

THE UNIVERSITY OF HONG KONG

DEPARTMENT OF COMPUTER SCIENCE



COMP 4801

FINAL YEAR PROJECT

PROJECT PLAN

PROJECT TITLE: LECTURE GAMIFICATION

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1. Introduction

Currently, teenagers are spending much of the time on playing mobile games. Some parents will play mobile games with their children in order to socialize with them. There are many reasons why games full up our life. It is also a huge potential that games can play a role in education.

Gamification is the use of game mechanics in non-game contexts. It makes learning more engaging by the use of features normally found in games to support learning materials. This project aims to apply game mechanics into secondary schools' classroom, so as to bring a new learning experience and to increase the motivation of learning.

In this project, we target at secondary school teachers and students as the users of the application. Games with different scale will be developed. The games are kind of quizzes/tests but in a game format. Teachers can input the contents of the questions and answers in advance. To achieve this, a user interface will be provided to teachers as a control panel.

2. Project Background

2.1. Overview

With the development of technology, many institutions are applying different technology to enhance the effectiveness of teaching. E-learning has been raised and developed in the past two decades. With the growth of technology, gamification in education can have more diversity, with more use of electronic devices and software applications.

2.2. Disadvantages of traditional education

Traditionally, the impression of lecture is lack of motivation. Students follow teachers' instructions and soaks up new knowledge passively. Besides, Unidirectional of teaching is boring for students. Gradually, students used to this passive learning method. They may no longer ask more questions to investigate thoroughly. Even the worse, they may lose interest to learn new things. As the result, Hong Kong's education has been known as spoon-feeding education for many years. In view of this trend, current schools require a more positive and energetic learning circumstance. How to increase student participation is one of the challenges in a lesson.

Enhancing effectiveness of teaching is also one of the biggest problem for teachers. In nowadays, traditional in-class practices and quizzes spend a lot of time on marking and recording results. Therefore, a teaching tool with effective technological function is required to reduce the time of preparing lectures and teaching materials.

2.3. Gamification

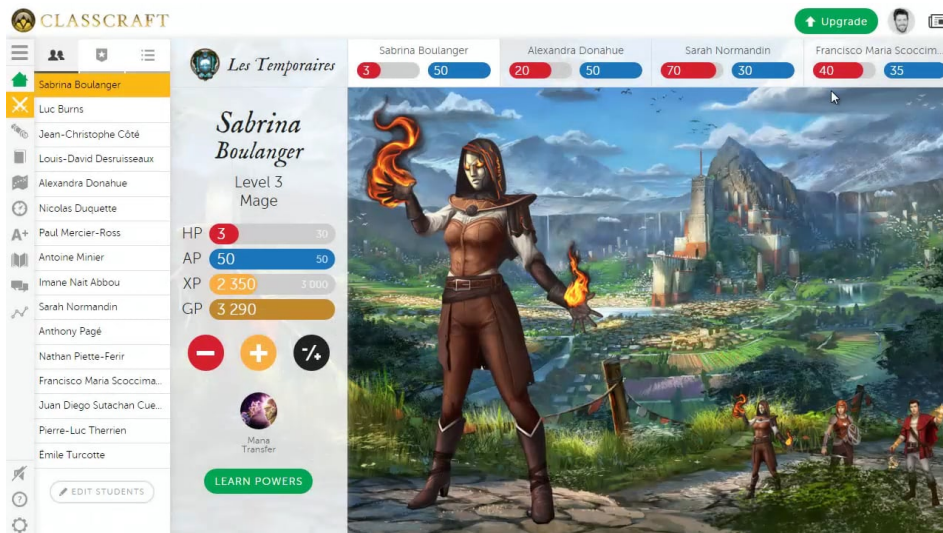
To increase student involvement, lecture gamification will be a good solution. Gamification is the application of game elements in non-game contexts. Research had suggested that the use of game elements can help students learn. [1] An interactive lesson can give better impression and help understanding rather than traditional teaching.

One of the example of game elements is giving rewards. In schools, students will be given rewards if they have good academic performance, which motivating them to study hard. Another example of game elements is ranking. Different students will have different performance. A ranking showing their positions will give competition among students and increase their desires to work hard, so as to not fall below in the ranking.

2.4. Case Study

Gamification has been used in classroom environment for some of the years. Similar gamification products had started to develop and appear in the market.

2.4.1 Classcraft



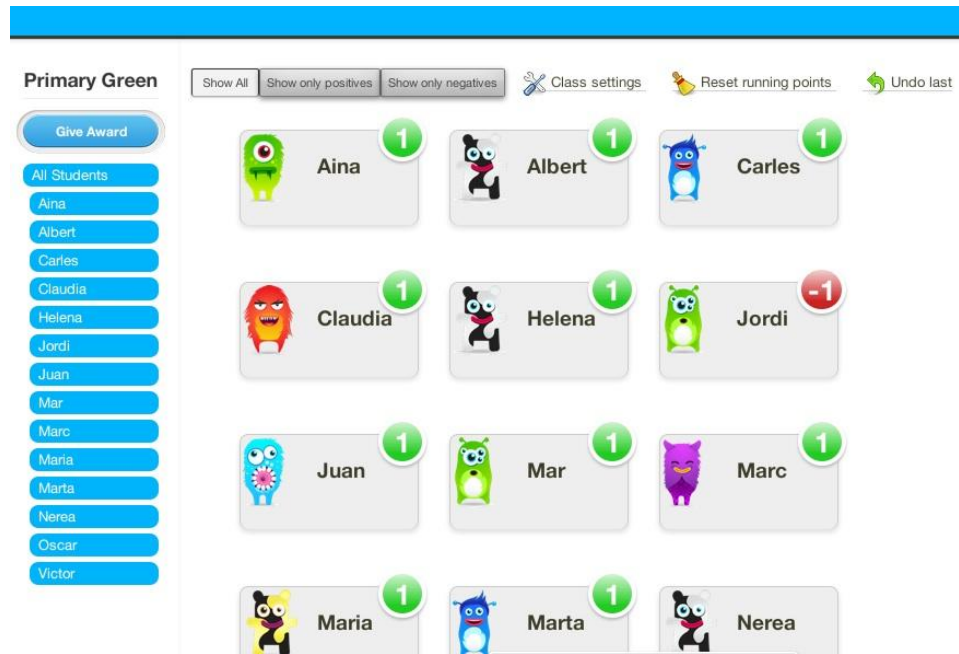
Classcraft is an online platform created by a high school physics teacher. [2] Student can gain game experience (XP) by completing homework, tests or learning tasks. It uses game mechanics to engage students. Students aware of the rewards for their participation and hence, increase the motivation of learning. Classcraft has integrated with Google Classroom and is available to the classrooms around the world.

2.4.2 Quiz RPG: The Mystic World of Wiz

This is a quiz-based RPG mobile game for Android and iOS. Players can get fantasy characters to have battles with monsters by answering quizzes. The questions are come from knowledge of any aspects and common sense but not only for academic and educational purpose.



2.4.3 ClassDojo



This platform aims at motivating students and build a more active and positive classroom community. [3] For example, students can get +1 rewards when they raise their hand as a participation in class. Other tasks like helping other students, working hard and leadership are also encouraged. This platform is targeted at children. Photos and videos of classroom moments can be shared with their parents.

3. Project Objective

3.1. Develop games for playing in real-time lecture

The major goal of this project is to develop games for playing in lectures. Game elements like characters, competitive environment and game mechanics are added to the content to provide a level up system and reward accomplishments such as getting points, badges, lives. Every student can get his/her own character to develop. Teachers can use different games to hold different purposes.

The games can utilize facilities inside a classroom including teacher's computer, students' smart phones or laptops and Wi-Fi infrastructure. With the use of this application, this can facilitate teachers in teaching new knowledge to students or helping students to revise what they have learned.

In long term, the development of this project would aim at making the games to be general so that they can be used in different courses.

3.2. Break of tradition by lively and interactive lectures

In this project, changing current teaching style is one of the goals. This application can increase the interactivity and cooperation. When playing with the games, students need collaboration so as to win. Hence, this can promote team spirit. By grouping students into teams, they can collaborate to compete with other teams or earn rewards. In order to earn more points in the games, students are more willing to complete the tasks effectively. Throughout the process of playing games, the happiness of attending class will improve students' intentions of learning.

3.3. Enhance teaching

In order to motivate student's learning interest, teachers may have to design some games when preparing for lectures. However, this is time-consuming and they may encounter problems when giving instructions to students to follow the steps. This application can act as a teaching tool, the question-based games can help teachers manage students and reduce their workload.

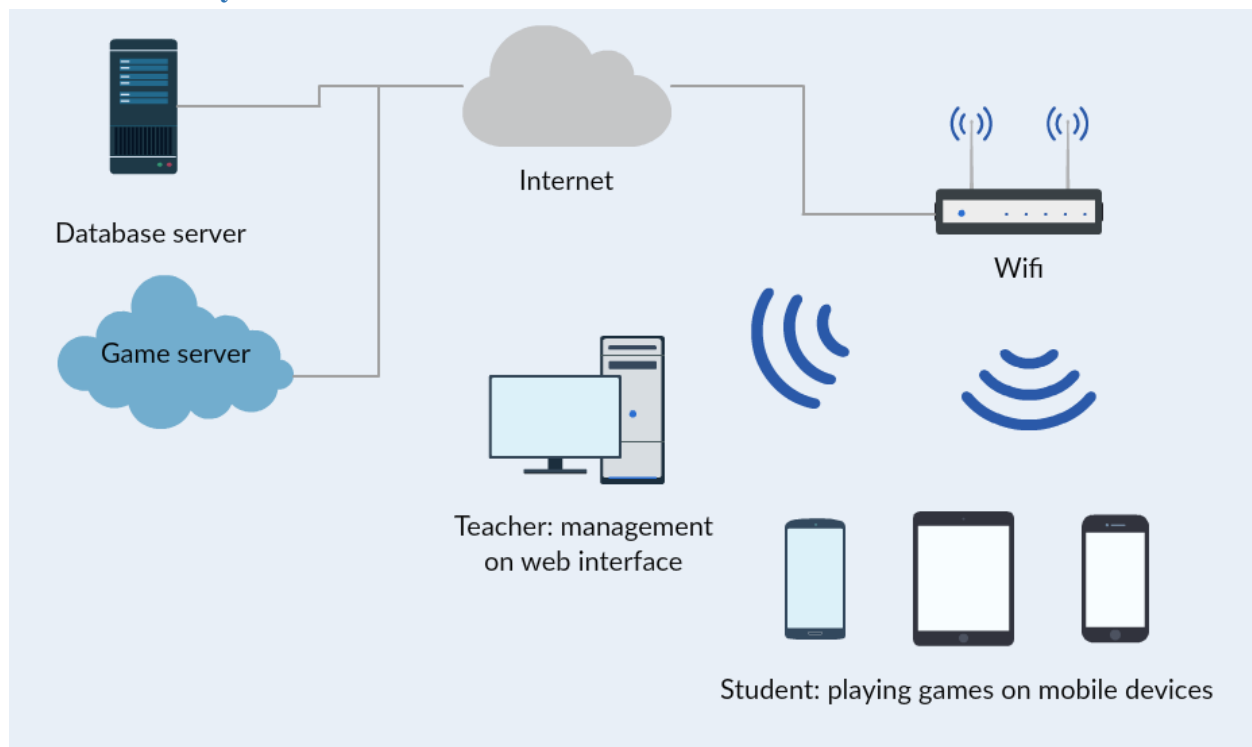
From the points of view of teachers, with using this application, they can know students' weaknesses and strength by getting analysis from the game results. After the end of games in lessons, teachers can discuss with students which parts they are not doing well.

4. Scope

4.1. Target Description

In this project, the target users of the application are secondary school teachers and students. Students in Hong Kong secondary school are under a great pressure of keeping up with their school work. Especially in lower form students, they may require to take more than 10 subjects before selection of subjects. The use of the application can help motivate them to study.

4.2. System Structure



4.3. Game Design

We decided to develop a role-playing game (RPG). Students require to answer questions which is set by teacher. Students can enjoy the game procedure and get rewards. Once they have finished a game, experience will be accumulated into their own character. Their character can level up and strengthen its ability.

Two main games will be implemented in order to fulfill different teaching purpose of a lecture. The first game is a small-scale game. This game aims to test student's strength and weakness in a short time. It will be consisted of many mini games such as Pac-Man. Each game requires to answer one question and it can appear repeatedly.

The second game is a competitive answering game. Students will be divided into groups. Each group requires to answer questions as fast as possible in order to win. Each student's character obtains different ability to obstruct other groups or support his own group. This is a medium-scale game which aims at cooperative training.

Login system will be used to manage the user accounts. Students are allowed to get their character's data after login and connected to the database. If character's data is empty, they can create a new character and design its appearance and attributes. Teachers can create a game room in the server so that students can join a certain game room by inputting specific key.

5. Project Methodology

5.1. Project Flow

In the beginning, the database model will be designed first. The database is used for storing the data of the whole application, including the questions and answers used in the games, and also the user accounts data. Which kinds of question type used will be decided before the implementation of the game. In other words, whether multiple choice or fill in the blank question can be used into the game.

A login system is also required for classifying students and teachers. The database will transact different data. The interface of students need to load their own character while the interface of teachers can acquire personal information and online status of the students. The database will be implemented by MYSQL with assistance of PHP as programming language to input and output data.

After that, the details of game play will be designed. In order to get rid of traditional passive lectures, interactive game element will be applied. Teacher's computer can display game result of students instantly.

Then, detail of the game interface will be devised. Simple graphics will be applied to implement the basic functions. There are two different interfaces for teacher and student.

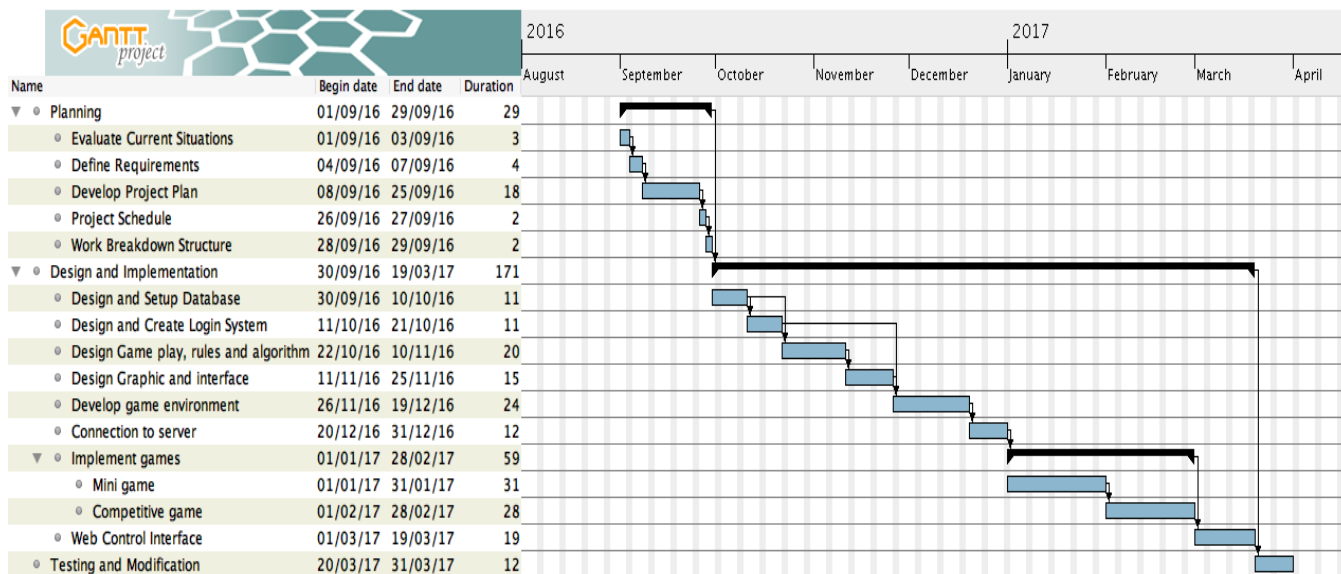
Next, the detail of the games will be designed and hence, the implementation of the game logic. Before delivery, the whole application will be tested to ensure it can work well. Modification will be made if necessary. Bugs which affect equity of players and lead to unfair game should be eliminated.

5.2. Game engine - Unity

To provide different highly-feasible games and optimized graphics, game engine is required for rendering 2D or 3D graphics. In this project, Unity will be used as the game engine. Unity is a cross-platform game engine with a built-in integrated development environment (IDE). It is used to develop video games for desktop platforms, web plugins and mobile devices like Smartphone, iPad and Android Tablet. Games can be implemented without limited of location. Unity provides an integrated development environment to enable simplified, rapid development of games. Elements for creating games such as graphics, sounds, animations can be put together in Unity's IDE.

For networking part, there are plugins to support Unity's networking application programming interface (API) management. As the game in this project is a server-client based game, it will require to handle real-time multiplayer game requests. Therefore, a dedicated server is needed for guarantee the connectivity and networking performance of clients.

6. Project Schedule and Milestones



7. References

[1] Amory A., Naicker K., Vincent J., Adams C. The Use of Computer Games as an Educational Tool: Identification of Appropriate Game Types and Game Elements. British Journal of Educational Technology. 1999; 30: 311-321.

[2] Classcraft [Internet]. Classcraft Studios Inc. 2016 Available from: <http://classcraft.com/about/>

[3] ClassDojo [Internet]. © Class Twist Inc. 2016 Available from: <https://www.classdojo.com/#LearnMore>