GNG 1103: Deliverable F

GNG 1103-F04
Submitted by: Group 2

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1 Introduction

Similar to Prototype #1, the second prototype is important for a designer in order to gather necessary information on performance, user feedback and the feasibility of the design. Prototype #2 acts as an extension of Prototype #1 in the sense that the testing objectives and design of the second prototype is orientated on the portions that needed improvement or were not tested in the first prototype. The purpose of developing a second prototype is to adjust the design according to the client's feedback, improve aspects that did not meet expectations and test and measure components that were not included in the previous prototype. Prototyping is important to mitigate risk and increase the quality of the end-product, while testing is essential to prevent error and measure the usability of the prototype. The testing of Prototype #2 will be focused on measuring the simplicity and usability of the design in the user's perspective.

2 Results of Prototype #1

Although Prototype #1 was not readily accessible to its users, we were able to test how a user would react to certain scenarios that were almost exactly what a user would incur in the environment. The testing focused on the customer's perspective and opinions of the environment we had created in terms of aesthetics, comprehensiveness, simplicity and dynamics. In order to test these aspects, users were asked to answer seven questions regarding the environment in the form of a survey. Our stopping criteria for testing was when the survey had reported at least 80% satisfaction of 10 users. If the 10 users did not have 80% satisfaction, new users interacted with the prototype and were asked to complete the survey. The results of the survey reported that overall ten users were 80% satisfied.

3 Test Plan

Prototype #2 will be measuring how the user will engage with the user environment portion of the design. Overall, Prototype #2 is focused on how simple and seamless the game is to follow for the user. Therefore, the testing regarding this prototype will assist us in learning how a user will react to the user environment.

3.1 Test Objectives

The general testing objective is that of learning, since the design is still in preliminary stages and some aspects of the design have never been created by the team. The team is still working through some kinks that can hinder us from completing the prototype on time or how we had originally pitched the product. The testing will allow us to understand what components of the design are feasible and whether the user can use the product seamlessly.

The specific testing objectives of Prototype #2 are to measure how the user interacts with the user environment and whether or not the user reports a seamless, error-free environment. The results of testing these objectives will allow us to adjust the design in order to meet the needs of the users. If a certain area of the game does not work, or is not working the way it was intended, it allows for the team to either adjust the design to either make the component simpler or more complicated, or even eradicate the component altogether. The reason why we have chosen these testing objectives is to understand what the user values from the game and if the design

is usable. As a result, the design for Prototype #1 and #2 can be combined and implemented to create Prototype #3, in which we will create a comprehensive prototype.

Test success will rely solely on the user's perception of the game and the feedback we receive. If a test is successful, a user will report 90% satisfaction based on different survey questions and a failed test will not meet 90% satisfaction. A failed test will also include the incompletion of the test for any reason, whether it is the result of the user or the environment itself. The possible types of results will rely on the user and the environment. There can only be one scenario for success, and that is the user completes the game and reports 90% satisfaction. The different types of failures are reported in the table below:

Failure Type	User Failure	Environment Failure	>90% Satisfaction?
User Incompletion	Yes	No	N/A
User Environment Failure	No	Yes	N/A
User Incompletion Induced by User Environment Failure	Yes	Yes	N/A
Unsatisfied User	No	No	No

4 Prototype

Prototype #2 is a focused prototype since the purpose of the testing is to gather information on how the user will use and interact with the prototype functions. Since the previous prototype was focused on the aesthetics and simplicity of the environment, this prototype is focused on the aspects that were not tested in the first. A focused prototype can be easily tested since there are very specific aspects being measured. As a result, acquiring feedback and testing results from a user is much simpler than that of a comprehensive prototype.

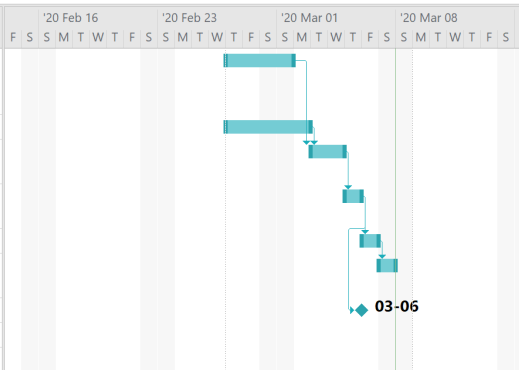
The first task one must complete is to choose a reaction or chemical discussed in organic chemistry in an everyday object in their bathroom, in this case we chose lactic acid on a toothbrush. The designer will then build the user environment and scripts to allow the user to interact with the objects in the bathroom. A set of dialogue will be included in the game to help guide the user to the course of action. Scripts and models of the micro-environment will be integrated into the user environment in order to help the user learn about the particular reaction or chemical in the item. A quiz or learning structure will need to be included in the environment to quiz the user by the use of scripts. The user will need to be deducted 'points' in the equivalency of time and therefore a clock should be integrated into the design. Once the total design is set-up, the user will be asked to engage with the game from start-to-finish. During this, the user will not be allowed secondary assistance and will need to rely on themselves and the

game to guide them. Comments and notes will be taken by the testing team and recorded for future use. If the user completes the game without error, they will be asked to report their overall satisfaction with the use of a survey.
The information will be measured by use of survey. The user will provide necessary comments and interactions of note that will be recorded by the testing team but this information will solely be useful for adjusting certain aspects of the game. The testing of the prototype will measure how the user interacts with the environments and whether or not the user can actually interact properly with the game. If the user cannot complete the game, it is recorded as a failed attempt. Any user that completes the game without error will be given a survey to complete and the satisfaction rate of the game will be recorded and studied.

The materials that are required from this prototype are bathroom item packages that are created and sold on the Unity Store. Other items are molecular structures that are either designed and created in house or from Jmol. The approximate estimated cost will be $5. Initially, the first steps to creating a user environment appropriate for first year organic chemistry students is to research the type of reactions and chemicals that are included in the course outline. From the list of potential reactions that are included in the course, a narrowed list of reactions must be selected of which can be represented in a bathroom environment. The research will allow the designers to construct an environment that will adequately represent the vision of the game. The development of scripts for interactions with items in the user environment, split screens and molecule movement will need to be completed before testing can initiate.

5 Testing and Prototype Schedule

Task Mode	Task Name	Duration	Start	Finish	Predecessors
	Compiling and constructing the user environment	4 days	Thu 20-02-27	Mon 20-03-02	
	Creating scripts	5 days	Thu 20-02-27	Tue 20-03-03	
	Constructing the micro-environment	2 days	Tue 20-03-03	Thu 20-03-05	1,2
	Compiling scripts and environments	1 day	Thu 20-03-05	Fri 20-03-06	3
	Testing	1 day	Fri 20-03-06	Sat 20-03-07	4
	Interpreting customer feedback	1 day	Sat 20-03-07	Sun 20-03-08	5
	Complete Prototype #2	0 days	Fri 20-03-06	Fri 20-03-06	4



Results are required as of March 7, 2020 to allow for one day of interpreting customer feedback. Testing should take approximately one day is dependent on tasks “Compiling and constructing the user environment”, “Creating Scripts”, “Constructing the micro-environment”, and “Compiling scripts and environments”. In order to complete the deliverable on time, the first tasks should commence on February 27, 2020.

6 Experimental Model

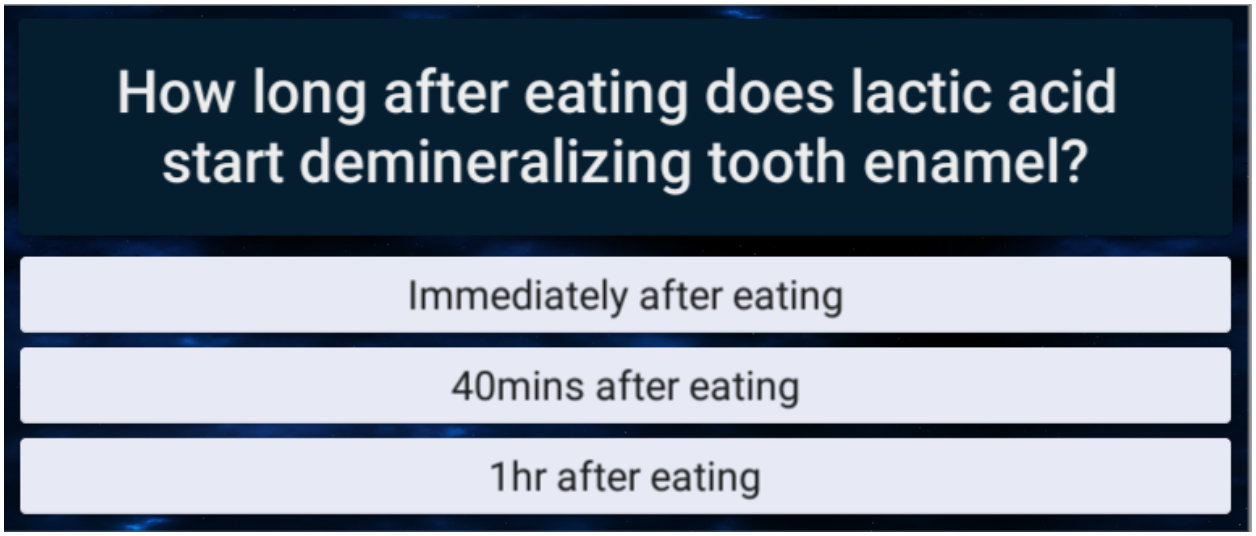


Figure 1: Updated quiz sample

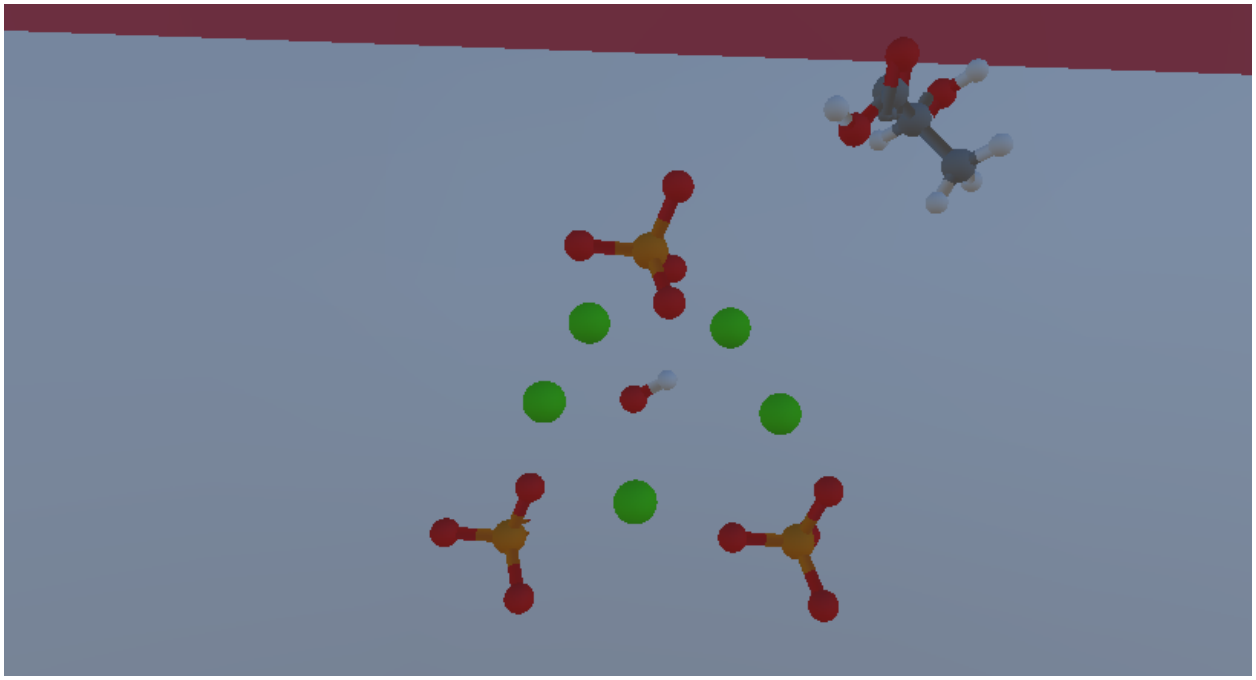


Figure 2: The microenvironment of lactic acid and hydroxyapatite (component of tooth enamel)

7 Customer Feedback

The customer feedback of this prototype was conducted using a Google Survey. The survey was sent to prospective customers/users of the product so that we could gather an adequate amount of feedback from a variety of different people. The statements that customers are asked to rate on a 5-point scale, from disagree to agree, are outlined below.

Question #1: I was able to seamlessly select and use the objects in the bathroom
Question #2: Switching from the macro-environment to the micro-environment was smooth
Question #3: The game was usable and simple to follow
Question #4: I did not observe errors in the game or user environment
Question #5: The game performed as it was explained to me prior to testing
Question #6: The environment enhanced my learning

The satisfaction of the customer is calculated using the same theory and equation as Prototype #1. The target satisfaction rate for this deliverable has been increased from 80% in the last prototype to 90%. Below are the results of the survey:

Table 1: Reported customer satisfaction measured by Google Survey

Customer (#)	Question #1 Rating	Question #2 Rating	Question #3 Rating	Question #4 Rating	Question #5 Rating	Question #6 Rating	# of 4 or 5 Ratings	Satisfaction (%)
1	5	4	5	4	5	5	6	100%
2	4	5	5	5	5	5	6	100%
3	5	5	4	5	5	5	6	100%
4	4	4	4	3	5	4	5	83.3%
5	5	5	5	5	5	5	6	100%
Total							29	96.7%

Additionally, the customers that engaged with Prototype #2 provided feedback and comments that will be implemented and addressed in Prototype #3.

8 Conclusion

In conclusion, the test objectives, testing schedule and prototype category for Prototype #2 have been outlined and discussed. The reasoning for each decision made for Prototype #2 is in regards to the customer feedback provided in Prototype. Likewise, the feedback provided for this prototype will be analyzed and implemented into Prototype #3, of which will act as a comprehensive prototype.