VIRTUAL REALITY THERAPY FOR PSYCHIATRIC DISORDERS

CREATIVE MEDIA AND GAME TECHNOLOGIES (CMGT)
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Abstract

This research report explores the idea of creating a virtual reality gamified experience that addresses the topic of mental health by bringing more understanding to mental disorders. In doing so, the paper begins by exploring how the topic of mental health could be broached with the use of video games. A survey was conducted for the purpose of gauging how the target audience viewed the topic of mental health and video games separately and in conjunction. Following this, commercial games and therapy games were analyzed for laying the foundation of the features and mechanics of the experience. With the collected research, a mental health game concept was designed and documented within a game design document. Ultimately, a prototype was created of the experience and tested with individuals ages 20 and older. The results of the test concluded that the concept addressed mental health in a realistic manner and has the potential to either become its own form of treatment for psychiatric disorders or be added to traditional treatment methods.

Introduction

The discourse surrounding the topic of virtual reality technologies has been had numerous times over the past decade. Even so—to this day—its devices remain scarcely used and the extent of its impact on society and human interaction is yet to be explored (Jenkins, 2019). In this regard, the subject of virtual reality and mental health sciences share a great deal in common. A paper written by José M. Bertolote titled *'The roots of the concept of mental health'* state that while the concept of mental health could be traced back centuries, technical references to the term as a field or discipline are not to be found before 1946; the establishment of the World Health Organization (WHO) and a Mental Health Association in London. From that point onward, several mental health associations have been created across the world (Bertolote, 2008).

Since then—whilst advancements in the field of mental sciences have progressed significantly, mental disorders such as depression and anxiety remain a leading cause of disability worldwide (Vos et al., 2015). In response to the prevalence of these psychiatric disorders, the discourse around the topic has steadily increased yet the stigma around the subject matter persists (Pavlova & Berkers, 2020). On a social level, this has led to conversations about mental illnesses being halted whereas on an academic level it is observed that less funding is being given for research towards this science. These grounds have not only stagnated society's development in the psychiatric field but have also limited the tools available to professionals to tackle our most prevalent disability (Rasenick, 2017).

Given that—individuals from both Saxion University of Applied Sciences, Delft University of Technology, and Enliven are in collaboration. The purpose of this cooperation is to explore the use of virtual reality technologies and their efficacy in addressing the topic of mental illnesses in a virtual environment. Ultimately, the aim is to lessen the stigma surrounding the topic by bringing awareness and attention to it through a medium that has yet to be fully explored.

Company

Background

Enliven is a software company—based in the Netherlands—that centers itself around addressing social issues through the use of virtual reality technology (Enliven, 2021). Whilst the concept of virtual reality and its devices creating virtual worlds far beyond what the mind could imagine is a tale that has been told throughout time, the integrated use of said virtual reality systems within society has many realms that are yet to be examined (Jenkins, 2019). Enliven, as a company, strives to explore the realm of current social issues by creating virtual experiences that allow individuals to view world issues through the eyes of another. The aim of creating such an experience is to encourage empathy and understanding for other fellow human beings, in hopes of tackling these matters—together (Enliven, 2021).

Despite the company itself only being officially founded in the year 2019, during that time it has not only joined a small team of roughly fifteen creative individuals together but has also obtained a grant from ‘Google.org Impact Challenge’ following traction gained from Dutch media sources (Enliven, 2021). At this moment, the team at Enliven is working on virtual reality experiences that address issues regarding ‘Discrimination’, ‘Hate Speech’, and ‘Mental Health’ (Enliven - Impact Fund, 2021).

Objectives and responsibilities

In developing an experience or product that is centered around creating more understanding and empathy, one question that is often asked at the forefront of the development process is: “How can we connect our users to our product?”. As previously addressed—whilst the concept of creating virtual experiences is not new, its success rate in being used and integrated into society indicates the contrary (Jenkins, 2019). Moreover, attempting to tackle the subject of mental health in such a seemingly new environment would also bring its own set of difficulties as the topic of mental disorders is quite broad and the stigma that surrounds it persists (Rasenick, 2017). Many of these obstacles and uncertainties regarding these subjects are surfaced by conducting desk research, interviewing the target audience, and other research methods that shall be introduced throughout this report. In obtaining this knowledge, a virtual experience would be designed for individuals seeking aid in their mental health journey. Designing an experience in which victims of mental disorders can come forward opens a new door for professionals within this field through which data could be harvested and analyzed. In essence, the virtual event aims to bring more understanding. To those suffering from a mental disorder, it would be understanding oneself and one's emotions. To the professionals in the field that utilize this tool, it would further their understanding of prevalent mental disorders in today’s society and how to approach them.

As a student with an educational background in ‘Game Design’, my aim is to research and design systems that could be gamified in the virtual experience which would in turn encourage users to engage with the produced product. For this, the following roles shall be filled throughout this project:

- Game Designer → Concept Design, Game Design Documentation
- Narrative Designer → World Building, Narrative/Story
- Level Designer → 3D Mockups, Assets Placement

Market

User

The virtual experience is aimed at individuals who are suffering from one or more mental disorders—or are experiencing symptoms of one. In regards to the age demographic, according to the *‘National Institute of Mental Health’* the prevalence of any mental illness is highest amongst the individuals aged eighteen (18) to twenty-five (25) (Merikangas et al., 2010). Moreover, this experience will be created for a virtual reality (VR) headset. An article that covers the challenges and opportunities of virtual reality devices states that engagement and use of these devices are highest amongst those ages sixteen (16) to thirty-four (34) (Buckle, 2018). As there is much overlap between the two stated age groups, it has been decided that the target audience for the virtual experience will be individuals ages sixteen through thirty-five. See Figure 1 and 2 for the background research conducted on the target audience and the user persona created.

Figure 1

User empathy map based on target demographic research

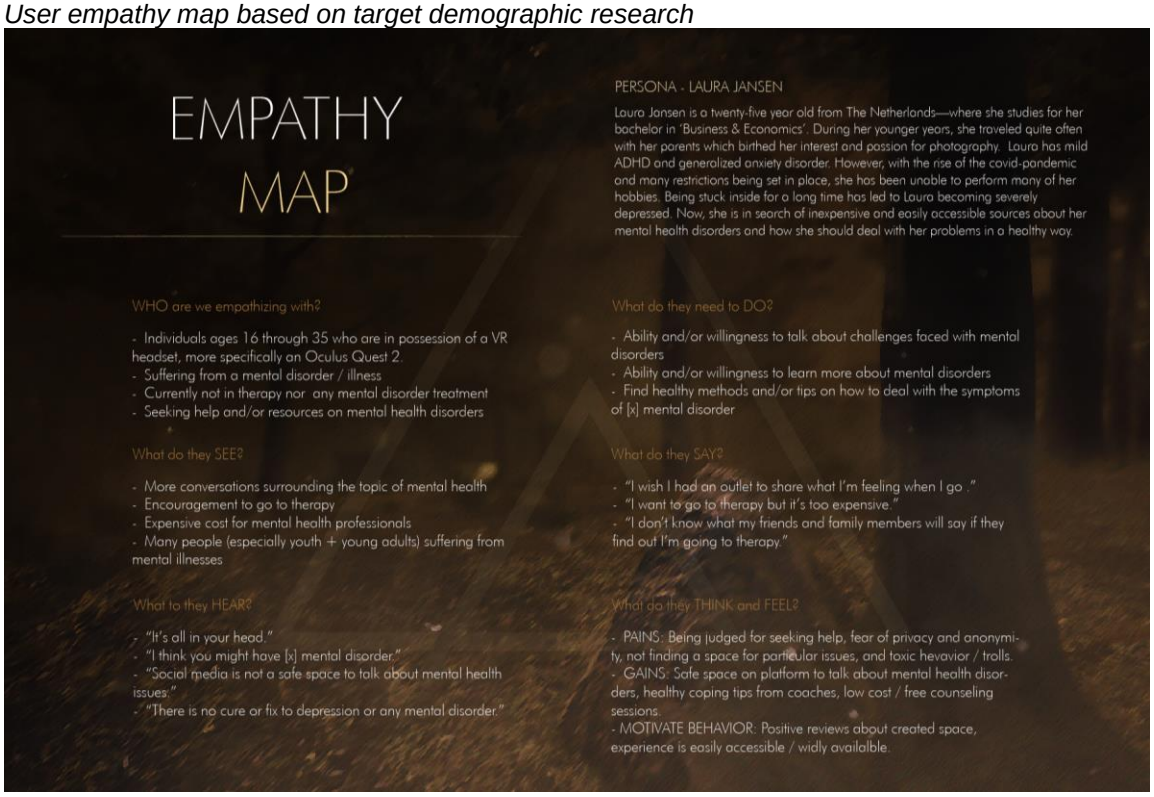
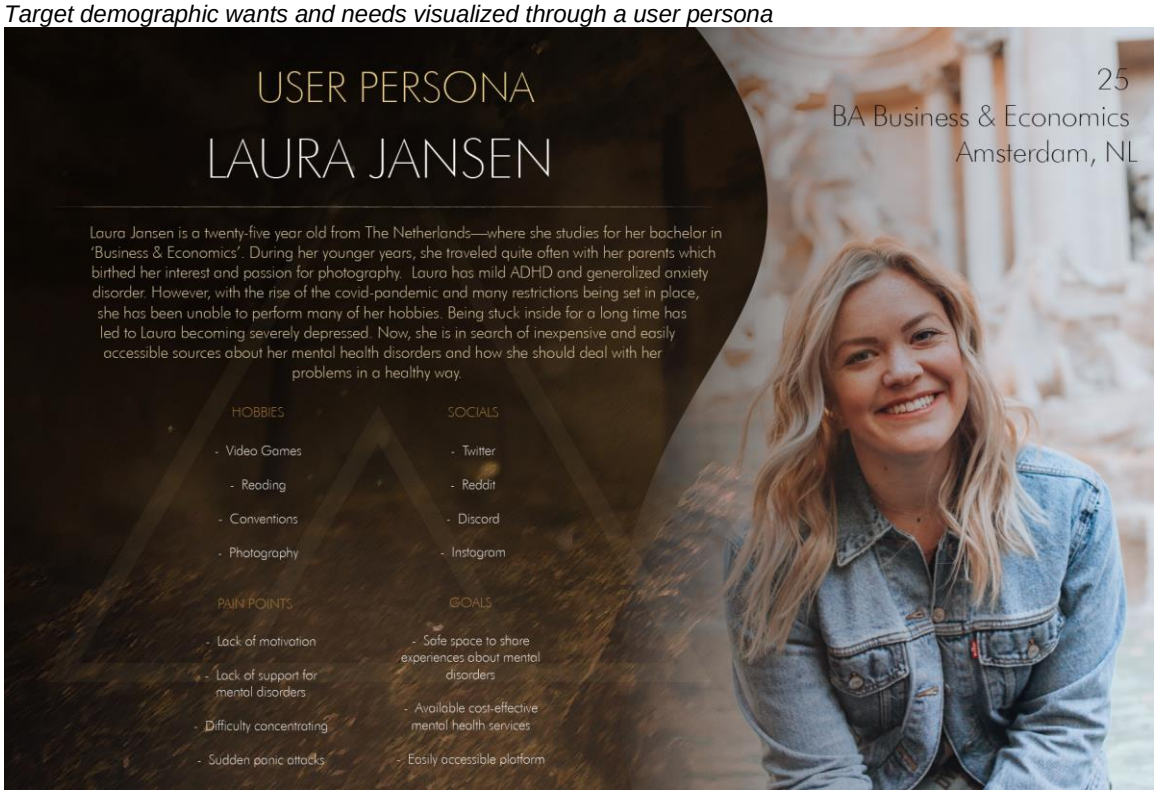


Figure 2

Target demographic wants and needs visualized through a user persona



Trends

In researching trends of existing virtual reality experiences that address mental disorders—also known as virtual reality exposure therapy (VRET)—a commonly found theme is that these experiences tend to focus on one, if not less than two mental disorders at a time. Consciously making this decision early in the development process has led to more specific experiences being designed for a particular psychiatric disorder. An example of a well-known successful VRET is *'Virtual Iraq'*. This is an experience created for war veterans who suffer from post-traumatic stress disorder (PTSD). By simulating the setting of war, many participants were able to normalize and overcome their traumatic episodes (Rizzo et al., 2005).

Alongside trauma-related disorders such as PTSD, other forms of mental illnesses have also been explored through VRET, such as anxiety disorders, eating disorders, and psychotic disorders. However—in regards to more generalized anxiety disorders and personality/mood disorders, there has been little to no evidence thus far on its efficacy via VRET (Emmelkamp & Meyerbröker, 2021).

Competitors

To establish what or who the biggest competitor(s) might be, it is first important to outline what the goal of the newly created VRET experience is. As briefly mentioned in 'Objectives and responsibilities', the virtual experience aims to become a tool that could be used to achieve a better understanding of mental disorders by collecting and analyzing data of the users that make use of it. In making that statement, it is crucial to recognize that the psychiatric field already has a wide range of tools at its disposal (Kessler et. al., 2005). Therefore, the greatest challenge or indicator of success will ultimately rely on how well the newly created tool can support or surpass existing tools within the psychiatric field.

Main Research Question and Sub-questions

Problem statement

As time goes by, more individuals are speaking up about the importance of mental health. However, despite the increased visibility, many individuals—especially youth and young adults—who face these issues are still hesitant to seek treatment or help (Pavlova & Berkers, 2020). The aim is to lower the bar/threshold in obtaining psychiatric disorder treatment for these said individuals who are currently not seeking/receiving any form of aid.

Indicators of success

- The design of the environment is user-centered as it portrays mental health in a realistic manner
- Users gain the resources needed to deal with their mental disorders healthily and are able to apply the knowledge obtained in their daily life

Research question

How to create a virtual environment for a virtual reality headset that emulates and gamifies the experience of current (physical) therapy sessions for individuals ages sixteen and older who are suffering from a mental disorder?

Sub-questions

1. How is the topic of mental disorders broached in video games?
2. How can a virtual environment be designed around a user's mental disorder?
3. How can gamified virtual experiences addressing mental health be fitted and/or combined with existing forms of mental disorder treatments

Methodology

The approach to psychiatric disorders in video games

Analyzing and understanding the use of mental disorders within video games is a process that will require a combination of several research methods. Primarily, a general search was conducted using both Google and Google Scholar search engine on video games that address mental disorders. With this information, a list of games was produced for further analysis. Ultimately, a survey was conducted with the target audience to gauge their insights on video games that address mental health and their potential level of influence in the near future.

Creating a gamified virtual experience addressing mental disorders

From researching games that addressed psychiatric disorders and analyzing their designs and performance on the market along with the insights acquired from the previously conducted survey, a list of guidelines were mapped out on features and mechanics to include in the virtual experience. These were brought into the concept ideation session(s) and the final design choices were documented in a game design document.

Integration of gamified virtual experiences into mental health treatment

With the solidified concept documented, a demo video was created to display all features and mechanics found within the virtual experience. This demo video along with a 360 video was viewed together with the target audience. Following the videos, an interview was conducted with the participants to obtain feedback from the interviewees on the individual features and mechanics presented throughout the videos. For the testing session, the experience was analyzed on four aspects: functionality, desired effect, aesthetic characteristics, and added value. The results of these interviews were used in the creation of a user journey map and a list of recommendations for further improvements to the concept experience.

Results

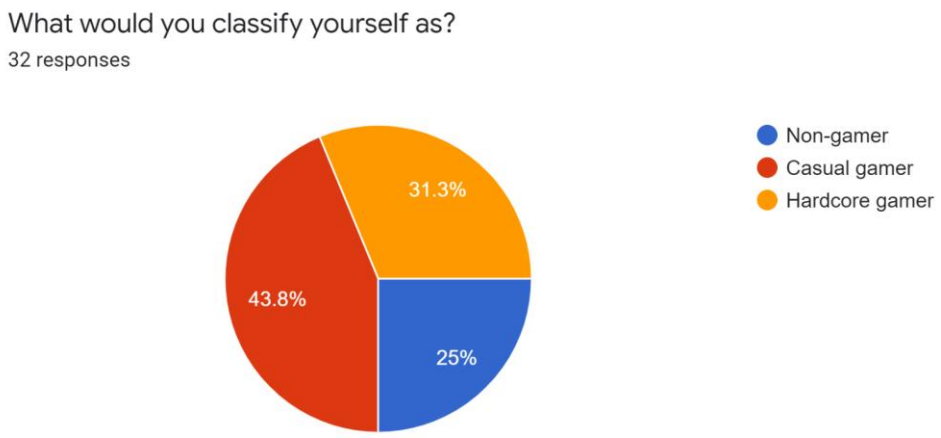
The approach to psychiatric disorders in video games

Societal perspective on the subject

By having a thorough understanding of where members of society stand in regards to video games that address mental health, a tailored and effective experience could be designed. This process of broaching a topic by taking into account where the level of understanding of the target audience lies is referred to as ‘bridging the gap’. In the academic field and within the gaming industry, this is done by acquiring information on the target demographic’s current knowledge, awareness, and skills and comparing it to where it should be after interacting with the designed product (Cannon-Bowers et al., 2014).

In pursuit of this information, a survey titled *‘The use of video games in addressing the topic of mental health and mental disorders’* was created and distributed to the target audience (see Appendix A. Test I: Survey Results). The aim of the questionnaire was to gather information from the target audience regarding their understanding and outlook on the subjects of ‘mental health’ and ‘video games’ both individually but also in conjunction. The survey amassed a total of 32 respondents ranging from the ages 18 to 49, of which 16 were male (50%), 15 female (46.9%), and 1 non-binary (3.1%). As the aim of this survey was to gauge the target demographic’s understanding of mental health and video games as previously stated, the respondents were primarily classified and broken into groups based on their usage of video games and their experiences and/or understanding of mental health. See Figure 4 for the classification of the respondents into sub-groups: non-gamer, casual gamer, and hardcore gamer. Additionally, both casual gamers and hardcore gamers were asked what kind of games they enjoyed playing. The listed games were categorized by genre, and the results of the top 3 genres, in order, were: role-playing games (RPGs), first-person shooters (FPS)—and tied in third—real-time strategy (RTS) and simulation games.

Figure 4
Classification of survey respondents based on their usage of video games



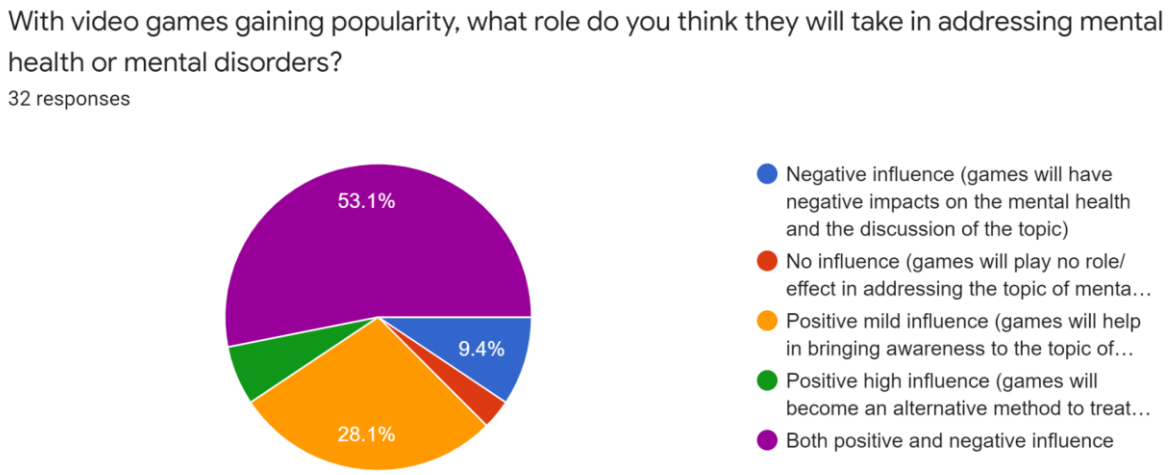
For the classification based on understanding pertaining to mental health, the participants were asked about their experiences with mental health and mental disorders and how they would describe these terms. Of the 32 respondents, 17 (53.1%) stated they had a mental disorder or experienced symptoms of a mental disorder, 10 (31.3%) answered to having no experiences with their mental health, and 5 (15.6%) of the remaining participants stated they were uncertain if they had a mental disorder or experienced any symptoms. Following this question, the group was asked to give their initial thoughts when hearing the term 'mental health' or 'mental disorder'. The results displayed a similar level of understanding irrespective of age, gender, gaming classification, or prior experiences with psychiatric disorders. The answers given were common mental disorders such as depression, anxiety, post-traumatic stress disorder (PTSD), borderline personality disorder (BPD), and schizophrenia.

Lastly, the participants were asked about their perspective on the subject of mental health and the potential changes observed over the last decade. A majority of the respondents stated that the topic had become less stigmatized and witnessed more open discussions about the subject, especially on social media. With that being said, a portion of the group commented that the subject and the field as a whole required more attention and awareness, particularly with regards to lesser-known mental illnesses.

Another area covered in the survey was the 'Influence of gaming on the topic of mental health'. With the given preliminary information gathered from the respondents on their gaming classification, understanding of mental health, and outlook on the mental health field over the last decade, the group was now requested to give their thoughts on the potential level of influence they *believe* video games might have on the topic of mental health in the near future.

The viable options ranged from video games having a negative influence to a positive one. In the listed options, a distinction was made between a positive mild influence and a positive high influence. This separation was made to gauge the difference between games bringing awareness to mental health (mild) and games that could potentially become a treatment method for mental health (high). See Figure 5 for the results of video games' *suspected* level of influence on the subject. A majority of the respondents viewed games as a positive medium to address mental health. A large part of the group viewed games as a source of hope for many individuals dealing with mental issues as it provides a safe space to learn, and overcome obstacles and encouraged players to seek help. The critiques given to video games and their potential negative influence on mental health were in regards to the addictive nature of these (video game) mediums and the possible negative portrayal of mental health to a wider target audience (e.g. video game protagonist going 'crazy') (see Appendix A. Test I: Survey Results).

Figure 5
Video games' suspected level of influence in addressing mental health



Ultimately, the respondents were asked if they would play a game that brought awareness to the topic of mental health by teaching individuals about mental disorders: 12 (37.5%) answered yes, 18 (56.3%) answered maybe, and 2 (6.3%) answered no.

Commercial vs therapy video games

In the approach of addressing psychiatric disorders or mental health within video games, a distinction must be made between commercial video games and therapy video games. Therapy games—also referred to as 'bespoke games' in the academic field—are, as the name states, games that are custom-made to be used in a therapeutic setting. Tasks and rewards within these games are based on commonly used mental disorder treatment methods such as 'Cognitive Behavioral Therapy' (CBT). Commercial games on the other hand are intended primarily for entertainment purposes; examples of such games are Portal 2, Mario Kart, Candy Crush, Plants vs Zombies, etc (Kowal et al., 2021).

When comparing both video game types on their ability to provide mental health benefits to individuals, recent studies have shown commercial video games to be as—or in some cases if not more—effective in providing mental health benefits than therapy games (Sweet, 2021). Examples of such benefits have been found in the aforementioned commercial video games, such as Plants vs Zombies, which studies have shown to reduce anxiety by creating a state of flow and goal achievement (Fish, Russoniello & O'Brien, 2014). Alternatively, games such as Candy Crush and Mario Kart have also been recognized for their benefits in decreasing depressive moods and stress by promoting enjoyment, and motivating players to complete tasks—encouraging goal-setting behavior (Pine, Fleming, McCallum & Sutcliffe, 2020). Furthermore, commercial video games possess qualities that both traditional therapy methods and bespoke games lack: accessibility and connectedness. With the development of technology and the rise of commercial multiplayer games, players all around the world are now able to engage with one another and form communities. The opportunity to socialize and make these connections combats the leading cause of poor mental health amongst most individuals: loneliness. In Table 1, the similarities and differences between commercial and therapy games are further highlighted (Kowal et al., 2021).

Table 1
Differences between commercial and therapy games

Criteria	Commercial games	Therapy games
Accessibility	Widely accessible	Not widely accessible
Purpose	Entertainment	Therapeutic
Cost	Low to no cost	Low to high cost
Mobility	Portable	Portable
Content	General	General, Tailored (to the user)
Experience	Single or multiplayer	Often single player
Guide	No supervision required	Qualified personnel required

Whilst the two form of games do share many aspects in common, as can be seen in the table above, the areas on which they differ are the most significant. Numerous individuals experiencing mental health disorders—or symptoms of them—do not receive any form of treatment. The biggest contributing factor to this are: individuals living in rural areas that are hard to reach, treatment sessions only available during school or work hours, costs of treatment, and/or being physically or psychologically unable to commute (Granic, Lobel & Engels, 2014). While therapy games do have the advantage of having a less stigmatized space to explore and learn about the topic of mental health, in view of the higher costs needed to create these bespoke games as well as it not being accessible to the general public, commercial games currently hold an advantage in the marketplace (Kowal et al., 2021).

Moreover, commercial games also have the added benefit in that it is driven through intrinsic motivation (Sweet, 2021). Intrinsic motivation refers to behaviors that are driven by internal rewards or personal gratification and is recognized within the field of psychology as one of the important elements needed for effective change in behavior (Cherry, 2022). As stated by Glenn Platt, a Ph.D. professor at the Miami University in Ohio, “people play commercial video games because they want to. And as such, the beneficial aspect of these games (in terms of anxiety and depression) are bestowed as a byproduct of their fun and not the outcome of their game ‘homework’” (Sweet, 2021). This sentiment was also shared by many respondents who conducted the survey stating that “I do not want an experience where mental health was the focal point or pushed into their face but rather something that occurs naturally as the game progressed” (see Appendix A. Test I: Survey Results section ‘Desired mental health game elements’).

Elements of psychiatric disorder games

As was previously established, in regulating one’s mental health, research has shown both commercial and therapy games to be effective (Sweet. 2021). However, a primary question persists: ‘How are these games able to regulate an individual’s mental health?’. In answering this question, a collection of widely known and effective commercial and bespoke games were collected and analyzed. For the analysis of each game listed, user and/or expert reviews, articles, and ratings were used in gaining a better understanding of the game, its goal, and the features and mechanics present. The purpose of undergoing this process was to acquire insights on each game’s design and by extension, the reason for their success on the market. See Table 2 for additional information regarding the aforementioned therapy games.

Therapy games

Throughout the research process on therapy games, the games which appeared numerous times across several academic papers were: SPARX, MindLight, and BraveMind VR (Kowa et al., 2021; Zayeni, Raynaud & Revet, 2020; Lin, 2021).

Table 2
Therapy games analysis

Game	Details	Experience	Source
SPARX	- 3D single-player role-playing game (fantasy) - Ages 12 to 19 - Mild to moderate depression - Cognitive behavioral therapy - 7 levels, using different CBT techniques	- Defeat GNATs (gloomy negative automatic thoughts) using CBT techniques - Range of NPCs present that educate the player on different disorders	(Merry et al., 2012) (Lin, 2021) (SPARX, n.d.)
MindLight	- 3D single-player neurofeedback game - Ages 8 to 12 - Anxiety spectrum disorder - Neurofeedback training, exposure training, attention bias modification - Guided by a clinician	- Navigate through a mansion, find the source of darkness, defeat it - Use of neurofeedback device to control in-game abilities - Overall reduction in anxiety at post-intervention (3 and 6 months follow up)	(Kowal et al., 2021) (Wijnhoven et al., 2015)
BraveMind VR	- 3D single-player action game (simulation) - War veterans - PTSD, substance abuse, pain - Exposure therapy - 14 levels, controlled by a clinician	- Recreates trauma scenarios from war/battlefield - Uses directional 3D audio, smells, and vibration to emulate the experience - Teaches effective emotional coping skills to prepare for combat - After 2 90-minute sessions for two weeks, significant stress/PTSD decrease	(Lin, 2021) (Perlman, 2017)

Commercial games

As the benefits of commercial games on mental health had already been established (e.g. Plants vs Zombies, Mario Kart, and Candy Crush), it is important to note that the aforementioned commercial video games are entertainment games. Entertainment games are video games designed with a focus on fun. In other words, the goal of these games is to be entertaining and trigger the player's curiosity. Aside from this game type, there are also serious games. Serious games on the other hand are created with a focus on learning. The goal of this game type is to provide the player with new knowledge that would lead to a change in skills and/or behavior (Susi, Johannesson & Backlund, 2015). As the goal of the virtual experience is to bring more understanding to mental disorders and the topic of mental health, within this section, serious games that address the subject of mental health were analyzed. Of the several game articles sought on mental health (Levandoski, 2021; Quick, 2021; Harris, 2021), the three most recurring and highly reviewed games were: Night In The Woods, Gris, and Hellblade: Senua's Sacrifice. See Table 3 for additional information regarding the aforementioned commercial games.

Table 3
Commercial games analysis

Game	Details	Experience	Source
Night In The Woods	- 2D single-player adventure game - Ages 12+ - Depression, anxiety, bipolar	- Depiction of young adult issues - World filled with rich dialogue - Journal that holds all memorable interactions encountered - Group of unique and supportive friends	(Quick, 2021) (Harris, 2021) (Rad, 2018)
Gris	- 2D single-player platform-adventure game - Ages 7+ - Loss and depression - Voiceless / nameless protagonist	- Shows 5 stages of grief - Level design that changes with the emotion it wants to convey - Monster that represent depression following the protagonist - Gray world starts to regain colors as protagonist beings cope with their loss	(Quick, 2021) (Harris, 2021)
Hellblade: Senua's Sacrifice	- 3D single-player action-adventure game - Ages 18+ - Severe psychosis, schizophrenia, depression	- Use of sounds to recreate 'voices in your head' - Illusions of monsters and demons - Symbols scattered around the environment leading to a hidden path	(Quick, 2021) (Harris, 2021) (Tyrrel, 2017)

Creating a gamified virtual experience addressing mental disorders

Concept ideation

With insights gained from the target audience on the mental health field and by analyzing various commercial and therapy games to gain a better understanding of their designs and approach in addressing mental disorders within their respective experiences, the next step in the process was the concept ideation session. The brainstorming sessions for the concept experience was done in collaboration with individuals from the Enliven company and Delft University of Technology. During these sessions, the 'brainwriting' technique was utilized. Brainwriting is a brainstorming method used for quickly generating ideas by having participants in a group write their ideas (Usability Book of Knowledge, 2012). Throughout the brainstorming phase, a wide range of ideas were created ranging in complexity in order to explore out-of-the-box ideas, stimulate creativity and innovation. From these sessions, four (4) ideas were created. With the description of each created concept, four elements needed to be addressed:

1) Experience type → *Is the experience educational or therapeutic? Is the designed experience meant to be played individually or as a group?*
2) Mental disorder → *What mental disorders does this concept address? Single? Multiple?*
3) Duration → *How long is the created concept expected to last?*
4) Functionalities → *What are the main features found within the concept experience?*

The 4 brainstormed ideas and a short description of each concept are as follows:

- **#1 VR THERAPY EVENT SPACES** → *Attend custom mental health talk spaces in VR.*
    - Experience Type: Educational, Group Sessions
    - Mental disorder: All
    - Duration: Min: 15m, Max: 2h
    - Functionalities: Experts – Create events, User – Request to speak, Avatar customization

- **#2 SPACE THEMED MINI-METAVERSE** → *Play mental health mini-games in an open world.*
  - Experience Type: Educational, Group Sessions
  - Mental disorder: All
  - Duration: Max: 2h, Mini-games max: 30m-1h
  - Functionalities: 'Free roam', Space/planet exploration, Mini-games
- **#3 PROBABILITY GAME (DISORDER)** → *Diagnostic advice based on in-game quests.*
  - Experience Type: Diagnosis, Individual Sessions
  - Mental Disorder: 1 or 2
  - Duration: Max 1h
  - Functionalities: Interact with items, Quests
- **#4 MIRROR MIRROR** → *Personalized mirror/portal to connect to mental health experts.*
  - Experience Type: Therapy/Counselling, Individual Sessions
  - Mental disorder: All
  - Duration: Max 1h
  - Functionalities: Search filters for sessions, Customizable personal space

Each concept was further analyzed and evaluated using a SWOT analysis (Strengths, Weaknesses, Opportunities, Threats). See Table 4 for a summarized version of the SWOT analyses. For an extended in-depth list of this analysis and concept descriptions, see Appendix B. Concept Ideation SWOT Analysis.

Table 4

Summary of ideated mental health concept experiences

Concepts	**Strengths**	**Weaknesses**	**Opportunities**	**Threats**
#1 VR THERAPY EVENT SPACES	+ Create events + Custom filters + Safe space	+ Expert verification + Many moderators + Not personalized	+ User interaction + New platform	+ Too many events + Abuse of power
#2 SPACE THEMED MINI-METAVERSE	+ Exploration + Customize user + Mini-games	+ Very complex + Too much freedom	+ Expand world + Address more disorders	+ Overwhelming + Addicted to space
#3 PROBABILITY GAME (DISORER)	+ Engaging + Quests (goal-driven)	+ Gather data + Complex tailored experience	+ Used with traditional therapy + Tailor user quests	+ Wrong diagnosis + No other value besides diagnosis
#4 MIRROR MIRROR	+ Personalized + Customize user + Safe space	+ Little socializing + Barren space + Requires experts	+ Expand to group-based sessions + Track experience	+ Similar to traditional therapy + Limited care

Initially after deliberating with the brainstorm group, idea #2 ('SPACE THEMED MINI-METAVERSE') was selected. Despite being one of the more complex ideas, when compared to the others, the open-world aspect of the idea had the added benefits of being able to expand the world and hence the concept idea as well. For the designing process, this meant having the flexibility to design an experience that suited a larger target audience by addressing more types of mental disorders and providing options for players to use the experience individually or in a group. Additionally, the implementation of mini-games within the experience also added a level of engagement and user interaction which seemed to be lacking in the other concepts. From this point onward, the chosen concept was further worked out and detail ranging from the look-and-feel of the universe to the types of activities/mini-games that would be found in the experience were laid out (see Appendix C. First Concept Overview).

The final necessary step before going from the ideation phase to the creation process was to revisit the data collected in the previous chapter of this report regarding the target audience's input on video games that address mental health. With reference to the organized survey, in section 'Desired mental health game elements' (see Appendix A. Test I: Survey Results) the target audience were inquired what elements they thought were important to have in a mental health game. The common responses given in this section were as follows:

1) Entertaining/fun experience
2) Relatable narrative that realistically portrays mental health
3) Examples of what it is like living with mental disorder(s)
4) Real-life based techniques for dealing with specific mental disorders in a healthy manner
5) Clear, attainable goals for the players to follow

For the remainder of the report, the 5 elements listed above will be referred to as the five q's (5Q - qualities).

When comparing the 5Q's with the chosen concept, it became apparent that multiple of the listed qualities were missing in the concept idea. Besides the mini-games, there were no other gamified or engaging elements within the experience. Furthermore, the concept had no narrative or clear goal for the players to follow which made attaining elements 4 and 5 of the quality list difficult, if not unattainable. An additional brainstorming session was conducted. During this session a mind map of all element the concept experience needed to cover was created. From this point on, the new concept was further worked out (see Appendix D. Final Concept Breakdown). The new concept was an open-world multiplayer game which taught players about mental health by fighting against different mental disorders represented as monsters in the game. Aspects of the previous idea such as the open-world element, exploration and mini-games were kept in the creation of the new experience.

Concept creation

Before beginning with prototyping, the next step in the concept development process was to further workout the chosen concept idea and establish the experience's objectives, theme, features, etc. For this process, a game design document—shortened as GDD—was created. A game design document is used in structuring all essential features and mechanics required for the development of a video game (Conway, 2021). For the documentation of the concept idea, a GDD template created by UNC Hill Computer Science Department was utilized (CS UNC, n.d.). The provided template was then modified and narrowed down to the elements that were applicable to the mental health concept idea, which covered: the experience structure, gameplay & mechanics, the game world, and lastly the interface. See Appendix E. Game Design Document for an overview of the entire game design document.

Within the following paragraphs, the chapters found in the GDD are covered and the design-making process for each concept element is highlighted and analyzed.

Experience structure

The first chapter of the GDD gives a short overview of the concept experience. This includes a description of the game, the intended target audience and platform, and lastly, the overall theme and setting. The chosen theme and world setting of the experience was fantasy-based. This decision was made in view of both the popularity of the fantasy genre amongst the target demographic as described in Jesse Schell's book 'The Art of Game Design' chapter eight (2008) and by analyzing the survey data (see Appendix A. Test I: Survey Results) on the most commonly played game genre: role-playing games.

Gameplay & mechanics

In the listed qualities (5Qs), the target audience stated that the experience needed to have clear attainable goals for the players. In light of this, the main objective of the experience is to defeat evil spirits that haunt the land. To accomplish this, players would follow primary (required) and secondary (optional) quests each with their own given mission objective—alignment, exploration, rescue/escape, and race. The added secondary quests and varying mission objectives aid to provide a range of options and tasks available suited for different player types (achiever, socializer, killer, and explorer).

As for the progression system in-game, an equipment-based system was chosen instead of a leveling-up system. This method was utilized to bring the focus of the experience more towards the journey of learning about different mental disorders through the use of various tools and gear rather than receiving permanent stats. In essence, making the experience less linear and less about grinding stats (TV Tropes, n.d.). Ultimately, this system became the biggest component that connected other aspects of the experience such as the player statistics and in-game items to the subject of mental health.

Lastly, within this chapter, various roles found in-game were presented—most notably: the 'player' role and the 'expert' role. This decision was made by drawing inspiration from therapy games that actively involved licensed professionals in their experiences (e.g. SPARX, MindLight, and BraveMind VR). Experts within this concept take on advisory and educational roles. In other words, players can approach individuals with the assigned expert role to seek advice, information or simply complete quests together.

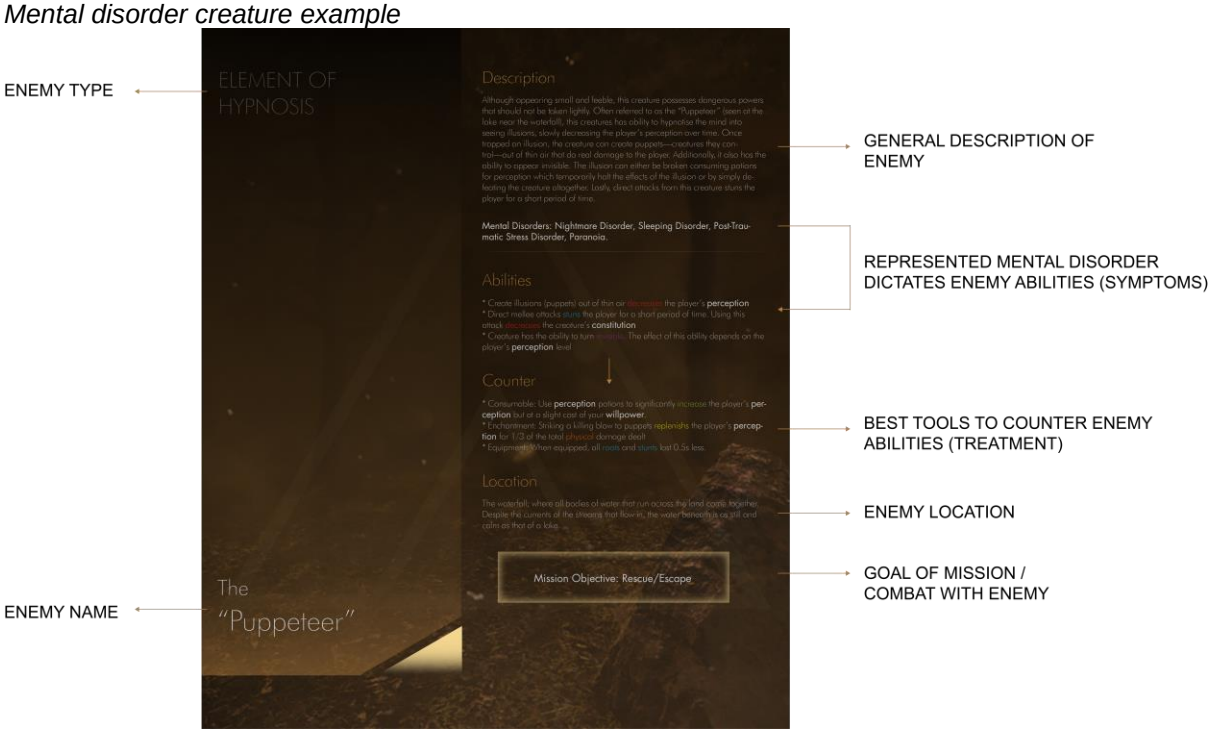
Game world

As detailed in section 'Concept ideation' of this report, the created experience is ultimately meant to be transformed into an open-world game. However, in view of the scope of this project, a smaller map was designed for the purpose of visualizing the experience and laying the foundation of the world where characters, sub-narratives, and additional quests could be designed and implemented (MasterClass, 2021).

Within the created world, several evil creatures were designed—each representing a set of different mental disorders. The abilities of each creature not only correlate to the biome in which it resides but also the disorders it represents. With this being said, whilst players may be informed about the type of disorders an enemy represents, the way in which players engage in battle will heavily depend on their initial player stats and current equipment. See Figure 6 for an example of an evil creature, its targeted disorders, abilities etc. By facing different creatures that represent various mental disorders and learning what tools to use to counter their abilities, players are taught how to identify symptoms of mental disorders—shown through the evil creatures—and what tools or techniques to use in those circumstances; overall, gaining a better understanding of the disorders and those it impacts.

Figure 6

Mental disorder creature example

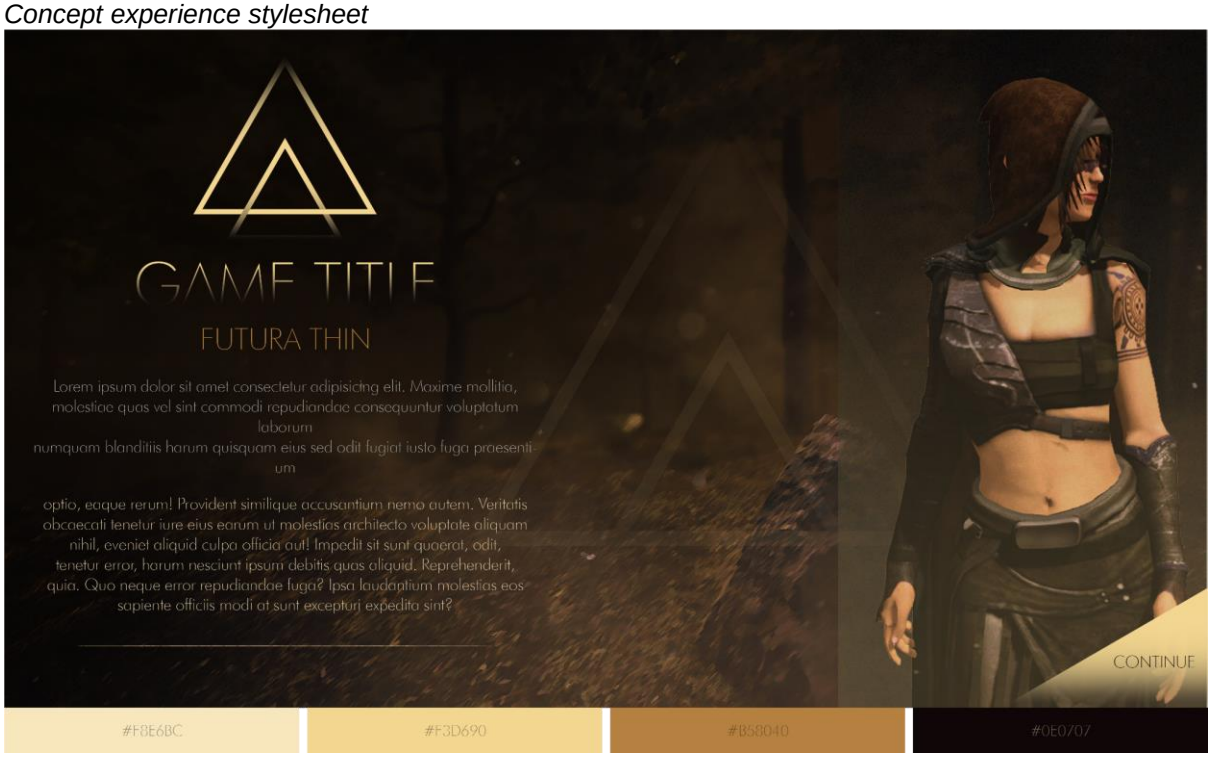


Interface

For the interface section of the GDD, examples of different screens the player would navigate through from the title menu all the way to the settings page were created for the purpose of

visualization. The style used for this interface leaned more towards the realistic side and predominantly made use of neutral colors. Another detail commonly found across all the boards in the interface was the use of a triangle symbol. Within the field of design, a triangle is commonly used to represent stability (when sat upright) and indicate movement or a sense of direction (Brooks, 2021). By using this shape as the logo, the experience aimed to echo the message of stability and give a sense of hope to the players of the game. See Figure 7 for the created stylesheet.

Figure 7
Concept experience stylesheet



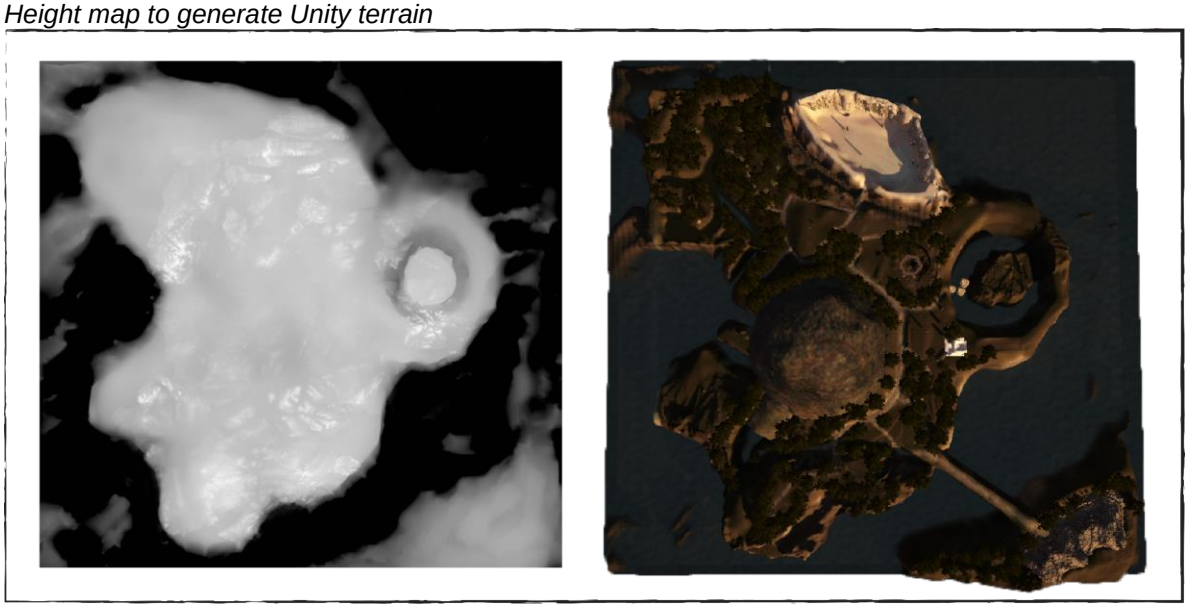
Concept prototyping

The goal of this project was to create a concept experience that addressed the topic of mental health by teaching players about the subject and its various disorders. This goal included the visualization of the documented experience in the GDD. In view of the scope of this project, the visualization—or in other words the prototype—was created in Unity Engine. Unity is a game engine tool used (professionally) in the gaming industry for the development of games ranging in all complexities from Angry Birds and Temple Run to Deus Ex: The Fall (Sinicki, 2021). In view of Unity's collaborative features where multiple individuals are able to work on one project, and with the program being an industry standard, it proved to be the most suitable tool for the development of the concept experience (Sinicki, 2021).

Terrain

The aim of the prototype was to create a world through which the concept could be visualized. The first step taken towards this goal was the creation of the terrain itself. With the use of Blender— a free, open-source software for 3D development—a terrain was sculpted on a flat plane from which the height data was exported as a height map (Hartmann, 2020). This map was then used in conjunction with Unity engine's 'Terrain tools' to generate the sculpted terrain. Utilizing these tools provided an efficient way to easily manipulate the environment by raising/lowering parts of the land, painting on different textures, and quickly populating areas with different types of vegetation (Fuentes, 2021). With these available tools, each area on the map was created to fit the particular elements (enemy creatures) that resided there as shown in Figure 8. From this point on, every location on the map was further developed using primarily free-to-use assets.

Figure 8
Height map to generate Unity terrain



Mechanics

The mechanics implemented in the prototype were largely concerning movement as this ability would be necessary for the character to walk around the map and display the various locations. In terms of movement, the player was able to jump, crouch and sprint. Sprinting in the game utilized the player's constitution (stamina). Additionally, a functioning inventory system was created for the use of consumables within the game. At this point in time, during the implementation of the game mechanics, many issues were encountered in exporting and running the experience on the Oculus Quest 2 VR headset. In view of this, an alternative approach was taken and a 360 video was exported from the created experience in Unity. This 360 video would then be viewed with the VR headset.

Integration of a gamified virtual experience into mental health treatment

Concept testing plan

The goal of the concept testing session was to garner feedback on the designed features and mechanics. In order to comprehend not only 'what' the testers liked/disliked but also 'why', interviews were chosen as the ideal testing method.

In preparation for the testing session itself, a demo video was made where all the main features of the concept were laid out. Ultimately, both the demo video (GDD content) and the 360 video (3D environment) were utilized in the final testing session. Furthermore, seeing as only a minority of the testers were in possession of a VR headset, a cardboard (mobile) VR was also used so that participants may obtain a VR experience through their own mobile devices.

Besides the 5Qs listed earlier in the report, there were four other elements on which the concept experience was tested:

1) Functionality → Is the game functional, and does it work as intended?
2) Desired effect → Can players identify aspects of mental health via the game?
3) Aesthetic characteristics → What do players feel about the VR aspect, and what about the UI? Is the gameplay experience enjoyable and easy to understand?
4) Added value → Did the players walk away from the experience learning anything new?

Interview results

For the interview testing session a total of 5 participants were selected from within the target demographic, ages 22 to 26. A conscious decision was made in choosing from participants with varying levels of gaming knowledge and/or interests to determine whether or not this game could be used in a broader sense in terms of attracting non-gamers who may also be dealing with mental

health issues. See Appendix F. Test II: Demo + 360 Video Interview Results for the detailed concept testing outcomes.

Functionality

In order to determine whether the concept worked as intended—during the interview section of the testing session—interviewees were first asked what they believed the goal of the experience to be. All participants answered that the goal of the experience was not to treat mental health but rather to give players a better understanding of the topic and the various presented mental disorders. This answer coincided not only with the original stated aim of the experience but also with the mission statement of the project company, Enliven. The interviewees were then asked how well the experience accomplished its goal according to their previously given answers. For this question the following scores were given: 8, 10, 7, 7, and 5—bringing it to an overall score of 8.

In terms of the technical definition of functioning, the game experience was functional enough to perform basic interactions with the environment, but not to the extent where players could actually engage in battle with enemy bosses.

Desired effect

Regarding the desired effect, a majority of the participants stated that the elements presented during the demo video of the experience mapped accurately how the subject of mental health is viewed and how it is treated in the real world. These comments were made in reference to the design choices concerning the functionality of the consumables (in-game potions/elixirs). The consumables had the ability to not only positively impact the player's stats but also negatively. Interviewees stated that this feature closely mirrored how real-life medication for mental disorders such as SSRIs (Selective Serotonin Reuptake Inhibitors) functioned (Casarella, 2021). Additionally, the interviewees also liked the gear-based progression system of the game. Some stated that the equipment-based approach shifted the importance of understanding mental health onto the journey itself and the tools acquired along the way rather than just simply aiming to achieve a high score and complete the most missions (Spring, 2022).

Aesthetic characteristics

Most of the interviewees stated that the UI was pretty clear with the exception of one icon that was used as the inventory button. Due to the inventory button icon being the logo of the experience, all participants confused the icon to be something that was simply part of the demo video or an element on-screen that had no functionality. Furthermore, some participants thoughts that the in-game UI could be more polished and refined.

In regards to the player stats, whilst the UI element itself was clear, some of the terms used to describe the in-game statistics were difficult to remember according to most interviewees—especially for casual to non-gamers. This is in reference to the words 'constitution' (representation of the player's stamina) and 'dexterity' (representation of the player's speed and critical strike chance).

All-in-all, as for the visuals of the world, the interviewees stated to have enjoyed the various locations and biomes found on the map and were very much interested in experiencing the world through a full-on VR experience.

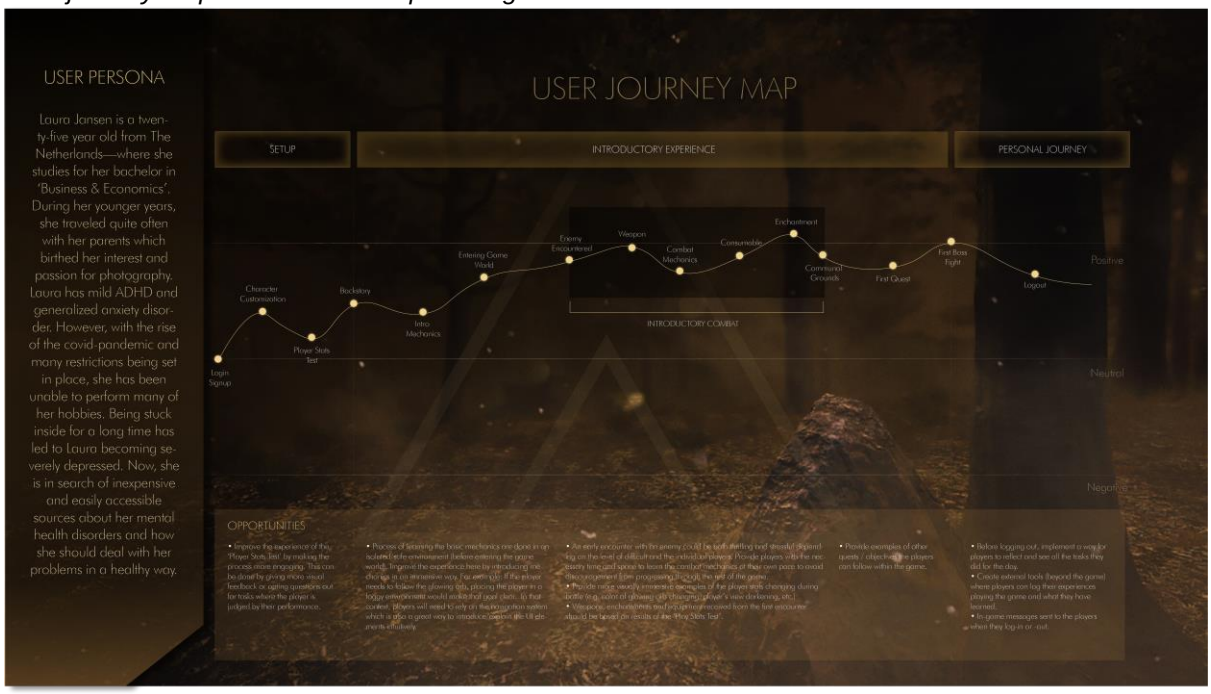
Added value

When looking at the potential added value, all interviewees said that they could walk away from this game learning something new due to the diverse range in mental disorders that were covered by each enemy boss. One interviewee stated that they appreciated that lesser-known disorders were also discussed and covered in the game.

As the interviews progressed, the players were ultimately asked what they thought about the integration of video games, more specifically this concept into the field of mental health as an alternative treatment option. On this question, the group of interviewees were somewhat divided in their answers. Some participants saw this concept as a tool that could be used alongside traditional treatments. One example given by an interviewee was using the game as a form of ice-breaker or establishing common ground when entering a therapy session. Other interviewees on the other hand stated that if this concept were to be further polished and released in collaboration with mental health professionals, it could very well be a viable treatment option as it provides access to mental health care to individuals who could not physically obtain it.

An overview of the entire testing session with highlights, recommendations, and points of interactions were visualized in a user journey map. See Figure 9 for this overview.

Figure 9
User journey map based on concept testing



Conclusion

As the discourse and number of individuals effected by mental disorders continues to rise, the stigma surrounding the subject still persists (Pavlova & Berkers, 2020). Despite 1 in 5 people suffering from one or more mental disorder(s) worldwide, only half the affected persons receive any form of treatment (SingleCare Team, 2022). Aside from the surrounding stigma, this is in large part due to financial and/or physical limitations (Granic, Lobel & Engels, 2014). For this reason, the aim of the created concept experience was to lower the bar for individuals to learn more about mental disorders and develop technique to deal with them in a healthy manner.

The journey first began by conducting a survey with the general target audience to gauge their outlook on the respective fields of video games and mental health. This was then followed up with desk research on the differences and similarities between commercial and therapy games. From the research it was found that despite therapy games being created for the purpose of addressing mental health issues, commercial games proved to be as effective—and in some cases if not more effective—in teaching players about the subject of mental health. In view of this, in the designing of the concept experience, both game types were used as a basic framework.

Within the designed concept, players encountered different bosses that each represented their own unique list of mental disorders. In battling these enemies, the concept draws inspiration from current treatment methods and medication used in fighting against those disorders. By incorporating all these elements the player is left with an experience where they have the opportunity to learn about various disorders and acquire the tools along the way on how the deal with its symptoms. As this is simply a game concept, there are still many ways in which the experience could be further improved. However, from the conducted interviews, the target audience are in agreeance that this product could very well be used in teaching individuals about mental health disorders and potentially becoming a treatment method.

Discussion

Overall, in this report there were two main shortcomings which could have certainly impacted the validity and reliability of the test results.

The first being the lack of interviews and interactions with mental health professionals. Whilst the research paper did do well to acquire a wide range of responses from gamers and non-gamers on the

mental health game concept, a more accurate or tailored experience could have been created with a professional on hand. These professionals not only possess knowledge about their work, but also about the field that they are in and the potential issues that may be present that are not seen from the surface or discovered through doing desk research.

The second shortcoming of this paper pertained to how the topic of virtual reality not being further explored or addressed. With the focus of the research report being the creation of a virtual reality concept experience, conducting more research on the use of virtual reality technologies could have provided valuable insights and a new perspective on potentially unexplored features and mechanics.

Despite the positive reviews received from the target audience on the created concept, it is still but a concept. It is possible that the enemy bosses found in-game could help players express themselves more and learn more about mental health in general. However, a concern/doubt still remains about how well in-game knowledge and information is retained and brought over to the physical world. In tackling this potential issue, a mobile application design was created (see Appendix G. Mobile Application Design). The mobile application itself is a bridge between the content presented in the virtual experience and the physical world. Its purpose is to encourage active learning, retention of information acquired in-game, and encouraging users to use acquired skills and information in their daily life. A manner in which the mobile application tries to accomplish this is through the use of a personalized journal. Within this journal, players are given an overview of their completed tasks and in-game performance along with a daily prompt on which they could reflect. As this application is also connected to the game itself, users could also find and connect to other players and professionals in the space to share experiences with mental health, exchange/acquire informational content about mental disorders or find friends to play the virtual experience with.

In saying that, another concern about creating a virtual reality game that addresses mental health is the possibility of players becoming infatuated with the virtual world to the point where they may ignore their problems in the real world. The aforementioned mobile application could minimize this issue, however it could further exacerbate it as well. All-in-all, this matter would need to be further explored as it is beyond the scope of this project.

A final discussion point for this section of the report concerns the feasibility of developing this experience. As previously stated, the goal of this project was to create a concept that addressed the topic of mental health. Future plans for the project would be furthered by the collaborative company, Enliven. The aim is to further develop this concept for the purpose of receiving funding.

Recommendations

Whilst there are plenty games out there that cover mental disorders, there is still a range of other mental disorders that are hardly ever touched or addressed. One main takeaway gathered from reading the feedback given on the survey and listening to the interviewees talk about the game concept and their experiences with mental health is how important diversity is. Not only across multiple disorders but within a single disorder. Two individuals can be depressed and express that in very different ways, and neither of them should feel like their feelings are any less valid because it does not fit within a predefined box of what ‘depression’ is.

Another recommendation is based on the research done on therapy games and commercial games. Most if not all games addressing mental health are predominantly single-player games. In the created demo video and game design document, there is a chapter where a multiplayer game mode is explored (see Appendix E. Game Design Document). Especially with the rise of new technology and VR devices becoming more of a norm in the future as the topic of the ‘Metaverse’ continues to rise, this could be a good opportunity to take the bases of the concept created here and expand on it with the vision of an open-world multiplayer mode in mind (Palandrani, 2022).

Additionally, with the feedback acquired from the target audience—more specifically casual and non-gamers—during the concept testing session (see Appendix F. Test II: Demo + 360 Video

Interview Results), the importance of designing an experience with both hardcore, casual and non-gamers in mind became more apparent. The targeted demographic—individuals above the age of sixteen who experience mental health issues—is quite broad. Therefore, it should be carefully considered whether the end product would continue to be advertised for such a large group or narrowed down to more hardcore gamers.

The last recommendation for potentially creating a game that addresses mental health is inviting professionals from the field to not only be part of the development process of the game but to be in the game as well. From the interviews conducted with the target audience, a fairly positive response was given to the idea of having these professionals be within these spaces and interacting with other players by sharing their knowledge and insights with a community.

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Appendices

Appendix A. Test I: Survey Results

Survey title: The use of video games in addressing the topic of mental health and mental disorders

Description: 'Mental Health' and 'Video Games' are two terms that have significantly increased in their usage over the last decade. This survey aims to gain an understanding of how individuals view these topics separately but also together. It consists of roughly 13 questions.

Duration: 5 to 7 minutes

Areas covered:
- Age demographic
- Gender
- Gaming classification & genre
- Understanding of mental health & mental disorders
- Outlook on video games
- Influence of gaming on the topic of mental health
- Desired mental health game elements
- Preferred platform

Survey respondents: This survey was distributed amongst friends and family, on online undergraduate/graduate forms, within Discord gaming servers, and with students/developers within the gaming industry. Ultimately, this survey acquired thirty-two (32) respondents.

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Questions
- What is your age?
- What is your gender?
- What would you classify yourself as?
- *For casual and hardcore gamers, what kind of games do you play?
- When you hear the words “mental health” or “mental disorder”, what’s the first thing that comes to mind?
- Do you suffer from any mental disorder(s) of your own? Or experience any symptoms of a mental disorder that you are aware of?
- *If you answered “Yes” to the previous question: Have you ever taken any actions or steps to get help? (such as diagnosis, therapy, medication, lifestyle changes, etc.)
- When it comes to the discussion of mental health over the year, do you think there’s been any growth in this field in terms of awareness? Please elaborate on your answers.
- What is your perception of video games? What do they mean to you?
- With video games gaining popularity, what role do you think they will take in addressing mental health or mental disorders?
- Could you elaborate on your answer given in the question above?
- If a video game were created that tackles the subject of mental health, would you play it?
- What kind of elements or features would you like to see in a game that tackles mental disorders that would make it more appealing to you (story wise, type of mental disorder addressed, mechanics (player abilities, game environment, etc.)?
- Lastly, now that you have a vision of what you’d like to see in such a game, what platform would you like this video game to be created for? Multiple answers can be selected.

Age demographic
The age demographic of the respondents lay primarily in two age groups. The largest group being those between the ages of 18 and 24 (46.9% - 15). Secondly, those between the ages of 25 to 34 (40.6% - 13). Lastly, those ages 35 to 49 (12.5% - 4).

Gender
A somewhat equal divide in the gender category was present with 16 male respondents (50%), 15 female respondents (46.9%), and 1 non-binary respondent (3.1%).

Gaming classification & genre
Users were asked about their consumption of games and how they would define themselves. Out of all the respondents, 8 (25%) classified themselves as non-gamers, 14 (43.8%) as casual gamers, and 10 (31.3%) as hardcore gamers. Casual and hardcore gamers were then asked to list what kind of games or genres they enjoyed playing. An extended list of genres and sub-genres was given. Amongst the top three (3) were: role-playing games (ARPG, JRPG), first-person shooters—and tied in third place—real-time strategy and simulation games.

Understanding of mental health & mental disorders
When asked what the terms ‘mental health’ or ‘mental disorders’ meant to the participants, the majority simply answered: “depression”. Respondents also listed other common mental disorders such as anxiety, PTSD, BDP, schizophrenia, and personality disorders. Overall, a majority of the respondents wrote that they recognized the struggles of mental health and disorders to be a real issue and that individuals should seek therapy if given the possibility. Additionally, when asked if the respondents had mental health issues or experienced any symptoms of a mental disorder, 17 (53.1%) answered yes, 10 (31.3%) answered no, and 5 (15.6%) were uncertain. Amongst individuals who had experienced symptoms of a disorder and those who had not, from the answers given, the level of understanding was the same if not similar.

Progression in the field of mental health
Users were asked about their impression of the mental health field and what changes they have (not) observed over the years. A majority of the respondents were in unison in saying that they have perceived a significant decrease in the stigmatization around mental health and have witnessed more open discussions and awareness of the topic—especially regarding social media. Given this, many respondents wrote that there is still much work to be done in destigmatizing the subject and bringing light to lesser-known mental disorders.

Outlook on video games
All participants (whether non-, causal, or hardcore gamer) were asked about their general impressions of games and what it means to them. A majority said that video games were a great pass time. Participants thought of it as an entertainment medium that brought a lot of relaxation and stress relief. Respondents also commented on how games helped them make meaningful connections and disconnect from the world. One respondent even shared how gaming helped in regaining motor skills and coordination. Some respondents also shared their thoughts on the less pleasant attributes of video games. They can be very addictive, lead to temporary short-term relief, and potentially worsen one's life or social interactions with others if not consumed in healthy doses.

Influence of gaming on the topic of mental health
Respondents were asked what roles they think video games might take on in addressing mental health or mental disorders. A range of options were available to choose from: negative influence (9.4% - 3), no influence (3.1% - 1), positive mild influence (28.1% - 9), positive high influence (6.3% - 2), and lastly, both positive and negative influence (53.1% - 17). The distinction between mild and high positive influence was made to gauge the difference between games bringing awareness to mental health (mild) and games that could potentially become a treatment method for mental health (high). Within all three gaming classifications (non-gamer, casual, hardcore), a majority of the respondents viewed gaming as a positive medium to address mental health. These participants saw video games as a way to provide hope to individuals dealing with mental issues by providing a safe space to overcome obstacles, educating individuals on the subject matter, and lastly, encouraging users to seek help if needed. Many casual gamers (7 out of 14), hardcore gamers (9 out of 10), and non-gamers (4 out of 8) deemed video games to potentially have both a positive and negative influence on the subject of mental health. The critiques given by this group primarily addressed the design and goal of the game. If not properly designed or if mental disorders were portrayed solely in a negative light (e.g. character going ‘crazy’), this could worsen and further stigmatize the subject of mental health. Three respondents who were non-gamers portrayed games as having only a negative influence on the topic. The reasons given for this were potentially developing a sedentary lifestyle due

to gaming and addiction which could lead to a lack of sleep, physical movement, real-world social interactions, and overall a worsened mental state.

Desired mental health game elements
Respondents were asked what features they would look out for in their ideal mental health game. First and foremost, the majority of the participants wanted an entertaining experience with a good narrative of either the main character showing what it is like to deal with a mental disorder or helping someone else within the story deal with theirs; a story that many could relate to. The experience needed to include real-life-based techniques for dealing with mental issues in a healthy manner (e.g. breathing techniques, grounding)—presented as game mechanics. Above all, many respondents claimed that they did not want an experience where mental health was the focal point or pushed into their face but rather something that reoccurs naturally as the game progressed. Some participants said that more elements of the environment should be utilized to tell the story such as sounds and visuals. Lastly, the punishments within the experience should not be too harsh as this may discourage many. During all stages of the game, even with a slight increase in difficulty, the goal should always be attainable to the player.

Finally, respondents were asked if they would play a game created that tackled the subject of mental health. Of all respondents, 12 (37.5%) answered yes, 18 (56.3%) answered maybe, and 2 (6.3%) answered no. The two no's given were of the non-gamer classification.

Preferred platform
As a final question, the respondents were asked which platform they preferred a potential game about mental health to be created for. For this question, multiple answers were allowed. The results are as follows: PC (84.4% - 27), Mobile (28.1% - 9), Tablet (18.8% - 6), Gaming Console (43.8% - 14), Virtual Reality Headset (28.1% - 9).

Appendix B. Concept Ideation Swot Analysis

#1 VR THERAPY EXPERIENCE BASED ON DISCORD STAGES / TWITTER SPACES
Based on the 'Stages' and 'Spaces' features found respectively on Discord and Twitter platforms. These stages or spaces are essentially events which users can create to discuss any topic of their choosing. As the topic of mental health has many avenues that could be covered, the experience itself needs to be approached from the mindset that there should be something for everyone. Allowing professionals/coaches within the field to create and moderate their own spaces not only increases the chances of these individuals being provided with accurate and solid care, but these interactions could serve to better the image that members in society hold of the mental health field as a whole.

Experience Type: Educational, Group Therapy/Coaching Sessions
Mental Disorder: All (specific to event/space created)
Duration: Dependent on stage events (min: 15m, max: 2h)
Functionalities: Create/host events, User interaction (request to speak, voting etc.), Profile/avatar customization

Strengths	*Weaknesses*
• Professionals and coaches have the opportunity to create and moderate their own spaces the way they wish • Many tags available for users to find the spaces that address their issues • Customizable space event settings (time, capacity, interactions, topics) • Customizable profiles for users (username, avatar, interests, pain points, location etc.) • Safe space/experience dedicated solely towards the discussion of mental health • Access to information about mental disorders from professionals in an interactive format • Little to no personal data required from the users • Not a 'formal' type of therapy (more leniency with medical ethic laws)	• Regular user is unable to create their own event/stage • Verification process for coaches and experts (safely store data) • As many if not more moderators will be required rather than actual speakers to moderate space • Limited visuals and/or interactions • Experience is not personalized/tailored to an individual • No clear way to combine it with current traditional therapy methods
Opportunities	*Threats*
• Chance to learn about what did/didn't work about this feature for existing platforms • Organize many different forms of events • Space to expand and evolve into something greater • Create options to quickly invite/share space you're currently in (connect with others across platforms) • Possibility to create ways for audience to interact with the speaker and each other • Hub to be used for future testing and gathering participants for professionals within the field • Develop into a platform of its own • Better image/impression of mental health field	• Feature already in use by big, established platforms • Too much freedom to create may lead to chaos and trolling • Potential abuse of power from event organizers/moderators • Too many events being created or too many users joining a single event (overload) • Only a handful of mental disorders get the most recognition and events • Conflicting incentives (financial, exposure, quality of care etc.) • Worsen image/impression of mental health field

#2 SPACE/GALAXY THEMED MINI-METAVERSE
When the topic of mental health or therapy is brought up, the mind instantly envisions a small room with a couch, maybe some books, and the ever frightening notebook and pen—where our life experiences are dwindled down into a few words as our every move is monitored. Taking inspiration from the metaverse, and creating a more open space such as a 'galaxy' will do great to give users the sense of freedom they really need. In some way, this universe in itself is a mini-metaverse as it allows users to travel to nearby planets/stars to explore those worlds and participate in several events of their own choosing.

Experience Type: Educational, Group Therapy/Coaching Session
Mental Disorder: All (specified by planet/star)
Duration: Sessions: max 2h, Mini-games: max 30m-1h
Functionalities: 'Free' roam, Enter new spaces, Mini-games

Strengths	*Weaknesses*
• Interconnected worlds represent different forms of mental disorders • Large space to explore • Lots of interactions (traveling/visiting different areas) • Lots of content (multiple planets/stars, characters, storylines etc.) • Character/avatar customization • Safe space/outlet for users	• Very complex and development time will suffer for this • Events or sessions hosted are usually group-based (not individual) • Cannot have too many differing interactions (with items) • Users having a lot of freedom in this space can result in a lot of abuse of power or toxic behavior
Opportunities	*Threats*
• Possibility to create custom content for each world and gamify each mental disorder • Ability to be expanded upon by adding more planets/stars to the universe (concept can be initially approached on a smaller scale) • Dedicate specific or central areas to host education events • Possibility to expand world/galaxy to a mobile application and make this experience cross-platform • Collaboration opportunities with other developers and/or mental health professionals • Possibility for users to also get involved and have their stories/experience be visualized in the world through tournaments	• Might be too overwhelming for those suffering from severe social anxiety • Too many people (multiple servers/dimensions required) • Multi-universe/planet space can leave room for a lot of bugs and errors to arise • Users spend too much time in this universe rather seeking offline help (platform becomes a new addiction) • Trolls

#3 MENTAL DISORDER PROBABILITY GAME
Getting a mental disorder diagnosis can seem like a daunting task and oftentimes a quite timing consuming one at best. The mental disorder probability game is meant to explore a new way of giving a diagnosis and monitoring how users interact with NPCs and do quests related to their potential mental disorder in a safe environment. This tool not only introduces an additional method in which professionals can gather/monitor data from their patients, but it also allows these individuals to learn more about themselves and their emotions through a gamified experience.

Experience Type: Diagnosis, Individual Sessions
Mental Disorder: 1 or 2

Duration: Max 1h (specific to 1 or 2 mental disorder per game)
Functionalities: Interact (items), Quests [depends on game]

Strengths	*Weaknesses*
• Professionals/coaches can use experience results to learn more about their patients and their pain points • Patient/user progression can be easily tracked and visualized • Less likelihood that individuals will get too engulfed in this experience/game in comparison to the other ideas presented thus far	• Lots of data needs to be gathered and stored (questions, quests, achievements etc. needs to be tracked) • Tailored 'diagnosis' game around one or two mental disorders • Even within the same mental disorder, individuals can have quite varying experience, therefore designing a probability/diagnosis game to apply to most if not all users will be difficult
Opportunities	*Threats*
• Could be easily used in conjunction with traditional forms of therapy • Include parameters for levels/games to tailor it to an individual's experiences	• In competition with (current) traditional forms of mental disorder diagnosis • May not offer any new value for individuals who have already been diagnosed • Wrong/unreliable diagnosis may lead to further distrust in the mental health field • Collected user data needs to be safely stored and privacy needs to be taking into account

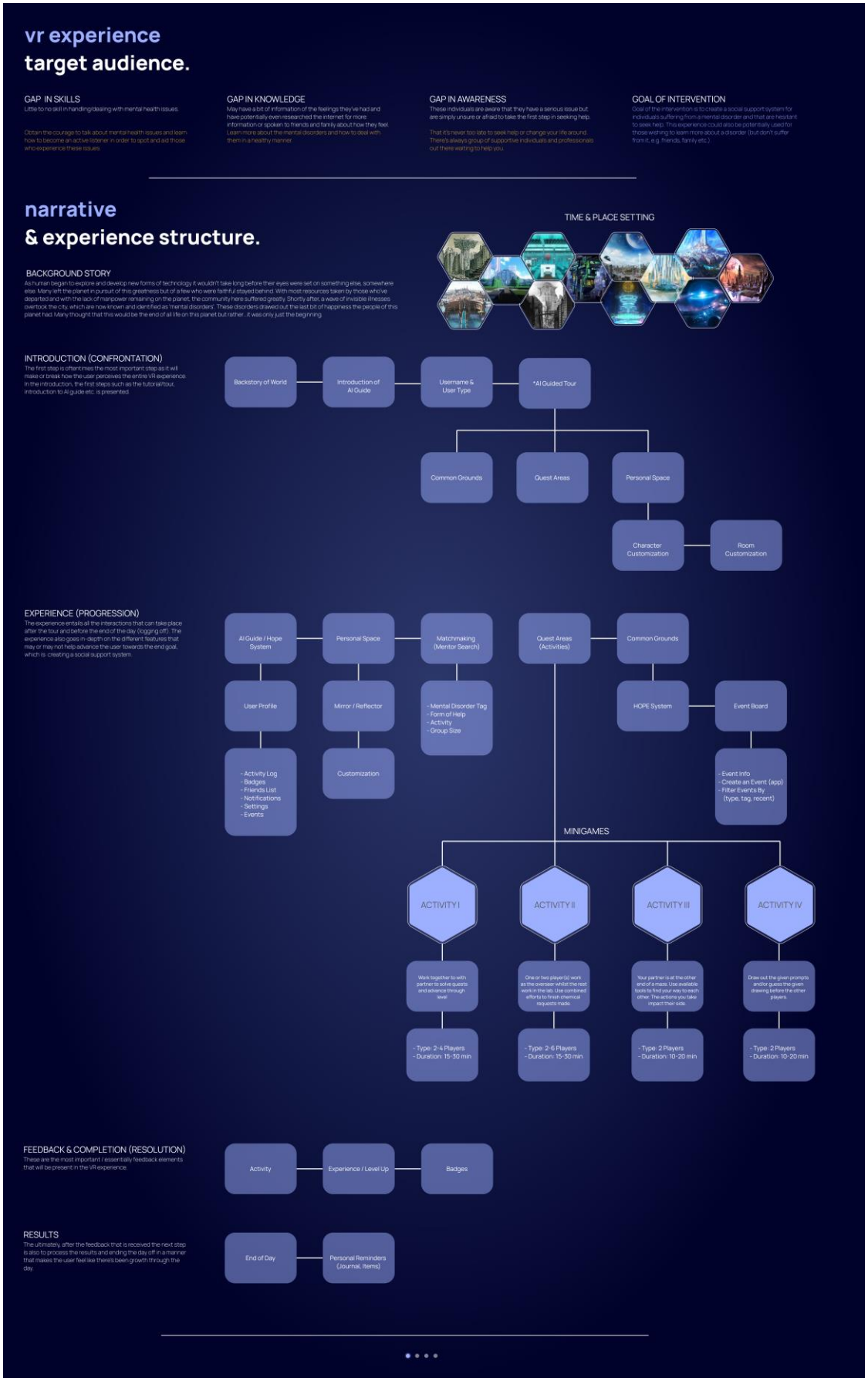
#4 JUST ME AND YOU | MIRROR MIRROR | I SEE YOU (CALL-IN)
Concept is very similar to a call-in show. In the digital/virtual space, users will enter a fairly dark and empty room with only a mirror and a chair located at the center of it. When the user first sits down they will be prompted to use filters to describe the form of help they're looking for. Within a matter of moments, the users will be paired with a coach/expert on the other end who will help them through their problems. As the conversation goes on, the users can feel free to share more about themselves and their in-game character/space through the mirror.

Experience Type: Therapy/Counselling, Individual Sessions
Mental Disorder: All (specified on tags used, although may not be used for all forms of mental disorders)
Duration: Max 1h
Functionalities: Interact (items), Filter/Specify required care, Unknown goals/achievements, Customizable space

Strengths	*Weaknesses*
• Very personalized experience (users can decided at what moment they wish to reveal personal details about themselves/avatar) • Allows users to open up and share more • A more easier and controlled environment for professionals/coaches to moderate	• Little to no social element to it • Requires more professionals/coaches on board • Environment/space is quite barren and empty

• Simpler concept in comparison to the other ideas presented, meaning less development time • Great for those suffering from severe anxiety that need an option to slowly ease into things	
Opportunities	*Threats*
• Option to expand this experience to a more group-based session if the demand is there for it • Either give the user or the professional/coach the option to customize space • Encourages those who are hesitant to therapy to get the help they need in a controlled and safe environment • Save user data and track experience/progression over time • Rating system for coaches/experts	• Very similar to current traditional forms of therapy • Users might end up feeling isolated and alone • Experience may not be suited for all forms of mental disorders (where for example, social or group interaction is really necessary) • Not enough professionals/coaches (due to one-on-one interactions)

Appendix C. First Concept Overview



Appendix D. Final Concept Breakdown

2

Learning Experience

Sense of Growth

Discovery

Connection to Mental Health

Social

what are we trying to make?

Safe Space

Safe Space

Ease Into

Journey

Personal Space

Connection to Peer Mentor

3

concept.

- Open-world experience
- One planet
  - Multiple obtainable lenses
- Player stats influenced by issues
- Unique bosses and evil spirits that focus on different mental illnesses
- Missions and side-quests
  - Alignment
  - Capture
  - Exploration
  - Rescue / Escape (flee)
- Equipment & consumables (elixirs)
- In-world mini-games
- No leveling-up system

4

concept.

ENTERTAINMENT

- Fun → Different abilities, in-world minigames
- Curiosity → Exploring planet, Trying different lenses, finding secret areas, Combining abilities
- Surprise → Hidden items/bosses/areas in different lenses

5

concept.

SERIOUS

- Knowledge → Learn more about dealing with mental disorders symptoms
- Skills → Actively encouraged to practice knowledge gained in-game (and also in real life)
- Behavior → Lack or loss in equipment will encourage a different approach to an issue

6

concept.

Experience

1) Design requirements → Learning how to deal with mental disorder symptoms
2) Game narrative → Rid stigma monsters / spirits by obtaining tools to defeat them
3) Task to solve → Addressing stigma, Acknowledge struggles, Obtain tools to fight spirits, Defeat bosses

Progression

1) Progress data → Defeat smaller spirits / monsters leading up to the ultimate boss, Interact with others and unlock new lenses and equipment, Better tools to fight more powerful monsters

7

concept.

GAME ASPECTS

- Game Space → Magical / mystical planet overrun by negative/evil spirits.
- Game Objective → Defeat these spirits and save/cure the planet.
- Game Abilities → Run, Jump, Crouch, 2 Sets of magical spells (1 for each hand)

  (*Item that lets you fly for a short duration of time)
- Theme → Man vs Society/Nature/Self

PLAYER TYPES

- Killers → Fight and destroy monsters, Dominate in mingames
- Achievers → Unlocked hidden achievements, get best equipment
- Socializers → NPC guide in-game, MC saving planet, Multiplayer
- Explorers → Combined abilities, Exploring planet, Lenses leading to hidden areas

8

concept.

NEGATIVE EXPERIENCES

- Pounding heart / sweating
- Interferes with ability to function
- Overreaction to minor things
- Sudden panic attacks
- Short breathe
- Self hatred / projection
- Extreme highs and lows
- Inability to rest / sleep
- Inability to eat or drink

POSITIVE EXPERIENCES

- Stress management
- SSRI → Feel happier / motivated
- Beta-blockers → Rapid heartbeat
- Exposure → Monsters, struggles
- Daily tasks → Repetition / routine
- CBT exercises → Identify feelings

PLAYER BASE STATS

- Health → Phys. endurance
- Willpower → Control emotions (abilities)
- Dexterity → Speed, reflexes, aim
- Perception → Awareness (consumables)

9

concept.

VR EXPERIENCE SCOPE

- Singleplayer, Multiplayer 2-4
- One Planet
- Vertical Slice

ADDITIONS FOR THE FUTURE

- Communal area (concept)
  - Local events
- Resource sharing (no equipment)
- Crafting system (shop)
- Resting mechanic?
- Traverse between planets?

VERTICAL SLICE

+ Environment
+ Tutorial (guide)
+ Basic Movements
+ 3-4 Player Abilities
+ Player & Monster Stats
+ 2-3 Equipments
+ 2-3 Consumables (elixirs)
+ 2-3 Quests
+ 1-2 Minigames

Appendix E. Game Design Document

Game Design Document Link →
https://drive.google.com/file/d/1U1PCGfUTu6c1YGtvzPz9bYDmLzQT2UF_/view?usp=sharing

Appendix F. Test II: Demo + 360 Video Interview Results

Interview title: Mental health awareness through 'Resolve'

Description: One in five children and adolescents is suffering from a mental health condition. And while the topic is gaining more attention, the stigma surrounding it is still present. 'Resolve' is a game concept that aims to address this stigma by creating a fun and entertaining experience that encourages users to learn more about mental disorders and how to deal with them.

Resolve | Demo Video Link: https://youtu.be/utr7FwsB0X0
Resolve | 360 Video Link: https://youtu.be/X3LVx1FULzU

Duration: 15-20 minutes (demo video), 4-5 minutes (360 video) + 20-30 minutes (interview)

Areas covered:
- Participant's gaming background
- Concept goal
- Concept experience
  - Narrative/story, Location/style, Enemy bosses, UI, Player stats, Progression, Tools (equipment, enchantments, consumables), Rewarding system, Entertaining, Knowledgeable, Overall likes/dislikes
- Integration of video games in mental health treatment
  - Treatment, Special Tags
- General impressions
  - Age group, VR, Feedback/suggestions

Interviewees: This interview was conducted with individuals with the target demographic, ages sixteen and older. In total, 5 persons between the ages of 22 to 26 were interviewed for this feedback session.

Participant's gaming background

Participants	Age	Gender	Single vs Multi	Player Type	Gamer Type
Interviewee #1	25	Male	Multiplayer	Explorer	Hardcore
Interviewee #2	22	Female	Singleplayer	Explorer	Casual
Interviewee #3	24	Female	Multiplayer	Achiever	Non-gamer
Interviewee #4	23	Female	Multiplayer	Socializer	Casual
Interviewee #5	26	Male	Multiplayer	Explorer	Hardcore

**In the text, interviewees are referred to by their number between brackets, example: "[1] stated that…"*

—

The following questions were asked after participants had seen the demo video and the 360 video.

Questions

Participant's gaming background
- How old are you?
- Between single-player and multiplayer games, which of the two do you enjoy playing the most?
- When playing games, what is most important to you?
  - "Socializing and forming friendships." (Socializers)
  - "Trying to get the highest score possible." (Achievers)
  - "Exploring the world and getting the most out of the story/items." (Explorers)
  - "Defeating challenging enemies (in-game bosses and/or players)." (Killers)

Concept Goal

- What do you think this game concept is about or is trying to accomplish?
- Based on the previously given answer, on a scale of 1 to 10, how well was that accomplished? (1 - Not at all, 5 - Well accomplished)

Concept Experience

- From your recollection, what is the context or story of this game world?
- What role do you think the character (shown in the video) plays in the story?
- What did you think about the different locations shown in the video and the enemy bosses that were described?
- What do you think about the visuals of the experience?
- Were the UI/HUD elements displayed on-screen (in the video) clear to you? What do you think each icon means?
- On the topic of UI, what do you think about the 5 player stats introduced in the game? Was the description of each stat and what they do clear to you?
- Was the way in which you progress through the game clear for you?
- It was mentioned in the video that way players become stronger and advance through the game was not through levels but with tools (such as equipment, enchantments, consumables, etc.) What do you think about this?
- Consumables (or in other words potions/elixirs) have both positive and negative impacts on the player. What do you think about this feature?
- Is the rewarding system in the game clear to you?
- Do you think this game could be entertaining and fun to play?
- Do you think you can learn something from this game?
- If you could name one thing you liked about the experience and one thing you disliked, what would that be?

Integration of video games in mental health treatment

- Based on what you've seen, do you think this concept or game idea could be integrated into the mental health field as a form of treatment?
- At the end of the video, in the "Multiplayer Mode" section, there was mention of implementing a "special tag" for professionals within the mental health field. What are your thoughts on inviting/encouraging licensed or trained professionals in the field to join this gaming experience?

General Feedback

- What age group would you say this game was made for?
- Would you play this game?
- Would you be interested in playing this game in virtual reality?
- Are there any last remarks you'd like to make?

—

Concept Goal

When asked what they believed the concept 'Resolve' was trying to accomplish, all participants said that the concept aimed not to treat mental health but to make people more open to the topic and gaining a better understanding of it. Lastly, when asked to score the experience based on how well they thought it could accomplish its goal, the following scores were given: 8 [1], 10 [2], 7 [3], 7 [4], and 8 [5]—bringing that to an overall score of: 8.

Concept experience

<u>Narrative/story</u>

Questions asked in regards to the narrative were used to gauge how well participants could recollect the game's backstory and what they thought their role was within the experience. Whilst a majority of the participants were in unison on what the backstory was (fighting against evil spirits to save the planet), some viewed the in-game character as a reflection of themselves whilst others did not.

<u>Locations/style, Enemy Bosses</u>

Overall, all participants liked the diversity in the landscape and how each enemy possessed abilities based on their environment. Additionally, all participants liked how each enemy represented a set of different mental disorders. One interviewee in particular [5] made a comment stating: "It was nice to see niche disorders like body dysmorphia being brought up as it is hardly ever talked about or covered in games." In terms of the style/look-and-feel of the experience, two participants [2] [3] said

they really appreciated how normal the world looked. They elaborated further on their answers by stating [2]: “The style looks approachable and looks like any other video game…” [3]: “...and just like this game, mental health should be seen as a normal thing.”

Player Stats, UI
For the most part, the player stats were pretty clear, although participants that were not hardcore gamers found some of the words used for the player stats hard to remember such as “dexterity” and “constitution”. Suggestions were given to opt these words out for simpler or memorable terms like “agility” and “stamina”. In terms of the UI/HUD elements displayed in-game, all icons were clear except for the logo icon that was used as an inventory button. Lastly, some feedback was given on polishing a few UI elements such as the inventory or profile screen.

Progression, Tools (equipment, enchantments, consumables), Rewarding system
Within this concept, the player advances and becomes stronger not through leveling up but by obtaining better items throughout their journey. Most participants recognized this feature and said [2]: “It is very realistic to how it works in the real world. Mental health cannot just be cured away”. More casual gamers commented on this feature saying [4]: “No leveling-up system makes the game less stressful and less about grinding.” There were however a few concerns voiced by one interviewee [1] in regards to what would happen if a player were to lose all their items. On the topic of items, another main feature of the concept was consumables (potions) possibly having positive and negative impacts on the player stats. All the interviewees enjoyed this feature quite a lot as it mirrored how certain medications or treatment methods for mental disorders work in real life. Lastly, some participants stated there should be more examples of what players could do in-between quests.

Entertaining, Knowledgeable
A majority of the participants stated that they thought the concept was fun and entertaining. The non-/casual gamers stated that they would be interested in trying the game if it was free. However, how long they would play ultimately depends on how difficult the game becomes. In regards to gaining knowledge, all interviewees thought that they could walk away from this experience learning something new and gaining a better perspective on certain mental disorders by fighting against the in-game bosses.

Overall likes/dislikes
The last section of the *Concept experience* asked for their general thoughts on what aspects of the concept they enjoyed the most and the least. In terms of likes, many participants liked the style of the world, character customization at the start of the game, monster abilities, and how they address niche mental disorders, along with the gear-based progression system. In terms of dislikes, some participants thought that the somewhat dark world might push some players away. Additionally, with all the entertaining aspects of the game, some interviewees were fearful that players might lose focus of the goal of the game.

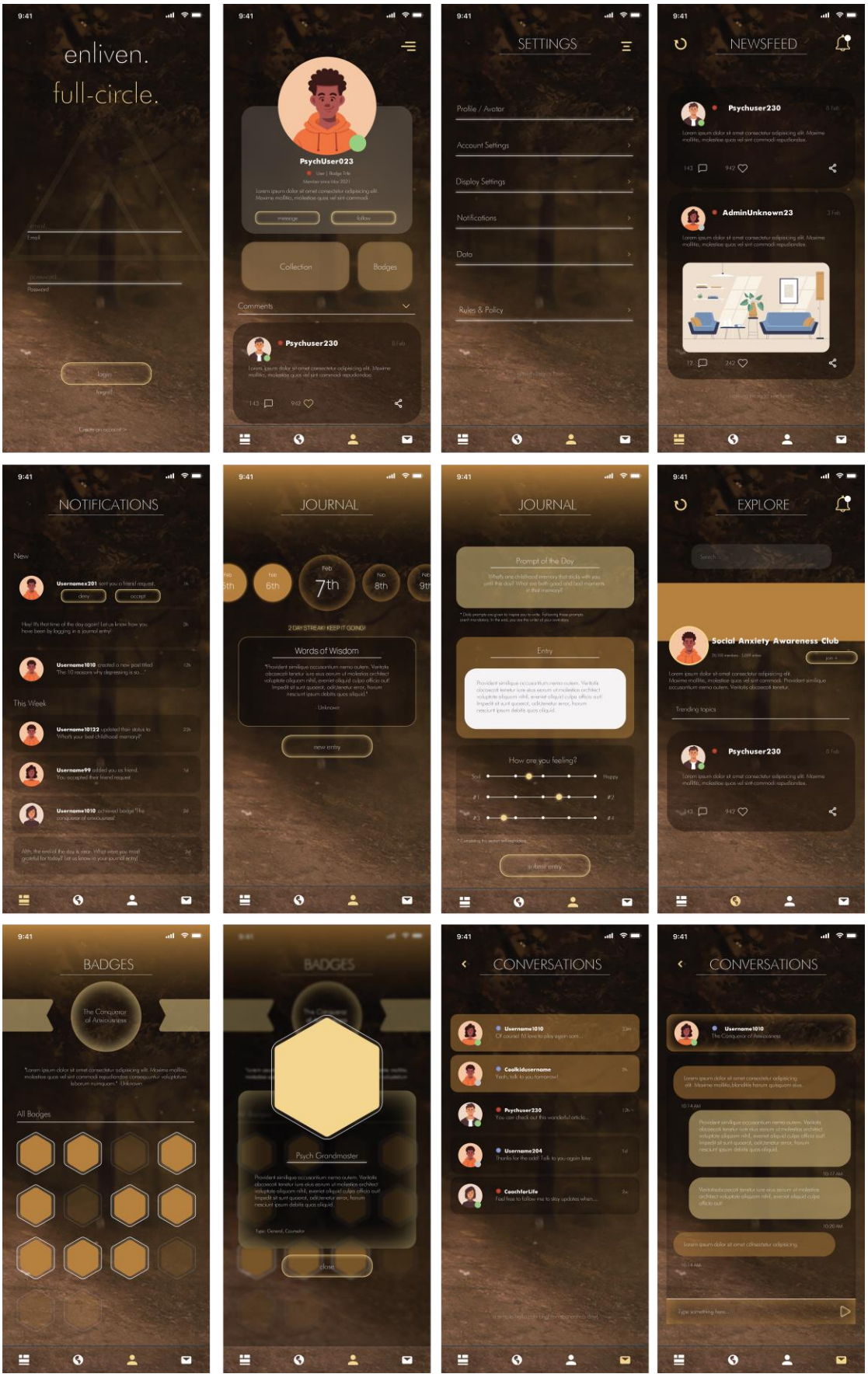
Integration of video games in mental health treatment
All the interviewees thought that this experience could be integrated into the mental health field as a form of treatment, the main disagreements/varying answers were to what extent. Some participants saw this tool as something that could be used besides traditional treatments, potentially as an ice-breaker or topic of conversation during therapy sessions. Other interviewees viewed this as a completely viable treatment method to be used in the field if polished well. In terms of using special tags for mental health professionals, many participants thought this was a good idea. There were however some concerns in regards to compensation and an individual’s privacy.

General impressions
Responses given by interviewees on what they perceived the age group to be: 12 to 30 [1], 13+ [2], 15 to 40 [3], 13+ [4], 12 to 20s [5]. When it came to the idea of playing this game in VR, whilst most participants were not in possession of a virtual headset, all stated that they’d be interested in playing this game in VR based on the presented concept and the 360 video.

Feedback
As final feedback, some interviewees stated that more examples should be given on how interactions with enemies would play out. The same was commented about the multiplayer mode (can you add players, what happens if someone has a panic attack in-game, etc.). Lastly, some suggestions were

also given on how elements found in-game such as the glowing orb could change colors to visually indicate what mood the player's character is feeling or if a certain stat is running low.

Appendix G. Mobile Application Design



Appendix H. Self-Reflection

Based on what I have seen from myself not only within this project but also from previous projects is how invested and determined I can get after doing research about a particular subject. One thing I really appreciate and like about the gaming industry and about being a game designer is that you not only have to research a topic but you must also gain such a high level of understanding of it to the point where you are able to take real world issues or concepts and transfer them into game mechanics, stories or worlds that are both enticing and entertaining. And in this project was in all honesty the first time I really got to experience what it's like when after weeks and weeks of researching and reading to finally come up with a concept or mechanic and say "That's it! That's the one!" It was such a gratifying feeling, and I really enjoyed it and definitely do think it has become a strong point of mine. To keep trying, changing and adapting until it feels right, until it makes sense. However, for that same reason, I do believe that in some ways that is my weakness as well. Investing too much time into something that may or may not work. Researching just for the sake of researching and wanting to know more. I definitely do feel that as a professional I should learn to value my time and be mindful of where I choose to invest it.

As for the future, I am still very much interested in writing and creating entire worlds (as I have somewhat done for this project) so far that I would say a game writer? However, I do still highly appreciate other art forms such as level design and 3D modeling which is something I have already begun investing time into. So for that, I would say that my field is still quite broad at the moment.