

Mobile Based Application with Gamification Applied Elements

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Abstract. A breakthrough development in the crossing of education and technology has long been a subject of heated debate. The recent shift in education from conventional to gamifying education reflects to a change in the way users consume and interact with games. The limitations in most learning applications are not engaging in an interactive way to attract their users' attention. Gamification is a process of using game thinking not only makes learning easy and interesting, but also engages and solves problems in learning across multiple contexts, through social and content interaction. Therefore, this project aims to develop a mobile-based application for gamification, called CURIO. CURIO is a mobile based application with gamification elements such as challenges, levels and achievements is developed to boost effectiveness in learning. In order to reach the aim of the project, several phases need to be carried out. First is to study and analyse the importance of gamification in terms of students' involvement and engagement in learning. Next is, to develop gamification elements for learning application and then to integrate the learning application in a mobile based application. Finally, the evaluation processes are implemented after integration process has done. The evaluation is to test CURIO's usability and user acceptance testing. Based on the results, this project achieves its aim to produce a mobile based application with gamification applied elements.

Keywords: Gamification, design thinking, game mechanics, game dynamics, game aesthetics, engagement, mobile based application.

1 Introduction

Gamification is a concept of which are not games itself but a game based thinking that is applied towards a brand, business, organization or an application on your phone. According to Zichermann (2013), a world's foremost expert and public speaker on the subject of gamification define gamification as, "Gamification is a process of using game thinking and game dynamics to engage and solve problems". In another words, gamification is also depicted as a concept of applying game mechanics and game design techniques to engage and motivate people to achieve their goals. It taps into the basic desires and needs of the users' impulses which revolve around the idea of status and achievement. This notion is used for improving both the users' engagement and their experience. By using gamification as a concept, an environment which can help improve productivity and creative outcomes for people especially students can be created.

As pointed by Kapp (2012), traditional methods of learning are losing favour, most page-turning e-learning modules are boring people who have grown up playing video

games for an average of twelve years. A focus on gamification increases engagement, relevance, and immersion and assists with the transfer of learning to the actual situation. Time and attention of learners are limited, and learning professionals must focus on providing an engaging and goal-oriented solution to the training and teaching dilemma. It is important for them to create an environment of intrinsic rewards to motivate students. Burke (2014) emphasised that gamification uses primarily intrinsic rather than extrinsic rewards. The three elements of motivation; autonomy, mastery and purpose are what drives users to continue in an engaged either playing or learning manner. Burke affirms that people are motivated by maintaining a sense of autonomy, progressing toward mastery, and engaging with a purpose larger than themselves. Gamification engages players on an emotional level using game mechanics such as levelling up, acquiring badges and completing challenges to motivate them. This is also supported by Fogg (2002) where Fogg states that in order to change or trigger a certain behaviour, students need to be motivated and at the same time have the ability to solve the challenges.

In this project, a method to implement gamification elements inside a mobile based application is presented. This project attempts to accomplish three objectives that is to study and analyse the importance of gamification in terms of students' involvement and engagement in learning, to develop gamification elements for learning application and to integrate and evaluate the learning application in a mobile based application to enhance user experience.

2 Related Work

2.1 Duolingo

Duolingo is a gamified language learning application. It has been around for about a few years since its release in 2011. The heart of the experience for most users is the lessons. These lessons are grouped in skills, and Duolingo gradually teach the users on respective language's vocabulary and phrases. The home page expertly focuses the user on user's progress by indicating progression level and strength on each skill while showing the full tree of skills in the language course. User can get experience points or XP for lessons and practice sessions, and level up as user gain XP in a language the users are working on as shown visually in the user interface in Figure 1.

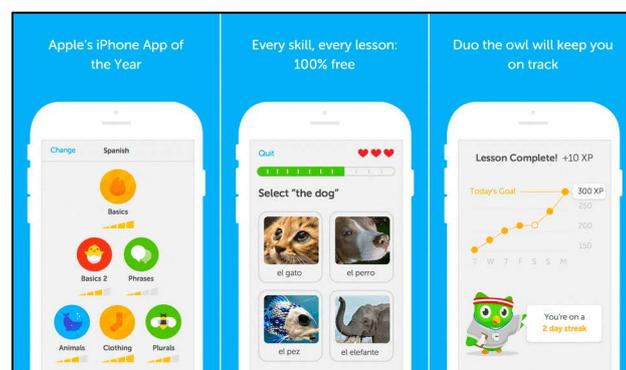


Figure 1. Duolingo application (Duolingo, 2017)

Whenever the users level up or complete a skill, user can earn “lingots”, a kind of virtual currency which users can spend in a virtual shop. Every learner can choose a daily XP goal according to the pace that learner want to learn at. Duolingo reminds the user to meet that goal every day and encourages them to reach longer and longer learning streaks.

2.2 Fitocracy

Fitocracy is an excellent personal productivity application for the workaholics that have mastered task completion, but leave little time for exercising and staying in shape. Burnout is very real and costly to those that are interested in achieving ever higher levels for their lives. Fitocracy allows users to log workouts and celebrate when user completed certain challenges. The ideals of starting an exercise program, staying consistent and becoming fit actually becomes a game. Players can not only win badges and levels, but also battle other members as well. The element of social influence is perhaps the most addictive factor of the game.

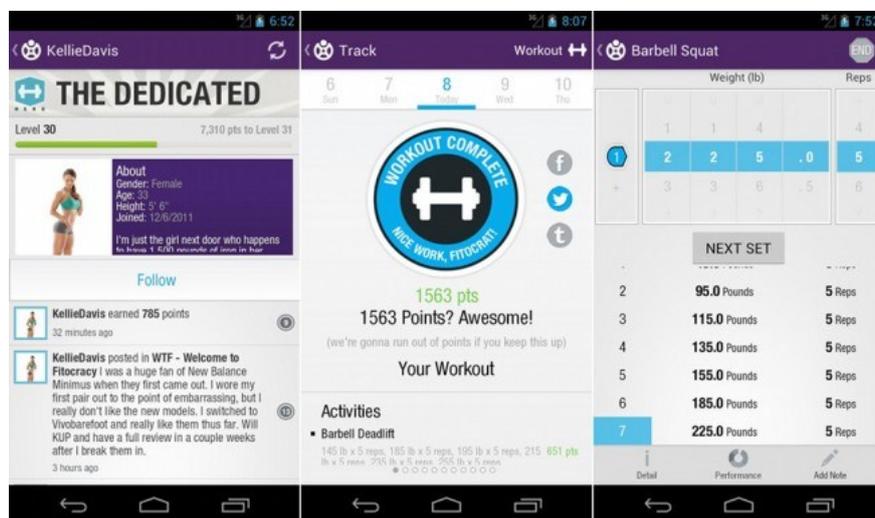


Figure 2. Fitocracy application (Fitocracy, 2017)

3 Project Methodology

There are three main segments that have been described in project methodology to give a guidance on the project design and also development cycles. Figure 3 illustrates three main segments to guide this project on its design and development cycles.

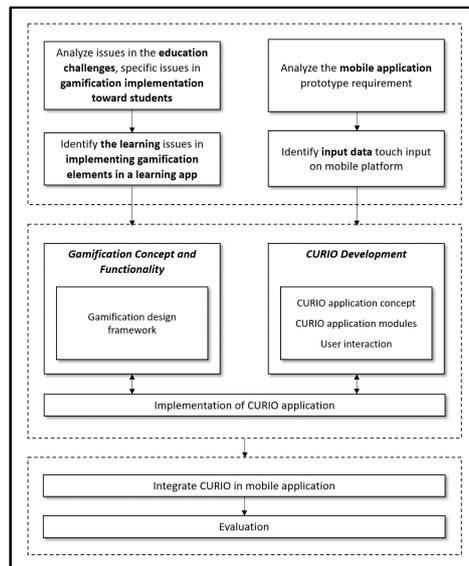


Figure 3. Project methodology

Several phases of project development to achieve the stated requirement are planned as follow:

Phase 1. Preliminary investigation and information collection of CURIO application concept: In this phase, research was conducted in exploring the existing gamification usage and implementation, as well as the techniques to implement them, in order to achieve efficient interactivity and enhanced experience when learning through an application. The elements that contributes to said efficient interactivity and enhanced experience are broad and extensive. In this project, a few are feasibly-tested and selected based on the scope of the project. These selected elements are then decided to be implemented in CURIO to meet the objective of the project.

Phase 2. Design the Gamification Elements for CURIO Application: Based on the information analysed and gathered in the previous phase, the gamification elements are designed. These gamification elements are the mission, achievements that includes a set of badges and the user profile for the user to keep track of his or her overall progress in the learning process. After these elements are determined, the next step is to go through the user interface design process in Adobe Illustrator and Adobe Photoshop.

Phase 3. Develop the Learning Application: After the design phase has completed, the process now is to proceed to setting up the framework of the application, which includes the design of game concept and the main gameplay itself. The prototype is developed by using suitable tools and game engine, provided in Unity.

Phase 4. Integrate the Gamification Elements Inside CURIO: After the development phase is completed, the gamification elements shall be integrated with the learning module, the quiz. The quiz concurrently send information to each gamification modules inside Unity and show all accumulated information in a user interface in the profile module.

Phase 5. Testing and Evaluation: In this phase, testing and evaluation of the gamification modules done to students based on the scope of the project. This shall include comparison of information from various respondents as well as including additional improvement if stated.

4 Implementation

This section explains about the application's framework and several phases of project development that involve during the implementation process. Figure 4 illustrates the general flow of the application and its framework.

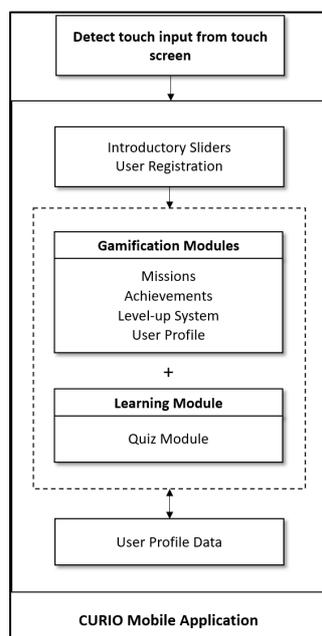


Figure 4. CURIO application framework

It consists of Introductory Sliders and User Registration followed by another six main components categorized in two modules; Gamification and Learning modules which are Missions, Achievements, Level-up System, User Profile and Quiz sub-modules respectively. In this sub-topic, the gamification elements mentioned in the framework are discussed accordingly.

4.1 Gamification Modules

The main components inside CURIO are Missions, Achievements, Level-up System as well as the User Profile and the Quiz Module.

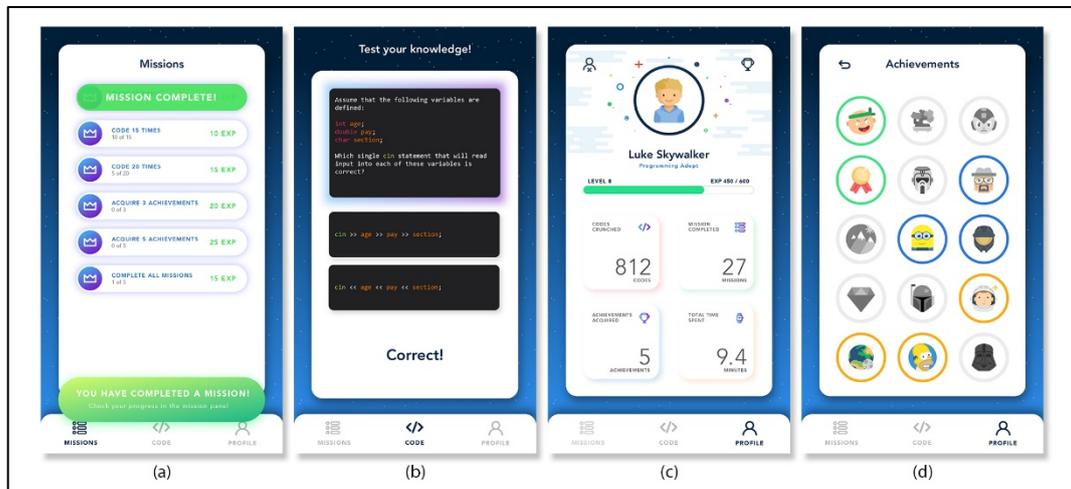


Figure 5. CURIO main components

The Missions module main function is to provide a set of challenges for the user to complete. A mission as shown in Figure 5 (a) contains an instruction, progress, an EXP reward and a hidden image that is enabled once the user completed the mission. The mission can only be activated once per user account. The quiz module as shown in the Code panel in Figure 5 (b) serves as the main source of the EXP for the user to level up and gain ranks. The module is made into three parts which are the question panel and two bars of answers. Once clicked, the answer gives the user EXP points based on the correct answer. More EXP can be gain than having a wrong answer. The EXP points value gained is sent to the user profile data to be updated and checked if there's a possibility of levelling up. The level-up system is embedded inside the user profile. It is represented through a bar, which is a Slider component inside Unity. It fills up based on the current EXP count as the minimum value and set the current level requirement as the max value to meet. This system also updates the user's current level and a new rank title once every two levels. The user profile as shown in Figure 5 (c) depicts an avatar that the user has chosen in the registration process, his/her name and rank title respectively. Also included is the EXP bar as mentioned before as well as a few statistics taken from the User Profile Data stored in local memory namely PlayerPrefs inside Unity. These statistics are tracked every time the user answers a question from the Code panel which embeds the learning module. The Achievements in Figure 5 (d) is another main component in this application. The achievement panel shows a list of badges where each badges are categorized into three rarities; Common, Rare and Legendary. Each badges contains a set of information which are its name, rarity and instruction. The user can click on badge and see its information. Once a user accomplished to meet its instruction, the user shall acquire that badge.

5 Result of the Project

The result of the project is a learning mobile based application with gamification applied elements. The application is created on an Android mobile device. The application will have two major components inside; the introductory sliders and the main screen. The user will need to navigate through the sliders by clicking each "Next" button and will finally arrive on the user registration panel as shown in Figure 6. The user will pick an avatar

based on his/her liking and input his/her name inside the given text area. Once done, the user will click the “Create Profile” button.

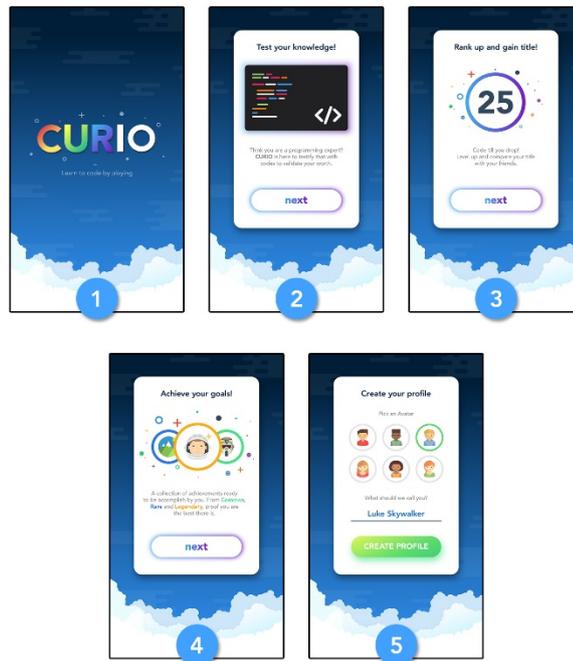


Figure 6. CURIO introductory sliders

Once in the main screen, the application will show the user’s profile in the user profile panel as shown in Figure 5 (c). The user can view his/her status and progression if any and can freely navigate through four different panels which are Mission, Code, Profile or Achievements panels. The first three panels are provided in the form of a button at the bottom tab of the screen and the Achievements panel is set to be click on a trophy button at the top right corner in the user profile. In order to gain EXP points, the user has to answer the questions in the Code panel. The questions will be randomly generated once the question is answered. The user will get 5 EXP points for every right answer and 2 EXP points for every wrong answer. At the same time, the user is still free to navigate through the application using the menu button at the bottom screen. The player can check their progress on the Missions panel to complete any of them as well as the Achievements panel that the user can view each badge and try to achieve it by meeting its requirement. As the user progresses through the game, the user will gain new levels and new ranks. The best user is determined by having the highest level and rank possible in the application besides than having a great statistics numbers displayed on the user profile.

6 Conclusion

As to conclude the entire project, this project represents how gamification elements can be applied to a learning application thus improving user engagements. The objectives for this are completely achieved and the suggestions are in order to enhance this project are discussing for further project improvement.

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