GNG1103 Section #B02 Team #B05

Project Deliverable B: Need Identification and Problem Statement

GNG 1103 – Engineering Design

Problem Statement

Our clients Dr. Justin Sutherland and Dr. Daniel La Russa, both medical physicists from the Ottawa Hospital, research virtual reality medicine and its applications, such as phobia treatment and patient rehabilitation. The two physicists have noticed increased anxiety and fear in patients over the various hospital machinery with which they are unfamiliar with, and specifically the procedures used for radiation such as CT scans and brachytherapy. The clients have requested the group to design a virtual reality (VR) application that would simulate the stages of radiation that patients have to undergo while remaining cost-effective and meeting the patient's needs. This may help alleviate the patient's fears and make them feel safe during the actual procedures.

Client Request

A bilingual (French and English) VR application to simulate how various machines function during the process of chemotherapy and radiation. A VR application simulates three-dimensional images or environment which are computer-generated. The images or the environment in question can be interacted with by a person. The use of a helmet with a screen and remote controls allows for such use.
The goal of the application is to familiarise the patient with the actual process of radiation so that they feel more comfortable during the actual procedure.

The application will be a platform that can contain multiple video files. Initially, the videos will be explaining to patients the process of radiation therapy to show them what they should expect in a safe environment. However, the application may later differ to other branches of the hospital to stimulate other procedures. Taking this into account, it is important that the application is modular and capable of supporting multiple video files, focusing not only on radiation therapy.

The total budget for the VR application is around $100, which will mostly be used to purchase assets in Unity. It will not be necessary to purchase physical materials.

In terms of the specification for the videos, it should be available in both French and English. The videos, which will be provided by the client, will include subtitles in both languages to accommodate certain patients' auditory disabilities. The videos will also include appropriate audio for the various machines which are featured in said videos. The field of view will span 180°, creating a realistic environment. It should also contain text prompts and audio prompts to explain what the user will be undergoing. The controls for the video should have two functions available: the first one being a non-stop view of the videos and the second allowing the user to stop, play, fast forward the video.

As far as the code of the application, it should be easy to understand and as modular as possible; this would be done to ensure that our clients can easily import their own content, as well as for them to eventually be able to adapt and use the VR application in other medical units within the hospital. It is also important to understand that not everyone is particularly adept with VR. Therefore, depending on the patient's age, the amount of user input will be adapted. The application will be programmed through the Unity software, in the language C#.

Overall, the client is looking for VR Application with a design that is easy to understand and is able to effectively simulate the process of radiation therapy for educational purposes that is specific to each patient. The application primarily goal is to ensure the patients are well informed and familiarized with the procedures.

Customer Statement	**Interpreted Need**	**Importance**
Design a VR application for patients undergoing chemotherapy to familiarise them with the procedure in a safe environment	Make a platform in which videos can play in VR	5
It has to be a tailored experience for each age group	Different experience for the user depending on their age (18 year old vs 70 year old, not going to be the same)	4
I would like it to be bilingual since we live in Ontario	Make a french and english option	4
I want the option to use both	Will make controller an option	2

controller and headset	for patients/clients	
I would like it to be open to all platforms	Available at home as well	2
The person has to be lying down to play	Using the orientation in the Oculus headset, make it impossible to play without the correct orientation. This will stimulate the actual procedures	4
I would want to have it expand to other branches in the hospital	Be able to put other videos in the program for different operations	4
I want the option to choose from multiple videos	Make a very easy to use menu selection	3