
Electro Convulsive Therapy (Shock Therapy)	ECT
Virtual Reality	VR
Ziekenhuis Groep Twente	ZGT

1. INTRODUCTION

1.1. THE PROJECT

The project “Kijk met mijn ogen” has been set up by the lectorate Saxion Ethics & Technology in collaboration with “Ziekenhuis Groep Twente” ZGT (ZGT, N.a.) in short. Within this project there is a developer and an artist as the two lead developers. The core of this project is to gain more empathy towards chronic depressed people. This project wants to show how big the challenges are for chronic depressed people in their day-to-day life. The client assumes this is helpful towards the friends and family of these depressed people as they can help with different treatments that most of the time are not explored. The loved ones from depressed people can help with the treatment process as they now know what chronic depression feels like.

This project has a secondary goal that aims to alter the bad reputation [ECT](#) has as one of the treatment options for chronic depression. ECT has this bad reputation as it is known as shock therapy. In many movies and series this is then portrayed as bad or lifechanging. In fact, it is lifechanging as, 50-65% of the patients using ECT are cured or have a significant drop in their depression that with therapy they can continue getting better (Bonvanie, 2023). This source is used to cite and introduce the relevant parties involved with this project. This secondary goal is not part of this project, but it is one of the main drivers for this VR experience. The VR experience helps with gaining empathy about depression and shows the struggles of these people. The intended result is to then trigger help for loved ones in the search of different medical procedures.

Our VR experience will be used by loved ones of depressed people to help understand what a depressed person goes through daily. This is done by the request of the ZGT in Almelo. Depressed people sometimes stop with their treatment abruptly while there are still treatment options out there. This is where the loved ones come in and help with the treatment.

1.2. THE CLIENTS

The clients for this project are the ZGT and the lectorate Ethics & Technology from Saxion. The professorship has been contacted by the ZGT psychiatry department to help gather information about chronic depression and what people know about depression. To target a large group, the professorship applied for Innofest (Innofest, N.a.). Sadly, our request has been denied by Innofest. Innofest denied the request for a subsidy, because this project does not fit the theme of Innofest. This project Innofest is an organisation that helps start-ups reach more people to test quicker and more efficient. Teams have to pitch their idea and then receive subsidy to further develop their idea. This subsidy was going to be used for this project to develop the idea, rent VR headsets, hire the team of developer after this project is done to develop this idea further.

The Ethics & Technology professorship is a research group within Saxion. They provide Saxion wide ethics reflection. In line with the spearhead living technology the focus lies on the impact of technology on humans, society and the environment. They work on ethical questions from practice in all domains and work fields. They profile themselves with the following questions: 1) Ethics and Technology in the healthcare sector, 2) Impact of smart technology, 3) circular economy. (Saxion, N.a.)

They have about thirteen people working for them which range from full time lecturers to parttime researchers. They have theme/guest teachers working for them as well. Their primary office is based in Saxion Deventer where they have a room to work and collaborate. Most of the time all the members of this research group are split everywhere.

2 PROJECT DESCRIPTION

2.1 THE END-USER

The end user of this product can be split between two groups of end users. The first group of end users are the target group, which are the friends and family of chronic depressed people. They are important to gain empathy with as they are close to these people. Most of the time they are still the only ones that really have an impact on the life of these people.

The second group of end users are the medical professionals working with mental illness together with the ZGT. The ZGT wants to use this VR experience to help gain empathy from loved ones. As this VR experience will be developed for loved ones and not depressed people the feeling must be accurate. We used a questionnaire to help with gathering data to make it feel authentic. These medical professionals can use this software to help with their treatment, but this is not a replacement or a primary treatment. This VR experience is part of the project called: “Kijk met mijn ogen” this is Dutch for: “Look with my eyes” a fitting name for a VR experience.

This project called “Kijk met mijn ogen” is a collaboration between the lectorate Ethics & Technology and the ZGT in Almelo, more specifically the PAAZ (Psychiatrische Afdeling Algemeen Ziekenhuis) department of the ZGT. This project is the main effort to change the stigma of depression. This VR experience would have been used at festivals to gather opinions of people about ECT.

This VR experience will become a part of the Ethics Lab in Saxion Deventer. This is a room that is currently being developed by the lectorate Ethics & Technology to showcase various ethical questions and solutions. The lectorate will continue with this project in house and store it in the Ethics Lab.

2.2 END GOAL

The current end goal is to make an experience to showcase what depression is like for people who do not have depression and have never experienced this. They will then see what it is like to live with depression. The team still must do research to make this fit and make this product feel authentic. The team needs to make this feel authentic to keep the feeling accurate, but not over the top with depression. The experience will incorporate a morning routine that will take the player from waking up to getting out of the house. This was chosen because it is more relatable to everyone as everyone has a morning routine. This decision will be justified later in the document. There are various tasks that will need to be completed, which seem normal to most of us but can be extremely hard for depressed people. More on this in the ideate phase.

3. EMPATHIZING

This document will follow the Design thinking process. This is a fluid way of making a project and helps develop software in a more efficient way. Design thinking helps solve complex problems that are not well defined, like this experience as the development team has a lot of freedom. It follows five steps: Empathize; Define; Ideate; Prototype; Test; In the Empathize phase you research the user needs. You assume a lot which you can verify in the Define phase. Which brings it to the next phase: Define. In this phase you state the user’s needs and define the project. In the ideate phase, you verify these assumptions and create ideas for your solution. In the prototype phase you build a prototype or many with different solutions. The final phase is testing where you verify your solution and get feedback. Within these steps you can always go back a step or multiple (Dam, 2022).

3.1 MARKET

The current VR market is expansive with many upcoming VR experiences becoming more available in every city. Not only are they now treated like actual game worlds and experiences within arcade game buildings, but they are also more integrated within museums.

VR games and experiences over the last few years are not bound to just personal use but have moved towards a broader application. They have been slowly introduced in museums, healthcare training, mental health therapy, education and many more (Thompson, 2022). VR trainers are applied in various industries from employee training to exposure therapy for example in the automotive industry, factory assembly and healthcare to train staff and treat traumas more effective (Vrowl, N.a.). The healthcare industry has had a special interest in VR as training staff with VR leads to better symptom diagnosis. VR also provides both patient and the healthcare professional with a safe space to practice without risk of failure. (Solutelabs, 2022) The possibilities are endless with VR, as this industry is rapidly expanding with new ways to apply VR for these purposes. VR has shown that what you are teaching becomes more effective while wearing a VR headset (Nguyen, 2018).

3.2 INDUSTRY STANDARDS

The industry standard now is that most of these VR experiences are made for someone to learn about a topic in history or they are used purely as treatment of phobias and not treating depression (GGZ Delftland, 2020). Take the Anne Frank VR experience for example. When wearing the headset, you will be transported into Anne Frank's room. You can interact with objects in the world and her room to learn more about who she was. This is a very good inspiration source for a mental health game, as the developers can take hint and feature ideas from this experience. (Anne Frank Huis, 2019).

Currently the GGZ in the region Delftland uses VR for treating depression (GGZ Delftland, 2020). They use this as exposure therapy which is something that is up and coming in the recent years (UMCG, N.a.) (Baghaei, et al., 2021). Exposure therapy is not something new, but using VR exposure therapy is an exciting up and coming technology. In the previous mentioned source, they call this technology: VRET (Virtual reality exposure therapy). The authors of this document researched and investigated the use of VR technologies to help support the treatment of depression and anxiety. Currently the development team does not want to use this experience as treatment, but the parallel could be drawn between these as not yet diagnosed people with depression could feel understood. They could then seek help from a mental health professional.

3.3 TRENDS

VR experiences are showing up in all sorts of places. From museums to full on game halls where the player can play FPS games or puzzle games with friends and family (VR4Play, N.a.) to now use VR technology to transport the player into the mind of a depressed person is something new. Although, some GGZ offices and psychology offices are offering VR treatment (GGZ Delftland, 2020). This has to do with symptom relieve rather than an experience. This new innovative experience could be useful towards future mental health awareness.

There are of course game that portray mental health in all sorts of way. A group of researchers wrote a paper about analysing different serious games and their promising directions for mental health. (Flemming, et al., 2017). This article is from 2017, but still has relevance as they talk about the direction of the current technology. Their findings are not far off according to these articles (Solutelabs, 2022) (Thompson, 2022). Currently we are in the great development race to get this technology going in the treatment process.

3.4 END USERS

The current end users of this piece of software are friends and family of chronic depressed people. They are targeted as we want them to have a better understanding of this mental illness. These people are the closest people to them and can help with medication and or the treatment process. To have them and give them a better understanding can save lives or cure these depressed people. (Bonvanie, 2023)

The other group of end users the team targets with this solution is the ZGT psychiatrist and the professorship. They want to gather data on people's opinion on the use of Electro Convulsion Therapy (ECT). This is done

within the game and with a questionnaire afterwards. The team wants this game to be as accurate as possible. This means sending out a questionnaire to our target audience and interviewing the experts from ZGT. As of writing this document the latter has been done. The team spoke with Doctor Andre van der Ende at the ZGT Psychiatry department. He gave the developers great insight in what the treatment process is and how he typically treats patients (Ende, 2023). He gave further insights in the life of a chronic depressed person. Most depressed people he talks to experience a lot of anxieties and have no energy left, they do not enjoy life anymore. Dr Andre also spoke about that most people think in catastrophes, and everything fails to make sense. They are living a non-productive life. He talked about all sorts of variations in depression, but for this experience the team decided to take the middle and most common depression. He continued to describe the several types of depressions which validated the team's preliminary research. This will be great for the development process as the team will be able to make a representable depressed experience by gathering this data. A full transcript with all the insight can be found in the [Appendix A6](#).

In the further paragraphs the design process will be explained in detail. Different concepts will explain in detail and how the team concluded choosing this concept.

3.5 EMPATHY MAP & QUESTIONNAIRE

To further understand the end user, it is customary to make an Empathy map. This map helps with visually putting in the assumptions about the target group. This empathy map has been made with the sources that were gathered during this phase and the pre-set-up phase. The empathy map can be found here and in the [Appendix A4](#). The sources used to fill out this Empathy map canvas are as following: (Zoë Birse, 2018) (Schilling, 2018) (Levinson, 2022) (Soccer, 2018) (Week, 2019)

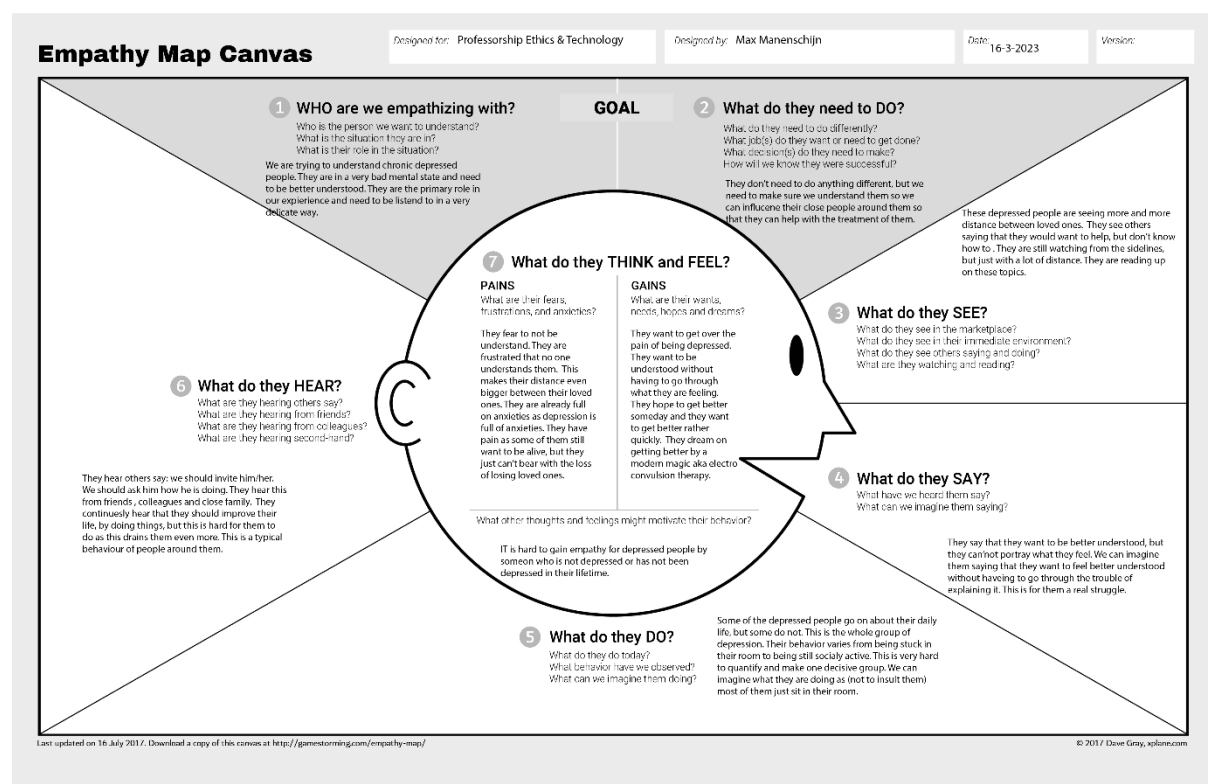


Figure 1 - Empathy canvas map

The next step was to make a questionnaire and send this out to depressed people. To find the right people the team at first wanted to share it in as many online sources as possible. This might result in getting a lot of

answers and this will result in an overload of answers. The best result for this topic is qualitative instead of quantitative answers. The more answers the questionnaire gets the more answers are similar. Most depressed people have the same symptoms and only a small amount of people have completely different symptoms. The team had discussed this internally to go for an average depression. After some discussion, two Discord servers were selected. A lot of students are suffering from depression, so because of that reason school discord servers were selected (Hoger onderwijs moet werk maken van mentale gezondheid studenten, 2022). These servers have a great amount of the target audience in them and would suffice for the right number of results. The Discord servers are the study's 'unofficial official' as they called it and the Study Association XP. These have about 1000+ members and are therefore enough for a good questionnaire sample.

The questionnaire has six questions and none of them are required to be filled out. This questionnaire is fully anonymous, and it only asks for your age between certain years. Link can be found here [Appendix A3](#). It is already a big ask to ask a depressed person to fill out a questionnaire as this requires effort. This might sound weird to other people, but it is the truth for depressed people. (Mayo Clinic, 2022) The questions are aimed at how a morning routine goes for a depressed person as this was chosen by the client. These questions are as following:

- Getting an analogy about depression.
- What a normal morning routine looks like for them.
- How they push them self to go out of the door.
- And to verify the teams results: what piece of media makes them feel understood.

The team included a brief explanation in the description of the questionnaire that, if they do not feel comfortable with any of the questions they can stop at any time. Every answer the team gets is a great thing and would help the team verify their assumptions and research. The questionnaire will result in some new insights as well as we are asking depressed people and every depressed person experience depression different. At first the team did not want to include the age question, but the lectorate wanted this to be included for their own research into the target audience and ages that experience depression.

There is one question in the questionnaire that asked them if they use medication. The questionnaire got 11 responses. The conclusions the team took can be found [here](#). This is done so that the team knows why this question might differ a lot from the median of questions. People on anti-depressants could see the world different and almost back to normal. This is still helpful data as the team can see the effects on depression with this medication.

3.6 CONSLUSION OF THE EMPATHY PHASE

To conclude the empathy phase and continue to work into the next phase, the main problem that depressed people experience is lack of empathy and understanding of them. Most things they hear is to just go outside, just talk to some people, just get up and do something. This is not the way to talk to depressed people. Even though some of the advice is good, but is just worded wrong. This is exactly what the experience about depression can change. That is where the problem statement in the next chapter comes in. This problem statement describes the current problem the team is trying to solve.

4. DEFINE

4.1 PROBLEM STATEMENT

The current stigma around chronic depressed people is they do not have a lot of empathy from their surroundings. This is vital towards their recovery as they are the closest people to them. In order to gain

empathy a VR experience will be created. Within this experience they can make the choices of depressed people to look through their eyes.

4.1.1 INDICATORS OF SUCCESS

The indicators of success are as following:

1. When the player after the experience can explain what depression is about.
2. If they understand what depression is and how to live with it.
3. If they are likely to reach out to their friends after this experience.

4.2 MAIN RESEARCH QUESTION

How to audio visually display a daily routine of depressed people to close friends, with a VR experience to enable them to empathise.

4.3 SUB QUESTIONS

1. How to make an immersive VR experience that accurately portrays depression?
2. What types of serious games and other media are present in the field of mental illness and how is depression displayed?
3. What kind of design works best for a VR experience with due regard for motion sickness and other VR side effects?

4.4 SCOPE

4.4.1 DELIVERABLE

The end deliverable will be a playable five-to-ten-minute VR experience to gain empathy for chronic depressed people.

4.4.2 INCLUSION

The VR experience will have a 3D world with interactable objects, a depression visualized in the form of a monster, short inner monologue.

4.4.3 EXCLUSIONS

This game will not be longer than maximum 5 to 10 minutes. This game will be made by two developers and cannot be bigger than this.

4.4.4 ASSUMPTIONS

The core target audience is between 18 and 40. They know how to play video games so minimal explanation is needed.

4.4.5 CONSTRAINTS

As this project must be completed within 5 months and is created by two developers, the project will be made as is described within this document. The developers have consulted with the professorship and agreed on it from both sides.

5 RESEARCH METHODS

In the figure below you can find the research methods used for every sub question.

1. How to make an immersive VR experience that accurately portrays depression?	
<i>Approach (how)</i>	The approach to this research question is to do desk research looking through sources online and watching videos about depression. There will also be a questionnaire made to gather data. There will also be some research done into immersive VR games.
<i>Data type (what)</i>	Qualitative through online sources and questionnaire data.
<i>Data source (what)</i>	The questionnaire data will be analyzed and stored, together with the desk research, this was combined in order to verify both data points.
<i>Data relevance (why)</i>	This data is of great relevance to the team as they want to make this game feel understood by depressed people and not done over the top with emotions that are not accurate.
2. What types of serious games and other media are present in the field of mental illness and how is depression displayed?	
<i>Approach (how)</i>	The approach to this research question is to do desk research looking through sources online and watching videos about depression.
<i>Data type (what)</i>	Qualitative through online sources.
<i>Data source (what)</i>	Desk research will be written down to get a good understanding on how other games and media have done this in their respective medium.
<i>Data relevance (why)</i>	This data is of great relevance to the team as mental health games and medium are a sensitive topic and needs to be done carefully.
3. What kind of design works best for a VR experience with due regard for motion sickness and other VR side effects?	
<i>Approach (how)</i>	The approach to this research question is to do desk research looking through sources online. After this is done the theory that has been researched was applied in the VR experience.
<i>Data type (what)</i>	Qualitative data through online sources and qualitative data with actual field testing the prototype.
<i>Data source (what)</i>	Desk research was written down to get a good understanding on the theory of limited motion sickness in games and questions asked when playtesting.
<i>Data relevance (why)</i>	The team needs to make sure that the VR experience does not trigger motion sickness to the players. This game needs to be played by a big target audience so that is why this research question is important.

Figure 2 - Research methods

6 IDEATE

6.1 SOLUTIONS

During this phase of the project, the development team produced several concepts and different ideas on how to implement this topic into a serious game/experience. In the beginning a mood board was created to empathize and produce different ideas. The team discussed this at every interval with the stakeholders to get their opinion and verify that their concept is still met. During the first meetings the team showed this mind map to give them ideas for different solutions:

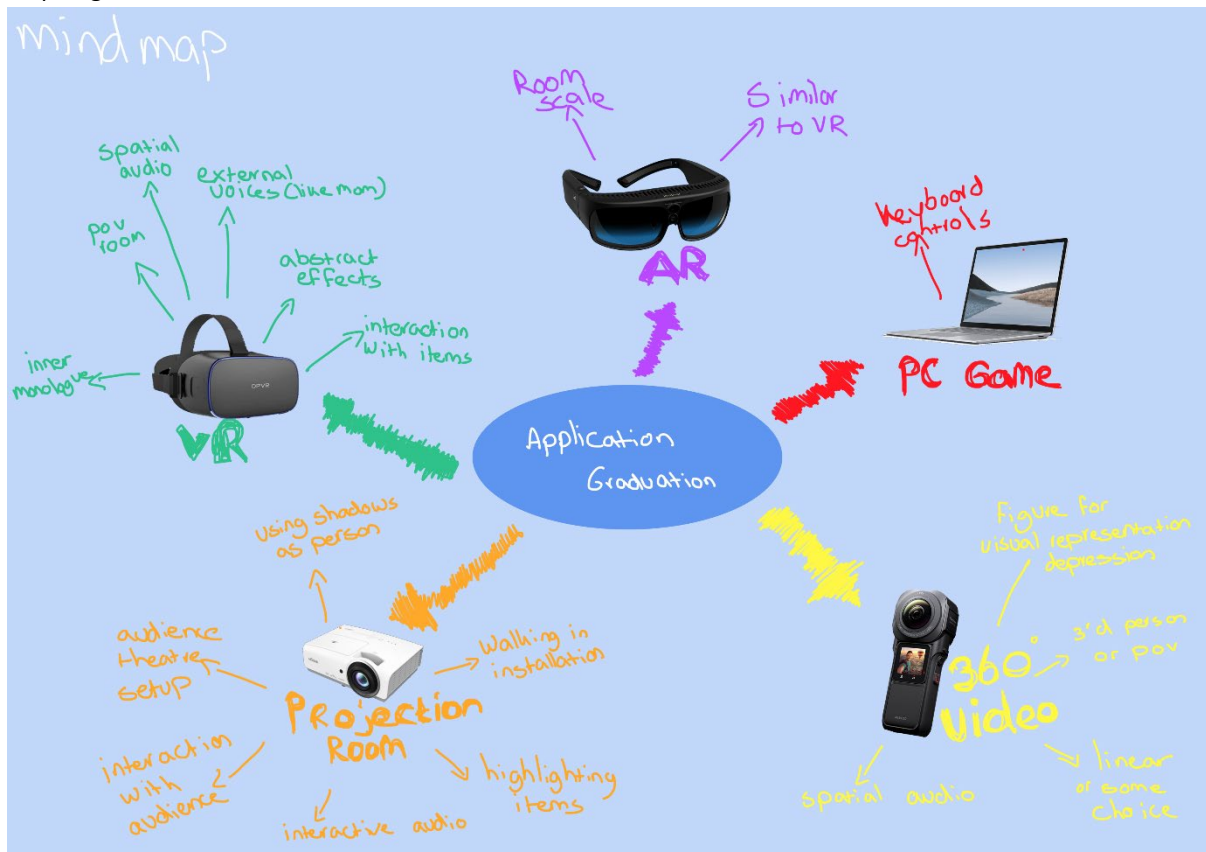


Figure 3 - Mind Map

In the end the professorship was set on making a VR game as this is the most immersive option out there. The team came up with two final game concepts which in turn were pitched to the professorship. The team pitched these concepts to the professorship together with the SWOT analysis made in the next paragraph.

6.1.1 SWOT ANALYSIS

After the mind map was created the team made five SWOT analysis to gain an idea of what could be the strengths and weakness of these solutions.

Solution 1: A video game

A game (preferably on pc) that takes you through a depressed persons' day. You will hear their inner thoughts and control their actions. The game takes place in the depressed person's house. You wake up in their bed and from there on you can pick your own interactions or where you go.

Video Game	
Strengths	Weaknesses
Very accessible, most people have a PC. You don't need external hardware to work with this game. Intuitive as most of the target audience is young, so they have played a game in their life, so they know what to do. You have more of a chance to do interaction as you have a lot of buttons. More personalized options, as it's intractable.	Not very immersive and blends with other games as this has done before. We need to stand out with this game, otherwise people won't remember our game.
Opportunities	Threats
Video games have more long term support as computer hardware is usually backwards compatible. You can set up a computer with ease in the future.	The game will be easy to forget if there are no unique options done. People will take it less seriously, because it is just a video game. Less immersion with the story as you can look away with real depression.

Solution 3: An AR application

This application will require you to wear AR glasses. They will be used to show you the same world you see, but through a depressed person's vision. The room you are looking at will have (interactive) components that fit the size of the environment.

AR Application	
Strengths	Weaknesses
Really immersed into the story as you can feel like you are there in the story. Easy to take with and move around with you and show to people. You can walk a mile in someone else's shoes. There is an opportunity to make a real impact as it is a unique way of making a game. Using controls to make a bigger impact with this game, which is not something you can do in normal video games.	Needs to be room scale and cannot be static. You need to make sure objects align with real world objects. It's difficult to fit in every room. Hard to test, because every room is a different scale and has different objects.
Opportunities	Threats
With phones becoming more advanced they can easily keep up with the technology advancements and can be built on top of.	Less immersive than VR, as you are still in the real world. Limited features in game as you need to make it customizable for every room.

Solution 5: Projector in a room (three walls and a floor projection)

A reserved room with lights will display a projection (on three walls and a floor) with an audience in front of it, or in it. The room will display a depressed person's room. The lights could help with highlighting certain parts. The application could show the room first from a healthy person's perspective, then showing the same room from a chronically depressed view.

Projection room	
Strengths	Weaknesses
Unique experiences as solutions like this are only in museums and not really somewhere where. We make a lasting impression on the player as they will really be experiencing it without tethers. We can make it intractable to get the audience to work with this way to make decisions. Audio is more immersive than when you are playing a game. Light can be used in a cool way to show this topic. You can really walk through the installation.	Hard to set up, need a lot of space, a dark room is needed and this makes it hard to test as it is a static object which is placed in a room. How to apply this to our game/experience is an extra hard thing to do. Very expensive product as you need a lot of room and equipment. Very breakable, as small changes to the room can break the game. Waiting for the next thing to happen in order to see what is changing rather than focussing on the message.
Opportunities	Threats
It is a unique way of portraying something. It stays current with the time as it is a video as they have been around for many and still seem to improve. There is still media being made in video form.	Projects keep getting better so you have to readjust everytime one breaks or a new one comes on the market. It is really static and you have to readjust everytime you move or the building closes. Not really future proof.

Solution 2: A VR application

The application will put you in the shoes of a person with chronic depression. Through the VR glasses, you will be able to see how they see the world. Your day starts in your bed and is guided through your choice of interactions, always having (negative) inner thoughts connected to everything. You use the controllers to move around and interact with your environment, but you won't have to walk around in real life.

VR Application	
Strengths	Weaknesses
Really immersed into the story as you can feel like you are there in the story. Easy to take with and move around with you and show to people.	Less intuitive as a normal PC game as most people. Depending on the VR game, you might need a lot of room. You need to test in person as not a lot of people have a VR headset. Motion sickness is a thing for some people. Scope can become too big as it's too ambitious. People with glasses will have a harder time as their glasses might be in the way.
Opportunities	Threats
There is an opportunity to make a real impact as it is a unique way of making a game. Using controls to make a bigger impact with this game, which is not something you can do in normal video games.	There is a chance that VR will not be as popular as they are now. VR hardware can become outdated rather quickly and might not be as backwards compatible as normal video games are.

Solution 4: 360 video

A 360 video is a video where every direction is recorded at the same time. For this solution, a 360 camera could be used to make a video where a depressed person's experience is filmed from a first person or third person's perspective. There could be an option for interaction. Depending on the choice you make within the video, a different part of the footage will be shown. All trying to capture a depressed person's view on life.

360 Video	
Strengths	Weaknesses
Immersive stories can be made very accessible because everyone has a phone. It gives you more immersive than a normal video, as it's sort of like VR without the glasses. You can choose the story of what you want to look at. You can do it in 3rd person, which can offer a different perspective for the user. As you are looking down or with a person with depression. The feeling of hopelessness can be conveyed with this medium.	Very linear, not really intractable, as we can guide them into what we want to see. Action will only happen on one side, as you do not have eyes in the back of the head. Both of the developers don't have experience with 360 video. Limited interaction makes it feel more like a movie. So you don't have the human touch to it to make it feel like you are experiencing depression.
Opportunities	Threats
It is a unique way of portraying something. It stays current with the time as it is a video as they have been around for many and still seem to improve. There is still media being made in video form.	Little replayability as the story line is linear, so people won't come back for another time.

The SWOT analysis can be found in the [Appendix A1](#). For a better overview. The lecture Ethics & Technology was open to different solution from a VR experience, but in the end chose the VR experience. The team then made two concepts to pitch to the lecture.

6.1.2 CONCEPT ONE BY MAX MANENSCHIJN

This is a VR experience where you are able to look through a depressed person's eyes. This concept

will first start with the player at work or another social gathering where it is required to be there. This fits perfectly with how depressed people feel. They must be there and want to not stand out. So, they are present, but are either in the corner or somewhere hidden. The player notices them and makes 'eye contact.' This is then how you are transported to this person's brain and eyes.

6.1.3 CONCEPT TWO BY EVA GROOTSCHOLTEN

The VR experience puts you in the place of a depressed person. You can interact with your environment and hear their inner thoughts. The depression will also take form as some sort of creature that you can see. For example, it can sit on you the moment you try to get out of bed. Combined with the VR controls making it harder for you to get up by having to push it off or push a button multiple times to sit up, it will simulate the feeling of how hard it can be to even get up when you are depressed. By making the depression a visual

aspect, it might help the user identify with it and understand that it is an illness, instead of thinking someone is just “sad” or “lazy.” It is also a good way to remind the user that it is a simulation.

These two concepts in the end were decided to be taken something from both, as the professorship liked them both. The two developers both worked on these two solutions and in the end combined them into one. A full description of the game concepts can be found in the [Appendix A7](#) and [Appendix A8](#). The team chose to only make one concept per person as most solutions the team thought of were similar. The creative process came however when the developers pitched this to the lecture. The original idea was always to make a morning routine as this is relatable and everyone experiences this. So, the team was limited in the ideas of creating different game concepts. The team then took the most liked features of the two concepts and made them into the VR experience that is created now.

6.2 THE FINAL DECISION

The final decision was made to have the game be set in a room where the player wakes up from their sleep. The player will experience visual effects that will affect gameplay. This visual effect will be described later in more detail. This idea was pitched to the lecture, and they liked it and gave the team creative freedom to make up their own morning routine. The room idea was chosen to make it feel more relatable towards daily struggles of a depressed person.

From the empathise phase the team discovered that most people just think that doing daily tasks should not be so hard, but when you are depressed, these tasks can become incredibly hard to do. This is what the team found out from experts like Dr Andre van der Ende, the questionnaire and the empathy map.

A flowchart has been created to help with the gameplay description. The flowchart can be found below this text. This flowchart can be easily looked at and will help with development for this VR experience. The flowchart was made after the questionnaire where most people described this flow of getting out of bed and going to leave the house. The medicine option in the bathroom was scrapped almost immediately after presenting this flow chart to the lecture based on ethical concerns.

Flowchart

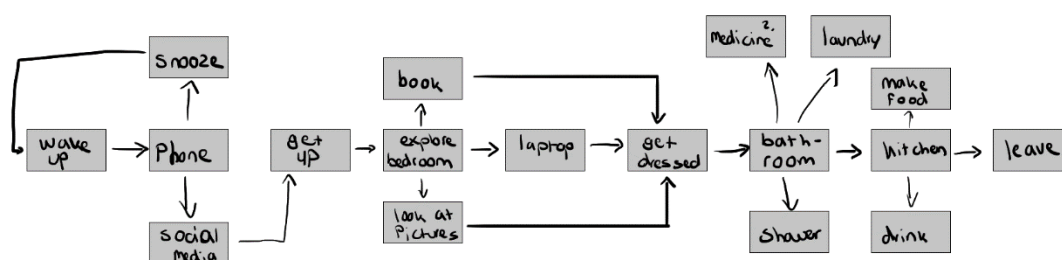


Figure 4 - Flowchart Gameplay

The team made this flowchart to help in the aid of an asset list (Unity, N.a.). An asset list is a list to aid in the making of 3D assets for the artist in this project. This helped me as well to produce all the gameplay options and interactions of the game. Our first prototype was made according to this flowchart and will be built upon with further iterations. A screenshot of the first prototype can be found on the next page. This prototype was

used to verify the XR toolkit and make sure the VR headset worked.

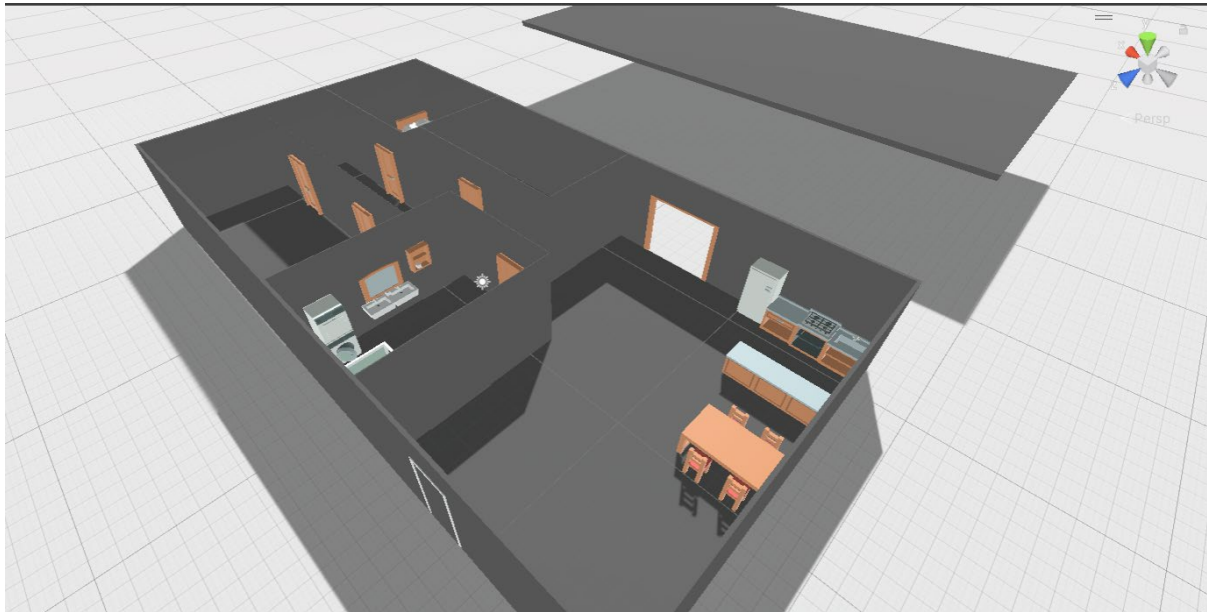


Figure 5 - First prototype

The team decided on this familiar setting to not have a big distance between the depressed patients or have a setting that is set in a familiar setting. A morning routine is something everyone needs to do to get somewhere for the day. Together with the lecture, it was chosen that a morning routine is a better fit for an experience like this then a party setting or any other setting for that matter. With this game/experience being set in an apartment, we can limit the number of interactions in a natural way. Some doors will be locked and will not open to guide the player through the apartment. Normal game design mechanics will be used to guide the player through the experience.

7 RESEARCH PRIOR TO DEVELOPING

7.1 SUB QUESTION 1

How to make an immersive VR experience that accurately portrays depression?

This sub question is the most important one as this question completely covers the basis of this game. It is important that this is done accurately to make sure that the games feel authentic. To answer this question, the developer did desk research into depression and field research with a questionnaire. The team had created a gameplay proposal prior to sending out the questionnaire. This meant that after the results came in the team altered the gameplay of the experience. The team had assumptions and tried to implement these in the game, but since the team did not have experience with depression, they could not think of everything.

The results of the [questionnaire](#) and in the [Appendix A3](#) gave the team great insight into a morning routine of a depressed person. The result was mostly similar and have a distinct line that is the middle with some different results. This made sure that the team is on one line. The team decided to scrap the showering feature and as almost no one mentioned making breakfast this feature was skipped as well and replaced with drinking something quick and grabbing a snack. With these results and some more desk research the work could begin.

The team took major inspiration from Actual Sunlight (Bezo98, 2021) and What remains of Edith Finch (Schilling, 2018). With Actual Sunlight the player gets the opportunity to think that they have a choice, but they do not have a choice and the game is linear. This is something that will be useful with depression as most people are on auto pilot and continue their routine. That is why the team chose to follow a normal morning

routine with a twist. The questionnaire showed the team that everyone uses the snooze function on their alarm. So, every time the player clicks the snooze button the sun will go higher in the sky. In order to keep the player in bed the movement controls will be locked, and inner monologue will play saying that staying in bed is preferable. After a certain amount of time the controls are unlocked so that the player can pick up the phone to check their messages. When they pick up the phone they are transported to a new scene where they are overwhelmed with messages. An inner monologue will trigger telling them to shoot away the messages and that they will respond later to them. After shooting them away they can pick up the phone again and it will teleport them back to the bedroom. This is all data the team got from the questionnaire.

With spending a lot of time in bed and checking their phone they have to rush the rest of the morning chores. They do not have time to shower and quickly brush their teeth and put on their clothes. Sadly, here is where they realized they have not done the laundry in a while and have nothing to put on. The player can then opt to do the laundry or put on clothes from yesterday. The player will put in a loop when they try to do the laundry with the washing machine and the dryer being full of dirty laundry. Like in *Actual Sunlight* where you think you have an option, but you do not. Then player rushes to the kitchen to get a quick snack and drink something to then leave the house. The inner monologue is inspired by *What remains of Edith Finch* (Father, 2017). The whole game is followed and told by an inner monologue. With this monologue the team can trigger and put in subtle hints about depression and what goes on in a depressed persons mind.

Currently there are several researchers researching to apply serious gaming to mental health treatment. They call serious games applied games (Flemming, et al., 2017). It shows that serious games and gamification have great influence into treatment of mental health. Which brings this research close to how great VR is to immerse someone into a new world. This is something that has been researched by the following group of researchers (Love, 2018). Yes, this article is over five years old, but the research done by these people is still relevant. With VR you forget what the real world is like and after 2 minutes in this new world you accept this as your new reality. This is great as the player will be fully immersed in the experience and forgets what the real world is like. This is a huge benefit to an immersive game/VR experience as VR already has this down. The main thing to keep in mind is not to break this immersion with cables getting stuck or the game dropping frames which will induce motion sickness.

7.1.1 CONCLUSION OF THE RESEARCH QUESTION

With VR you can easily immerse player into a different world. When done right you do not need a lot to make them feel immersed, but if one of the above factors are not met, for example: the cables are getting stuck, or objects feel too big or too small you would break the immersion. The game needs to feel realistic enough in order to be believable. You should not mess with a lot of effects as this will break the immersion too, a big no in VR development is to change the field of view (Unity, N.a.) in a game. This will induce motion sickness immediately. There is a lot of research out there which was a great asset during the research into immersive games. The team chose a morning routine as the most immersive option out there as everyone's has a morning routine of some sort.

7.2 SUB QUESTION 2

What types of serious games and other media are present in the field of mental illness and how is this done?

This is an important question as it is hard to make an authentic game that feels like depressed people are understood. So, this research question is of great importance to make the game feel authentic. The developer has watched videos from series, games, and short movies in order to understand what peers have done to make a serious game, video or film about depression and mental illness. *UNSPOKEN* (Zoë Birse, 2018) is a short award-winning film about depression, but not the depression that is stereotypical. This film is about high functioning depression. This means that to everyone around the main player he seemed normal when he was

around people, but as soon as he was alone his depression kicks in. This is something psychiatrists call high functioning depression (Mayo Clinic, 2022). This is something the team wants to implement as this common among people that still go to school or go to work. The developer has also watched a clip from Euphoria (Levinson, 2022) a series about a girl with depression. All she does is stay in bed and watch reality TV as a sort of escape from reality. This aligns with the answers in the questionnaire as they will endlessly scroll through social media when they wake up.

What Remains of Edith Finch (Father, 2017) is a great game about mental illness where it is not noticeable in the beginning, but during the game more details come in about her struggles. In the beginning nothing is really visible or hearable about her depression, but after getting a lot of flashbacks the game gets deeper every time. This game is praised on how accurate the struggles are with mental illness (Espinelli, 2017) (Anderson, 2020). In the forementioned article they talk about how not over the top they introduce mental illness into the game. They do not make a stereotype about her depression, but just show what it is like to have mental illness without introducing shock value suddenly. This is something the developers of this depression experience want to do as well. Making the player question if the person in the experience has depression is a better approach, then shocking them all of a sudden with this topic (Anderson, 2020).

The developer took the dialogue system from What remains of Edith Finch. It is a more natural way of showing depression instead of throwing too much obvious signs out that the person is depressed. The way the game flows where you explore room by room is something the team has taken from What remains of Edith Finch too. In the game you pick up objects from your childhood or something else and this brings back memories (Father, 2017). The developer looked at one other game which is called Hellblade: Senua's Sacrifice. In this game the main character is not suffering from depression, but is suffering from schizophrenic episodes (Davis, 2021). The developer analysed this game not to take inspiration from, but rather to see what the most extreme case of mental health could be and still feel accurate and true to the patients.

7.2.1 CONCLUSION OF THE RESEARCH QUESTION

To conclude this question there is much to say of how to portray depression in video games. If the developer of the game wants to get the attention you can make a game with a shock factor. This however is not something that will then be praised by the patients suffering from this mental disorder. For the purposes of storytelling, you can use this shock factor to grip the players attention, but this will backfire if not done right. Looking at all the different mediums mentioned in the paragraph, some mediums are praised for their accurate portrayal of mental health.

To play it safe the developer or the storyteller should do research, hold interviews with specialist and sent out a questionnaire to the target group of the research group you want to develop a game or film after. This helped the development team a lot to get a better understanding of the group suffering from this mental disorder.

8 FINAL PRODUCT

8.1 DESIGN PROCESS

The developer started working with the flowchart as reference. First building all the interactions with the XR toolkit for Unity (Unity, N.a.). With this plugin it is made easy to quickly develop high end VR games. You start from a XR template and build up from there. By adding XR Grab Interactable objects you can interact with objects. See the image on the next page.

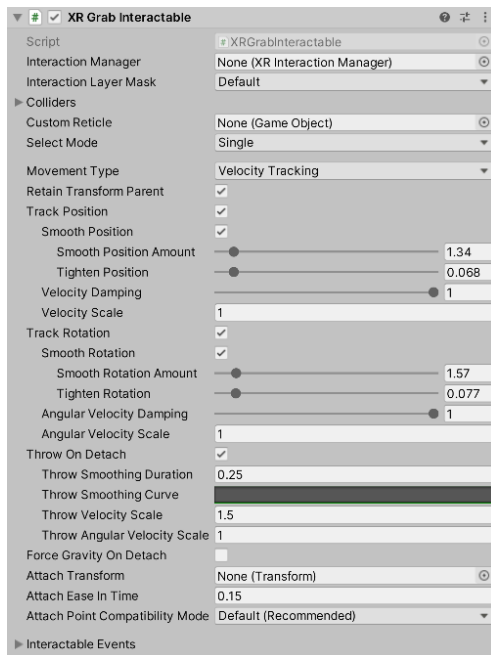


Figure 6 - XR Grab interactable.

This class helped the developer quickly set up grabble objects, functioning doors, drawers and teleportation for movement. With this out of the way the developer then went ahead build the specific features that make this game a depression experience. The word experience is used instead of game as in games there is a way to go game over or lose. The development team does not want this. The team took inspiration from actual sunlight. In this game you get the illusion that you have free choice, but you are forced into a specific way. If you deviate from this the game loops and goes back. Watch this video for more information on the gameplay loop (Bezo98, 2021). The assumptions that the team made, were verified by the questionnaire. This is good as this meant that no features had to altered. In the appendix you can find the questionnaire answers.

8.1.2 SETTING UP GAMEPLAY AND PROGRAMMING THIS

8.1.2.1 PHONE PICK UP

Looking at the flowchart from figure two, you can see there are two options when the player wakes up. Snooze or social media. It is important to know that you can only check social media after a few snoozes. As every depressed person from the questionnaire mentioned they snooze a lot before getting up. After a few snoozes you pick up your phone to check social media. This will teleport the player to a sphere where they will be overwhelmed by the messages and then after a while, they feel comfortable by the Instagram Reel/TikTok feature. This is that endless scrolling of content feature which is highly controversial as it keeps the user locked in a dopamine endorsing, endless content loop (Koetsier, 2020). After some time, they get the urge to leave this bubble as they need to get going. After exiting this loop, which is hard to do, they get transported back to the bedroom where they started and can now go on about their day.

8.1.2.2 EXPLORE BEDROOM

After getting back into the bedroom the player can decide to walk around and pick up objects. These objects will trigger a short dialogue clip that will have some sort of sentimental value. This is what short films about depression portray. When they look at pictures in those films or come across certain objects they get reminded of good times. This is important as this will make the player understand what a depressed person goes through. They do this not only in films, but also in games. What remains of Edith Finch is a great example where the player goes through the old house, they used to live in (Father, 2017). As, this is small experience the development team will keep this limited. Anne Bonvanie, one of the associate lecturers and the coach of the development team, she suggested adding small details that are not present in the median of the questionnaire. This will mean that everyone on the scale of depression feels somewhat represented. The artist will also try to implement some posters that will show this or at least try to portray it.

8.1.2.3 SMALL GAMEPLAY CONSESSIONS

Depending on the development time the laptop will be made functioning or not. Most to everyone that filled out the questionnaire said that they usually stay in bed as long as possible. This flowchart seen in Figure 2, was made prior to sending out the questionnaire. After getting the results of the questionnaire, the development team adjusted the flow of the gameplay. Less time will be spent in the bedroom and now more time is

focussed on the beginning of the game. This will tie into the procrastination effect depressed people experience. After the player explored the bedroom a bit, they can open the door and move to the bathroom.

8.1.2.4 BATHROOM GAMEPLAY

After having explored the room, the player can move towards the bathroom. In the bathroom the team decided to remove the ability to use medication. This became ill-advised by the head of the lectorate. As, this might give the player some false sense of that taking medication is good and necessary. This is something the team absolutely does not want to portray as taking medication is a very sensitive topic. This has been made clear by an interview the team has done with the psychiatrist Andre van der Ende. Andre is a psychiatrist who is a big supporter of ECT and other forms of medication (Ende, 2023). A transcript of the interview can be found in the [Appendix A6](#). The team has made altering gameplay features in the bathroom too. Looking through the answers of the questionnaire all the responses describe their bathroom routine the in the same way. They go into the bathroom and do the following: brush their teeth, do their hair and put on make-up if they put on make-up. All of them do not shower in the morning. So, because all of them do not mention showering the development team has decided to remove this from the gameplay loop.

Instead of giving the option to shower there will now be a dialogue options that will be triggered. This voice clip will say that they do not have time to shower. They will then brush their teeth and look in the mirror. After brushing their teeth, they look at the laundry pile on the floor and a dialogue option will be triggered explaining that they really should do the laundry. They can open the washing machine which is full. This will be a cycle, so they just must leave and do that some other time. After this they leave to the kitchen.

8.1.2.5 KITCHEN GAMEPLAY

After the player is done in the bathroom they can walk over to the kitchen. The team's assumptions that they do not really do a whole lot for breakfast was proven true. According to the answers of the questionnaire, most do not even eat breakfast and just leave straight after they are done with brushing their teeth. Some of them do still mention that they will drink something or grab a quick snack. There is one that says they are preparing lunch. As this is only one of the respondents the team has decided to stay in the middle of the responses and not include this. The gameplay for the kitchen will include having the option to choose from: making coffee, making tea, drinking some water and grabbing a quick snack from the fridge. This will keep the experience as close as possible to what depressed people go through in their morning routine. After finishing in the kitchen, the player goes to the final area where they can leave the house.

8.1.2.6 LEAVE THE HOUSE

After finishing the kitchen, the player walks over to the hallway. This is where the experience ends, and they will now open the front door. By opening the door, the experience ends, and the player will be presented with some stats and some links to read further upon this topic. These links will include research material on this topic and some great videos. This is a leftover feature that was going to be used for when the lectorate received subsidy. This is still relevant to put here as after playing this short experience the player only has a glimpse of what it is like to have depression. It is important to have this here as close friends and family have great impact on the recovery (Bonvanie, 2023) (Ende, 2023).

The final product can be found here in the [Appendix A11](#).

9 RESEARCH RESULTS AFTER DEVELOPING

9.1 SUB QUESTION THREE

What kind of design works best for a VR experience with due regard for motion sickness and other VR side effects?

As the developer of this game suffers from motion sickness while playing VR games, this research question was personal. To make a VR game with no motion sickness the developer first dived into the literature of what makes a VR game a VR game. The Unity documentation was a great start. The XR Toolkit mostly takes care limiting motion sickness with setting the field of view (Unity, N.a.) (Unity, N.a.). Changing the field of view is a big no go in VR as this makes things very unstable. Having a consistent framerate is key as well. This ensures that the players eyes do not have different framerates for each eye (Wang, et al., 2023). Lower framerates are acceptable as long as they stay consistent the participants of this research started to compensate for the lack of frames.

To mitigate further motion sickness side effects, this experience can be played seated as well. The only time you would need to stand up is to reach the upper shelf. Having a seated experience takes away a big factor in feeling motion sick, but is not a fix all problem (Coles, 2021). To reduce motion sickness even further in the experience the team opted for a teleport option instead of moving around normally. When you teleport the eye effect comes in to make the movement feel heavy. This was done for gameplay effects, but also helps for motion sickness as the player now smoothly transitions between the two locations.

Finally, when switching between scenes the player will see a fade in front of the headset. Switching between two scenes makes players really disoriented. This is what the developer tested in the first playtest which can be found in the [Appendix A5](#). After turning on this feature all the disorientation was gone, and the experience was smoother and did not intervene with the immersion. This fading is done in most VR games, but in the game Virtual Rickalty it is done really well (Quad, 2021). The developer played through this game and was inspired by the mechanics of this game when it comes to changing the scene or teleporting. The only time you switch from a scene in the depression experience is when you pick up the phone or stand in the hallway.

With all these measures in place the experience should be as little motion sickness inducing as possible. There is never the option to make it safe for everyone, but all the options are explored to make this a comfortable experience for everyone.

9.2 CONCLUSION

To conclude this research question there is a lot to say, but making a more inclusive experience that can be enjoyed by everyone is valuable. Motion sickness is something that is different for everybody, but with making the right choices in the development of a VR game or VR experience can help a lot in mitigating motion sickness. The team had this in mind from the moment it became clear that the final product became a VR experience. Some features were created around this including the heavy feeling of the eye closing. This was done for gameplay purposes, but also to mitigate motion sickness.

10 TEST PLAN

10.1 TEST GOALS

The main goal to test for is to make sure the VR experience is understandable and feels authentic. To make sure the indicators of success are completed. In short, the following goals need to be tested during the test phase:

1. When the player after the experience can explain what depression is about.
2. If they understand what depression is and how to live with it.
3. If they are likely to reach out to their friends after this experience.

10.2 TEST METHODOLOGY

10.2.1 TARGET GROUP

The target group for the test can be everyone, preferably one or two people who suffer from depression to make sure the game feels authentic. The rest can be regular people. Ideally the test group should be small as any more than five will generate duplicate answers. These tests will generate clear answers which are helpful for the development team to further fine tune the prototype. This prototype will be a serious VR experience that has a custom and specific target group. As almost everyone knows someone that is dealing or has dealt with depression there is a good target group to test with.

10.2.2 THE FORMAT AND THE SETTING

The VR experience can be played everywhere. This experience can be played sitting down or standing, so this test can be done everywhere. The only thing that is needed for this test is a VR headset, specifically the Meta Quest 2. This VR headset was used during the development phase, so this experience works the best on this headset. This headset is a standalone headset which means there is no need for a laptop to run this game. This makes it even more accessible for everyone to test and the places where to test. With some luck the team might be able to test at the ZGT. This would be the location where to find people with depression. The team can also test at the lectorate for even more data.

When it comes to the setting it really does not matter. The VR headset was chosen to be portable and standalone. The ideal setting would be in the psychiatrist office or a consulting room where the loved ones of depressed people could come down and play this experience. This experience could also be tested at the GGZ offices. Here it might be more accessible as they have information evenings. These meetings have a lesser formality to them as say in the ZGT. As mentioned before it does not matter as this experience can be played everywhere so these places mentioned before are the optimal setting.

10.2.3 DESCRIPTION OF DIFFERENT METHODS

During this experience there will not be an opportunity to ask questions. As this experience needs the full attention of the player so that they can understand what is going on. The player is constantly being reminded of what to do and therefore will not need a lot of guidance. If they do, then that is where the team can watch along on the screen and if they are stuck in a level then they can get help. As the team can watch along with this experience, they can make observations during the play session. Together with asking questions and observing this will give good results. This will answer one of the sub questions immediately as the game will in that case not be accessible. After the player is done with the experience the team will ask questions with a prepared questionnaire. For time's sake this questionnaire will be sent to them so that they can fill out in their own time. This does not mean that the team will not ask questions to them afterwards. To answer both the

research questions from the designer and the artist they will ask three to four questions that are the most critical. These need to be asked right after playing the experience as the VR experience is still fresh in their memory. These are some of the questions that could be asked:

- Did the VR experience put you in a different world?
- Are the controls easy to understand for you?
- Was the gameplay direction clear and did you understand where to go next?
- Did you feel motion sickness during this experience?

These questions are asked to make sure the indicators of success are met. If they are put in a different world the player is more likely to recommend this to friends. If the controls are easy to understand the player did not feel distressed and at ease. If the gameplay direction is clear the player felt immersed in the world. The same goes for the question if they felt motion sick during the experience.

The team can observe with a playtest how and which objects, doors and other items are being interacted with. With this behavior the game can be altered to have a better flow. The team will not ask these sorts of questions during the play session, but rather observe this as most players will not have extensive knowledge of level design. So, asking these questions will only generate confusion.

10.3 TEST RESULTS

10.3.1 FIRST TEST

The team did a first play test on Wednesday the 17th of May. Four of them do not have depression and one of them does. Link can be found here in the [Appendix A5](#). This test was done to make sure the basis of the game is understandable, and the mechanics are intuitive. The developer made a first playable prototype to test these mechanics. One of the core features did not work, which was the dialogue system. This meant that the team needed to guide the player a bit. Even though this first iteration had no visual guidance, most players found their way around the apartment. The results can be found in the appendix. Overall, the feedback was positive. All the play testers could see that this was an early prototype and so they did not expect much. When they entered the experience, they were surprised by the first prototype.

The general feedback that was given was that all but one player knew what to grab. They all suggested some sort of highlight when near an object to indicate this is interactable. None of them felt motion sickness, which is great, but this still needs more development to make it feel even smoother. All but one felt immersed in the world already without even having the proper assets in. The play tester that did not feel immersed gave this as an argument. Once the assets are in the game will feel more natural and more immersive.

The last point of this test session was to find out if there are any issues/bugs in the game. As the developer has been looking at this game for a few weeks now and cannot test everything. All the players found issues. This is of course not a terrible thing, as that is why this was asked. The major issues are that the collisions do not work from time to time. This is something that needs to be fixed for future testing as this means that a lot of interactable just disappears. This will in the future be game breaking as the player will then not be able to proceed.

Lastly there was an option to give some feedback or tips. The team got two great feedback points which is something the team will implement. In the dialogue as sense of urgency will be added to make the player feel rushed. This is something depressed people have as they procrastinate a lot. Lastly the fridge will have some products that will be expired or just not something that can be made into a meal. This will further immerse the player into the world of depressed people.

To conclude this first test was already a massive success. The next test will take place in a few weeks when the dialogue, assets and the feedback is implemented. The experience will be further in the development cycle and the final research question can be answered by then.

10.3.2 SECOND TEST

The team did a second and last playtest on Wednesday the 14th of June. The team had seven play testers and because of ethical reasons we are not allowed to ask them if they have depression. The team made a survey which can be found [here A9](#) and there is a notes document which can be found [here A10](#). The overall feeling of the game was that it came across as sad. As seen in the figure below:

How did the experience make you feel?

7 antwoorden

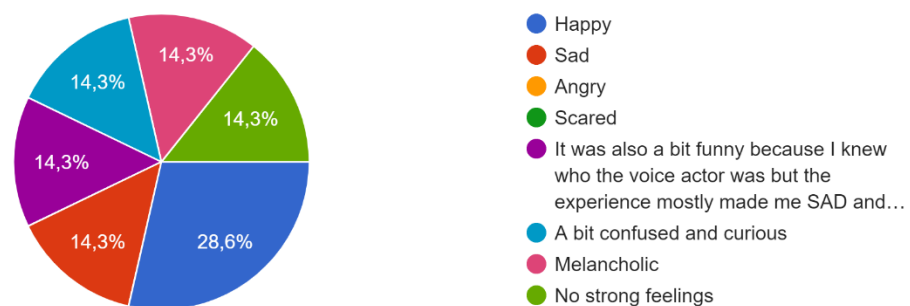


Figure 7 - Feeling Diagram

Most of the play testers found that it accurately portrayed depression as seen in the figure below:

Do you think the application represented depression accurately?

7 antwoorden

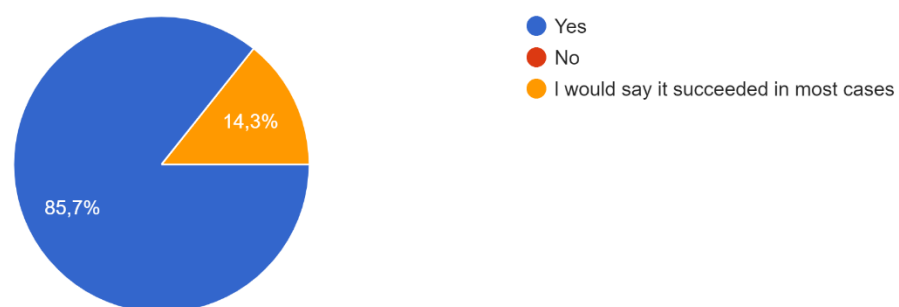


Figure 8 - Depression portrayal

All of them felt somewhat immersed in the game as seen in the figure below:

Did the environment feel immersive?

7 antwoorden

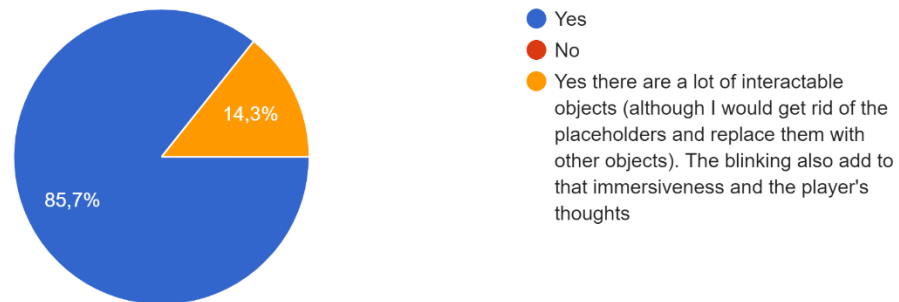


Figure 9 – immersive

None of the play testers felt any motion sickness as seen in the figure below:

Did you experience any motion sickness?

7 antwoorden

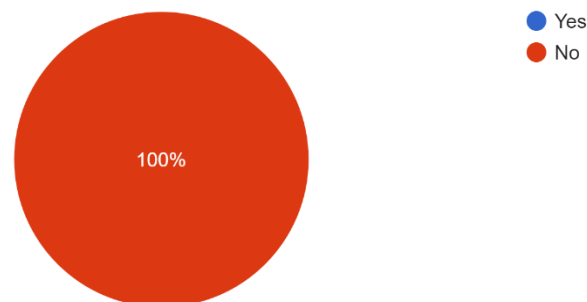


Figure 10 - Motion sickness

This final test was to make sure the prototype was up to standard the team has set for this experience. The team took out the full day for this test in order to make sure that everything went smoothly. The overall results are as expected with the indicators of success in mind. All the sub questions were answered that were set by the designer. A more detailed overview of the test results can be found here [A9](#) and here [A10](#).

10.3.3 CONCLUSION OF THE FINAL TEST

To conclude this final test the conclusion can be drawn that the target of the game was met. The overall impression of the visuals, audio and the ambiance were as expected. Which should be sad, gloomy and melancholic. These are words are seen back in the survey which the teams sent out. This verifies that the research the team has done to make it feel depressing were successful. One small side note is that two of the respondents felt happy after playing the VR experience. This can be put down to that VR in and of itself is a fun experience as you can interact with objects and throw them anywhere you would like. In hindsight VR maybe is not the most optimal way of conveying a serious topic. More on this in the conclusion.

11. CONCLUSION

To conclude and answer the main research question: 'How to audio visually display a daily routine of depressed people to close friends, with a VR experience to enable them to empathise.'

The team created a prototype. This prototype shows a morning routine of a depressed person with an inner monologue. This helped the players understand that the person is suffering from depression and served as guidance. The visual effects of a blurred vision and haptic feedback makes the player feel like they have to do a lot of effort to move. The flow of the gameplay which is modelled after the actual routine of a depressed person made the experience feel authentic. This was in part all done with the three sub questions that were done to further understand how depression is portrayed in other media and how to apply this into an experience.

According to the play testers the game feels immersive and made them feel like they now understand what a depressed person goes through. It is only a prototype, but the decision to make this a polished prototype helped with the immenseness of the VR experience. The results of the play tests were positive and the lectorate is pleased with the result of the VR experience and met their initial idea of this project. The prototype was as good as bug free with this final playtest and this made the feeling of immersion even greater. This is something the team strived to do as this is an important part of the research question.

In hindsight VR makes a game very immersive, but as two players found the experience fun, this medium might not be the right tool to convey a serious topic. This is only a small percentage, but still, it is enough to consider this as something serious. Overall, the experience was a great success as something unique and innovative.

With this still being a small experience which can be played within 5 minutes the message of this experience was well received. With this in mind the main research question has been answered.

12 DISCUSSION & RECOMMENDATIONS

While this project was meant to be played at a festival and this sadly could not go through, this project will end up in a good place. This place is the ethics lab of the lectorate Ethics & Technology. Here they are showcasing all the student projects and other ethical dilemmas. This project could also be used as a basis of where to build upon to make a true VR experience for people to gain empathy for depressed people. From the last time the team talked to the client this was still on the planning. For that reason, this five-month project is a good basis and a proof of concept.

The project was still received in a good way by the play testers and the feedback the team got was as expected which is fantastic. With all the play testers mentioning that they got the feeling that the person in the experience is depressed. The conclusion can be drawn that the target has been met.

With the lectorate already having a focus on VR from the beginning it was hard to make a good choice for another medium. This was of course not an issue as VR is a good fitting medium, but other options could have been explored better. Currently in the Ethics lab, there already two installations with one using projection and another using regular screens. This VR installation is a great fit for a diverse variety of installations and solutions.

This project was done by two developers, while this was enough for getting an early prototype this project could have used a dedicated engineer. It would have made the prototype a whole lot smoother and that more polished. To further develop this project a dedicated engineer is a good addition to make this game feel that more polished. With further research into the peaks of depression you would be able to make everyone feel included in this experience. This was not explored with this current round of development as the choice to start development was more important.

To further develop this idea, it might be wise to explore a different medium. Early in the development phase the team had the idea to make an interactive installation. This was not further explored for the sake of portability as the original idea was to go to festivals with this project. Now that this project will find its place in the Ethics lab of Saxion Deventer this idea could be explored again and would make for a memorable experience of the visitors of the lab. This of course with more research would make for a different solution and can only be done with a bigger team.

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15 APPENDICES

A1 SWOT ANALYSIS

SOLUTION 1:

Solution 1: A video game

A game (preferably on pc) that takes you through a depressed persons' day. You will hear their inner thoughts and control their actions. The game takes place in the depressed person's house. You wake up in their bed and from there on you can pick your own interactions or where you go.

Video Game	
Strengths	Weaknesses
<p>Very accessible, most people have a PC. You don't need external hardware to work with this game.</p> <p>Intuitive as most of the target audience is young, so they have played a game in their life, so they know what to do.</p> <p>You have more of a chance to do interaction as you have a lot of buttons. More personalized options, as it's intractable.</p>	<p>Not very immersive and blends with other games as this has done before. We need to stand out with this game, otherwise people won't remember our game.</p>
Opportunities	Threats
<p>Video games have more long term support as computer hardware is usually backwards compatible. You can set up a computer with ease in the future.</p>	<p>The game will be easy to forget if there are no unique options done. People will take it less seriously, because it is just a video game. Less immersion with the story as you can look away with real depression.</p>

SOLUTION 2:**Solution 2: A VR application**

The application will put you in the shoes of a person with chronic depression. Through the VR glasses, you will be able to see how they see the world. Your day starts in your bed and is guided through your choice of interactions, always having (negative) inner thoughts connected to everything. You use the controllers to move around and interact with your environment, but you won't have to walk around in real life.

VR Application	
Strengths	Weaknesses
Really immersed into the story as you can feel like you are there in the story. Easy to take with and move around with you and show to people.	Less intuitive as a normal PC game as most people. Depending on the VR game, you might need a lot of room. You need to test in person as not a lot of people have a VR headset. Motion sickness is a thing for some people. Scope can become too big as it's too ambitious. People with glasses will have a harder time as their glasses might be in the way.
Opportunities	Threats
There is an opportunity to make a real impact as it is a unique way of making a game. Using controls to make a bigger impact with this game, which is not something you can do in normal video games.	There is a chance that VR will not be as popular as they are now. VR hardware can become outdated rather quickly and might not be as backwards compatible as normal video games are.

SOLUTION 3:**Solution 3: An AR application**

This application will require you to wear AR glasses. They will be used to show you the same world you see, but through a depressed person's vision. The room you are looking at will have (interactive) components that fit the size of the environment.

AR Application	
Strengths	Weaknesses
Really immersed into the story as you can feel like you are there in the story. Easy to take with and move around with you and show to people. You can walk a mile in someone else's shoes. There is an opportunity to make a real impact as it is a unique way of making a game. Using controls to make a bigger impact with this game, which is not something you can do in normal video games.	Needs to be room scale and cannot be static. You need to make sure objects align with real world objects. It's difficult to fit in every room. Hard to test, because every room is a different scale and has different objects.
Opportunities	Threats
With phones becoming more advanced they can easily keep up with the technology advancements and can be built on top of.	Less immersive than VR, as you are still in the real world. Limited features in game as you need to make it customizable for every room.

SOLUTION 4:**Solution 4: 360 video**

A 360 video is a video where every direction is recorded at the same time. For this solution, a 360 camera could be used to make a video where a depressed person's experience is filmed from a first person or third person's perspective. There could be an option for interaction. Depending on the choice you make within the video, a different part of the footage will be shown. All trying to capture a depressed person's view on life.

360 Video	
Strengths	Weaknesses
Immersive stories can be made very accessible because everyone has a phone. It gives you more immersive than a normal video, as it's sort of like VR without the glasses. You can choose the story of what you want to look at. You can do it in 3 rd person, which can offer a different perspective for the user. As you are looking down or with a person with depression. The feeling of hopelessness can be conveyed with this medium.	Very linear, not really intractable, as we can guide them into what we want to see. Action will only happen on one side, as you do not have eyes in the back of the head. Both of the developers don't have experience with 360 video. Limited interaction makes it feel more like a movie. So you don't have the human touch to it to make it feel like you are experiencing depression.
Opportunities	Threats
It is a unique way of portraying something. It stays current with the time as it is a video as they have been around for many and still seem to improve. There is still media being made in video form.	Little replayability as the story line is linear, so people won't come back for another time.

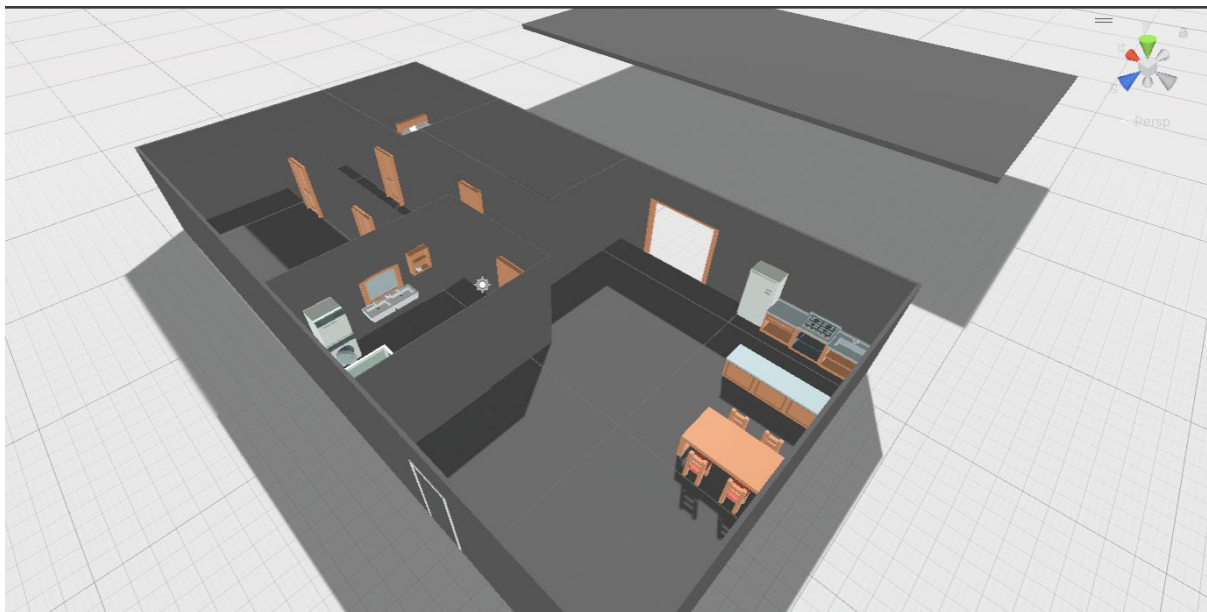
SOLUTION 5:

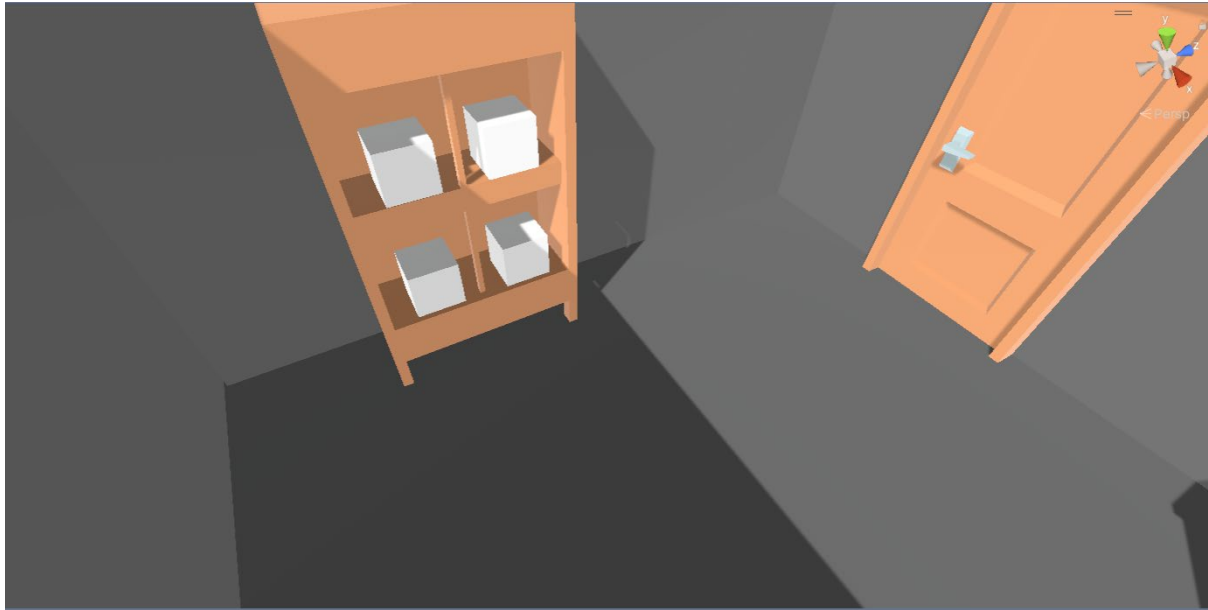
Solution 5: Projector in a room (three walls and a floor projection)

A reserved room with lights will display a projection (on three walls and a floor) with an audience in front of it, or in it. The room will display a depressed person's room. The lights could help with highlighting certain parts. The application could show the room first from a healthy person's perspective, then showing the same room from a chronically depressed view.

Projection room	
Strengths	Weaknesses
<p>Unique experiences as solutions like this are only in museums and not really somewhere where. We make a lasting impression on the player as they will really be experiencing it without tethers.</p> <p>We can make it intractable to get the audience to work with this way to make decisions. Audio is more immersive than when you are playing a game. Light can be used in a cool way to show this topic. You can really walk through the installation.</p>	<p>Hard to set up, need a lot of space, a dark room is needed and this makes it hard to test as it is a static object which is placed in a room. How to apply this to our game/experience is an extra hard thing to do.</p> <p>Very expensive product as you need a lot of room and equipment. Very breakable, as small changes to the room can break the game. Waiting for the next thing to happen in order to see what is changing rather than focussing on the message.</p>
Opportunities	Threats
<p>It is a unique way of portraying something. It stays current with the time as it is a video as they have been around for many and still seem to improve. There is still media being made in video form.</p>	<p>Projects keep getting better so you have to readjust everytime one breaks or a new one comes on the market. It is really static and you have to readjust everytime you move or the building closes. Not really future proof.</p>

A2 FIRST PROTOTYPE | TWO SCREENSHOTS





A3 QUESTIONNAIRE ANSWERS

Link to questionnaire: <https://docs.google.com/forms/d/1Zk4-cEAY18oEJzKRHU29oZWtjqEpgVHQy4t5-vL50lo/edit#responses>

A4 EMPATHY MAP

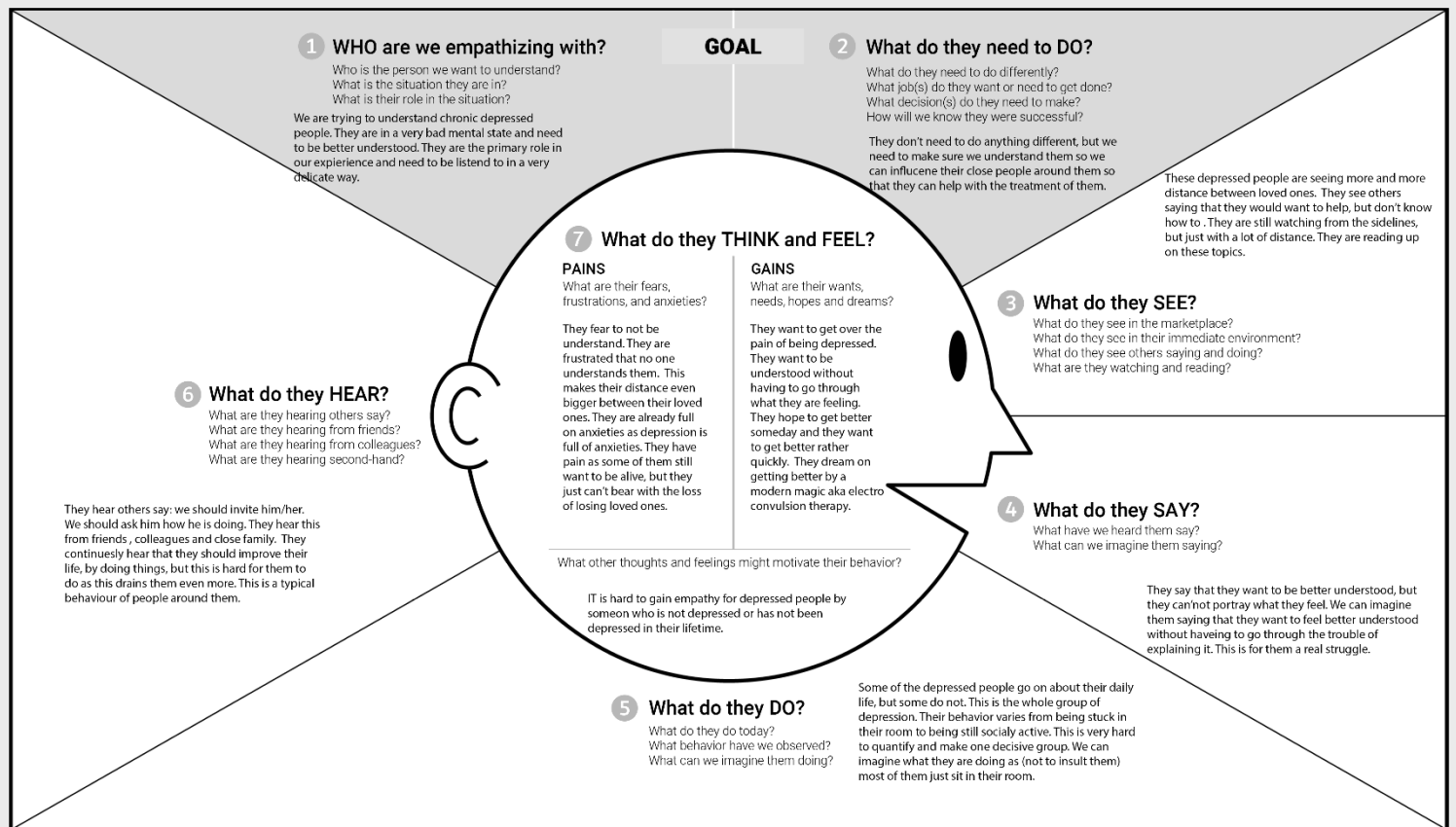
Empathy Map Canvas

Designed for: Professorship Ethics & Technology

Designed by: Max Manenschijn

Date: 16-3-2023

Version:



Last updated on 16 July 2017. Download a copy of this canvas at <http://gamestorming.com/empathy-map/>

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A5 TEST RESULTS

Five play testers:

1. Christian Richters
2. Drilon Bajrami
3. Fin Rovers
4. Mihai Barsan
5. Humam Abdulla

Which mechanics were unclear to you?

1. No dialogue. After finishing clothing I had to think what to do. Grey blocks unclear. With dialogue can be fixed. alarm was great and social media bubble was fun.
2. Highlight the grabbable objects. So you know what to grab. Add collisions to interactable objects.
3. The general thing is that I did not know how to pick up things. Highlight grabbable objects. General player guidance.
4. Nothing really it was just three buttons. The shooting mechanic was not intuitive.
5. Turning off the alarm press and bang.

Did you feel or experience motion sickness?

1. No motion sickness was experienced
2. Again not motion sickness
3. No motion sickness. Rather invested to pick up things
4. No, no motion sickness.
5. No, no motion sickness.

Did you feel immersed in the world?

1. No not really. Once every asset is in it should be fine.
2. Yeah actually it was fun. The teleport function is fun.
3. Yes, I was very immersed in the world. The camera sometimes faces the wrong way. Sometimes that made me disoriented.
4. Yes, I could interact with a lot of things so that was a big part of it.
5. Yes, if there was a ceiling it would feel more immersed.

Where did you experience any issues?

1. My coffee cup fell through my coffee machine.
2. The collision boxes are the main issue.
3. There still needs to be stuff implemented like the coffee machine. When I left the house I could not teleport in to the room to leave. Only the outer edges were teleportable.
4. I missed the bathroom because there was no dialogue.
5. The clipping was a slight issue. For the rest was fine.

Feedback:

Fridge is empty or everything is empty or expired.

I liked the passing of time when you pressed the alarm.

Urgency to the player. Like firing off the job or missing an important test.

Throwing stuff could be fun.

Add a short tutorial to help with controls.

Add highlight with interactables to make them more clear.

Put some random stuff around and change the alarm sound.

Vragen

1. Hoe beschrijven de meeste patiënten een depressie?
 - a. Er valt een deken over de mensen heen. Het gaat gewoon niet meer, geen energie of geen plezier. Ontzettend vlak en veel spanningen. Alsof je in de put zit. Pieker en angst komt ook vaak voor. Ratelt maar door met negatieve gedachten. Niet meer productief in hun dagelijks leven en ze denken vaak in catastrophes.
2. Wat zijn de grootste verschillen in symptomen die je ziet tussen mensen met depressie?
 - a. Vitale depressie, niet eten geen lust. Somberheid en nergens meer van kunnen genieten. Het raakt de persoon meer. Mensen werken wel door met high functioning depressie, want die gaan gewoon door. Depressie met psychotische episodes. Een ander beeld van de wereld, schuldgevoel, kosten aan dingen en een waan hebben. Catatonie geen contact (ECT levensreddend). Hokjes passen niet. Hier moet je ook vooral niet aan denken.
3. Hoe beïnvloedt depressie het dagelijkse leven van deze mensen?
 - a. Hangt van de ernst af. Niet meer instaat om hun normale leven te kunnen doen. Ouders verwaarlozen hun kinderen. Neem remming mee, je bent op alles geremd in je leven. Invalideren. Sociaal is heel belangrijk voor de ondersteuning, want dit help deze mensen heel erg. Ze kunnen dan hier ook hun verhaal kwijt. Het is allemaal te veel. De drempel is hoog om in contact te blijven.
4. Hoe zorg je er als psychiater voor dat mensen met depressie zich begrepen voelen?
 - a. Als mensen hier komen is er al een drempel die ze overkomen zijn. Luisteren is heel belangrijk voor de patiënten. Het is een opluchting voor de patiënten dat er hier een plek is waar ze een werk relatie kunnen opbouwen. De persoon fysiek zien is heel belangrijk. Niet definiëren naar hokjes. Stoornis separeren van de persoon. Mensen met depressie lijden enorm. Defusie is de term om hiervan los te komen. Mensen moeten uiteindelijk zelf de keuze maken voor deze psychotherapie. De psychiater moet nog wel echt helpen tijdens dit traject voor de patiënt. De huisarts heeft altijd de doorverwijzing en de eerste stap is ook daar al gezet.
5. Wat is een metafoor wat mensen veel gebruiken om hun depressie te beschrijven?
 - a. Weer die deken en het wil niet meer. Zo moe dat is ook een. Ze geven hun stemmen een naam. Eigennaam aan de depressie.
6. Wat voor soort medicatie is er naast antidepressiva en ECT?
 - a. Onderscheid tussen klassiek en nieuw. Er is een bult keuze. SSRI en lytshiem met klassiek medicijn. Anti phytolium middel. Deze krijgen ze om beter te kunnen slapen. Magneet therapie staat nog niet in de richtlijn, maar wordt al wel soms toegepast. Moet nog onderzocht worden om dit ook echt in de richtlijnen te krijgen. Ketamine wordt ook gebruikt als een van de laatste stappen voordat er wordt overgegaan op ECT. Dit is nu ook erkent in de behandeling. LSD en Hallucinerende drugs komen ook weer terug in het behandel proces. Weinig vernieuwing in de Medicijnen en daarom zie weer een terugval in de oude medicijnen. We zoeken naar andere wegen voor een behandeling. Deep Brain stimulation is ook iets wat we steeds vaker proberen. Echt diep in de hersenen dit gebeurt samen met de Neurochirurg om de juiste hersenmassa te stimuleren. Nervus Vagus stimulatie is ook iets wat wij vroeger deden. Tegenwoordig wordt het niet meer vergoed, maar dit helpt echt en heeft de mensen ook een veel beter kwaliteit van leven gegeven.

7. Wat is de algemene houding tegenover ECT?
 - a. Vaak schrikken mensen daarvan het is het laatste redmiddel. Als dit niet werkt dan werkt niks meer. Zo denken deze mensen. Zijn gaan er toch vanuit dat het werkt als in als de dokter dit zegt dan zal het wel werken. Het klinkt heel heftig. Goede voorlichting van wat er allemaal gebeurt. Ze horen soms verhalen van bekenden of in de media. Onbekend en vaak roept het vragen een weerstand op.
8. Wat houdt een chronische depressie in als in hoe wordt dit geconstateerd?
 - a. Dysthymie is een chronische verlaagde stemming. Dit is milder en een langdurige depressie. Therapie resistente depressie bestaat ook en dit klinkt heftiger dan dat het is. Hier is nog een ECT toegepast namelijk en dit kan deze patiënten echt helpen. ECT kan hier dan helpen. Onderhouden en beschermende factoren is een belangrijk iets voor de mensen die het hebben. Met een partner ben je wat beschermd en als je je gasrekening niet kunt betalen dan heb je een onderhoudende factoren. Iemand met een slechte jeugd is daar misschien biologisch zwakker voor. Je kijkt naar een multifactor ding, zoals oorzaak wegnemen helpt niet bij een depressie. Een goede basis is van belang voor het weggaan van een depressie.
9. Ziet u deze vorm van depressie bij een specifieke leeftijd of is dit aanwezig bij elke leeftijd.
 - a. Kinderen kunnen wel depressie hebben, maar wordt niet zo gediagnosticeerd. Meestal bij de 40 zit de piek. Ook bij ouderen. Dementie komt ook soms gepaard met depressie. Sociale media heeft ook zeker een invloed. Sociaal maatschappelijk heeft ook invloed rondom het individu.
10. Wat voor reacties krijgt u van patiënten als u ECT voorstelt als behandeloptie.
 - a. Is al beantwoord met vraag 7.
11. Hebben grote gebeurtenissen in de wereld effect op het humeur van de mensen? Schrijft u ze dan ook andere medicatie voor?
 - a. Zelf onderzoek doen.
12. Is er een inclusiviteit kaart van verschillen in depressie? (hoe bepaal je de ernst van de depressie?)
 - a. Daar hebben wij niet echt een richtlijn voor. Wie laat je zien misschien met genderfluid. Iedereen kan het treffen. Onmogelijk om te doen aangezien het bij iedereen voorkomt. Het kan iedereen treffen.

A7 GAME CONCEPT ONE

VR experience

This is a VR experience where you are able to look through someone's eyes who are depressed. This concept will first start with the player at work or another social gathering where it is required to be there. This fits perfectly with how depressed people feel. They have to be there and want to not stand out. So, they are present, but are either in the corner or somewhere hidden. The player notices them and makes 'eye contact'. This is then how you are transported to this person's brain and eyes.

This concept can also be adapted towards a more simpler concept in order to gain more empathy and simplicity towards this VR experience. This idea would still follow through my eyes, but it would be a bit easier to understand.

The features

- You are able to look at this person and will then be transported into their world. You are going from a colourful world into a more grey world where everything feels like a blur. This is how a depressed person experiences the same thing you are seeing. For someone who is not depressed they can now experience what depression is. This would be something like walking a mile in my shoes concept. After experiencing what it is like to be depressed the person can walk up to them and ask them what is going on. (Maybe insert here a sort of lead up to the ECT method for depression therapy. At the very least give them this option here.)

- During this outer body experience the player sees abstract objects and hears muffled sounds.
- You start out in a colourful world but as soon as you switch bodies the colour fades.
- One room type of game where the player can walk around in the game while walking in real life.
- Movement can be limited to none at all with darkening of the screen to teleport around in order to not generate motion sickness.
- Inner monologue where the player hears about the depressed person's thoughts and how they deal with the situation.

A8 GAME CONCEPT TWO

Concept 2: VR depression creature

The VR experience puts you in the place of a depressed person. You can interact with your environment and hear their inner thoughts. The depression will also take form as some sort of creature that you can see. For example, it can sit on you the moment you try to get out of bed. Combined with the VR controls making it harder for you to get up by having to push it off or push a button multiple times to actually sit up, it will simulate the feeling of how hard it can be to even get up when you are depressed. By making the depression a visual aspect, it might help the user identify with it and understand that it is an illness, instead of thinking someone is just "sad" or "lazy". It is also a good way to remind the user that it's a simulation.

Basic features

- desaturated colors
- negative inner monologue, catastrophizing
- interacting with environment/ having to perform tasks
- being able to walk through the house (bedroom, bathroom, kitchen, living room)
- Having a positive option but not being able to choose it or perform it

Possible features for creature

- Getting out of bed while the creature is sitting on you. You have to push it off or push a button on the controller many times to get it off of you.
- The creature covers certain parts of the room, like pictures with friend and family or hobbies. Since people with depression tend to lose sight of the things they once loved.
- The creature can cover your screen for a part when you try to focus on an interaction
- The creature, even when you do not see it, can be on your back while walking. Making it hard to move around in the application. It should feel like there is some resistance.
- The creature can always be in your way. Always in your eyesight.

A9 LINK TO QUESTIONNAIRE & QUESTIONNAIRE

<https://docs.google.com/spreadsheets/d/1TcBi2P-8dwgQ1bN5B6k2Kx0Uy3M0jCnYRu-sAI5qF54/edit?usp=sharing>



Gameplay test -
Google Formulieren.p

A10 NOTES FROM THE PLAYTEST

1. Humam:
 - Dropped phone
 - Can't reach under cover to grab phone
 - Headset is shaky (doesn't fit well)
 - Tried to grab clothes
 - Alarm is hard to push
 - Monologue for pictures not clear
 - All audio plays at the same time
 - Hard to grab laundry
 - no laundry in dryer and washing machine
 - The floor is lower than the actual floor
 - Light from the back of the fridge
 - Thinks counter looks like blood
 - Tried to open oven
 - Tried to move chairs

Feedback in person:

- Add physics to objects

2. Lisa:
 - white screen is bright when you teleport to social media thing.
 - Phone fell off the stand in social media scene and got lost
 - Tries to turn off the alarm on the phone
 - Floor is too low in calibration
 - Tried to grab cup and plate
 - "Because of teleportation it's hard to focus on dialogue"
3. Mihai:
 - The door glitched a bit
 - Went straight to the closet to throw blocks
 - Took time to look at the pictures
 - The button of alarm flies off a little
 - The controller in the bathroom
 - Can't grab clothes off the floor

- Hit hand to the actual wall
 - put collider on noodle packs
 - tries to grab everything
4. Christian:
- “This guy is so depressed and has a big ass house”
 - Turn off the fields of interactivity
5. Finn
- on-screen text is low
 - struggled to start the social media mini-game
 - goes to the phone twice
 - lines overlapping
 - tries to pick up the cup on the desk
 - tries to pick noodles
 - doesn’t find it comfortable to look down to look at the text
 - said the text by the picture was good for context
 - make the triggers a bit better
 - voice randomly kicking in, happens too fast
6. Borja:
- didn’t understand how to turn off alarm
 - thought phone was alarm
 - text too low
 - picked up phone twice
 - dialogue for photo’s starts playing when he picks up the ball
 - didn’t look at photo’s
 - skipped bathroom
 - tries to grab everything
 - Didn’t know what to do from the beginning
7. Kalina
- doesn’t pay attention to the alarm
 - right closet door keeps clothing
 - keeps playing with the ball
 - teleported into the closet
 - phone has problems with transporting to social media scene
 - keeps playing with the ball
 - didn’t look at pictures
 - ignored the voice, too busy exploring, the voice did sound depressed
 - You end up in your room again, you never got out
 - The right door keeps closing when you open it.
 - was actually fun

A11 FINAL PRODUCT LINK AND SCREENSHOTS

<https://youtu.be/tFSVYTfq9ol>





A12 13 REFLECTION

The opportunity to graduate at the lectorate Ethics & Technology was a great experience. They gave us a lot of creative liberty and had faith in our skills. I learned a lot during these past 5 months about VR development. VR development is something I have never done before starting this project. The Unity XR toolkit helped me build the game quick and tutorials taught me a lot about how to set up VR in Unity. This toolkit saved me a lot of time and made my development phase easier to do.

For full transparency I did use ChatGPT for some inspiration for the empathy phase of this document. This was done to get some inspiration for VR games and rephrasing of certain sentences. This was all in accordance and with an open discussion to my graduation coach Hester van der Ent.

Time management and setting a scope of the project has always been one of my weak points as you always want to impress the client and over deliver. Luckily during the initial round of setting up the experience my project member and I set up clear boundaries of our personal limits. This helped a lot and made us be on the same page from day one. Even though progress was quick during the development phase some specific features became too complex to be done. So, the decision was made to scrap them. This was the smiling feature in the bathroom and a more elaborate heavy feeling feature.

Furthermore, during the ideate phase we waited for a long time on a VR headset that we could use. This made progress slow and sometimes unmotivating. During this time, we had to wait for a response back from the Saxion ethical committee as we are working at a lectorate with medical solution. The original idea was to test this at a festival so having an ethics committee looking at our project is advisory. The subsidy was canceled and not granted to us so the response from the ethical committee was not as important anymore and we decided to work further on the game without advice from the committee. As of writing this there still has not been an answer from the ethical committee. We only got an email that they are looking at it and nothing really happened after that.

For me personally as a Creative Media & Game Technology student and soon to be young professional. I developed myself a lot during the study. This can be found within this graduation project. All the skills that I learned as a designer were applied within this project. The game design, programming the game and researching topics that I do not know anything about were all vital skills I learned during the last years as a student. My personal weak points are that sometimes I am over ambitious and would like to please the client too much. My personal strong points are that I learn things quick and can adapt to any solution the client wants. This was part of this graduation project. Personally, I do not have a lot of experience with building VR experiences and games. Combine that with a new toolkit that had to be learned and this made for an excellent learning opportunity.

For my future career I can see myself continuing with serious game development and start working for serious game companies. Serious gaming has always been an interest to me and doing something good with games is what gives me joy in my work. That is in part why I chose to take this opportunity with the Lectorate Ethics & Technology. They gave us a great opportunity with this project and a great portfolio item. The freedom given by the lectorate Ethics & Technology was fantastic as they put their trust in us to come up with a solution to their current project.

Looking back at this graduation period the time flew by. It helped that I did this project together with good company and we got along well. Working with friends is sometimes ill advised, but me and Eva did not really know each other in the beginning it worked out. We made clear agreements in the beginning of this project what we are going to do and what not, what our limits are and our expectations. This helped with a good basis for the project. Some great memories were made during these last five months.

All in all, I have learned a lot and now know what it is like to work on a VR game/experience. It was more fun than expected and gratifying to work on. When you are in the VR headset you really feel that you are in a different world. This makes it that much more fun to develop for. Combine this with the assets made by Eva Grootsholten, the artist, you really felt that you were in a different world. This motivated me a lot at some point, as I started to see everything come together in the experience. In the end I am super proud of the results that are now completed in the experience. A lot has happened personally and at school these last few years with last year having a lot of difficulties. So, managing to now graduate is something I will look back on in a few years with a big smile.