Gamifying Higher Education: Enhancing Learning with Mobile Game App

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ABSTRACT

We present a mobile game app (EUR Game) that has been designed to complement teaching and learning in higher education. The mobile game app can be used by teachers to gauge how well students are meeting the learning objectives. Teachers can use the information to provide 'just-in-time' support and adapt their lessons accordingly. For the students, the game app is a study tool that can be used to test their own understanding and monitor their study progress. This, in turn, supports students' self-regulated learning. Gamification elements are also included in the game app to enhance the learning experience. During the demonstration, participants will experience the features of the game app and be engaged in an interactive session to explore the possible ways to use the mobile game app to support teaching and learning.

Author Keywords

Formative assessment; mobile application; gamification; blended learning; motivation; self-regulated learning.

INTRODUCTION

Formative assessments are useful for both teachers and students [1]. On one hand, teachers can use formative assessments to find out which topics students are having difficulty with. By doing so, they can clarify students' misconceptions or reinforce understanding. On the other hand, students can use formative assessments to monitor their own understanding and adapt their learning strategies to enhance learning. In addition to formative assessments, studies also suggest that gamifying learning experiences may enhance student motivation [2]. Therefore, to enhance teaching and learning at Erasmus University Rotterdam (EUR), a mobile application that supports formative assessment with gamification elements was developed.

The EUR mobile game app (EGA) framework offers easy implementation of formative assessments by teachers within a Content Management System (CMS). Depending on the learning objectives of a course, questions related to the course content can be effortlessly added to the CMS. Subsequently, teachers can determine when students can access the questions to complement their teaching. To aid students' understanding, feedback and links to additional resources are provided along with the questions. The CMS uses learning analytics to display information about students' performance. Figure 1 shows an example of aggregated students' performance in the teacher's view. This information can help teachers to evaluate how well students have met the learning objectives. In this way, teachers can adapt their courses based on students' progress at scale.

Self-regulated learning plays a major role in student success in higher education. In order to regulate one's own learning, one has to monitor how well they are learning and take steps to achieve their personal learning goals. Students can use the game app to not only test themselves as a way of remembering information but also to monitor their own understanding based on the feedback they receive from the game app.

DEVELOPMENT OF EUR GAME APP

Built and released in 2016, six of the nine faculties at the Erasmus Rotterdam university have used EGA. A group of students was involved in the design and development to ensure that EGA can be used by students intuitively. In February 2017, more than 500,000 questions were factored into the app. Teachers have the option to use EGA when it

Figure 1. Teacher's view of students' performance in the Course Management System

supports their didactical method. Similarly, the use of EGA by students has been on non-obligatory terms.

FEATURES OF EUR GAME APP

The game app is designed to be as user-friendly as possible and can be downloaded in both Android and Mac iOS phones (see figure 2A). Teachers can upload up to 250 questions in the format of either true-false or multiple choice. Once the questions are uploaded, students can access them. Students only need their student identification number for login purposes and Internet connection. Given that mobile data plans and WIFI connection are common, students can use the game app anytime and anywhere. Once students are logged in, they can select the course to access the questions over four modalities (as shown in figure 2B):

Practice: Students are given the opportunity to strengthen their understanding by answering a series of questions presented in a loop. Immediate feedback is given after each question. When a question is incorrectly answered, the question will be presented again in the loop until it is correctly answered.

Test: Students can work on sets of questions related to various topics in the form short practice tests, allowing students to assess their understanding after a lecture or a study session. Students receive feedback on the questions and study advice at the end of the test.

Compete: In the 'compete' mode, students' aim will be to correctly answer as many questions as possible within the shortest amount of time (see Figure 2C). Students receive a score as soon as a question is incorrectly answered or when the time has elapsed. The score is then displayed on a leaderboard.

Battle: Students can choose an opponent with whom they would like to play against as illustrated in Figure 2D. The challenge is to correctly answer more questions than the opponent. The player who correctly answers more questions wins the battle and rises up the ranks. In the event of a draw, the faster player wins the battle. Similarly, the scores are displayed on a leaderboard.

REFLECTIONS

The game app supports teaching and learning at scale in a couple of ways. First, based on the data gathered from students' answers, teachers can scale up their evaluation of students' progress. The information will not only help teachers to adjust their lectures to help students meet the learning objectives, but also help teachers to create materials that challenge students appropriately. Second, students are given greater control over their learning. The game app provides students with the opportunity to monitor their progress. In turn, students can actively take steps to close the gap in their understanding. Also, by testing themselves, students will become more confident of what they know. Third, the gamification elements in the app intend to make learning a fun and motivating experience. Since the game app is an optional learning tool, it will not add to students' stress in studying.
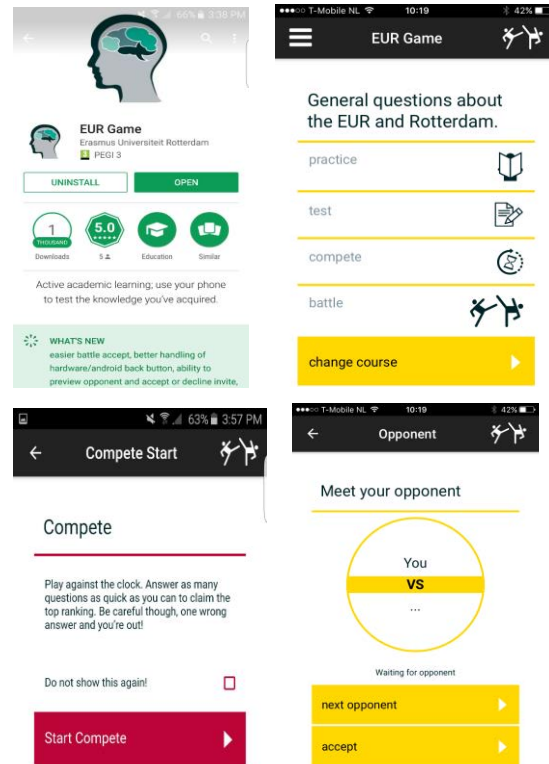

Figure 2. (2A-top left) Game app in the app store, (2B-top right) Four modalities available in the game app. (2C-bottom –left) Instructions before starting the compete. (2D-bottom right) Battle mode in the game app.

FUTURE DIRECTION

At the time of submission, we are conducting an empirical research on the learning outcomes of the app. Based on the findings, the app will be revised and updated with new features. The CMS will also undergo some changes to enhance the visualizations in the dashboards so that teachers can evaluate their students' progress with greater ease.

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