

Raffi and Bryce's Super Duper Report

1.OVERVIEW

Our game, Math Gladiator is directed at pre-teens who wish to better their mathematical skills. By being involved in an animated, non-graphic combat system, we hope that our audience will find using our game engaging and fun, and that they will improve their understanding of the laws of mathematics. The mechanics of our game revolve around a turn-based system in which the user answers a math question to do damage to the opponent. When the user or the opponent reaches zero, the game is over.

1.1.Changes

The only visual changes that we have made since assignment 2 is that now users have to start playing from level one and unlock further levels by beating the previous ones. We have made other back end changes in order to record and store information, and we have tweaked how some tasks are completed. Otherwise the game has remained the same.

2.DATA COLLECTION

2.1.Questions to Address

The aspects of our game that we are interested in observing directly revolve around the users' experience. We want to determine:

- 1) How far the average user progresses through the game for each mathematical operation (addition, subtraction, etc.).
- 2) If the levels of difficulty of the game are appropriate for our users.
- 3) If the users used the tutorial or not.
- 4) If the users found the app entertaining.
- 5) If the users learned from our game.

These are the same questions as stated in Assignment 2 except we now additionally address the concept of learning via the addition of question five.

2.2.Data Collected

To examine the first four questions, we used the tactics stated in assignment two; mainly, we collected data about the user as they played our game. For example, to answer question 1 from the previous section we recorded the level of difficulty the user achieved for each section. Question 2 required more observational data, including both the number of questions asked in each level of each section, and how many of these questions were right and wrong. We also recorded the total time spent on each section. This data will allow us to see the rate of change between right and wrong answers as the levels progress. Question 3 merely required logging the total time spent on the tutorial by each user. Question 4 required the logging of total time spent on the app by each user. In theory, if users spend large amounts of time using the app, it is indicative that they enjoy it, or at least feel that it is worth spending time on.

In order to answer question five we altered the method of collecting the data from question 2. We no longer hold one set of data for each level in each section, instead, after the user finishes a level their information is recorded and does not override any of the data previously collected about the questions asked in this level. This allows us to see if the user has improved when finishing a level by comparing the old and new data.

3.TESTING

A university student was one of the users who tested our game. She was instructed to play until level 5, at the minimum, and then she could stop there or continue playing if she wished. We got the users to play the game on the Corona simulator since it allowed us to access the users' data we wanted to collect more efficiently than if testing had been done on mobile devices.

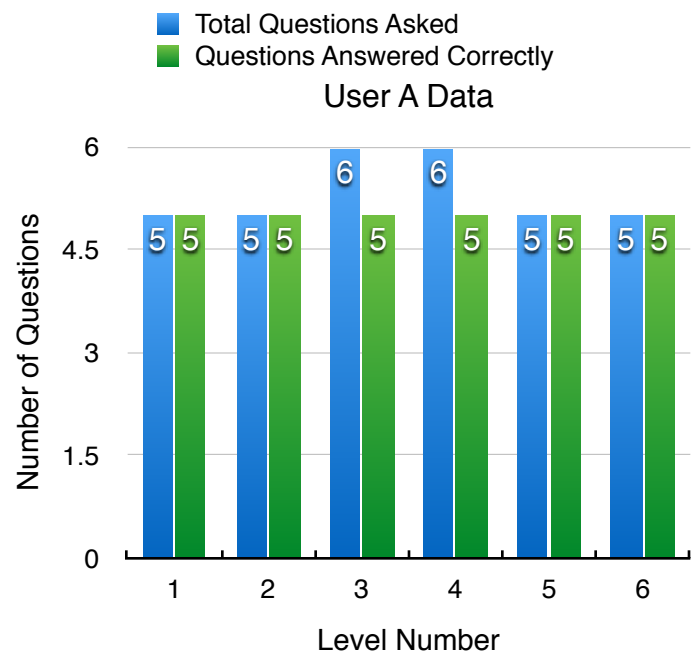


Figure 1

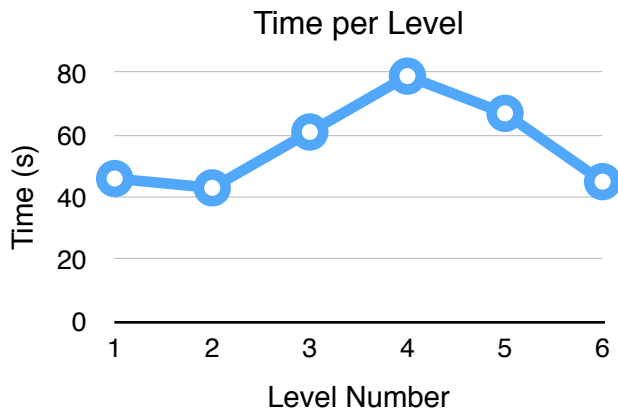


Figure 2

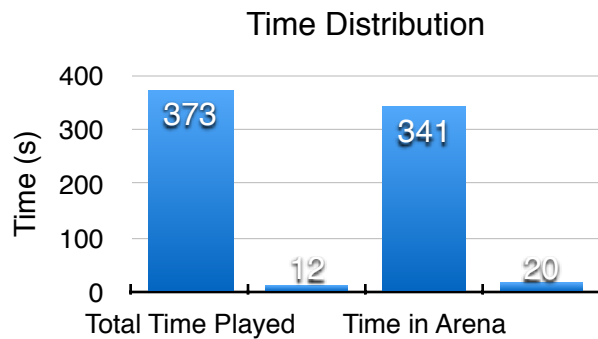


Figure 3

3.1 User A

The results of user A's data is shown above.

Figure 1 shows the total number of questions asked displayed next to the number of questions answered correctly on each level. In this case the user only decided to play up to level 6. The graph shows that the user only gets a maximum of one question wrong and this is not surprising since the user is far beyond the age range of the game. The incorrect questions may be due to a miscalculation or an accidental click, but it is clear that the user understands the concepts and would have gotten bored quickly. This data supports the idea that it may be beneficial to have the game adapt to users' scores in order to provide more proficient users with harder questions in order to challenge them more and potentially increase their engagement with the game.

Figure 2 shows the time spent on each level. This trend is not what we are looking for, as we would expect the user to spend more time on each level as each level should be harder than the previous one. This inconsistency can be attributed to the current implementation of the program. Currently as users progress through levels they have a chance of encountering harder problems but they can encounter easier ones from earlier levels as well. As we can see from the graph the user is encountering hard questions that make her take a little longer on each level. On level five and six, by chance, she encountered some easier questions which allowed her to answer more quickly. Comparatively, level three and four each have one more question than the other levels, which would cause the user to spend more time. A more accurate way of interoperating the data would be to take the average time spent playing per level. In our final implementation we will make sure the user is guaranteed to encounter harder

questions and not see easier ones. With this implementation we would expect to see more of a positive parabolic shape with time increasing on each level as compared to the level before.

Figure 3 holds the distribution of time spent throughout the game. We can see that the user spent a total of

- 1) 373 seconds (6 minutes and 13 seconds) playing the game
- 2) 12 seconds in the tutorial
- 3) 20 seconds navigating throughout the app in total
- 4) 341 (5 minutes and 41 seconds) playing the levels (times are stated like this because not all the titles fit)

This data shows what we were hoping to see; mainly, that most of the time is spent playing the game and little is spent navigating. We do need to incorporate a "Play next level" button once the user completes a level and this will drastically reduce navigation time as the user will no longer have to return to the home page after every level. Time spent in the tutorial is as expected. Our tutorial is still only one screen so we do expect the time to increase in the future but it is our goal to keep it as minimal as possible seeing as pre-teens have a short attention span.

3.2 User B

The results from user B's data is shown below.

Figure 1 shows the total number of questions asked and the number of questions answered correctly in each instance of a level. This graph shows that the user played, and completed all levels. The user was then asked to intentionally lose a level, so we could show that our data collection does in fact work. The user then replayed level 9 and got 3 questions incorrect. This data, ignoring the second instance of level 9, shows that the data collection works, although in order to test properly, we would need to test with users in our target audience.

Figure 2 shows the time spent on each instance of a level. The data shows large fluctuations in the time spent on each level by user B. This is not what we were expecting or looking for. We would like to see a linearly increasing time sent on each level. In the case of user B, the fluctuations can be explained. User B was watching tv while playing the game, and kept getting distracted.

Figure 3 shows the distribution of time spent throughout the game. We can see the user played:

- 1) 812 seconds playing the game
- 2) 9 seconds in the tutorial
- 3) 530 seconds in the arena
- 4) 273 seconds navigating the game

It is important to note, that as mentioned before, user B was playing the game while watching tv. This explains the large amount of time navigating the game.

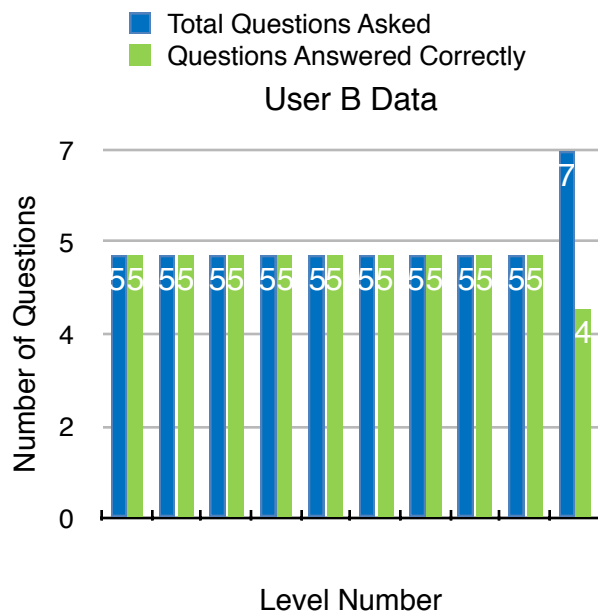


Figure 4

This user data indicates that there are no levels that are too difficult, or that no levels are too significant of a jump in difficulty for this user to complete. Secondly, and more importantly, the data shows our ability to easily gather user data. Consequently, we are now able to analyze any data gathered by more age appropriate users. This data, in turn, will allow us to update and improve the game accordingly.

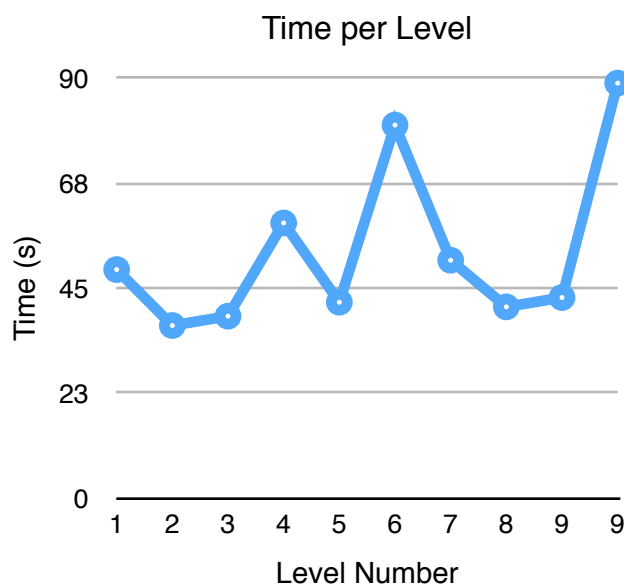


Figure 5

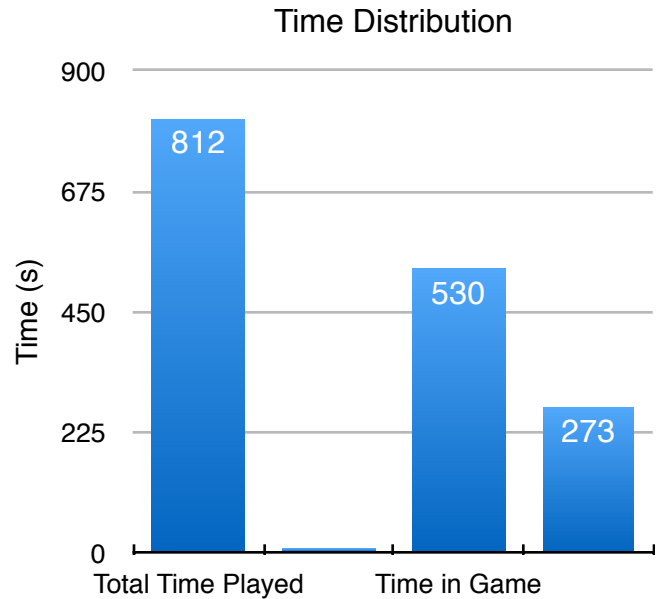


Figure 6

3.3 Summary Of Results

Our results are what was expected from two adult users. Very few questions were answered incorrectly, except in the case where user B was asked to intentionally lose a level. In the case of user B, one statistic that stood out was the 273 seconds navigating the game. This was attributed to the fact that the user was watching TV at the time they played the game and kept getting distracted while in the menu screen.

Our results show the progression of two users. It is important to note that both users are adults and wouldn't be considered part of our target audience. The data collected does not successfully answer our questions as it is not collected from our target audience. It could however be used to answer the questions given target audience users. With that in mind, the data collected does tell us a few important facts. First, the data shows that there are no levels that are too difficult, or that no levels are too significant of a jump in difficulty for an adult, and therefore an adult could easily help a younger user who may have gotten stuck on a level. Secondly, and more importantly, the data shows our ability to efficiently and correctly gather user data. This successful data collection technique will allow us to collect and analyze any data gathered from our target user groups. Finally, the collection of this data will allow us to update and improve the game in ways most beneficial to our target audience.

