

Design of a Virtual Environment Applied to Social Phobias to reduce the Treatment time in Patients

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ABSTRACT

People who suffer from social phobia, when they speak in public, have feelings of nervousness, anxiety and panic as well as experiencing it at different times in their daily lives such as at work, school, university, among others. In this work the methodology of the planning treatments was implemented. In this case study, programs were used for design and development such as Google Sketchup, Blender, and VrmIPad. The results of the virtual world design together with the methodology that was used helped to make comparisons of a different virtual world used to other needs. The development of the virtual world implemented in health clinics in Lima will help patients with social phobias of the non-generalized type, because employing the Virtual Reality treatment contributes to the improvement of the patient and in turn allows us to achieve results in a few periods of time.

Key words: Social Phobia, Virtual World, Virtual Reality, Virtual Reality Treatment.

1. INTRODUCTION

Social anxiety disorders or as it is also known as social phobia, are the symptoms that people suffer at the time of presenting a social situation, which causes the person to panic or despair, in addition there are 2 types of social phobia, the first is the non-generalized type, in which people normally exhibit performance anxiety and have feelings of fear when speaking in front of large groups, the second is the generalized type, people suffer from this disorder, because they have a fear persistent and avoidance of most social situations [1]. Peru does not get rid of this disease in regards to MINSA (Ministry of Health) in 2018, 7% of the population suffers from anxiety, which is directly linked to the phobia [2]. While in adolescents according to the National Institute of Mental Health they suffer more frequently mental disorders obtaining 7.1% in Lima and Callao of social phobia compared to the other regions of Peru [3].

The methodologies encountered for a better development of To treat social phobias, psychologists use somatic methods that include medications, and psychotherapeutic methods,

such as supportive psychotherapy compared to Spanish clinics such as Psius and Previ that improve these treatments using Virtual Reality (VR), exposure to virtual reality It creates a greater sense of presence and is much more immersive. This is an important issue since the therapy aims to facilitate the emotional processing of patients to social situations [4]. With the support of VR technology, a 3D virtual world will be designed applying the Planning methodology of a methodological process for the creation of virtual environments [5]. It is worth mentioning that the SENDA methodology was not used, which is a flexible framework that can be used for the life cycle of a Virtual Environments (VE) or only for a set of Processes [6]. Compared to the methodology used, SENDA does not have a testing stage as it is necessary to know if the virtual environment is functioning in an optimal state.

Clinics specializing in mental health control use different techniques and treatments such as SET-C is a multifaceted behavior treatment modeled from a successful program used for adults with social phobia [7], that is why it will be implemented in the Lima clinics, devices such as HMD are the virtual reality (VR) head mounted screens (HMD) which allows us to create a highly immersive experience [8], that will allow the patient to interact with the virtual world, which in this case will be a scenario where the patient will face his fear of speaking in public with certain hours of sessions per day.

The general objective of this research work is to strengthen my research knowledge, as well as the topics discussed (social phobia and RV), to design an RV environment that will improve the treatment of social phobias and thus achieve better results in a short time frame.

The research work will be divided into 5 parts, in the first stage: The introduction, in the second stage the methodology will be used, in the third stage: The case study, in the fourth stage: Results and discussions, the fifth stage: The conclusions, where the answers to the proposed research objectives will be found.

2. METHODOLOGY

For this investigation the methodology of the planning of a methodological process for the creation of virtual

environments will be applied [5], the structure of this methodology will allow the design, as well as the development of the virtual environment, as shown in Figure 1.

2.1 Space selection and prior study

In this first stage, the scenario to be created will be specified, in addition to all the essential characteristics that the environment will have, as well as its restrictions and scope, through the help of a form.

2.2 Planning of the Virtual Environment Creation Project

At this stage it will be decided the tasks and the time it will take to perform them, as well as specifying what it will take for the creation of the virtual world through the help of the schedule of activities.

2.3 Obtaining Requirements

At this stage the functional and non-functional requirements that are desired for the virtual world will be carried out with the help of the client's participation, in this case the patient and also the psychologist.

2.4 Design

At this stage, the virtual world modeling design will be carried out with the help of the Google Sketchup program.

A. Google Sketchup

It is a 3D dynamic drawing software that is generally used to design 3D construction models [9].

2.5 Model Development and Integration

In this stage the virtual world model is developed based on the design that was made in the previous stage. The Blender tool that is open source will be implemented in addition to modeling, rendering and package animation software [10]. In addition to having VrmIPad: it is a standard file format to represent three-dimensional (3D) interactive vector graphics, [11] and the Cortona 3d tool to visualize the virtual world with a web browser.

2.5 Tests

In this stage, the respective tests to the virtual world will be carried out in order to rule out any errors and defects that can be identified. The tests will focus on the design of 3D objects and test users (patients with social phobias), in addition to performing the tests, the virtual reality helmet VRShinecon will be needed.

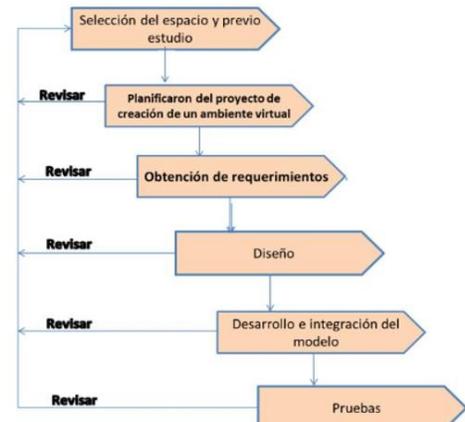


Figure 1: Methodology for creating virtual environments

3. APPLICATION

3.1 Space selection and prior study

The virtual environment was specified, as well as the objects it will contain and as can be seen in Table 1.

Table 1: Space Selection

Space Name	Stage for speeches	Type of Objects	Armchair patio, proportionally high rectangular shaped scene, racks next to the scene, podium, reflectors and people created for the virtual environment.
Objective	The environment will be created to help people afraid to speak in public.		
Scopes	The patient can interact with the environment as many times as necessary. People created for the environment will react well or badly according to the circumstances of the case. The patient will expose a certain topic for the virtual public so that it manages to function. People created in the virtual world will interact with the patient at the end of the exhibition.		
Limits	A simple virtual environment will be created. The design of people in the virtual environment will not be so complex.		

3.2 Planning of the Virtual Environment Creation Project

To establish the duration of the activities and the tasks to be performed, as well as their respective duration, a schedule of activities was developed as shown in Figure 2.

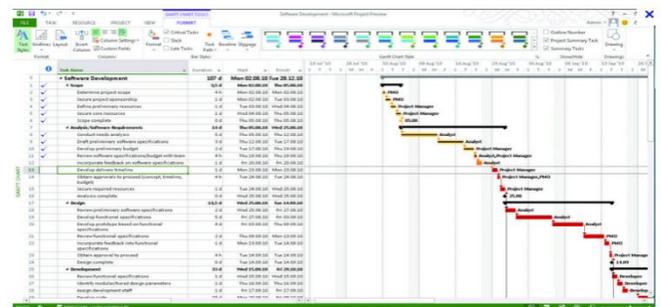


Figure 2: Schedule of activities.

3.3 Obtaining Requirements

Tables of functional and non-functional requirements of the virtual environment were made as shown in Table 2 and Table 3.

Table 2: Requirements

Number	Requirement	Description
RF-01	Interact with the virtual environment	The user can interact in a limited way with the virtual environment.
RF-02	Take the defined route	The user will be in a defined place, he will not be able to choose the place he wishes to visit.
RF-03	React to the user	people created in the virtual world will react to the user.
RF-04	Develop virtual objects with a simple level of detail.	The detail of virtual objects will be based on a simple environment.
RF-05	Develop dynamic and static objects	The objects for the virtual environment will vary between dynamic and static, for interaction with the user.

Table 3: Non-Functional Requirements

Number	Requirement	Description
RNF-01	Implement the virtual world on a device	The virtual environment will be implemented on a Shinecon G04E VR device.
RNF-02	Portability	The virtual environment will provide comfort to the user.
RNF-03	Usability	The virtual environment will allow easy use.

3.4 Design

At this stage the Google Sketchup design tool will be implemented which will allow us to design the virtual world as shown in Figure 3.

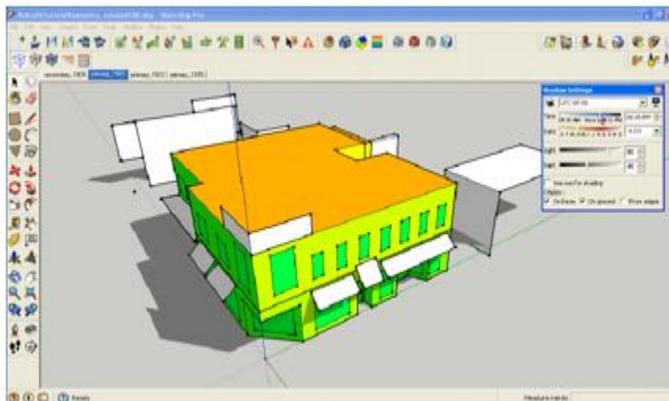


Figure 3: Google Sketchup environment example

3.5 Model Development and Integration

For the development, the Blender tool will be used to give a better 3D design to the objects on the stage as shown in Figure 4, then the VmdlPad tool will be used to develop the virtual world, and finally will use Cortona 3D, to be able to visualize the virtual environment on the web.



Figure 4: Example of the Blender environment

3.5 Tests

For the testing stage, it will be verified with the help of a person who will test the virtual environment with the help of the VRShinecon [12] as shown in Figure 5.



Figure 5: VRShinecon object

4. RESULTS AND DISCUSSION

4.1 About the Application

In the case study, the design of the web system was achieved with a Chat Bot, especially to apply it to the detection of diabetes with Machine Learning. In the design of Figure 6, you can flow the future functionality that the Chat Bot will have.

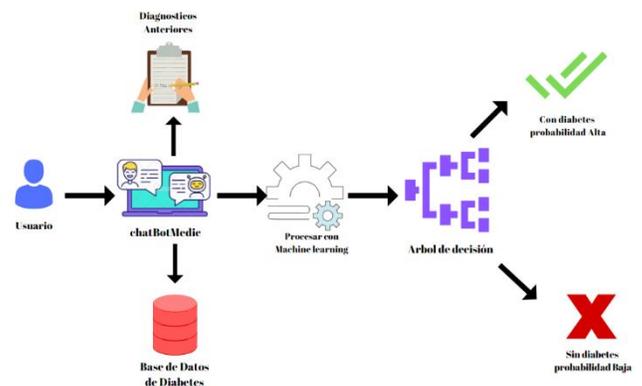


Figure 6: Software flow

In the case of this research work, only one person with social phobia of 16 sessions will be carried out during the 4 months, with a duration of approximately 1h each session, where the therapist will observe the treatment process through a monitor[13].

In this project if there is a defined methodology, although little known that will help to define well the processes that will be implemented, divided into different stages and the use of different design and programming tools such as Blender and VrmIPad. Unlike the virtual world presented in the magazine which resembles a room with people sitting in front of you, for this work there was a stage similar to a theater where the patient will have to present a topic in front of an audience, and these they will react positively or negatively depending on the interaction of the patient[14].

4.2 Comparison of the RV in another Phobia

In the research work The virtual reality treatment of phobia to fly, they have 4 people who suffered different traumas throughout their lives, to help them it was decided to opt for the Virtual Reality treatment, using development tools such as Sense's WorldUp8 Corp, and with the help of these tools such as DIVE, 3 scenarios were created: a room in which travel bags are placed, the boarding room and inside the plane. 8 treatment meetings were held where the virtual reality exposure sessions lasted approximately 35-45 min, a monitor allowed the therapist to observe the VE to which the participants were exposed [15][16][17].

In the case of this research work, only one person with social phobia of 16 sessions will be carried out during the 4 months, with a duration of approximately 1h each session, where the therapist will observe the treatment process through a monitor

5. CONCLUSIONS

To implement the environment of a virtual reality scenario, the Cortona 3D program is being used to visualize the virtual environment with the help of an HMD such as VRShinecon to achieve a better immersion, so the Lima clinics specialized in mental treatments will opt for choosing RV treatment by implementing it with patients with social phobias.

The methodology used, although little known, was used for the structure that is divided into 7 stages, necessary to make an adequate description of the information, design, development and testing of the virtual world, as well as the correct use of resources such as time and money used, stages that methodologies such as SENDA do not count.

For future projects it is recommended to develop the design proposed in this methodology, as well as to implement different methodologies that have not been mentioned in this research work for the development of RV environments.

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