GOOGLE GROUPS FOR COMMUNICATION ENHANCEMENT IN COOPERATIVE LEARNING STRATEGIES

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Abstract

In this paper we show our experiences in the use of Google Groups and other similar services to improve the communication between students and lecturers in a cooperative learning environment. We will present the details of using these internet tools in Industrial Engineering studies at Miguel Hernández University.

Since 2008, we are using cooperative learning methods to improve the quality of teaching, motivate students and develop more skills. Cooperative learning is the instructional use of small groups so that students work together in order to maximize their own and each other's learning. This process is performed using a strategy which promotes mutual collaboration, obtaining a more harmonious and comfortable atmosphere to achieve the learning objective. The evaluation results have shown that the cooperative learning approach really improves the student learning, but we have found some problems in the communication among students from the same group or team and between students and their lecturers.

The communication from the teacher towards the learner is simple, since it is done through the publication of documents and notices on the website of the course. However, communication from students to teachers is more expensive, and it is done primarily through the use of email. In order to enhance this communication we have experimented in the use of Google Groups to increase the discussion between all the people related to the course.

Google Groups is a service from Google that supports discussion groups based on common interests. Membership in Google Groups is free of charge. So, we have created a Google Group for each course with all the participants in the course (lecturers and students) as the group users. The users can discuss and participate in threaded conversations, either through a web interface or by e-mail. They can also share documents in the site, create and edit new webpages and create and edit documents online while collaborating in real-time with other users (through Google Docs). So, these tools offer a powerful way of improving the communication between all the members of the course.

In a Google Group, the lecturer can make different announcements, publish slides, documents, exercises, old examinations, etc.; the students can share their own solutions to the exercises or they can deliver them to the teacher. Google groups can be managed as an e-learning software platform or Virtual Learning Environment (VLE), but its management is simpler than other popular e-learning platforms, as Moodle or Claroline.

Keywords: cooperative learning, e-learning software platform.

1 COOPERATIVE LEARNING TECHNIQUES

In cooperative learning students work together in small groups in order to maximize their own and each other's learning. This process is performed using a strategy which promotes mutual collaboration, obtaining a more harmonious and comfortable atmosphere to achieve the learning objective. Basically, cooperative learning is based on the interaction between several students (group size usually ranges from 4 to 6 students) who cooperate in the learning process of a specific subject. This learning process is supervised and directed by the teacher [1][2].

This methodology deals with a concept of learning which is non-competitive and non-individualist as the traditional method. It promotes a collaborative mechanism which aims to develop team work habits or competences, solidarity between classmates and encourage students to take part autonomously in their own learning process. Besides, cooperative learning is particularly well suited for student

belonging to new generations (the so-called "millennials") which show a high level of loyalty for their groupmates: a student tries much harder if he knows that their groupmates depend on him [3].

In order to implement cooperative learning techniques, one of the key requirements is the availability of reliable and powerful communication tools:

- First, students belonging to the same group must be able to share their results through the internet, or even to work simultaneously from their homes, by using shared desktops. In this way, meetings can be reduced to a minimum.

- Second, the communication between students and teacher must be flexible enough. Traditional communication by email is not adequate, due to the huge amount of emails involved in a scenario with lots of students and lots of tasks assigned. Thus, tools allowing the students to upload and download information in an easy and reliable way are required. In the same way, forums must also be present in order to improve communication.

2   BENEFITS OF WEB 2.0

The term "Web 2.0" is related to a different way of interaction between the users and the web pages. In a Web 2.0 application, the user is not only a passive receiver of information but a contributor to the site content. Nowadays, many common web applications are examples of the Web 2.0 philosophy: virtual communities, video-sharing sites, wikis, etc. In Web 2.0 applications, the ability to create and update content leads to the collaborative work of many rather than just a few web authors. In wikis, users may extend, undo and redo each other's work. In blogs, posts and the comments of individuals build up over time. In virtual communities, the contents of each page evolve continuously with user uploads.

Most Web 2.0 applications include the so-called "tags" and "tag clouds". A tag is a short label used to facilitate searching, while a tag cloud shows closely related terms that can be found in a web page. An example of tag cloud showing the main aspects of Web 2.0 (taken from [4]) is shown in figure 1.

Figure 1: Tag cloud showing Web 2.0 main aspects

Web 2.0 is thus a perfect platform for cooperative learning techniques, where the interaction between students belonging to the same group and also between lecturers and students is a key factor for success.

3   WEB 2.0 TOOLS

Among the Web 2.0 applications that can be used for communication enhancement in a cooperative learning scenario, there are two Google tools that are particularly useful: Google Groups and Google Docs. Besides, our University has also developed specific Web 2.0 tools.

3.1   Google Groups

Google Groups [5] basically support discussion groups for users with common interests. It is a free of charge service offered by Google, so there is no cost for the students or for the University. Groups can be anonymous, although this is not the case in a cooperative learning application. Some of the main features of Google groups that can be of interest for the students are shown below:

- All the users (students and lecturers) can post information, which is made available to all group members.

- A search tool powered by Google makes it possible to perform searches across all the posts for a certain topic.

- Users can create and edit their own profiles. This includes the lecturer, the individual students and the student groups.

- All members can create and edit group pages.

- Members can rate posts, which can be useful for evaluation purposes.

As an example, figure 2 shows the main page of a Google group created for the topic "PIC microcontroller programming", which belongs to one of the core subjects of the Industrial Engineering degree at Miguel Hernandez University.

3.2   Google Docs

Google Docs [6] offers a free of charge data storage service that also allows users to share information and to work simultaneously through the web. It offers three different on-line applications: a word processor, a spreadsheet and a presentation tool.

Although the communication capabilities are more powerful in a Google group, there are several aspects of Google Docs that are also very useful in a cooperative learning scenario:

- Members can share documents and they can even edit them simultaneously through the web.

- Whenever a document is modified, a notification can be sent to a specific set of users.

- All documents are saved in Google servers by default, but they can also be saved locally. Thus, there is no need to take care of backups.

- All common office suite formats are available (HTML, PDF, WORD, etc.)

3.3   Web 2.0 tools developed by Miguel Hernandez University

Our University has also developed specific tools [7] which make use of Web 2.0 capabilities in order to improve the communication between students and lecturers. Every subject of a degree has an associated web page which allows students to upload and download documents, to share information, and to create specific forums. Figure 3 shows a screenshot of the web page of the subject "Automatic and Electronic Systems", which belongs to the Industrial Engineering degree.

Even though such tool is at present being used by many lecturers and students, future plans in Miguel Hernandez University include the introduction of standard tools (particularly, Google tools) for the same purpose.
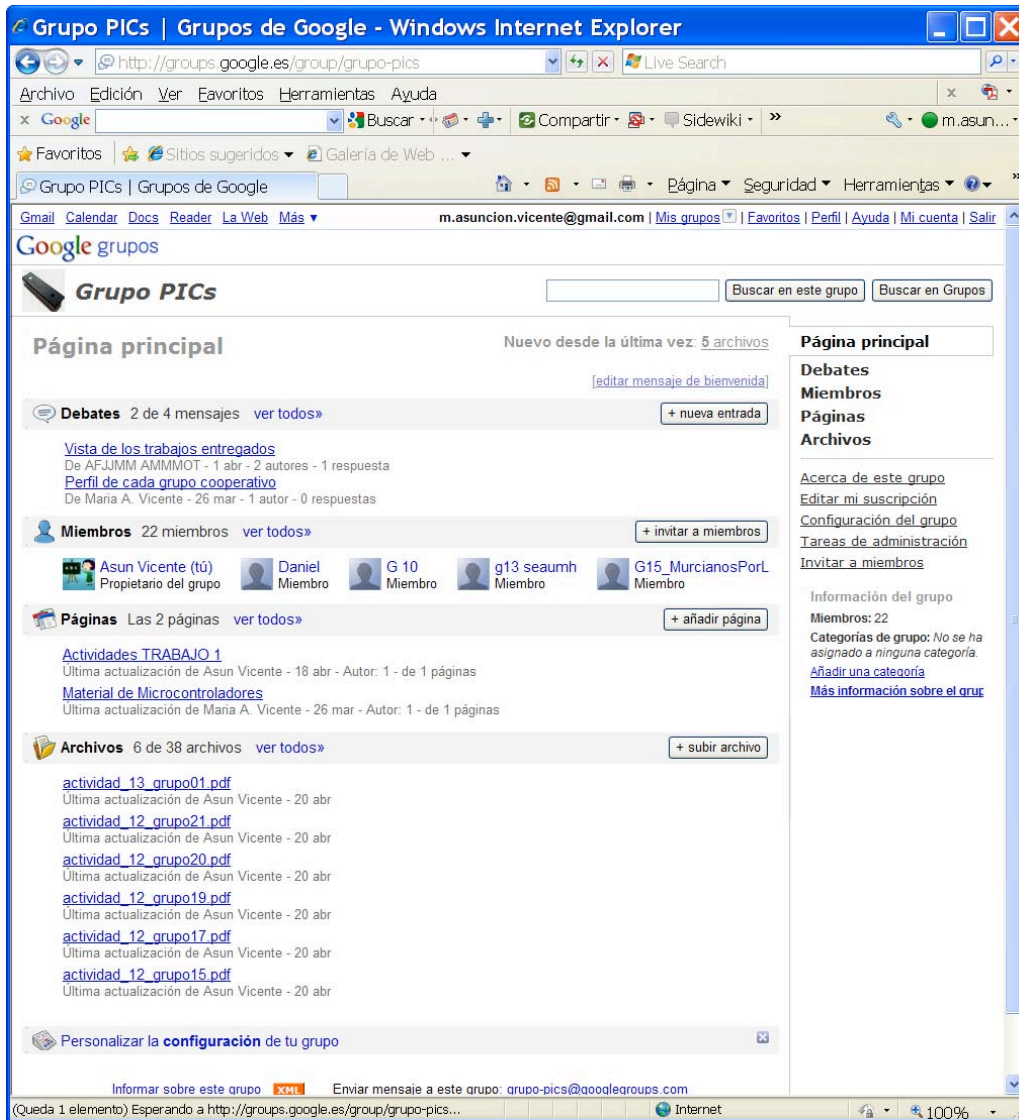
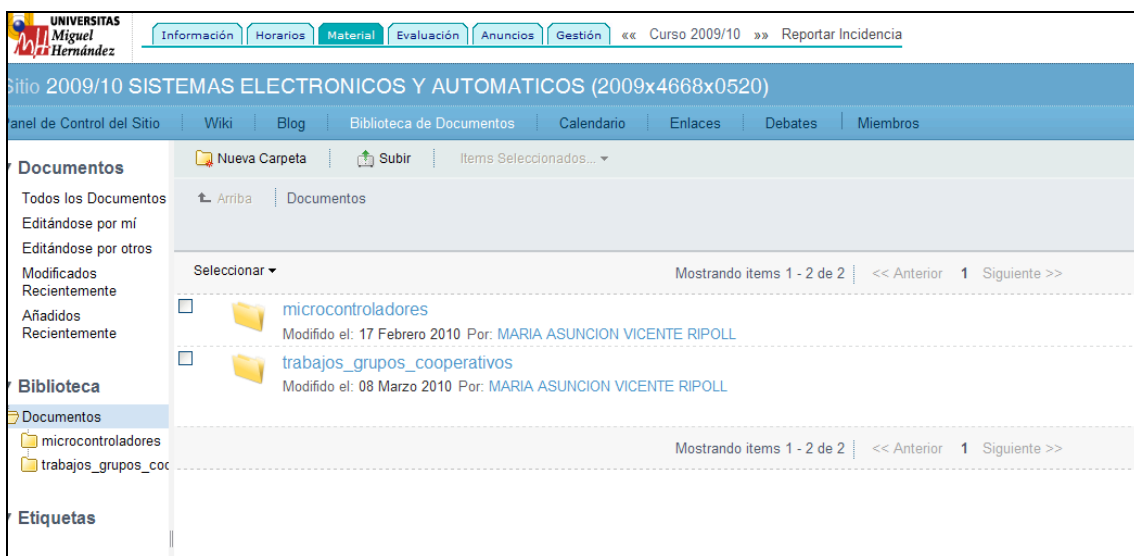Figure 2: Google group for "PIC microcontroller programming" topic

Figure 3: Web page of the subject "Automatic and Electronic Systems"

4 EXPERIENCES AND RESULTS

We have been using cooperative learning techniques for the last two academic years, with excellent results in terms of student motivation.

As an example, figure 4 shows the results of one of our last exams (topic "Instrumentation", from the subject "Automatic and Electronic Systems"). Marks range from 0 (lowest) to 10 (highest). Cooperative learning is optional for students, so they can choose to work in groups or not. It can be seen that the students that joined a group performed clearly better than those that did not.
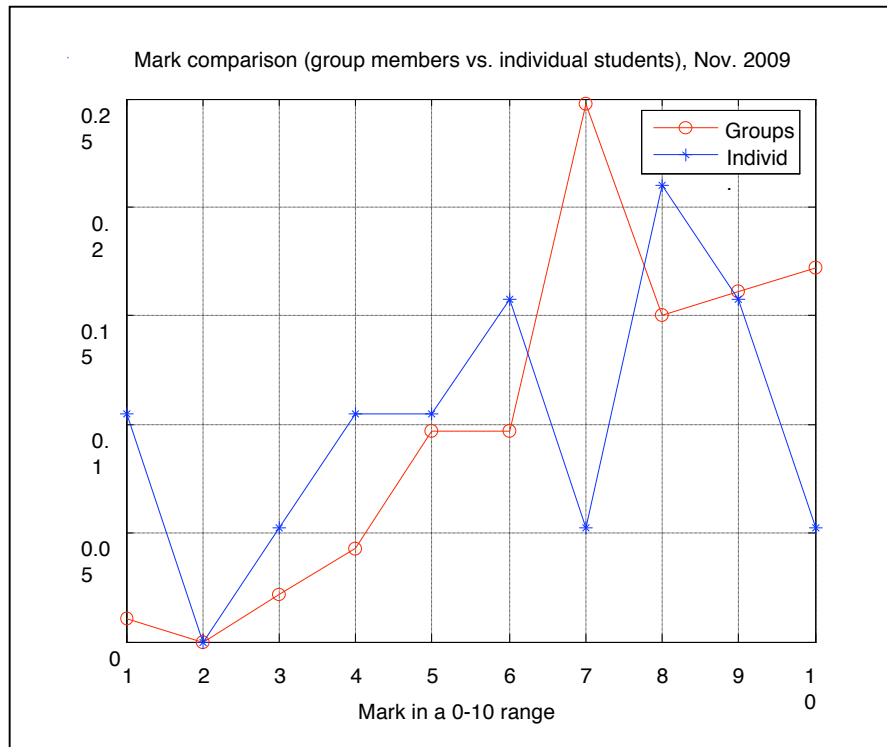
Figure 4: Mark comparison in the topic "Instrumentation"

From our experience, we have also found the weaknesses of different communication tools. Some details are given below.

4.1 Academic year 2008-2009

We first carried out cooperative learning techniques in the academic year 2008-2009. We relied in simple tools for communication between students and lecturers:

- Official web page (Web 1.0) of the subject. Such web page was used for communication from the lecturer to the students: task assignment, documentation, etc. The students were able to download information, but not to upload their work or to communicate within themselves of with the lecturer.

- Email for communication from the students to the lecturer, including sending the lecturer the assignments and asking questions.

- No specific means for communication between students of the same group. In most cases, the members of the same group needed to meet in order to cooperate in their work.

Although the communication from the lecturer to the students was good enough, the feedback from the students to the lecturer needed to be improved. There were a huge number of emails, which made the lecturers work difficult, particularly when a certain student or group sent different versions of their assignment. Besides, asking student questions was not efficient, as multiple emails were related to very similar questions.

4.2 Academic year 2009-2010

During the academic year 2009-2010, we have tried other communication tools that have proved to perform much better:

- Official web page (Web 2.0) of the subject. It has been used both for communication from the lecturer to the students and from the students to the lecturer. The students have been able to download and to upload information, as well as to take part in forums.

- Google group for a specific topic (PIC microcontroller programming). It has been used basically in the same way as the official web page (Web 2.0) of the subject, but it was focused on a particular topic.

The results in terms of communication efficiency have been considerably better than those of the previous academic year, although we have found some problems with Google Groups for document uploading. We plan to use Google Docs next academic year in order to solve such problems and to add extra capabilities such as the simultaneous edition of a document by the group members.

5 CONCLUSION

Cooperative learning is a very powerful methodology in order to increase student motivation, but it requires efficient communication means.

In particular, giving information to the students is an easy task that can be accomplished using traditional Web 1.0 techniques; but gathering the student feedback requires more appropriate tools.

Emails have proved to perform poorly both for assignment upload (mainly, when there are multiple versions of the same assignment) and for answering student questions.

On the other hand, Web 2.0 tools are particularly well suited to cooperative learning, as they are focused on user interaction.

We have performed tests with a specific platform developed by our University and with the Google Groups tool. Both platforms have performed well, although we have found several problems with document upload using Google Groups.

Concerning future plans for next academic years, we will try the Google Docs application in order to improve document uploading and to allow students to edit simultaneously their documents through the internet.

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