



Delft University of Technology

Demo proposal great library

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Demo proposal Great Library

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Abstract— The Great Library is a game-based learning (GBL) environment that was developed by Delft University of Technology staff together with OrbitGames developers as part of a project to improve the peer review process in a MSc course on research design. This project was granted by SURF, a Dutch government funded organization for education and research.

Keywords—game-based learning environment, gamification, peer review

I. INTRODUCTION

A. Background

Higher Education often makes use of peer feedback and peer review. Various peer-reviewing systems have been developed to allow students to learn from both providing and receiving feedback from their peers. Most systems assume that students are capable and feel confident to give and receive review from their peer students. However, peer reviewing and the systems used for this may come with issues. For example, reviewers often experience peer pressure or bias. This can be solved by doing the peer review anonymously, but that has its own disadvantages, such as a lack of community feeling, unobtrusive feedback, unsatisfactory reviews and insufficient learning.

Also, peer reviewing is often performed using another tool or platform in the e-learning environment leading to multiple sign-on. This is often perceived as distracting for users.

Another issue is seen when reviewees experience unfair criticism without any opportunity to reply to the reviewer. We did not find any peer review system that supported learning processes: allowing multiple feedback steps, supporting learning how to review, and offering symmetry in peer feedback between reviewer and reviewee. Peer assessment tools focused on the quality of the content of the assignment, and ignored the quality of the review.

All of these issues were apparent in the Master thesis preparation course of the faculty of Technology, Policy and Management at Delft University of Technology [1]. We elaborated more on these issues in “Increasing the effect of peer review” [2].

B. What is at stake

The course aims to support learning how to write a research plan and learn to review. In previous course evaluations students reported that they felt limited in their learning experience by multiple sign-on, freedom of speech, lack of informal communication due to anonymity or prejudices in cases of known identity. Moreover, multiple sign-on led to multiple dashboards for teachers, who needed to make a serious effort to keep overview of student activity and progress. It also disconnected the peer feedback from the research plan for students.

C. Solving the issues

Our aim was to develop a single learning environment containing all of the study material and activities that students need to complete their assignments and to review each other. Moreover, we wanted to provide a simple overview for teachers. Game elements, an avatar in particular, would allow students to have an anonymous identity.

II. WHAT WE DID

A. Steps towards solution

Our proposal to develop a game-based learning environment (GBL) was granted by SURF, a Dutch government funded organization for education and research. We formed a collaboration between instructors, learning developers and instructional designers to further carry out the plan and decided on criteria for the game-based learning environment and timing for various pilot runs.

B. Criteria

Most important was that students and teachers could do all their course work in one place, with a single sign-on. Besides that, the environment should provide a complete overview of the status of all activities and progress in the course.

The avatar was the key game element we wanted to introduce. Students (and teachers) should not need to reveal their identity or be hindered by past performance and identity when they are avatars. This criterion supports the concept of stimulating professional behaviour, reducing peer pressure and improving constructive arguing.

The GBL should support a formal exchange of reviews and rebuttals, but also allow informal communication between avatars. Participants should be able to see each other's avatars and thus, feel part of a learning community.

Last but not least, game-based incentives would be added to make the learning more engaging. As in many courses, the final (graded) assignment is scaffolded. Students develop their final assignment step-by-step and give and receive their peer reviews per step. In this way they are able to develop arguments to improve their work within a longer timeframe before the final assessment. Scaffolding implies that the peer reviews are done several times which can be quite tedious and time-consuming, therefore we decided that giving constructive feedback, timely delivery and progress should be rewarded.

C. Planning

As soon as we heard that the project proposal was granted we started carrying out the project in May 2018. We decided to aim for running a first pilot version of the new GBL in two courses in November 2018. Based on student and teacher feedback the GBL could then be adapted for a second pilot run in January 2019 and then for a third run in April 2019.

III. THE PRODUCT

The GBL is called The Great Library as it is designed to look like a traditional library. It is a stand-alone executable that can be downloaded and installed on any computer. It has been programmed in Unity and it communicates with a Java back-end which runs on a TransIP server located in Delft and maintained by Orbit Games. The client application can also be downloaded from this server.

It has a single web-based Teacher Portal which provides teachers the opportunity to keep track of student progress and to add content. Teachers can adapt the content in the Great Library and set the review steps to fit their course, so this GBL can be adapted to any use of peer feedback in any type of education.

A. Entering the Great Library

Entering the Great Library students must first do a tour and answer a number of questions to check their understanding of the GBL. Then they can go to their course and start their coursework.

The Great Library consists of an entry point, the student's 'room' (Fig. 1) where the students can see their avatar, progress, skills achieved, upcoming deadlines and at the bottom right there is a map of the library.



Fig. 1. Student Room

B. Course materials and reviewing

The map in the students' rooms links to the course materials and to the other parts in the Great Library where students can carry out their tasks. There is a Review Hall for reviewing peers (Fig. 2). On the left students see their own avatar and on the right their counterpart will appear once they have submitted their work.



Fig. 2. Review Hall

There is also a separate forum (Fig. 3) where avatars can chat with each other, with their teachers and with the developers. They are directed towards the forum to discuss their field of interest in various activities.

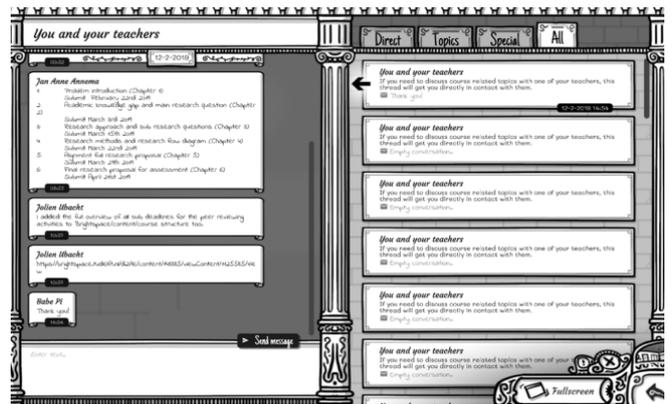


Fig. 3. Forum

C. The Review Tree

The Review Tree (Fig. 4) grows as the student progresses with the different review steps. This helps increase motivation to finish growing the tree.

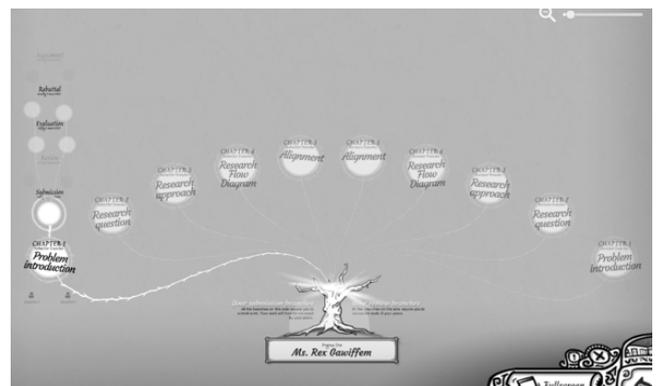


Fig. 4. Review Tree

D. Pilot experiences

The Master Thesis Preparation course has now had 3 pilot runs in the GBL with more than 160 students. Teachers especially value the clear teacher portal, with all student info in a single page. Students had varied responses about the learning experience. The course structure, its content and the many peer review steps remained the same as in the 'old' learning environment. However, we did not receive any comments about single environment, single sign-on, whereas in previous years this was one of the complaints. Most relevant, students nor teachers reported peer pressure as in previous years.

Most appreciate the look and feel of the Great Library, however not all see the need for the game elements in this master level course. One student described it as adding candy to a bitter pill: the final assignment. This is something the teachers continue to look into.

E. Future plans

The developers are still adapting the Great Library and adding more game elements. For example, the aim is to add more rewards and also to further develop the library in such

a way that students can visit the rooms of the other avatars to see how they are doing. In this way there will not be a competition with a leaderboard but students can compare themselves with others.

In September 2019 the Great Library software will be made available as an open source application on Github or similar platform together with documentation. The game developers will also provide hosting and support services for a fixed fee per student or group of students.

F. Our Demonstration

[This video shows](#) the main features of the Great Library and how it can be used. During our demo we will provide more in-depth information and show both the Great Library and the teacher portal. We would also like to discuss different ways it can be used and answer questions from the audience both on how the current course is organized and how the application was developed.

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