REAL CLASSROOM

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Objective

Real Classroom is a classroom which facilitates interactions between a tutor and his/her students in virtual reality.

**INTENDED USERS**

* **Professors and students from Medical Background**. - The developer intends to provide a virtual platform for tutors to teach the medical students about human anatomy and the medical conditions they are likely to encounter as physicians. It can be of real help in medical science as many a time it is hard to arrange for human bodies to educate the students on the same. Real Classroom helps them in teaching it with the help of photo realistic 3D models of human body parts. The tutor therefore may easily teach the students about surgery and other subject matters.

Real Classroom for Medical Background has two versions:

i) Real Classroom Tutor: The tutor starts the class, chooses the topic of human anatomy he/she wants to teach the students. With each topic he has a set of 3D models and other useful objects he needs.

ii) Real Classroom Student: The students enter the class and learn about the human anatomy being taught by the tutor. They can interact with the tutor as well as the other students making it feel fully immersive.

* **Education for one and all**: Gone are the days of expensive education. Now even poor students can study in posh virtual classrooms at reasonable amount. Two versions for the same are available in a similar way as above.
* **Education from anywhere**: No more necessary to be physically present in the class. Now the students can attend the class with their classmates and be taught by their teacher in a virtual classroom from anywhere in the world.

Technologies used

* Unity 3D Version 5.4.2.
* Photon Realtime, a cloud service for networking.
* Photon Voice, a cloud service for sending and receiving of voice.
* Google Cardboard API for Unity version 1.3.

**REQUIREMENTS**

A smartphone compatible with the Google cardboard (requires MEMS sensors such as Gyroscope and Compass).

A Google Cardboard Virtual Reality box.

Microphones are preffered (to reduce noise level when communicating using voice with everyone in the classroom).

CASE STUDY: REAL CLASSROOM TUTOR

**Default page**:

The application opens with a default page where the user can change his/her name and then proceed to enter the class which opens up into a new scene where the classroom lies.

**Movement:**

Every user who joins the classroom will look like a bird (the app instantiates a bird's 3D model for every one of them and puts it inside the head of google cardboard camera as its child). Alongside they will also have their names displayed below the bird's 3D model. The movement can be easily controlled using a bluetooth controller. There are two fire buttons on the bluetooth controller. First one is dedicated for the movement. It will restrict or free the motion i.e clicking on it restricts if in motion and vice versa. The user will move in the direction he/she is facing (according to the head tracking of Google Cardboard).

**Browse models to teach:**

The user can double click (time gap should be less than 0.3 second) on the second fire button. This would activate a canvas. The user can select the desired 3D model to teach. The 3D model he browse will instantiates it with PhotonView (such that it is visible to the other users too). The 3D model will instantiate below the ceiling light (seen in the screenshot), hanging in the mid of air. Double clicking again will deactivate the canvas. The canvas will always be displayed 3m in front of the user (z dimension) with respect to the position where he stands.

**Interaction:**

Interaction between everyone in the class is made using sending and receiving of voice. Clicking on the second fire key will pause and unpause the sending of voice to other users i.e clicking restricts if sending the voice and vice versa.

CASE STUDY: REAL CLASSROOM STUDENT

Everything is same as the tutor version except that the students can't '**Browse models to teach'.**

CHALLENGES

The project needs highly detailed 3D models. Also these models should work on the smarphones.

Proper synchronization is needed for 3D models that require a PhotonView component.

Reduction of noise levels: Sending and receiving of voice requires the correct order of sampling rates to reduce the noise level. Furthermore it also depends upon the device.

**MILESTONES AND MODULES**

1. **Warm up**- Gather for 3D models to be used in the application, ie 3D models to be used for the classroom, User Prefab and the medical topics.  
   Deadline: No hard deadline.
2. **First Scene**- The first scene that loads when the app is opened. The user can change his/her name and can enter the class with the entered name.   
   Deadline: Done.
3. **Modelling the classroom** -  
   Key Features: Spacious; Posters of biology topics everywhere in the classroom making it feel like a medical classroom; a door that opens to the outside (restricted to go outside); Light effects at the center where the tutor browses 3d models to teach.  
   Deadline: 14 Feb
4. **Networking support -** using Cloud services from Photon realtime and Photon Voice. Each user has its own networked User Prefab. Also the 3D models browsed have its own photon view. The users communicate using voice, which is sent over the network using Photon Voice.  
     
   Deadline:  
   i) 24 Feb: Reading the Documentation of Photon and getting a clear understanding of how it works.  
   ii) 2 March: Applying it to getting practical understanding and figuring out what all modules and functions are needed for the BTP from Photon's cloud services.  
     
   i) **User Prefab and tweaking the Gvr main**: The application will start with instantiating a networking prefab for each user. The prefab initiated for the user should be trackable by other users too. Also the user prefab should contain a 3D text for displaying the name of the user.   
   Deadline: 14 March  
   ii) **Voice support** - Using cloud service from photon voice. The users can can choose to pause or unpause sending of voice over the network. To work on minimising the noise levels.  
   Deadline: 30 March
5. **Provision for selection of 3d models for medical topics for the tutor version-** The 3D model selected should a part of network and it should be instantiated and changed according to tutor in not just tutor's session but in every user's session.

Deadline: 17 April