FOSTERING LEARNING THROUGH MEDIA GAMES IN COMPUTER SCIENCE

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Abstract

One of the key challenges of university teaching is encouraging students to revise the learnt matters along the academic semester, rather than waiting for the final exam to study it. Occasionally, partial exams are included in the middle of the semester, becoming the same problem: students study only for the exam that is not currently at the end of the semester, but they do not revisit the contents any more. In this paper, we relate an experience developed in several subjects of the Computer Science and Engineering Degree at the University of Cádiz, Spain. In such subjects, we introduced a couple of well-known media game shows along the semester. We encouraged students to study during the week before in order to compete (in teams of around five people) in the game. The game questions focused on the subject contents. The results were that the students (1) studied before the game (even though there were no extra mark for reward), (2) collaborated in their team to be the winners, (3) revisited the topics during the game, and (4) enjoyed the activity developed. As a result, the learning process was reinforced and improved with a motivating game-based activity.

Keywords: Gamification, Education, Learning Process, Motivation.

1 INTRODUCTION

One of the key challenges of university teaching is encouraging students to revise the learnt matters along the academic semester, rather than waiting for the final exam to study it. Occasionally, partial exams are included in the middle of the semester, becoming the same problem: students study only for the exam that is not currently at the end of the semester, but they do not revisit the contents any more.

In order to face such a challenge, we have developed a novel action in several subjects of the Computer Science and Engineering Degree at the University of Cádiz, Spain. This experience has been developed under the scope of three different subjects, namely Parallel and Distributed Architecture (PDA), Parallel and Distributed Programming (PDP) and Information System Engineering (ISI). These subjects belong to the third or fourth course of the degree, depending on which year the students decide to apply for them.

In such subjects we introduced a couple of well-known media game shows along the semester. We encouraged students to study during the week before in order to compete (in teams of around five people) in the game. The game questions focused on the subject contents. Even though they could search for the information in the Internet during the game, it was mostly needed that they had studied before since (1) they had a limited time to answer the question; (2) some questions were very specific of the matter studied.

The results were quite positive; students from all the subjects involved reinforced their acquired knowledge in the proposed activities and got additional benefits as working on team to win the game, reinforcing the team work feeling and also enjoying the activity and therefore being more encouraged to study the subject in question. The students also evaluated the experience positively.

2 METHODOLOGY

In the following paragraphs we explain the media games used during the innovative action and the procedure followed before, during and after the game.
As previously mentioned, this experience has been developed under the scope of three different subjects in the Computer Science and Engineering Degree at the University of Cádiz, namely PDA, PDP and ISI. These subjects belong to the third or fourth course of the degree, depending on which year the students decide to apply for them, and are developed during one semester. We usually have around 10 students in such subjects.

We selected two well-known media games, which are the Spanish equivalent to *The Alphabet Game* and *Jeopardy*. More or less, at the beginning of the second month of the semester we carry out *The Alphabet Game* and by the beginning of the fourth month we carry out *Jeopardy*.

We notify the students about the date in which the game will be developed two weeks in advance, so that they can start studying and we remind it the week before, encouraging them to study for winning the competition.

![Figure 1. The Alphabet Game screenshot.](image)

The day in which the game is developed, the students are divided into two equilibrated teams. When playing *The Alphabet Game*, each team will have to answer different questions starting or containing every letter in the alphabet (Figure 1 shows one screenshot of one of the games carried out). Before starting, they agree who will be the spokesperson in each team, who will be the only one authorized to answer the question, but all the team will agree the answer to be given. When one team fails, then the other continue by the letter where they failed before. In case they continuously give the right answers we switch teams every 5 words, so that the other team does not get bored. When playing Jeopardy (see one screenshot for *Jeopardy* in Figure 2) there is an only set of questions for both team and they play alternatively, choosing the question they prefer according to the topic and score.

![Figure 2. Jeopardy screenshot.](image)

In general, questions are prepared to be answered correctly if they studied regularly and the competition usually ends with a tie from both teams, or almost a tie. After the competition, the lecturer congratulates all them for their effort, reinforcing their behavior so that to encourage them to study again in the future. To include such a price sometimes some snack is given to all the participants.
3 EXPERIENCE RESULTS

In this section we explain the experience results from two points of view: from the point of view of the students and from the point of view of the lecturer.

3.1 From the students point of view

After each activity, a survey of three questions was followed by the students so that to assess the students satisfaction. The questions answered by the students are shown in Table 1, where we can see that first question was regarding how helpful they found the game for the learning process, second question focused on their expectation for additional activities of the same type and third question was related to comparing traditional methods with the presented one. We have enumerated the questions to facilitate their identification in the figures.

<table>
<thead>
<tr>
<th>Question</th>
<th>Question wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1</td>
<td>Did you find the activity useful for your learning process?</td>
</tr>
<tr>
<td>Question 2</td>
<td>Do you think that developing similar additional activities would help you in your learning process?</td>
</tr>
<tr>
<td>Question 3</td>
<td>Would you have preferred using a traditional method to reinforce the contents learned?</td>
</tr>
</tbody>
</table>

In general, satisfaction from the students was good as shown in Figure 3 and explained in the following lines. 100% of the students were motivated by the use of the game as a tool to improve the learning process; 100% of the students considered that using this learning tool occasionally would help them in the learning process and none of the students would replace the game activity by a traditional activity.

![Figure 3. Results from the survey taken by the students](image)

3.2 From the lecturer point of view

In general, the three lecturers were quite satisfied with the results of the innovative action. Firstly, the students were motivated for studying at home; secondly the students were motivated by the activity developed in the classroom and finally the learning process was improved.

Even more, it is also important to mention that the proposed activity imply that the students improve several cross-curricular skills, such as team work [1] and negotiation, which is one of the main aims in the attempt of unification of European studies through the Sorbonne [2] and Bologna [3] declaration. Besides, the activity increased the links among the students and also with the lecturer, since the atmosphere during the lecture was more relaxed than usually.
4 CONCLUSIONS

As a result, we can conclude that including games during lectures in order to test the knowledge of the students through a team competition provides great benefits to the students. The students improve their learning process as well as their motivation and they also work their cross-curricular skills.

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