

From Anxiety to Empowerment: The Design and Development of a Serious Game to Tackle Phone Anxiety

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When someone experiences heightened levels of anxiety and fear associated with phone calls, this is commonly called telephobia. While therapy is a way to treat the affliction, not everybody has access to or time for therapy sessions. Another remedy is through exposing oneself to easy and safe phone calls, but not everyone has access to this either. While games exist to train you for professional calls, and games exist to raise awareness about phone anxiety, no games attempt to treat phone anxiety. For this purpose, Telephobia aims to make the player aware of tips they can apply themselves to make phone calling less of a hassle. To evaluate whether the game was effective, thinking-aloud sessions and semi-structured interviews were done with participants who played the game. It was found that, while the game had potential, it was not fully effective in making players aware of the tips. By putting more time in game development and extending the scope of the game, this potential could be reached.

Additional Key Words and Phrases: Phone phobia, Serious gaming, Telephobia, Telephonobia

1 INTRODUCTION

Communication plays a vital role in the interconnected world of today. One prevalent mode of communication is through phone calls, as the average person makes or receives around eight phone calls every day [5]. Even though phone calls are common, a considerable subset of people experience heightened levels of anxiety and fear specifically associated with phone calls [1], a phenomenon commonly known as *telephobia*. Part of this anxiety can be explained by the lack of body language or other social cues, making it more difficult to correctly understand the person on the other side. Another reason for phone anxiety is the increased asynchronous forms of communication like e-mail or text messages; with the phone call being synchronous, you need to respond immediately, which can become scarier as you get more accustomed to asynchronous communication [6].

Multiple sources point to exposure therapy as the best way to overcome phone anxiety [6–9]. They suggest to start with easy, clear-cut, and structured phone calls, like ordering pizza or making an appointment with your hairdresser.

By creating a simulator game where your main objective is to have phone calls that range in difficulty, with clear examples of what to do and what not to do, it provides practice for individuals with phone anxiety. Through trial and error, along with positive feedback and support, individuals should be better equipped to handle real-life phone calls after playing the Telephobia Game.

2 RELATED WORK

While not closely related, games have been developed with the purpose to train users in phone calls, like *E-Calling Game* [2]. The training goal of this game is to master the art of customer relationship over the phone, focusing on, e.g., the different phases of a sales call. While being an innovative training tool, it does not address the anxiety aspect of phone calls.

While being able to perform well on the phone, telephobia is the reluctance or fear of making or taking phone calls [6]. A game that better addresses the anxiety that arises whenever a phone rings, is *Should you pick up the phone?* [10] Its focus lays on increasing awareness for intrusive thoughts that someone may have when the phone rings, which might not be relatable for everyone. It involves thoughts like "Maybe my mum wants a screaming match", "Maybe my dad wants to bully me again", and "Maybe someone died". Moreover, the game does not involve actually picking up the phone, and lacks tips for addressing the anxiety (aside from 'waving' the thoughts away).

Another game that has been developed is *I hate picking up the phone* [3]. The game involves a character who hates picking up the phone, even though they are excited to talk to their friend. The game focuses on the internal monologue the character is experiencing, and how their anxiety increases as time goes on. The game increases awareness for phone anxiety, but does not involve having to actually talk on the phone or how to address the anxiety.

One way to treat telephobia, aside from talking to a therapist, is by gradually introducing individuals to the phone [9]. Alongside this there are some tips that can aid individuals during a phone call, like smiling to themselves or by letting it go to voicemail [7]. The best way to get over phone anxiety, however, is to simply pick up the phone and go through the motions [8]. However, not everyone has easy access to phone call "training", making opportunities for practice sparse.

3 SERIOUS GAME CONCEPT AND DESIGN

The serious game developed for this research aims to help people in reducing their phone anxiety by providing them with tips on how to deal with it. An effective way to lower phone anxiety is through preparation and practice of phone calls [8]. This method is supported by the game as the core game loop revolves around selecting appropriate responses during calls.

This loop is supported by an engaging storyline in which the player takes on the role of a newly hired receptionist at a pizza place. Except there's something off about the place as the kitchen door remains locked, communication with colleagues is solely through phone calls, and some customers seem overly excited about the pizza. By finding the hidden clues within the phone calls and office environment, the player unravels the mystery of the business. Once they have gathered enough evidence, they can report the place to the police as an illegal drug operation by calling the alarm number! The inclusion of this mystery storyline aims to keep players engaged, encouraging them to make more calls, discover more clues, and subsequently learn more about the remedies for phone anxiety.

In addition to uncovering the company's secret, the player can also strive to excel in the game by being a capable receptionist. The

work performance is based on the number of calls taken and the responses chosen during the conversation. However, it's important to note that these job-related actions also increase anxiety. If the anxiety level becomes too high, players will be unable to make calls or select the correct dialog options. This balancing mechanic of managing two levels was inspired by the game "Papers, Please", where players work as an immigration officer and must balance work performance with moral decisions.

The game represents the work performance and anxiety levels as simple score bars to make it easy for players to check their status at a glance. The scale and amount of points assigned to each event were determined through playtesting. Here, the player's experience was kept in mind as the balancing of scores should not be too difficult, creating frustrating gameplay.

The script of the game including the phone conversations was designed using dialog trees. To give the player a feeling of freedom and to allow them to practice their responses during calls, the player is given multiple responses to choose from. However, to limit the complexity of the prototype the maximum number of options was kept at three. The dialog trees were also used to indicate the changes in work performance and phone anxiety levels. A snippet of one of the trees is shown in Figure 1.

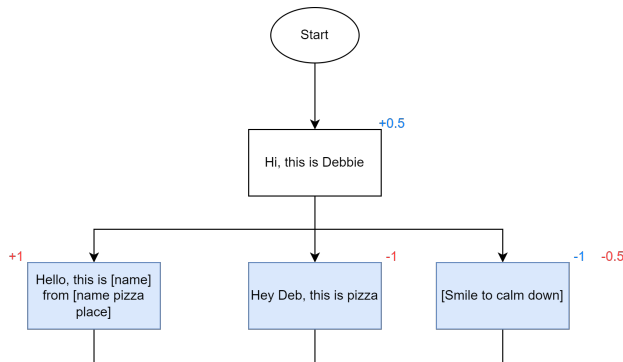


Fig. 1. An example snippet of a dialog tree used in the game. The text from a non-playable character is shown in a white box, the player's response options are shown in the blue boxes, and the work performance and phone anxiety points are shown in red and blue respectively.

At first, both the caller's text and response options were represented textually, but later it was decided to remove this and only play the caller's audio to align better with real phone call experiences where only audio is present. To cater to players who may miss the caller's statement, we added a 'Can you repeat that?' option, enhancing the game's accessibility and user-friendliness.

To accomplish the characterizing goal, this serious game included tips during gameplay for how to deal with phone anxiety. The player can discover the tips by choosing certain options in the game, and noticing how they decrease their character's anxiety level. An example is shown in the dialog tree in Figure 1, smiling to yourself has been proven to make you less nervous during calls. Something that has not been implemented yet but has been designed



Fig. 2. Four poster designs used in game.

conceptually is an end-of-day overview, in which the player can review the anxiety tips they discovered and missed for each in-game day.

As stated in the introduction, a possible cause of phone anxiety is the need to respond fast, unlike forms of communication like texting. In future work we plan to implement this aspect by incorporating a timer in the game, giving the player only a short time to choose appropriate responses during calls. This would be valuable practice for people struggling with this, and makes the game more realistic by simulating the time constraint in real-life calls.

4 IMPLEMENTATION, INTERFACE, AND INTERACTIONS

The development of the Telephobia Game was executed in two main stages: the creation of a first prototype for initial evaluation and feedback, and a second prototype that incorporated the feedback and evaluation results from the first prototype.

The versioning software used for this project was GitHub¹, a public fork of the final prototype is also available on this service². The game development platform chosen was Unity 2021 LTS³, as it is the most stable version, and the features of later releases did not provide any significant benefit for this prototype. Stability was deemed more beneficial for our purposes.

All game assets were created using Blender⁴, with a low polygon aesthetic to make it easy to efficiently make a cohesive environment. Texturing was kept minimal, with vertices each being assigned an individual color to save time. This, combined with a toon shader⁵, resulted in a polished, playful look. In game posters were generated using Dall-E⁶ (Appendix ?? Figure 2). These posters were then altered by hand to include text overlays, and to fix AI-image generation flaws such as weird teeth, hands, etc. A skybox for the world was generated using a stable-diffusion-based image generator by Blockadelabs⁷.

The core mechanic of the game, the phone call interaction, was designed to be as realistic as possible while still being feasible for implementation. We initially considered ambitious implementations such as real-time voice recognition or on-the-fly AI speech generation. However, we quickly realized that these approaches would be

¹Retrieved from <https://github.com/>

²Public fork of Telephobia can be found at <https://github.com/Samuwhale/Telephobia>

³Retrieved from <https://unity.com/>

⁴Retrieved from <https://www.blender.org/>

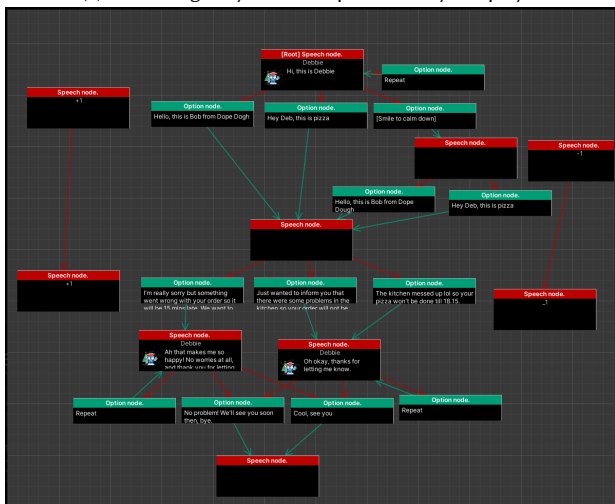
⁵Toon Shader used was developed by Vladislav Kantaev and is publicly available on <https://github.com/Delt06/urp-toon-shader>

⁶Retrieved from <https://openai.com/dall-e-2>

⁷Retrieved from <https://skybox.blockadelabs.com/>



(a) The dialogue system as experienced by the player



(b) The implementation of the dialogue system

Fig. 3. The dialogue system as seen by the player (a) and its implementation (b).

overly complex to implement, difficult to evaluate, and could also potentially detract from the game its accessibility.

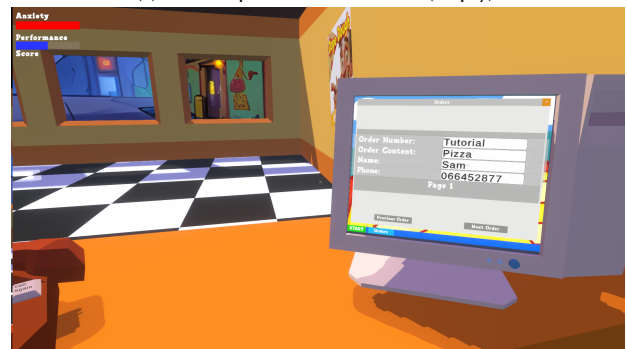
Instead, we adopted a more practical approach by utilizing a pre-scripted dialogue tree with multiple-choice response options. This decision allowed for quicker and more flexible implementation of the dialogue (see Figure 3b) system while still providing a believable phone call simulation. As a result, players listen to the caller and select their response from a set of choices, triggering unique responses from the caller (see Figure 3a). We utilized Elevenlabs' Text-to-Speech (TTS) service⁸ to generate the caller's voice. This solution provided a cost-effective and time-efficient alternative to hiring voice actors while still delivering a realistic-sounding voice for the caller.

To simulate a real-world office environment, we included a computer where the information on incoming orders can be stored (see Figure 4). While the current prototype does not validate the input into the system, it provides enough functionality to prototype it.

⁸Retrieved from <https://beta.elevenlabs.io/>



(a) The computer with order info (empty).



(b) The computer with order info (filled in).

Fig. 4. The in-game computer with order information, both (a) and after being filled in (b).



Fig. 5. A sticky note as it is being composed (on the left of the screen) and a previously written sticky note that has already been stuck on the computer (center of the screen).

To further enhance the office simulation, we introduced interactive sticky notes (see Figure 5). These can be placed anywhere in the world and written on using keyboard input, allowing players to note important information. This mechanic was designed to mimic real-life note-taking during phone calls and to provide an additional layer of interactivity within the game environment.

We implemented a physics-based interaction system using Unity's built-in rigid body physics. This allows players to grab and throw

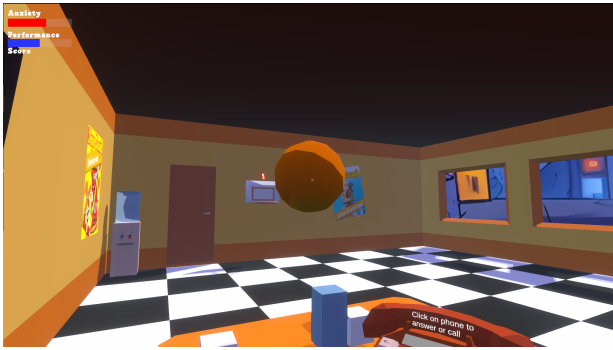


Fig. 6. A basketball just after being thrown towards the hoop.



Fig. 7. The anxiety and performance bars as seen in game.

objects, adding an element of physicality and immersion to the game. The idea behind this is that it allows for fidgeting with objects around the desk, just like one might in real life. Based on this, we also added a basketball hoop and balls. These balls can be thrown in the hoop, which has a built-in score counter at the top (see Figure 6). This serves as an anxiety reliever and also contributes to the overall enjoyment of the game.

The interaction system underwent several iterations. We experimented with both a free-moving cursor and a fixed, center-aligned crosshair. After testing, we found that having the crosshair fixed to the center, requiring the player to move the camera around to aim at objects (to then interact with them), felt more intuitive as it aligned with a player's pre-existing mental model (from traditional FPS games). Therefore we opted to go for that approach.

To create an immersive environment, we incorporated various ambient sounds and audio effects. These were sourced from publicly available and royalty-free sample packs. The inclusion of sound adds depth to the game world and enhances the player's sense of presence within the game.

The second prototype built on this, based on evaluation results of the first prototype. One of the key improvements in the second prototype was the implementation of a working anxiety and performance system (see Figure 7). Placeholder UI elements for these were already implemented for the first prototype, but logic for them was only implemented for the second prototype iteration. These HUD elements (in the form of bars) reflecting the in-game character's job performance and mental state were linked to the dialogue choices made by the player during phone calls. Alongside a simple bar representing the performance, a numerical 'score' value was added under it to provide a more precise view of performance. Different dialogue options trigger varying levels of anxiety and performance in the game. In-game triggers are also in place, allowing an increase in anxiety when the phone rings for example, or a performance increase when answering.

To improve communication of the character's emotions and provide guidance to the player, a pop-up HUD element in the form of a thought bubble was introduced in the second prototype. This thought bubble appears on the screen and displays a message reflecting the character's internal thoughts and suggests a recommended action for the player to take. In the case of the second prototype,



Fig. 8. The thought bubble communicating the characters' anxiety and the prepare call button.

the thought bubble indicated that the character was feeling anxious and advised the player to do a fake 'preparation' call.

To facilitate the suggested action, a button was included within the thought bubble interface. In the prototype, this button was labeled as a "practice call" button and appeared simultaneously with the thought bubble. While this particular feature served as a placeholder for a potential practice call mechanic, its purpose was to effectively convey the concept that practicing calls can help alleviate anxiety. This aspect has the potential to be expanded upon in the future to incorporate a wider range of character thoughts and corresponding courses of action. The thought bubble and prepare call button can be seen in Appendix ?? Figure 8.

To streamline the gameplay experience, an automatic saving feature was implemented for order information. This feature automatically transferred the details mentioned during phone calls to the computer in the game (see Figure 4). However, players still had the option to manually edit this information if needed, providing flexibility and control.

In terms of visual enhancements, the second prototype introduced various post-processing effects, including anti-aliasing, color grading, and bloom. These effects contributed to a more polished and visually appealing game environment, enhancing the overall immersion and aesthetic quality of the game.

5 EVALUATION

To evaluate the game, semi-structured interviews were conducted to gather general insight in how participants experienced the game, along with providing opportunity to ask further questions when appropriate. Beforehand, the participant would play the game prototype and think aloud; verbally expressing their thoughts and what they experienced. The evaluations focused on whether the game was able to help the participant with their phone anxiety, or whether they think it would be appropriate to help others with their phone anxiety. The main questions focused on whether the participant understood the goal of the game, whether that goal was reached, and if the tips given by the game were experienced as helpful.

Alternatively, A/B testing was considered. However, as A/B testing focuses more on interface differences, it was left aside for semi-structured interviews. By first letting the participant walk through the game at their own pace, they can become familiar with the game, after which they can express their opinions through the interview.

5.1 Procedure

In order to take the evaluations, a procedure was followed. The procedure for the thinking aloud session can be found in Appendix B. Afterwards, the procedure for the semi-structured interviews was followed. It can be found in Appendix C. Lastly, the participant was informed that this was the end of the evaluation, and they were thanked again.

5.2 Results

To assess whether the game reached its goals, it was evaluated with five participants. Generally, the goal of the game was only sometimes clear for the participants. Participant 3 and 5 did not catch the goal; one was too focused on the performance aspect and the other thought it was intended as a receptionist training simulator. Because of this misunderstanding, they had difficulty catching the tips that were intended for lowering the anxiety.

The other participants were able to identify the goal, and generally thought the tips could be helpful to manage their phone anxiety. Participant 4, for example, was already aware that smiling during a phone call can calm you down, which was something they had already learned during their call-center job. Participant 5 felt that having a list of the name and number of the caller helped them feel more prepared for the actual call.

One main takeaway of the evaluations came from participant 4, as they explained how they felt about the "prepare for call" anxiety-reliever. They said:

The prepare call didn't do anything in the game, whereas in real life you might prepare some steps or actually walkthrough it. When I'm actually gonna call someone I can't click to reduce my anxiety, so it would be nice to see more how I would actually prepare a call to reduce anxiety.

Indicating that, while the game did work as a sort of exposure therapy, they were unable to actually learn what the tips for relieving anxiety entail. If the game would elaborate on how the character actually calms themselves down, it might have been more effective.

6 DISCUSSION

6.1 Implications

In future research, the conducted study has the potential to impact individuals with phone anxiety by providing an alternative approach to reducing their anxiety. Typically, people with phone anxiety are directed to therapists who utilize exposure therapy techniques. However, this game offers a different method of exposure, albeit in a more subtle manner. Players are still exposed to the challenges of making and receiving phone calls, but within the context of a virtual game. This approach can be less stressful since it only affects virtual characters rather than real people, and individuals can engage with the game from the comfort of their own homes, which also lowers the barrier for working on their anxiety. Compared to the games mentioned in the related work, our game takes a different approach than simply addressing calling or phone anxiety. The game developed in this study places greater emphasis on the personal growth and improvement of individuals with phone anxiety, rather than solely raising awareness about the issue. By providing helpful tips throughout the game, it actively assists players, potentially leading to reduced anxiety when they have to make or receive calls in real-life situations.

6.2 Limitations

After conducting the research, several discussion points emerged. Firstly, the limited time available to conduct the study may have resulted in biased results. Additionally, the small number of participants who evaluated the game means that the comments provided may not be representative of the general population. It is possible that with a larger sample size, we would obtain different results altogether.

Due to time constraints, it was not possible to complete the entire game. As a result, certain elements, such as a functioning progress bar and anxiety bar, could not be added to the game. Since the game was still a prototype and unfinished, some aspects could not be thoroughly tested during the evaluation process. If the game had been completed, it could have potentially garnered more positive feedback from participants and provided an overall improved experience.

6.3 Future work

After evaluating the project, there are several areas that need improvement in the future. For instance, many participants failed to notice that the in-game character experienced phone anxiety themselves. As a result, it was unclear why the character received specific tips to remain calm. Additionally, it is necessary to incorporate more tips into the game so that players can genuinely learn from their gameplay experience. Currently, there were no noticeable consequences if players selected wrong answers or answered the phone too late. This absence of a score system made it unclear why the game was being played and what the overall objective was. In future iterations, it is important to implement a functioning score system and make the game react to player mistakes, potentially increasing anxiety levels.

Another aspect that could not be included in the game was customization. Customization in games allows players to perceive themselves differently in virtual worlds. Player identification, which affects enjoyment and reduces self-discrepancy, can be influenced by avatar-based customization [4]. If customization had been incorporated into the game, it could have improved the relationship between the player and the character, potentially leading to different outcomes.

Once all these elements have been implemented, it would be beneficial to conduct another evaluation with a larger sample size, given the constraints of time in the current study.

7 CONCLUSION

This paper presented a serious game called the Telephobia Game, designed to help individuals with phone anxiety by providing them with tips and practice in managing their anxiety during phone calls. The game aimed to address the unique challenges of phone anxiety by offering a virtual environment for individuals to gradually expose themselves to phone calls and learn effective strategies for reducing anxiety. By balancing work performance and anxiety levels, players were encouraged to make appropriate responses during calls, while managing their own anxiety. The game also provided tips throughout gameplay to assist players in lowering their anxiety levels. The study has implications for individuals with phone anxiety, offering an alternative approach to addressing their anxiety through a virtual game. Unlike traditional exposure therapy, the game provides a more subtle form of exposure while still offering opportunities for practice and improvement. The convenience of playing the game at home further lowers barriers to working on anxiety. Overall, the Telephobia Game developed in this study shows promise in assisting individuals with phone anxiety and offers a new avenue for addressing this common form of anxiety in an engaging and supportive manner. Future iterations and research can build upon these findings to create more effective interventions for phone anxiety management.

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A GAME DESIGN

B THINKING ALOUD PROCEDURE

- Thank participant for participating in our evaluation
- Give them the information sheet and give them the opportunity to ask any questions. If they still agree to participate, have them sign the consent form.
- Start up the game, ask the participant to voice any doubts/questions/comments they might have while playing. They do not need to say every thought out loud (since there will be audio in the game which they might not be able to hear if they talk over it). Tell them that we won't answer their questions while they are playing but they are important for us to hear to know what parts of the game aren't clear.
- After they are done playing (they played out all conversations, don't know what to do anymore, or don't want to play anymore), perform a semi-structured interview about their experience with the game and take notes.

C SEMI-STRUCTURED INTERVIEW PROCEDURE

- What do you think the overall goal of the game was?
 - if they get the goal wrong, explain the actual goal of the game (to inform players about ways to remedy phone anxiety)
- Do you think this game is suitable for achieving this goal?
 - What are the tips that you picked up from the game?
 - Did you know already that these tips help with phone anxiety?
- Did you realize the character had phone anxiety?
 - If not, how do you think this could be made more obvious for you?
- Have you ever experienced phone anxiety?
 - If yes, do you think this game could help you with your anxiety?
 - If no, do you think this game could help others with their anxiety?
- What did you think about the game overall?
- What did you think about the mechanics of the game and the interactions possible?
- What did you think about the design/look of the game?
- Is there anything else that you would like to comment on or have a question about?

D INFORMATION SHEET

E CONSENT FORM

Information sheet - serious game evaluation

This evaluation is conducted for the course serious gaming. Participating in this evaluation is completely voluntary and is not mandatory to pass the serious gaming course. We created a prototype for a serious game and will evaluate whether it is suitable for reaching our main goal (which we will tell you about after the game).

During this evaluation you will get to play the prototype version of our game. We will ask you to voice any thoughts/concerns/doubts/questions that you might have during the game. But there will also be an opportunity to voice these after playing, so do not worry if it's too much mental effort to voice them while playing. We would also like to ask you some questions about your experience with the game after you're done playing. We would like to take notes about your thoughts and answers to our questions during the evaluation. If you consent to this, any materials produced in the evaluation may be used for publication but will be fully anonymized.

You may withdraw from the experiment at any time for any reason. If you have any questions let us know!

Fig. 9. Information sheet

Consent Form: Serious Game evaluation

The students conducting the experiment: Merel Das, Mette Duijnhouwer, Samuel Spithorst, Lukas Stermerdink, Osled Ahmed Reda Abdelrahman Elemary

Gender of the participant:

Age of the participant:

Highest level of education achieved:

For questions after this evaluation, you can contact Merel Das at m.f.m.das@students.uu.nl.

Please complete the form below by ticking the relevant boxes and signing on the line below. A copy of the completed form will be given to you for your own record.

- I confirm that the evaluation has been explained to me and I have had the opportunity to ask questions which were answered satisfactorily.
- I am voluntarily taking part in this evaluation. I understand that I don't have to take part, and I can stop my participation at any time;
- I don't expect to receive any benefit or payment for my participation;
- I am aware that the researcher will take notes of this session. I understand that my answers will be written down.
- I confirm that I am 18 years of age or over.
- I understand that the information/data acquired will be securely stored by the researchers, but that appropriately anonymized data may in the future be made available to others for research purposes only.
- I understand that I can request any of the data collected from/by me to be deleted.
- I agree to take part in the evaluation of the serious game created by Group 4 of the Serious Gaming course.

Name of participant:

Date:

Signature:

Name of researcher:

Date:

Signature: