

Using games to promote student integration in universities through the use of virtual worlds – Work in Progress

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This paper presents the design of a work in progress project where the primary goal is to develop a set of collaborative game levels on a virtual campus, in order to help the integration process of newcomer students to University, particularly to the large courses of Faculty of Engineering, University of Porto (FEUP), Portugal. The global activities that can be performed by the students were designed for a group approach in a controlled virtual environment. The present work selects Second Life for the implementation of these collaborative “games”. Future work will include presenting the proposed platform to FEUP’s newcomers.

Keywords

Student integration, virtual worlds, second life, game development, game design, collaborative games, group dynamics, problem solving.

Introduction

The integration of newcomer students to the university can be an overwhelming experience, especially for individuals with a more introverted personality in large courses which, in extreme cases, can even lead to abandonment of the course. In an attempt to help students integration processes, the Faculty of Engineering of the University of Porto (FEUP), at Portugal has provided several activities organised in a preliminary mandatory course named “Projecto FEUP” with 2 ECTS (for additional information, please see [ProjFEUP](#) Curricular Unit web page).

Having in consideration the huge impact and constant evolution of online communities, social networks and virtual worlds for collaborative activities, the use of these

realities in the context of student integration seems like an interesting option. Although several technologies have been analysed for this project, like for instance Unity, UDK, Torque and XNA, the Second Life “metaverse” appears to be a more flexible and steadfast way to implement our needs in the context of virtual simulations and simple multiplayer games.

Recently, with creation of a virtual place of Porto University in Second Life, an additional opportunity to reinforce this multitude of approaches has emerged. The new objective is to design and implement, in a parcel of the private region (island), a virtual space for students to meet and interact with each others, through a set of specific digital game levels that need to be played in team.

Another important goal is to promote common experiences between newcomer students and promote their communication and collaboration. To achieve that, each student should create their own avatar with a name and personal characteristics and complete a series of challenges – latter, these challenges may even be beneficial to the final grade (as a reward mechanism).

With all this in mind, the core task of this work evolves the development of several collaborative game levels with very simple and specific objectives. The best approach to implement a suitable interaction design and adequate game mechanics in this work are not obvious, but a survey on some works that are related with the area of team integration and collaborative game design helped to shape structural concepts.

Related Work

The project eScape (2005) studied and analysed the adequate implementation of puzzle games in a virtual multiplayer environment. The experiment was applied to a

total of six groups of four players, where each one was in an isolated room. It also collected the interaction player data through the use of several methods. The conclusions that resulted from this work provided a better perception and knowledge in multiplayer puzzle design and collaborative gaming in general.

EduTeams (2004) was initially developed as a case study, becoming afterwards a commercial product. The main goal was to broaden the core skills of students in elementary and secondary schools. That includes teamwork, communication, planning, problem solving and logical thinking. The result was a multiplayer system with several team based activities. During the evaluation of the case study, professors reported some benefits in classroom. They perceived that some students were more motivated, more extroverted and better aware of the importance of teamwork.

Game Development in Second Life

Although Second Life is not a game, it can be used as a platform for game development. Some private regions are completely dedicated to work as a game, like for instance the DarkLife (2003) role playing game or The Pot Healer Adventure (2005) exploration/puzzle game.

The fact that Second Life offers a prebuilt engine with a solid networking system and a multi-platform web client were key factors for its selection in this present work. Of course, Second Life platform may present limitations for game development, like the use of a non-object-oriented scripting language and a somewhat rigid interaction model, but those are minor drawbacks for the purpose of this project, as the mechanics need to be simple and straightforward for an inexperienced user target. The technical implementation is being developed in a parcel of the University of Porto's island with the use of custom assets (models, textures and scripts) for the construction of the game and its levels.

Other aspects also need to be taken into account, like the adaptation of the student to the Second Life client interface and in-world interaction controls and the overall performance. As stated in The Developers Guide to Pwning Second Life (2006), it's not recommended that the game possess complex mechanics and it shouldn't rely heavily on numerous prims and high frame rate scripts. Usually, attempts of that kind resulted in a poor user experience and presented high latency problems.

Game Concept - Requirements

One of the first conceptual problems of the project was the high number of students that should be integrated under the virtual platform. Each year FEUP has more than 800 newcomer students, so coping with these numbers is a requirement. The proposed solution is to separate classes of a maximum of thirty two students and divide that class in four teams (that could comprise a total of eight users per team at best). A competition between teams is used to reinforce the focus on the tasks ahead, where a classification

system is implemented and rewards are available accordingly with the results. In similar projects, some analysis report that users tend to loose focus and just wander around when there is no reward or competition involved (eScape 2005).

The mentioned project is named "FEUP Adventure" and is composed by a game with three different levels. Each level needs to be played by two teams (acting team and opposite team), and the three different levels are played with distinct teams, assuring that all teams will face each other (as depicted in table 1).

Table 1: Team distribution by level

Level 1	Team A vs. Team B Team C vs. Team D
Level 2	Team A vs. Team C Team B vs. Team D
	Team A vs. Team D Team B vs. Team C

The proposed virtual space has three game rooms and a free practice area. The levels are based in physics, moving objects and orienting the avatar of the player's character. There will no flying available in the parcel due the nature of the levels, and therefore, the practice area will allow the students to become more aware of the interaction with the avatar and objects in the new virtual space.

Proposed Game Levels

Each level is composed by a specific set of rules and objectives, designed to promote the creation of collaborative and adversarial experiences. Levels are to be simple but allow different strategies, still demanding human communication, thus promoting interaction among colleagues.

The game at Level 1 is called "Crate Carrier" (see figure 1) and is a 6 vs. 6 player level, where the objective is to score the most points possible during a limited time (e.g. 5 minutes). Each team will score points by carrying crates over their ramp and dropping them into a moving platform. To ensure a balanced game for each team, the position of the objects is symmetrical and in the beginning all team members will start on the top of their ramp.

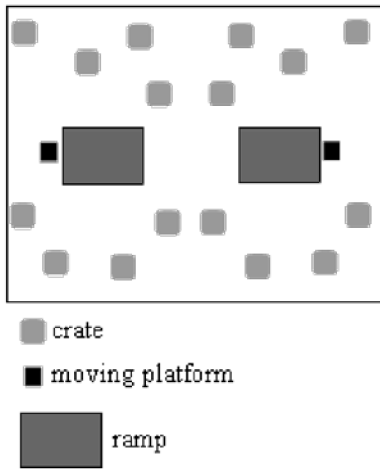


Figure 1: Map for level 1 of the “FEUP Adventure”

Level 2 is called “Sliding Spheres” (see figure 2) and it is proposed that four players of a team play and the objective is to score the points during a short limited time (e.g. two and a half minutes). Each team will score points by direct falling spheres through a ramp into a large target. Each time a sphere hit the target the team will be rewarded with one point, but there will be two members of the opposite team that will try to catch the spheres with a block. The block wall can only be moved along the sideways of the ramp, in this case, only to the right or left. If any spheres touch the block wall, it will disappear. The spheres will appear in intervals of five seconds and the two teams will be present in the same room, with four players in the respective team ramp and two players on the other ramp trying to catch the enemy spheres.

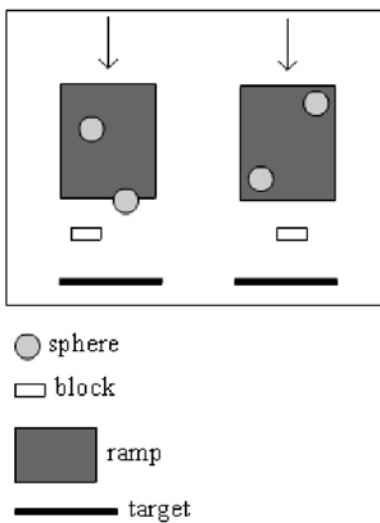


Figure 2: Map for level 2 of the “FEUP Adventure”

Level 3 is “Jumping Platforms” (see figure 3) and consists in a large room with several objects that work as platforms and obstacles. Each team will be represented by four players and the objective is to reach the finish line by the same four players the soon as possible. In this case there are no points, only time. The timer will stop only when the last team member reach the finish line. Meanwhile, the opposite team will try to render difficult the task. The obstacles can be controlled by the interaction of players and at the same time players of the acting team can pick up “power-ups” to slower the obstacles devices, enabling more options to the tactical approach, because ever time a player fall from the platforms, he or she must restart all over again. Due to the nature of the game, it will be needed one session by team, in opposition to the other games where one session abridge the results for two teams

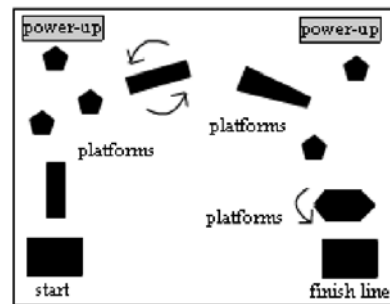


Figure 3: Map for level 3 of the “FEUP Adventure”

There are also reports (Revolution 2004) that some students tend to use some disruptive behaviour during gameplay. It’s necessary to consider that students may use the game mechanics to completely counter the active team tasks. For example, a single player could be on the top of the moving platform in the crate carrier level, preventing the team of scoring any point. To avoid this, students’ avatars can not cross adversary ramps or platforms. The game has to be well balanced in order to prevent frustration on the teams.

Conclusion and Future Work

This work proposes virtual games as a helper tool for engineering students’ integration at FEUP. Requirements were listed and the choice of the Second Life platform was discussed. The presented game called “FEUP Adventure” will hopefully promote student integration in an amicable virtual environment and construct real experiences in a controlled environment that can provide a starting point for other integration activities.

Future work includes evaluation procedures to gather information about the students experience and final results,

like structured interviews, in-game video capturing, etc. these techniques will be proposed for gathering feedback of the proposed approaches. If the results show indications that the use of virtual worlds and collaborative games can somewhat help the integration of students, it is foreseen that, in future years, levels are refined and new levels added.

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