Designing Pervasive Games to Support University Studies in Media Technology

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Abstract

New media technology students at university face many challenges from social to pedagogical when they start academic studies. One of the programs initial goals for these new students is to introduce them to some of the key social web services that they will need to use for their schoolwork. The use of pervasive games to reach this specific purpose may help new students acclimate to these challenges. This paper presents a pervasive game that helps teams of students work together with new technologies to solve a mystery about a missing fictional professor. Our particular research interest relates to how pervasive games can be used to introduce social web technologies and support team building for a university course. The game presented in this paper show promise as a tool to get new university students in media technology actively involved in exploring social media web services.

1. Introduction

New media technology students at university face many challenges from social to pedagogical when they start at University. One of the programs initial goals for these new students is to introduce them to some of the core social web services that they will need to use extensively for their school work. Although most students are familiar with media sharing services but have little experience and knowledge in the collaborative services available. The use of pervasive games in this situation may help new students acclimate to these new challenges. They can provide new opportunities and encourage students to adapt to new learning challenges [5]. In the recent decade pervasive mobile and alternative reality (AR) games have garnered the interest of researchers and educators as serious tools for supporting different types of learning [10]. A large majority of these technology enhanced learning applications have been mostly used for language learning, mathematics, history and science [3, 10]. Other research has focused more on the game experiences that explore interaction and play [11]. Some of these games have explored the social aspects and skills needed for training and these types of learning activities are commonly known as serious games [3, 4]. This paper presents a prototype pervasive game, The Search for the Professor where teams of students need to help a fictional professor find his missing formula for a new cognitive enhancing drug. Therefore the research question is as follows, how can a pervasive game be used to introduce social web technologies and support team building for a university course? The paper also raises questions about how to best evaluate the game’s outcome.

The next section presents a brief background to these types of game based learning activities. The third section describes the game systems while section four introduces the research approach and the preliminary results of our efforts. The paper concludes with a discussion and the next steps.

2. Background

Recently game based learning applications have begun to reach critical mass moving from research labs to more of an everyday activity helping people learn where ever they go from formal to informal training [7]. The advantages of these educational and serious games are that they have the potential to let learners experience and think about the world from different perspectives [9]. These types of games support contemporary learning theories of situated and authentic learning by engaging the students in meaningful and appropriate contexts with real world problems that are relevant to the learners [6]. The next section describes the game, the design process behind
it and what technology that was used in order to make the game.

3. Game Description and Settings

The game grew out of a research project that took place the previous year when new students were involved in testing rich mobile services. As part of this previous research project and from other courses it was discovered that new students were not as familiar with web 2.0 services as thought by the instructors. This was illustrated through in class discussions and surveys conducted. This insight became the impetus for the current game.

*The Search for the Professor* presents the students with a narrative driven mystery about a professor and secret formula. The students need to solve successive tasks to succeed. Each of the tasks was related to different themes of the introductory course in Media Technology. The tasks made use of different web based services that the students needed to utilize for solving each of the problems. Tasks included activities that made use of sharing different media such as photographs, and GPS coordinates on different web sites like, Google Maps, and Flickr. Simple cryptography puzzles were designed to make the students explore ASCII, hexadecimal and public and private keys. The games antagonists used foreign languages that the students had to translate. The game utilized web and mobile-based clients and each team was given a mobile phone that contained a hidden file they needed to find and decode as one of the different missions and puzzles.

3.1 The Technology

Due to the loose coupling between the narrative parts and the game missions with a short timeframe for the development of these software components, a web-based client was chosen. Web-based clients has a few advantages over a generic mobile client, amongst these is that no installation is required on the mobile and stationary hardware. When developing the purposed client an existing resource framework called CodIgniter (http://codeigniter.com/) was used in order to facilitate the rapid development process. The system consisted of two parts, an administrative part and one part which was used to play the game, display scores, give clues, send e-mails to participants, the basic game engine. The administrative part was used to add players, missions, add players to groups, trigger missions and manually set the score for missions that required it.

Since the game was played over a period of three days the system supported time event missions. These events were automatically triggered at set times during the course of the game, or manually if the game flow needed to be adjusted. Whenever a new mission was triggered, an email was sent to the groups email account that was coupled with the phone and to the student’s personal e-mail accounts. The game’s progression was controlled through the input of these code words for each mission. Once the team had solved a mission through the exploration of social web services and tasks around the campus, they entered the code word into the game system. The system facilitated the change of missions by giving each correct answer a response, a short explaining text and an email or a link that contained a new clue that provided hints of how to figure out the new code word.

4. Research Approach

Utilizing a design-oriented research method perspective, where the goal is to generate knowledge that would have not been possible with out development and implementation of a prototype [2]. We developed the game prototype in hope to understand how to motivate and involve new students in active exploration of new technologies that will become part of their future studies. This fits into a broader research domain of Design-based research methodology that is concerned with the design of learning processes, taking account of the involved complexities, multiple levels and contexts of educational settings [8]. *The Search for the Professor* was implemented in the beginning of an introductory course for new media technology students studying at University. There were 24 students, 16 men and 8 women. Each group was given a Nokia N70 smart phone that enabled them to take photographs, video, and receive email. The groups also had access to a special web page.

5. Findings and Analysis

Twenty-four students responded to the survey, sixteen man and eight women (n=24). The survey provided a snapshot of the skill level and what type of services the new students use in their everyday life. The students differentiated from creating websites (87%) versus knowing how to program (68%). In general, we can see a trend showing that most of students are not as familiar with social web services as commonly expected, except for video, music, and chat services. The game exposed them to these diverse services. From a collaboration aspect the students
discussed the problems together (80% felt strongly) and the majority felt even more strongly (96%) that they needed to use strategies to solve the puzzles. The students overwhelmingly felt that the game was a good way to meet their classmates and a majority (70%) of them would be interested in developing a new game as part of a course. The survey included a question that asked the students to describe their game experience in 3 adjectives. The top adjectives the students used to describe the game are: fun (18 uses), interesting (17 uses) Tricky (8 uses) exciting (7 uses). Figure 1 illustrates this in a simple tag cloud. The after action review that the instructor conducted confirms the survey results with several students explaining how the game got them to try different social web services that they might not have explored in more traditional assignments.

![Figure 1](image_url)  
**Figure 1** a tag cloud of the adjectives used for description

Additional open-ended feedback was obtained from the survey and the interviews of several students. A student reported that the game provided new knowledge and experience about web services.

6. Discussion and Next Steps

The *Search for the Professor* AR game shows promise as a tool to get new university students in media technologies actively involved in exploring social media tools while providing ways for students to form work groups. What this version of the game lacked is clearer integration into the course work and a set of richer tools for evaluating the students learning outcomes. The comments on the micro-blog during the game showed both satisfaction and frustration with the game and indicate that the students were emotionally involved. Since the goal of this design-oriented project was to test the basic hypothesis using pervasive gaming to introduce social web services and foster the social aspects of new students the game can be considered successful. From the research objective we have the basic instruments in place to conduct a more rigorous trial for the next version of the game that can look into the learning opportunities with more sophisticated tools.

7. References


