Taskification – Gamification of Tasks

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Abstract
Leading a busy lifestyle can have a negative impact on the productivity levels of individuals. Lack of motivation is also another factor that can influence the output of any task or activity conducted by a user. This also applies to students within an academic context, where the distractions and lack of motivation can have a negative impact on their learning and results. In this paper, we propose 'Taskification', a task management mobile application, which incorporates core gamification features. The objective of this application is to increase student engagement and motivation during tasks such as coursework or exam preparation.

Author Keywords
Gamification; Human Behavior; Personalization.

ACM Classification Keywords
H.5.m [Information Interfaces and Presentation (e.g., HCI)]: Miscellaneous; K.8.0 [Personal Computing]: Games; J.4 [Social and Behavioral Sciences]:

Introduction
Previous studies have indicated that students tend to perform better academically when they are motivated [1, 2]. Another contributing factor to poor academic performance is the distractions caused by the ubiquitous nature of smart devices. This is driven by

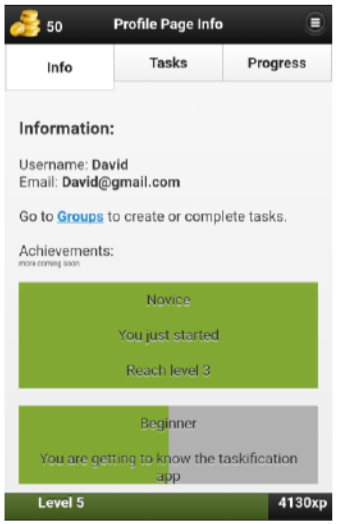

Figure 1: Dashboard

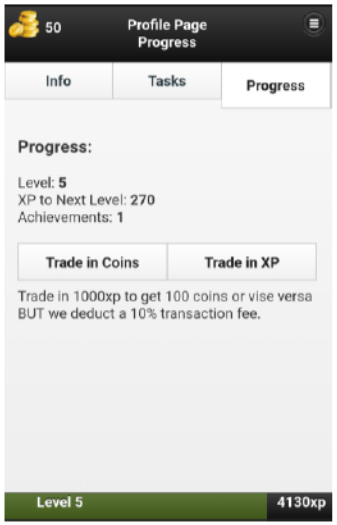

Figure 2: Coins and XP

the surge in the number of mobile applications available, which is now over 6.5 million1. Hence this signifies the importance of using the mobile platform for engaging students and looking for ways to motivate them academically.

The exponential increase in smart phones followed by a huge range of applications has led to the creation of everyday applications that are inspired by key elements of video games [3]. This is known as "Gamification", where the use of game mechanics is integrated into non-game related context to solve problems and more importantly engage users [4]. Gamification also addresses certain psychological areas, such as: social development [5], challenge [6] self-determination [5], and of course fun, as without it, determination and motivation is extremely difficult to maintain for a prolonged period.

In this paper, we propose 'Taskification', a task management mobile application, which incorporates gamification features to increase student engagement and motivation, while they conduct tasks such as completing a coursework or preparing for an exam. The proposed application has integrated game elements such as in-game avatars, experience bars, score tracking and leader boards. The objective of the application is to offer a flexible, versatile environment which will increase the student's academic motivation.

Related Work

In a gamified framework, there are elements that are present throughout the game consistently forming the feel and nature of the game and are responsible for the visual stimulus. These elements cannot be trivial gimmicks but must be deeply integrated into the system so that they have some meaningful importance to the user [7]. These visual stimulus elements must support specific game mechanics that have already been planned or implemented in the system [3]. The way that these elements work with each other will boost the gameplay, preservation and the motivation [8, 9]. These elements can be implemented in a lot of different ways but in learning environments they are usually implemented as visual game elements [3, 4, 10, 11].

Gamification has grown exponentially over the years; however, its adoption within an academic context has been limited. Oliver et al developed a web framework called 'Questlab' to try and gamify seminars/classes [7]. This system replaced the standard homework and quiz structure of a normal class room. The design of this framework was based around an MMORPG (Massively Multiplayer Online Role Playing Game) where each student would have had a digital avatar/character. That character could complete quests (small assignments / homework) and beat bosses (exams / quizzes). They subdivided their quests into quest types where each type would offer the teacher enough flexibility to construct a valid course within that system. The framework also included a simple achievement system that would give the user an achievement for set milestones. However, this approach focused more on the collaboration side of things rather than competition as they let users join up into groups and let them tackle certain quests together. O'Donovan et al. developed an application that helped students with lecture attendance, content understanding, problem solving skills and general engagement [12]. Based on their findings the

1 https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/

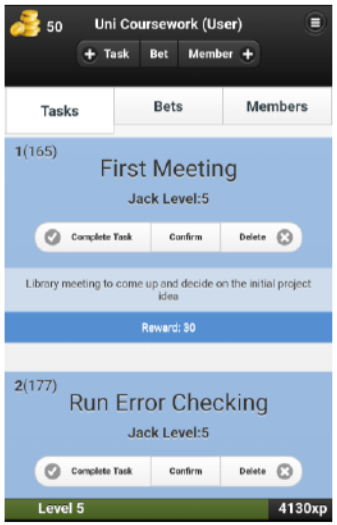

Figure 3: Task Status

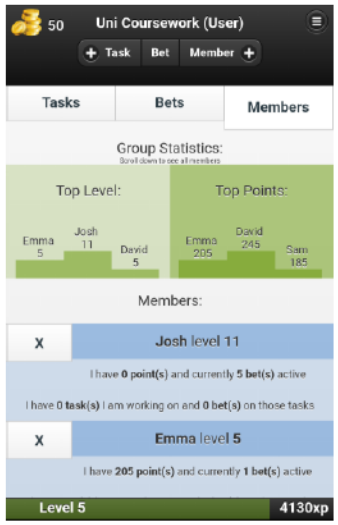

Figure 4: Leaderboard

results were positive, however they also weighed that up against the resources needed for implementing such a system. In their case, it was beneficial to implement such a system within their Computer Games Development class, which means the adoption of their approach could not be applied to other disciplines within academia. Also, the process of lecture attendance recording was not efficient as students could easily tamper with this data, which defeated the purpose of this system. Li and Watson developed a system that gamified the experience of understanding core concepts of programming [13]. They designed a game where students are provided with a series of programmes with missing snippets of code. The game expects the student to provide the missing code to get the programmes working. However, further gamification elements such as a simple leader board of how fast the students completed the programme and a ranking element could have been incorporated.

It is evident that the existing gamification adoptions within an academic context are not comprehensive enough, as they only utilise partial gaming elements as opposed to having a fully gamified system that makes use of a wide range of gaming elements.

Implementation and Features

Implementation Highlights

The implementation of Taskification was based on the development of a front-end and back-end of the proposed system. two different systems. The front-end was developed in Mobile JQuery, CSS and HMTL to be packaged through PhoneGap. The reason for this was because we wanted to ensure that the application was available on both on iOS and Andorid platforms, as these are the most widely used mobile platforms. The back-end was implemented in PHP, SQL to perform the server side actions.

Features

Taskification is a task management application (Figure 3), which tracks the progress of tasks (e.g. coursework) and rewards the user with XP (experience points) once they reach certain milestones while completing the task. The application incorporates a series of core gamification mechanics and elements such as:

- ***Leader boards*** (Figure 4) to track the students' progress. This can be motivating for students to see how they are progressing on a certain task in comparison to their peers. This also invokes the competitive nature of gaming that can be very useful when trying to motivate students.

- ***Levels and points*** (Figure 1 & 2) have been incorporated within the system, where students can progress to different levels of difficulty when they achieve a certain threshold of points. The level of difficulty provides the students with an opportunity to earn more points, however the nature of the task and time required to complete the task are more time consuming.

- ***Dashboard*** (Figure 1) gives an overview of the students' performance to date. The dashboard also provides the student with information on how to progress to the next level, e.g. 10 points needed to move to level 7.

One of the novel aspects of this system is the ability for students to ***place bets*** (Figure 5 and 6) on the

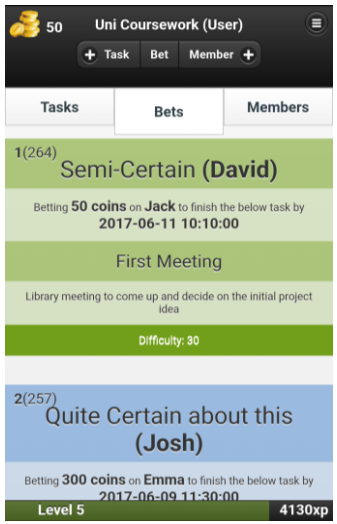

Figure 5: Task Bets

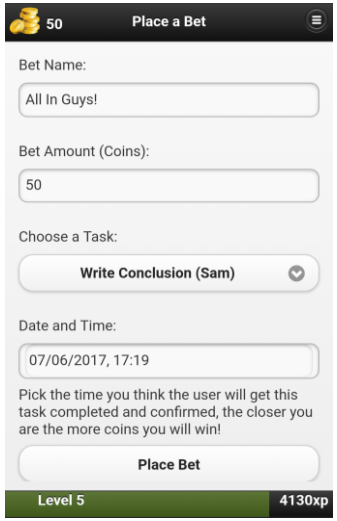

Figure 6: Betting Portal

performance (e.g. completion date) of others student performing a task (e.g. coursework). This feature allows students to earn points and can also be motivating for the student placing the bet as it will encourage the student to perform better on their own task.

Future Work – User Study

During next the semester, we will be conducting a user study to assess impact of the proposed application on student motivation and performance. This study will be conducted in parallel at University of East London and University of Engineering and Technology, Taxila in Pakistan. The study will also assess the different levels of engagement within the two distinct groups of students from different parts of the world.

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