Cooperative Learning to support the lacks of PBL

Javier García Martín
Universidad Politécnica de Madrid
Ctra. de Valencia, Km. 7
EU Informática, Madrid 28031, Spain
+34 913365053
jgarcia@eui.upm.es

ABSTRACT
In this paper, we describe the use of some cooperative learning methodology sessions in a Project Based Learning course, in order to cover those topics uncovered by the project.

Categories and Subject Descriptors
J.7 [Computers in other Systems]: Real time. K.3.1 [Computer Uses in Education]: Collaborative Learning.

General Terms
Management, Experimentation.

Keywords
Cooperative Learning, Project Based Learning, Real Time Systems.

1. GOALS
In the Technical School of Computer Science, we have developed a Project Based Learning (PBL) methodology in a Real Time Systems (RTS) course. The goal of this course is the study of theory principles, techniques and tools needed for the construction of a RTS. This makes it appropriate to establish a PBL methodology. One of the most well-known disadvantages using PBL is the difficulty of teaching all topics included in a course [1]. This problem usually leads professors to a resistance to use PBL. In order to solve this problem we used the Cooperative Learning methodology (CL) [2] to perform several sessions dealing with those parts of the subject uncovered by the development of the project.

2. APPLICATION
The project development is carried out by teams of three students. We scheduled two CL sessions in which all members of a team work together to solve a problem related with their project. Each session lasted 110 minutes.

One session was designed to work on the last two chapters of the course that were not covered by the project development (Fault Tolerance and High Integrity Systems). The main contents of these chapters were divided into three parts, and a different part was assigned to each member of a team. At the end of the session, a small problem was proposed to every team. This problem could only be resolved if all of the three members worked together sharing the individual knowledge about the chapter. The session was structured as follows. The instructor gave 20 minutes to each member to read the assigned material. Later, the members met with other members with the same material assigned. Those groups are called “expert” groups. Over 10 minutes, experts met for discussing and solving doubts. Then, the instructor reconvened the teams in their initial configuration. During 5 minutes, each expert in a team taught the other team members about the information studied. After 15 minutes, the instructor gave the problem, related with the project, to be resolved by the team in 40 minutes. The problem solution needs information from the three experts. The last 25 minutes were dedicated to present the solutions to the class. Within this phase, the instructor started a discussion among the teams. The second session was designed for a different purpose, specifically to help students to develop a critical phase of the project.

3. RESULTS
Besides improving the team-working skill, these self-contained sessions turned out really helpful to complete the topics included in the syllabus. Students demonstrated enough knowledge on these topics, which would not have been studied in other cases. Furthermore, this educational methodology got a favorable reception by students. The 60% of the students agreed significantly with the following assertion: “Cooperative Learning is a helpful methodology to learn the contents of the subject” in a poll completed at the end of the course. The 27% simply agreed with this assertion, and the 13% did not agree.

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5. REFERENCES