

Gamification

Team: Formed Fiction

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Executive Summary

This report will summarize our project, Gamification, and the work we have done over the course of the past year from January 2017 to December 2017. Our goal in this project was to create a game that was interesting and fun enough to draw in the attention of college students and keep them interested in the game for a semester. The game will be a motivator for their studies by limiting the student's gameplay until they have submitted class work and have participated in attendance.

Our project mentor, Chris Cain, assigned us the task of learning how to use Unity3D in the beginning of the project since none of us have had any prior experience in game development nor using Unity3D. We became self taught through the use of online resources and have become fairly proficient at it by the end.

While learning to use Unity3D, we also discussed different types of games we would be making and what they would contain. After the first two weeks, we knew what genre of games we would be making and had a general idea of what the games would contain.

The initial idea was to have the game created by summer, tested during that time, and released for data collection by fall. However, we were not able to finish the game in time and had to continue working on it throughout the fall semester instead and changed the release date to spring.

With the additional time, we were able to work on fixing major bugs and improve our games with some additional features as well. There were a lot of challenges with figuring out how to get the game to save and load through the server instead of locally, but we were able to manage it along with a test account. Another issue we ran into was getting Github to work with Unity3D. There were lots of conflicts that couldn't be resolved and required extra steps to get the game pushed. We had to work on pushing and pulling at the right times to try to avoid these conflicts.

The future plan is to have the game deployed while the next team works on continuing the game development, more secure communication with the server and possibly include more games.

Introduction

Gamification is gaming elements in a non-game setting such as the classroom. We designed a game for students to play that will track class-based effort and reward them accordingly. Our goal was to design and create a game that is enjoyable to a majority of students such that they will be motivated to put more effort in their classes. By doing so, the game will improve user engagement to their academic, self reported motivation, participation in class, and finally getting a better grades as an result.

Description of Culminating Design

We selected the incremental style game as the base of our game, and use it to support three other mini game with distinct gaming element base on BrainHex. We picked the top three popular game type because we believe that will have the most impact to connect with most of the people based on the statistics from BrainHex.

Project Management

The project contains five different tasks: incremental, seeker game, mastermind game, conqueror game and back-end. Since we had five team members, each person was assigned to work on one part of the project. After the shape of the project was taken, we worked together to connect each of the mini games to the incremental game and the incremental game to the server.

Incremental provides long lasting gameplay and rewards in increments. It is the base for the whole project, where it contain three remaining minigame. The person assigned to this task needed to make sure the base is build in stable, simple, well defined interface for every type of users to be used. It also the most important part of the whole project because it is the part to connect to the back-end, and make sure all the saving and loading are flow from here.

Seeker game provides exciting exploration in a world full of dangerous traps and surprising treasure. The task for the person assigned is to create dungeons for player to explore along with an mysterious background story waiting to be experience, giving player an opportunity to fulfill their desires for discovering items.

Mastermind game provides different levels difficulty for player to challenge themselves while exercise on their brain. The person assigned to this task need to create solvable sudoku board differ into six levels within two modes. It is important to create stable sudoku board for player to exercise on their brain, and forcing them to think about the solution in the process of solving the puzzles.

The conqueror game provides gaming experience for gamer who are looking for challenge as passing stages. The person assigned to this task need to create a top down shooting game that player survive bosses and enemies coming after you and try to destroy your character. It is important to create the game in such a way that would have a slightly faster paced than all the other game type, and a sense of challenge as the enemies try to take you down.

Back-end provides a server to store all the student's data and keep track of their progress in game, alongside with their academic statistics. The person assigned to this task needed to connect the server to the Incremental, send and receive data from both sides, and make sure every action students do for their course will tie to the Incremental progress.

Results

Final Prototype Description

The final prototype is built in unity3D based application with whole incremental game and three different types games. From the back-end side, the game uses the EECS server for storing players' game data. Students are be able to log in with students' e-mail and student ID number.

The final prototype comes with a list of bonus code, and the instructors will distribute a code to the students who attend class and pay attention to the lecture. With the code, students receive extra play time and stamina. The bonus code system will be a good motivation for the students to attend class regularly and pay attention, and do homework.

Final Prototype Test Results

While we haven't been able to take our product to test in a classroom setting, we have tested the game personally and with acquaintances. We mainly tested the game on finding bugs and balancing. Through multiple tests, we have reduced the number of bugs to only a few minor ones left.

We also tested for balancing. These tests were conducted by ourselves. We tested our own games for one hour each and reported the amount of incremental progress we gained. In doing so, we hoped to achieve more balance between games so that players would not be more inclined to play one game over another just because it would provide more incremental progress.

A lot of testing was also involved with saving and loading to the database. This took a lot of time to figure out how and in what format the saving and loading would be in. Another issue that took a lot of time was getting the network script and game script to be in sync while loading. Since we started out by saving and loading locally, we had to go through and change them to save and load from the database instead.

Final Prototype Validation Results

With being able to work closely with our mentor, there was little we needed to validate by the end. We were able to easily ask for clarification and validate the prototype as we built it. Because of this, we can validate that we have implemented nearly all the features established by our mentor. Some key features include saving and loading from the database, player log in, statistics for our mentor's research, and the proper implementation of each minigame.

Analysis, Modeling, and Implementation/Simulation Results

The project will be passed to student volunteers in college with lower level, such as computer science intro class. We are planning to get data from their involvement.

We will be gathering data from the three mini game and send them to the server database through the Incremental. Then we will extract the useful data, such as time spent on game and the most played game type. The data will be further analyzed and combined as research for our mentor to see how successful the game relates to student's academia.

The more participants are involved, the more data we will be able to gather. Now the project is ready to deliver, server is ready to run, and all we need is to send the copy of the project through classes in the next semester to start gathering data.

Broader impacts and Contemporary Issues

The project still have space for improvement, such as adding new mini game, adding more element into Incremental to attract different type of people. These changes introduce new aspect for the project. With these changes, the project will be related to more people, and gain their interest.

With all these security issues introduce nowadays, our team aware there are a possibility people will try to hack their way to mess with the data. We introduced encryption for login in password to protect them from leaking or even being access. The next steps is to encrypt data sent from the Incremental to the server and do testing on the capability of the server in case there are a lot of people login at the same time and causing errors or packet lost.

Limitations and Recommendations

Unity3D is a very useful program to help creating projects. It is a wide known program to help combining graphic and scripts in couple steps by support 3d and 2d environment to match the programmer needs. However, just like every other programs, there are limitation in everyone of them.

Unity3D is not recommended to use it with Github. One of the main issues is with Unity assets, Tiled and Tiled2Unity assets in particular. Unless everyone has the asset downloaded and installed including the shaders, the maps created on Tiled and exported by Tiled2Unity would show up as a pink background. This forced us to have the one person using these tools to have to build the executable whenever it was needed.

The conflict resolution provided by Github also often has difficulties when trying to resolve Unity3D conflicts. Often we had to remove files we have worked on, reclone the

entire project, and then insert our fixed files back in. It is not the ideal alternative solution, but it is the simplest way to negate all the further errors.

Conclusions and Future Work

The program is planned to be deployed in the following spring semester. Our biggest concern is that there is not enough interest shown by the students who participate in this game and that most of them will drop it after a week or two. While this concept may work for very well done games, it may not be as effective with a small game created by amateurs. This is especially with the audience being college students. It is possible that this would work with a younger audience such as elementary school students due to possible lower expectations.

Due to the lack of completeness in some areas, the project will be handed over to another team for the following year. We will be kept in contact with our mentor and will help the next team in working out where they could start and to clarify anything in the program.

Acknowledgement

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