Stage A – GROUP TASK: Project Idea and User Analysis

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BACKGROUND

Due to COVID-19, many universities took their main teaching methods online since everybody was encouraged to stay at home, which created a whole bunch of issues in the education sector. Practical sessions for university students were reduced and peer to peer interactions were reduced. Students were encouraged in watching pre-recorded videos and listening to pre-recorded audio where they cannot experiment on their own. The purpose of this app is to provide students with a hands-on experience with their tasks which they are not able to attend physically. Moreover, the VR technology helps users to gain knowledge similar to being present on the spot. Furthermore, users can interact with other students and avail real time experience among the avatars of their classmates while being present in the classrooms. Students can visit labs, different sites in order to get experience according to their degree. The VR system provides an opportunity for students to learn theoretical aspects related to their degree and get experience through labs and communicating with fellow students regarding subject matters. Through the VR system classrooms and labs can be used effectively where each student can perform a task based on the time they are given by simply staying at home.

PROJECT DESCRIPTION

Idea:

We are going to implement a VR application for university students. Each student will get a specific login id and password which can be changed by students. After logging in the application, the student will get an interface in which they can see the units they are enrolled in and each student will be assigned an avatar which will be used for virtual classrooms and for virtual labs and field trips. Later, students will allocate themselves to the lectures and attend lectures on their respective time slots. To access their respective virtual lectures, labs and field trips, they will be given a link which will direct the users to the virtual environment.

How will it work & achieve the target improvement:

Firstly, the students will log in to the VR application using the university assigned user ID. Afterwards, students will be given the option to customize their avatars according to their preference. Next, the students will now have to look at their timetable for each unit and attend the virtual lectures, labs and field trips at the allocated time. Furthermore, in order to do that student will click onto the unit which will direct the students to the link for their respective lectures, labs and field trips which will only be accessible at the specific allocated time.

Now let's look at how the virtual classroom would work. In virtual classrooms we are going to provide an environment just like a actual classroom and each student avatar will be allocated a seat in the classroom initially, although students can change the seats of their avatars if there is an empty seat in the classroom, just by clicking at the free seat, The student will get a point of view of the class from where their avatar is seated - this is why the seating arrangement is essential. This is also beneficial for students as they will get to experience an in-class environment.

The classroom environment will allow the students to interact with teachers easily as when a student speaks using the built-in microphone in their devices or the headphones connected to that device, the lecturer can see which student is talking as his or her seat would be highlighted, and the lecturer can mute or allow anyone before speaking. If the student wishes to speak, they can be seen raising their hand virtually which can be done by clicking the raise hand option present on the virtual screen. A Student can interact with another student by clicking on their avatar and they can speak to each other while they can listen to the lecturer in the background and this would help in peer-to-peer interaction. Along with that the other students as well as the lecturer will not be able to know what these students are talking about. Although, the lecturer can know which two students are talking as there will be a line drawn between the two students on the lecturer's screen and the lecturer can choose to intercept their communication and

control it. The screen shared by the lecturer will appear in front of the whole class as a PowerPoint presentation on the virtual projector.

Now let us look at the virtual lab & field trip environment required for a certain school:

Medical School

A bed with medical students working on a patient. The students will be able to see each other's avatar as well as the patient lying in front of them. They can easily determine the issue with the patient by looking at the virtual avatar present in front of them and with the tools provided they can work on the patient and carry practical tasks. The virtual screen would allow the students to see each organ labelled alongside the tools which would help them to understand and learn in an informative way.

Chemical Engineering

Another example includes chemists or chemistry students who require hands on experience in order to gain knowledge about their areas of study. The use of chemicals and taking readings could be done using VR technology by the help of virtual flasks and chemicals and a lab setting suitable for chemistry students. This would help them to experiment and work without taking necessary safety precautions as they will be working virtually. However, the avatar would be required to take the precautions and the students will be required to fill up the safety precautions sheet prior to working on their tasks. The safety precaution sheet will help them to learn about the safety precautions required before entering the laboratory.

Civil Engineering

Moreover, the civil engineering students can take trips to factories, construction sites and avail industry experience which is essential for their degree. These students can use the VR technology and work on their given tasks and experiment what they have learned in class. Every student will be registered to attend the field trips and will get access to it once they log in with their ID. The students can access the field trips using a link which would then lead to a virtual screen where students will automatically arrive at the construction site and will be able to proceed from there with their tasks.

Overview

Overall, virtual labs & field trips will allow students of these schools to carry out tasks seamlessly and will gain real time experience and become more competent in real life scenarios as they will be using the tools themselves virtually which would help them understand the use of those tools better. The virtual learning experience would encourage peer to peer interaction as students will be working together. The students will be comfortable in working with people later on in the real world.

USER ANALYSIS COMPARISON AND DISCUSSION

BASIC USER INFO

The majority of the survey respondents are seen to be University students in their early twenties, pursuing their bachelor's degree. Amongst these users, from direct questions as well as assumptions, we can deduce that all of the respondents are very well versed with online educational technology where a huge percentage use "Zoom" for their educational delivery and other applications as well, such as "Canvas", "Google Docs", "Kahoot" etc. This further tells us that these students also have personal laptops and mobile devices - in order to use these applications - thus, are skillful in sharing screens, scanning QR codes, annotating and other features provided by said applications.

The collected data enables us to categorize our respondents into four major groups: Business majors, Science majors, Information Technology majors and Engineering majors. The most common interest all four groups hold is the desire to use Virtual Reality (VR) for virtual classrooms, labs and field trips to compensate for its shortfall in the current education delivery methods. They all believe that this will decrease their lack of concentration and increase their engagement, motivation and focus as well as enhance peer-to-peer interactions. While internet connectivity is a common concern, all four groups believe that with various features, such as personalized avatars, sensory feedback, status bars and so on, introducing a VR platform for education will be a smooth transition for university students for the better.

SIMILARITIES IN USER DESIRES AND STRUGGLES

Taking a deeper look, we can deduce that according to the level of practicality and nature of the course material being taught, different groups have different desires on their usage of VR.

Looking at Business and IT majors, we see these students desire an alternative method for peer-to-peer interaction the most compared to other uses. Judging by the lack of visually learned content, considering that these two degrees are very theory-based, we see a lower desire for using VR to learn course material kinesthetically. Business and IT students specify that they want virtual classrooms and office simulations where they can obtain a classroom or interview location-like feeling in order to enhance interaction beyond normal "Zoom" calls. They also desire a platform where they can work collaboratively with one another. This is however not only seen in these two majors, but in Science and Engineering students as well. Thus, we can infer that online schooling has definitely made a dent in the way people are interacting with each other. Due to this, they desire features such as calling, personalized avatars, chat boxes and more in order to create as realistic of an interaction as possible. We can confidently state that students crave a more authentic, human-like method of interacting and this helps them engage in classrooms and stay motivated.

On the other hand, Science and Engineering majors much rather prefer to use VR to learn their course material kinesthetically. The on-going pandemic has disabled them to carry out real lab lessons or go out on field trips, therefore they feel as though their comprehension of course material, motivation and focus has significantly decreased. Looking at the practicality and nature of their course material, we can deduce that their degree is very hands on and largely relies on activity-based learning to teach many concepts. Science majors learn largely from diagrams, then apply that knowledge in their lab sessions, where they can carry out medical procedures, use microscopes, carry out experiments etc. Therefore, they desire features such as great design/aesthetics, consequences, status bars and so on, in order to achieve as realistic of a lab experience as possible. This will not only increase their comprehension and engagement but will also ensure that they understand exactly how their course material functions in the real world. Engineering majors create loads of 3D models and often go on field trips; therefore, they desire features such as design/aesthetics, sensory feedback and sound effects/music in order to understand their degree functionalities in their respective applications and receive a better delivery overall of their course material.

Lastly, all majors expressed their difficulties in internet connectivity during current educational delivery. They also all desire a distraction-free simulation so that they can maintain their focus. All in all, every major is interested in using VR and believes that it can help them in one way or another.

DIFFERENCES IN USER'S DESIRES AND STRUGGLES

The coping of IT students with the E-learning transition is better than others, as IT students don't need to go for any labs or practical work on campus. For IT students' tutorials are delivered easily through e-learning platforms and doing them at home is fairly similar to what you do in the lab. But business and science students have suffered from a drop of academic performance because science students missed labs, which can only be efficiently conducted on campus. And having it online was not as good as on campus. And for business students, they have a lot of presentations and group work, which is in their opinion hard to do online. Engineering students also are not like IT students, engineering Students could not visit sites, and projects and diagrams are hard to do online. Regarding the use of our VR platform, business and IT students see that VR will be useful for better understanding and visualization when learning and Engineering students see that it's useful for field trips, like construction sites and also science students are interested in using it for practical work so they can get hands on experiences while being at home.

Majority of data we collected suggests that the opinion of the platform they are comfortable in using is split between mobile based apps and web-based desktop apps. People tend to choose web apps because they are already familiar with learning management system (LMS) platforms from their respective universities. The reasoning behind people choosing mobile apps is because phones get the most screen time and is more usable when doing VR.

So, when we look at our data for struggles in different users, science and business students are comparatively still unfamiliar with using VR equipment. On the other hand, IT and engineering students have much more experience using VR appliances because they tend to be more tech savvy. So, when asked about transitioning into a VR learning platform, IT and engineering students agree more compared to business and science students.

Though science and engineering students have struggles not being able to attend to their practicals IT and business students do not feel the same. This is because for majors like medicine and streams of engineering, it is essential to do on field/ on site work to get experience on their respective fields. Because IT and business students don't have any hands-on practical work, they only struggle in not being able to do collaborative work, presentations etc.

UPDATED USER PERSONAS

Natalie Evans
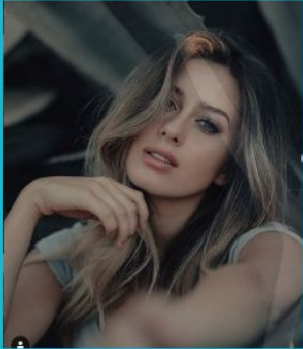
"Everyday is a new opportunity to save a life."

Age: 23
Gender: Female
Field of Study: Bachelor of Biomedical Sciences

Goals

- She is in search of an Immersive learning platform which can give her an interactive and realistic practical experience.
- She wants to have interactions with her peers and feel connected to the real world.
- Have a way to practice surgeries on avatars in an interactive virtual space.

Frustrations

- Struggling to do activity-based learning through video streaming platforms.
- Lack of focus and motivation due to being stuck in her room without human interaction.
- Missing out on a real-world medical experience that is required to be a good doctor.

Technical Capability

- Competent in using phones and laptops.
- Currently uses applications like Zoom, Skype etc.
- Fairly unfamiliar with VR technology but willing to learn about it.

Expectations

- A mobile or desktop application that can provide a lab-like environment where she can conduct virtual experiments.
- She wishes for features such as sensory feedback and good design and aesthetics so that she can have the best learning experience.
- She thinks this will help her learn her course material much better.

Bio

Natalie is a 3rd-year medical student at McGill University in Motreal, Canada. Being used to studying on campus, she is struggling to adapt to online learning and wishes for a better method to learn the course material. She is very interested in using VR and hopes it can help her.

Jonathan Ma
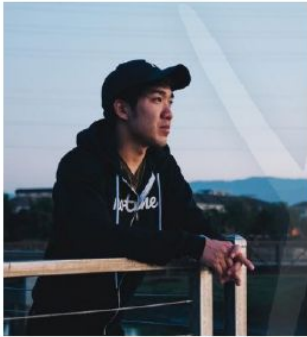
"Scientist think about doing things, engineers do them"

Age: 22

Gender: Male

Field of study: Bachelor of Engineering

Goals

- To use a VR platform to do walkthroughs in engineering project sites to get a hands on experience to learn concepts in a practical way.
- Use a interactive VR space to collaborate with his peers to do group practical

Frustrations

- Hard to connect with peers and frustrated about not being able to explore real world engineering projects.
- Declined academic performance due to the lack of practical work done through online-learning.
- Less motivation when listening to pre recorded lecture videos and tutorials.

Bio

Jonathan is a 2nd year civil engineer in the university of Sydney. Due to the pandemic situation, he decided to fly back to his home country and continue with the degree using online platforms.

Technical capability

- Competent in using phones and laptops.
- Currently uses applications like Zoom, Skype etc.
- Familiar with VR technology.

Expectation

- Expects it to be a desktop application.
- They want good aesthetics, better interface, easy to use and navigate

Marcus Lyles

"Be the change you wish to see in the world."

Age: 22
Gender : Male
Field of study : Bachelor in information technology majoring in business

Goals

- Have virtual collaboration spaces to do group work.
- Have virtual classrooms that you can interact with your fellow peers and lectures.
- Experience presentation in an immersive way.

Frustrations

- Frustrated not being able to do collaborative work with fellow peers.
- Too much hassle with the current online education platforms.
- Unable to focus and concentrate when listening to online lectures.

Bio

Marcus is a student at Monash University who double majors in Business and Information technology. He is now receding in an apartment near the university. Because the universities are closed due to the pandemic, he is stuck in the apartment doing e-learning on his own.

Technical capability

- Competent in using phones, desktops, etc.
- Very familiar with VR, already uses devices like the oculus rift.

Expectations

- Expect it to be a mobile VR app to be portable
- Basic VR hard ware will be adequate to use the app

UPDATED USER STORIES

1. As a medical student I want VR Technology which provides me details of organs and tools as I am carrying out my practical tasks on the patient to gain live understanding.
2. As a medicine student I want educational tasks so that I can learn course material kinesthetically.
3. As a medicine student I want the interaction to be more natural so that I can understand the concepts
4. As a medicine student I want better motivation so that there will be more engagement and focus.
5. As a medicine student, I want a platform to be easy to use so that I can manage my work better.
6. As an engineering student, I want to go to different places virtually for my major, so that my education is not restricted.
7. As an engineering student I want better collaboration so that I can efficiently communicate with my peers.
8. As an engineering student I want a more engaging platform so that I can understand better and improve my performance.
9. As an engineering student I want the online education delivery to be more efficient so that my performance increases.
10. As an engineering student I want features like motion sensors so that the virtually developed skills are closer to the real ones.
11. As a business student, I want encrypted private virtual meeting features so that I can do consultations and therapy with my patients.
12. As a business student, I would like access to virtual classrooms where I can interact with people as well as carry out group tasks/presentations seamlessly.
13. As a Business student I want a call feature so that I can effortlessly communicate with my peers and lecturers.
14. As a Business student I want to have classroom and office simulations so that I can virtually attend meetings and interviews.
15. As an IT student I want a better platform interface so that I can manage my work better and easily.