Project Deliverable F

Prototype 1 and Customer Feedback

Group 4

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Introduction

In this deliverable we are creating the first prototype of our organic chemistry VR game. This prototype will be complete when our test objectives are completed and our team has a version of the game that a user can play. This deliverable will outline the creation of the prototype and the process of testing it. Testing the prototype reduces the risks of having technical issues with the VR in the future and ensures that the clients expectations are met before delivering the final outcome.

Test Objectives Description

1. Specific Test Objectives:
    - In the first prototype we will start creating the ‘storyboard’ of the game. This will be the guideline for having different levels of the game that the user must complete in order to complete the learning objectives.
    - Create all of the molecular models and variations of molecules that will later be used for showing the microscopic level of the reaction.
    - Start making the scripts to manipulate the molecules.
    - Implement a bow and arrow to choose correct answers to quiz questions
    - Implement teleporting into the game.

2. What exactly is being learned or communicated with the prototype?
   In this first prototype the entire team is learning how to use unity to best serve us in the project. When creating this first prototype of our game, we are going to focus on learning how to better improve the user's mobility, our game requires the user to teleport onto different planes. We are also learning how to let the molecules move randomly.

3. How will these results be used to make decisions or select concepts?
   The results of testing our first prototype will guide our team into creating a better second prototype now that we have the base point of the VR game. From working on the first prototype and gathering information of what worked well and what didn't work well, we can make decisions better in the future and have better ideas for timing for the team gantt chart.

4. What are the criteria for test success or failure?
   The testing of the first prototype is very qualitative and is submissive to each user. Success for this prototype is to have a working version of the game that the team can improve each prototype.

What is Going on and How is it Being Done?

1. Describe the prototype type and the reason for the selection of this type.
   The prototype 1 that our team has created is a comprehensive and physical prototype of our final project. It is comprehensive because we are creating the basis of each element of the project(ie the environment game levels, molecular molecules,ect.) so that we can improve existing elements in future prototypes. The prototype is a physical prototype because it is a tangible approximation of the final project.

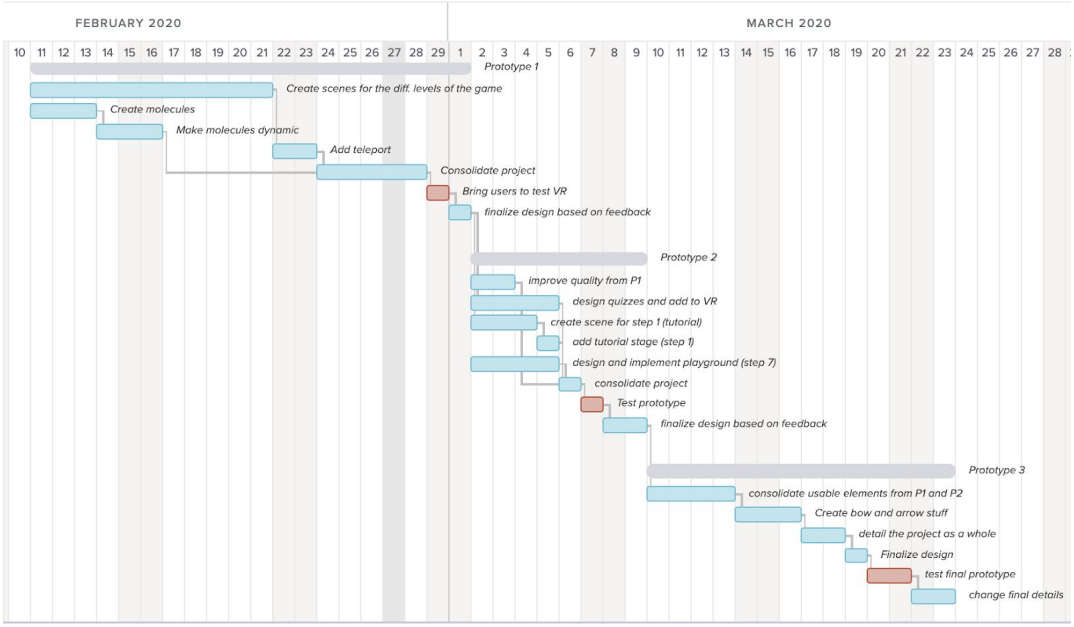
2. Describe the testing process in enough detail to allow someone else to build and test the prototype instead of you
   To build the game, each member was assigned a different task from our test objectives. We all created our parts separately in unity and then merged the different components together. The different parts include developing the environment space, creating all versions of molecules, developing random movement for molecules, and implementing user teleporting on different planes. The testing process occurs inside of the VR game where the environment and the molecules are already built and perfected. We load the changes made and play the game through steam VR and have a user move around in the game to test teleporting as well as ensure that the proportions of objects and surrounding makes sense.

3. What information is being measured?
   - Qualitative data, subjective to the users testing the prototype. Aspects they have to rate after testing the prototype include ease of use, overall appearance of the environment, how easy is it to move around, if the instructions are straightforward, if the transitions between levels are clear, and if the learning outcome was understood from the chemical reaction shown in the different levels.
4. What is being observed and recorded?
   - The users testing the VR will observe the entire environment and move around freely, seeing the different levels and interacting with the molecules. Afterwards, they will be able to rate different aspects of the VR, including ease of use, to provide some insight on what must be improved so that the game is straightforward.
5. What materials are required and what is the approximate estimated cost?
   - The only materials required to run the VR environment are the headset and sensors, which are calibrated and connected to the steam software running on a PC. In order to test the prototype of the game, it is only needed to set up the equipment and run the program, therefore, there are no costs associated as the university provides the hardware. On the other hand, to build the prototype, we had to purchase some assets from the Unity store to be able to add some functions and visuals to the environment. For this prototype, only the basic functions of the

final outcome were done, so only part of the budget was spent on the most necessary assets, which was around $20 dollars.

6. What work needs to be done?
    - For the next prototypes, it will be necessary to improve certain aspects of the game based on the feedback received. In addition, more specific features will be added to the game and more complex molecules will be introduced to the reaction, such as the phenolphthalein.

When is it Happening?

1. How long will the test take and what are the dependencies?
    - The test will take as long as it takes the user to finish the game, which means they have to go through all the levels and successfully understand the learning outcome. This will depend on how well they understand the learning outcome and how much time they spend simply exploring the environment. In order to perform the test, the equipment must be set up first, calibrated and have the boundaries of the room determined, and then run the finalized prototype of the VR game.
2. Test planning Ganntt chart: updated Gantt chart of tasks that need that be done for each prototype and the designated days to test it and improve it based on the feedback received before it has to be handed in.
    - 

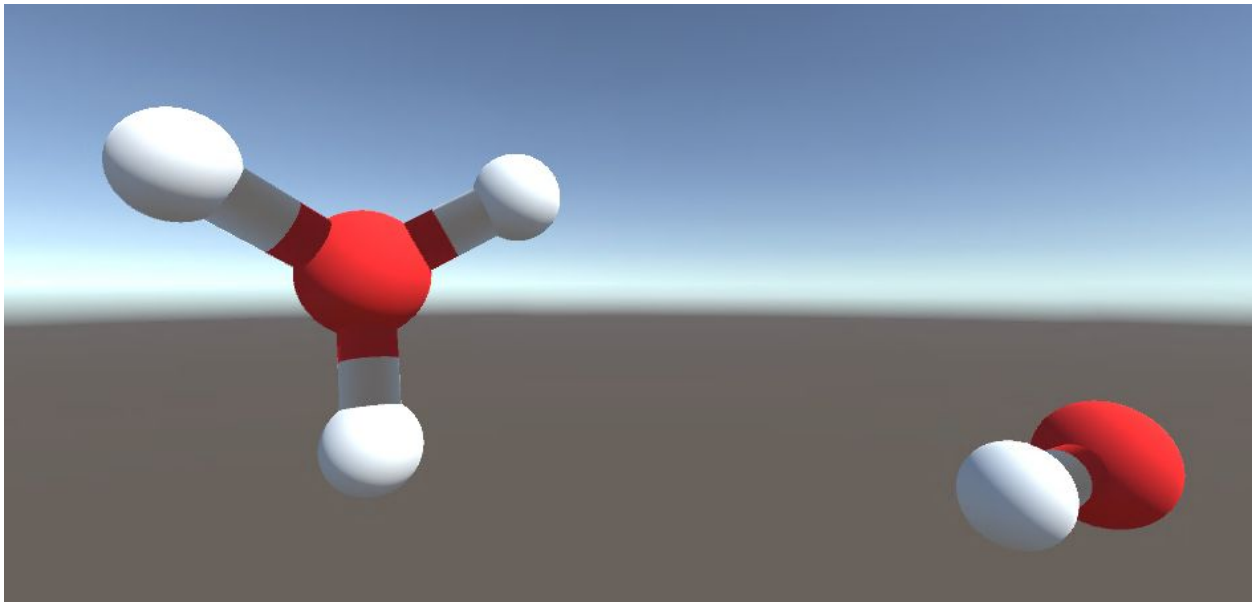
3. When are the results required? And what depends on the results of this test in the project plan.
    - The results are obtained immediately after the test is performed as the feedback received is immediate. Modifications of the project will be made according to the feedback received so that the quality of the game can be improved for the second prototype.

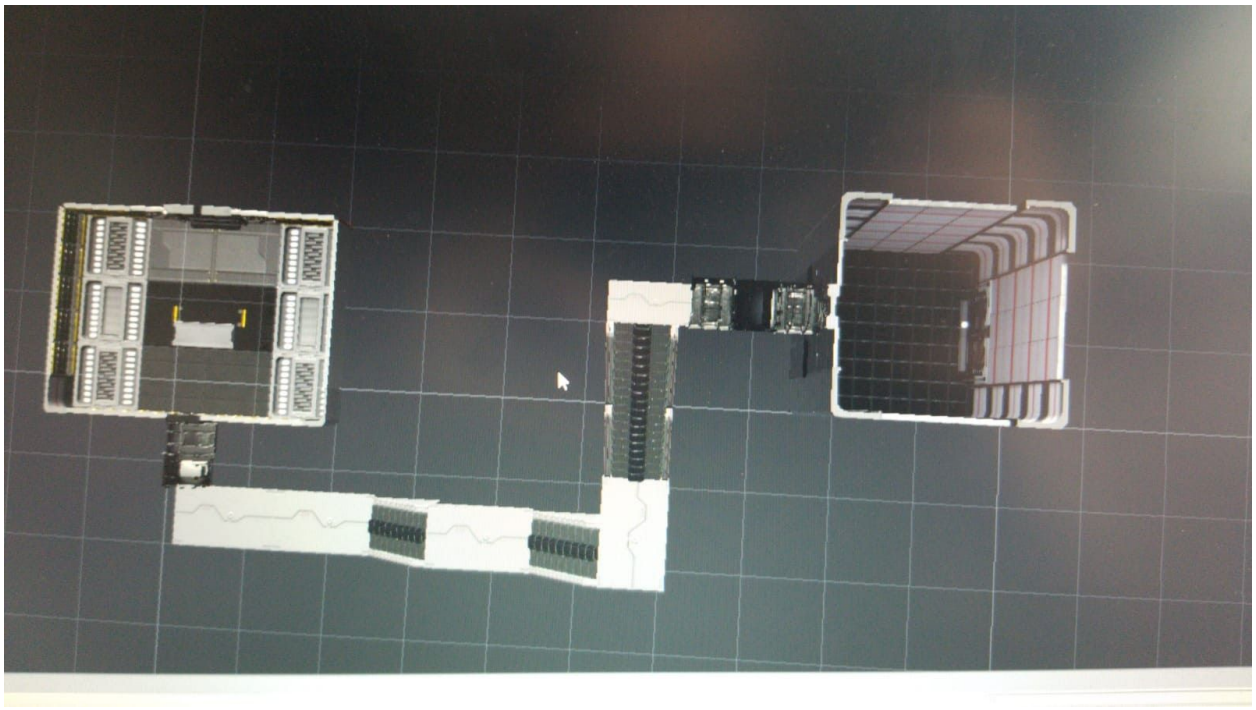
Current Feedback

Users that tested the prototype rated the following aspects on a scale of 1-5, where 1 is the lowest and 5 is the highest.

Aspect	**Rate (1-5)**
Ease of use.	4
Overall appearance of the prototype.	5
How easy is it to move around?	4
Are the instructions straightforward and clear?	4

Our Prototype





Conclusion

After developing and testing the first prototype of our VR game, we were able to determine what had to be modified to improve the overall quality and user experience, as well as ensure that the learning outcome was understood. The significance of testing the prototype is that it reduces the risks of having technical issues with the VR as well as ensuring that the client's expectations are met before delivering the final outcome. From performing this first prototype, we have a solid base of the final product that has the core functions needed to meet the client's needs and it provides a foundation that can later on be further improved and more specialized functions can be included.

Issues faced in the first prototype, according to the feedback, that must be improved:

- Build levels and implement the storyline of the game now that the foundation has been created.
- Develop the microscopic environment with molecules floating around the user.