

# HOW ONLINE APPLICATIONS CAN HELP TO ACHIEVE INTEGRAL LEARNING

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## Abstract

The development of transversal competencies provides an integral education. However, its practical implementation among different subjects is not a trivial task. There are several issues that should be previously solved in an optimal way to take advantage of the synergy among subjects. Main issues are: i) the need for a common space for the documents management, ii) the availability of the document everywhere and anytime, and iii) the possibility to collaborate in the documents edition tasks. It was implemented a virtual portfolio for the students which allows the assessment of all the subjects in a global way. To this goal we used the Google apps due to its free access, availability and suitability for the collaborative editing tasks.

Keywords: virtual portfolio, integrated learning, collaborative tasks

## 1 INTRODUCTION

Current curriculum tends to develop transferable skills that provide students with a comprehensive training approach. However, the implementation of transversal competencies among subjects is not a trivial task and reveals several problems to be solved in an optimal way to take advantage of synergies between subjects and be effective on the training of students.

One of the firsts requirements arising from the implementation of the transferable skills is the need for a common on-line portfolio. It is essential that such portfolio be on-line, given the opportunities arising the Internet now, such as the so-called Web 2.0, the generation of web content, the communication tools, the possibilities for cooperative work, among others.

The second requirement is that this shared space should allow documents to serve as host for all subjects who wish to be part of the development of the transferable skills, to jointly provide content to the learner's online portfolio.

Thirdly, the common space should allow for some interactivity to users, both students and teachers, as is required by the subjects and the learning process. Both actors can contribute to the learner's portfolio, and interactivity should facilitate the process.

Finally, this tool should support viewing, editing and above all, the online collaboration for different types of documents (which includes spreadsheets, text documents and graphics). This is essential to facilitate the task of learning and collaborative work and cooperative.

All these aspects can provide students with a virtual portfolio and provide a comprehensive view of that portfolio. Thus, the assessment of knowledge and the learning process can be developed from an integral perspective.

## 2 THEORETICAL FRAMEWORK

The design of a project in a network, as well as the multimedia didactic material or the virtual environment of learning, implies, first of all, a theoretical framework that provides consistency and coherence to the diverse planned actions.

The student portfolio is an educational tool that allows the students to improve the autonomous, participative and reflexive learning. Furthermore, it provides a result that can be evaluated from an integral perspective. According to Rico Vercher and Rico Pérez (2004), "the student portfolio is basically a work portfolio, on paper or virtual, that results from the student's effort to pass from the procedure to the product". It is important to highlight this vision of the portfolio as a tool for the evaluation of the result of the student's effort (Montes Fernández et al., 2005). The best possible result in the sciences learning is an integral education, where the future professional faces from early stages of its knowledge development to situations of real work. In addition, the ability to communicate the results of its analyses in a scientific way is a very important transferable skill. Since the student portfolio is a methodology of great utility for the application of the transferable skills (Fernández Portero and Alarcón Rubio, 2008), in our case, we have selected a virtual portfolio that implies two basic requirements: i) the availability and ii) the cooperative work environment. It is necessary to mention that the interactivity is already presupposed in the last requirement.

The availability must be achieved so that the user can access these documents everywhere and anytime, thus facilitating the learning task. The cooperative work among students reinforces the knowledge acquisition in several areas inside the team context (Ramaswamy, Harris and Tschirner, 2001). These two bases of the online student portfolio that we have formulated in our work should facilitate the application of the transferable skills.

The idea of learning in a collaborative way, in groups, indicates that the student is not contemplated as an isolated individual, so in its learning it should be an interaction with the others (Collazos and Mendoza, 2006). "The collaboration implies to share objectives and to distribute responsibilities, and these are desirable forms of learning" (Gros Salvat, 2004). In this sense, the used tool or online application has to facilitate the interaction processes and the cooperative solution of problems.

"So that a real collaborative learning exists it is not only required to work together but rather it is necessary to cooperate to reach a certain goal that it could not be achieved in an individual way" (Driscoll and Vergara, 1997).

In a virtual environment of learning, the students can also be designers and producers of contents. In this sense, it is much more participative and active since the student can collaborate with his contributions, to increase the base of knowledge, to reinforce connections, and so on.

### **3 IMPLEMENTATION**

In order to facilitate the understanding of the selection of the online tools, here we will describe the objectives proposed in our planning for the implementation of the transferable skills among the subjects on the second course of a degree in biology. The subjects are: Introduction to Statistical Inference and Marine Biology.

#### **3.1 MAIN OBJECTIVES**

The general objectives have been: i) that students can carry out a study that addresses a real case study and ii) to know to communicate in a formal way the results of this case study. These broad objectives can be divided into specific objectives as are detailed in the next subsection.

## 3.2 SPECIFIC OBJECTIVES

- 3.2.1 *Understanding the design of the experiment (proposed by the teachers of both subjects) according to the various scientific objectives.*
- 3.2.2 *The experiment, namely the sampling phase, is carry out by the students themselves. They are divided in groups of two field trips (the sea and the coast) where they take samples according to the experimental design previously presented.*
- 3.2.3 *The data collected by each group, should be used for all groups. This will improve the overall perception of the status of the field under analysis.*
- 3.2.4 *Based on the observed data field collected in such practices, pupils should perform an analysis of data to finally give their conclusions.*
- 3.2.5 *These conclusions are presented in a seminar to assess from both subjects the result of its investigation by professors in an integral way.*

Given the design of the implementation of transferable skills was absolutely necessary that the students could enter the data in a cooperative way since each group only the data available but not all the data. Finally, all students should necessarily have access to all data to make the analysis required by the biological objectives.

## 4 MATERIALS AND METHODS

In order to achieve the stated objectives, we developed a planning of actions for the project teamwork: the students. Each of the specific objectives and requirements demand a need that must be considered when selecting (online) tools. Table 1 lists these requirements in terms of objectives.

Each specific objective requires a basic aspect of the online tool. First steps provides the guidance for the development of the experiment, then, the level of requirement is basic, goals can be seen in pdf or presentation format, no extra requirements in this step.

Scientific objectives are assigned to each group, which requires high teacher-student interactivity. Note that this experience has been proposed as optional work and therefore the groups are not previously assigned. The students are encouraged to form workgroups on its own initiative. The first days workgroups are very dynamic, and this aspect requires the tool to facilitate that task.

Once there are working groups, the practice field where data is gathered is carried out. Each group must input their data to a database. The database is implemented simply as a spreadsheet, but collaborative editing is a fundamental requirement. In addition, it is desirable that the tool supports some kind of version control should they need to recover a previous version of the worksheet.

With all the data entered, students can carry out an analysis of data. Each working group is assigned a scientific objective for the development of their project. Then, there are basic requirements in this step: to be able to editing a text document with graphics in a collaborative way.

Finally, the working groups have to present the results in a workshop. Thus, a slideshow tool will help to prepare the presentation. The tool must be able to manage such documents.

Specific goal	Content	Requirement
Understandability of the experimental design	Experiment guide	Slideshow visualization
Workgroup creation and assignment of the scientific objectives	Worksheet with groups and description of scientific objectives	Editing, visualization

Database input (collaborative work)	Worksheet with data	Collaborative editing, version control
Data analysis	Documents (text and figures)	Editing, visualization
Results presentation (Workshop)	Slideshow	Editing, visualization

Table 1. Requirements for the online tools

These minimum requirements to be met by the tools, together with the condition of free use has led us to analyze two sets of tools: the Virtual Campus of the University of Alicante and the applications offered by Google (Google Apps). We also have compared other similar tools, however, for the sake of simplicity, the ease of use, the learning curve and broad acceptance of both tools in our educational environment, we decided to analyze these two online tools.

#### 4.1 VIRTUAL CAMPUS

Virtual Campus is a corporative virtual tool that seems to be a good complement to the classroom teaching. From this point of view, we can find two group of applications: on one hand those tools which main goal is the communication with the students, and, on the other hand, those tools prepared to manage the agenda.

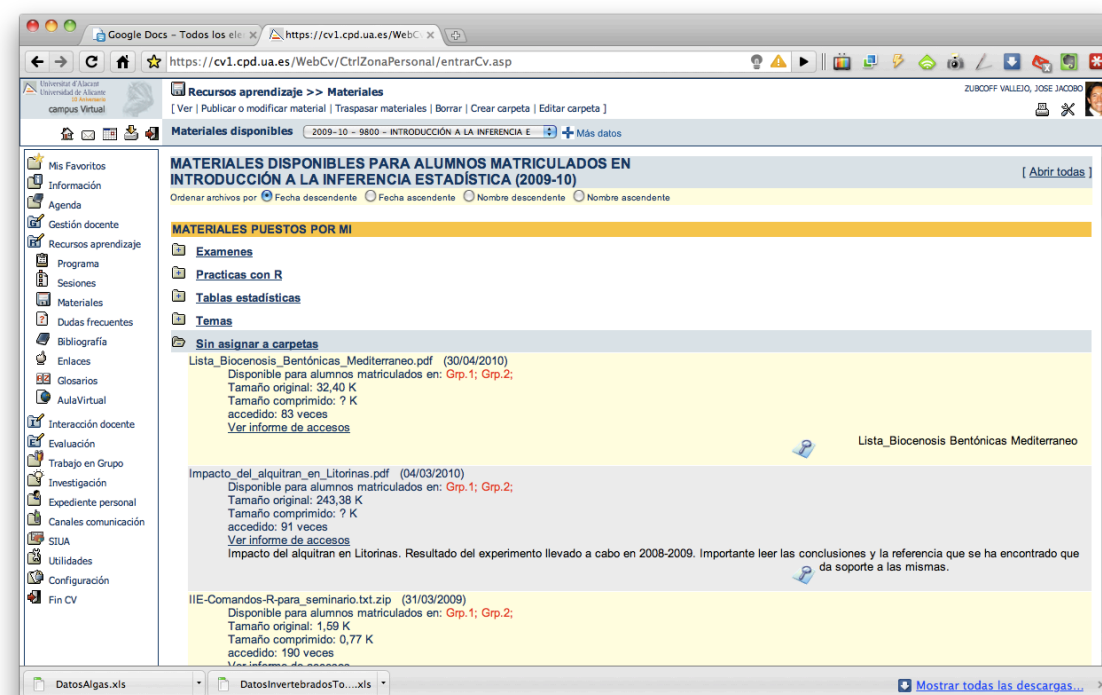


Figure 1. Screen capture showing available material for students on Virtual Campus

Within the tools oriented to the communication with the students we can:

- Create, edit and query sheets for each subject (teachers, schedules, curriculum, assessment, bibliography).
- Search for students.
- Groups of Practices: Functionality designed to create and manage groups of practices of those subjects that have practical credits.

- Sessions: You can group and manage different Virtual Campus resources (materials, links, debates, frequently asked questions, examinations and tests) to design learning pathways to students.
- Materials: Allows students to make available all kinds of files to be downloaded or just viewed.
- Additionally, there are other tools as on-line tutorial, messages to the students, on-line noticeboard, debates, polls and objective tests.

The utility designed to manage the agenda allows to:

- View upcoming appointments.
- Add citations to your personal calendar. You receive email notification.
- Invite / add appointments to your colleagues and / or students.
- Creation of categories in the agenda.

In addition to these tools, the Virtual Campus offers a virtual disk with a capacity of 250 MB and a maximum size of 10 MB per file. Currently, there are file hosting services platform in the cloud as Dropbox that can store up to 8 GB and there is no limit on the size of the files. These other platforms allows users to store and synchronize files online and between computers and share files and folders with others.

Note that the Virtual Campus has been developed as a service to complement the teaching and academic and administrative management. Therefore, it is intended both to students and teachers and administrative staff of the University of Alicante. As for the teachers and students, the functionality of the tool are designed to provide some teaching and management tasks.

Through this tool, teachers can obtain class lists, view their student records, prepare your form with your hours of tutorials, etc. Therefore, the tool offer several mechanisms to facilitate the management of their teaching. From this point of view, teachers can manage recommended readings for their courses, receive and answer tutorials, propose and moderate discussions, provide materials to students, among other useful features. Figure 1 shows a list of materials available for download from the students. In relation to this option, note that each document that is uploaded to the Virtual Campus is automatically compressed (to minimize the space occupied), therefore, reducing the possible use as an interactive tool. Furthermore, this eliminates the possibility to edit the document online or work in a collaborative way with them. User must download the document, work on their computer and then upload another version. In addition, only teachers can upload material, making it very difficult to carry out tasks of cooperative work.

As a student, Virtual Campus has a number of options through which it facilitates the management of their studies, such as: students can formalize their registration, check their records, know the email addresses of their coworker, etc.

Related to the interactivity, a student may participate in a debate on the extent to which the teacher has been opened. Their also can download a material provided that the teacher has made available or view the recommended reading, among others.

## 4.2 GOOGLE TOOLS

This interactive and collaborative tool has increased the possibility of user participation and collaboration. Typical applications of the Google tools are:

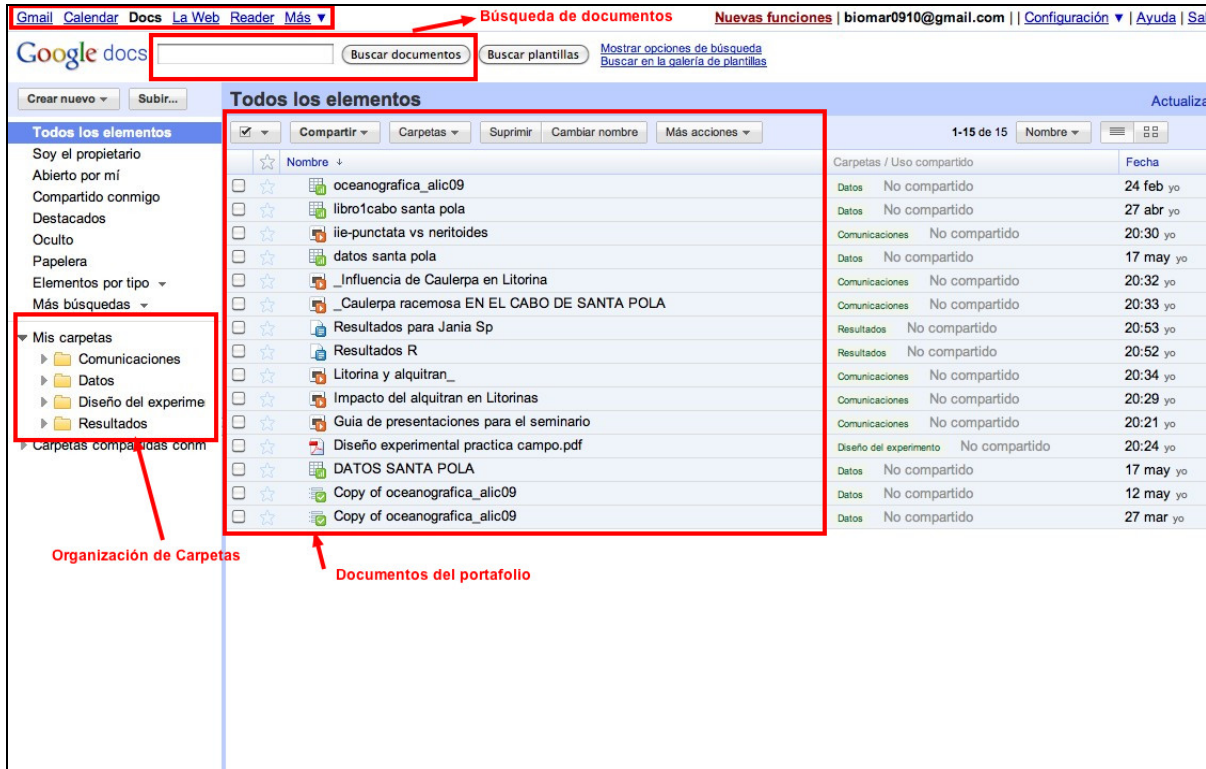


Figure 2. Google Docs interface

Google Docs: Allows the managing and editing of online documents with real-time collaboration. As shown in Figure 2, users can access documents, spreadsheets, drawings and Web-based presentations in any time to allow users to edit files simultaneously and always have the latest version. In addition, you may download them to widely supported formats (like. Doc,. Pdf,. Txt,. Xls,. Ppt,. Jpg, etc.). The ability to compare versions (Fig. 3) can become a tool of great potential given the ability to retrieve documents or parts of there from previous versions. It is also very important the possibility to work simultaneously, as it allows rapid updating and loading data into a spreadsheet or document.

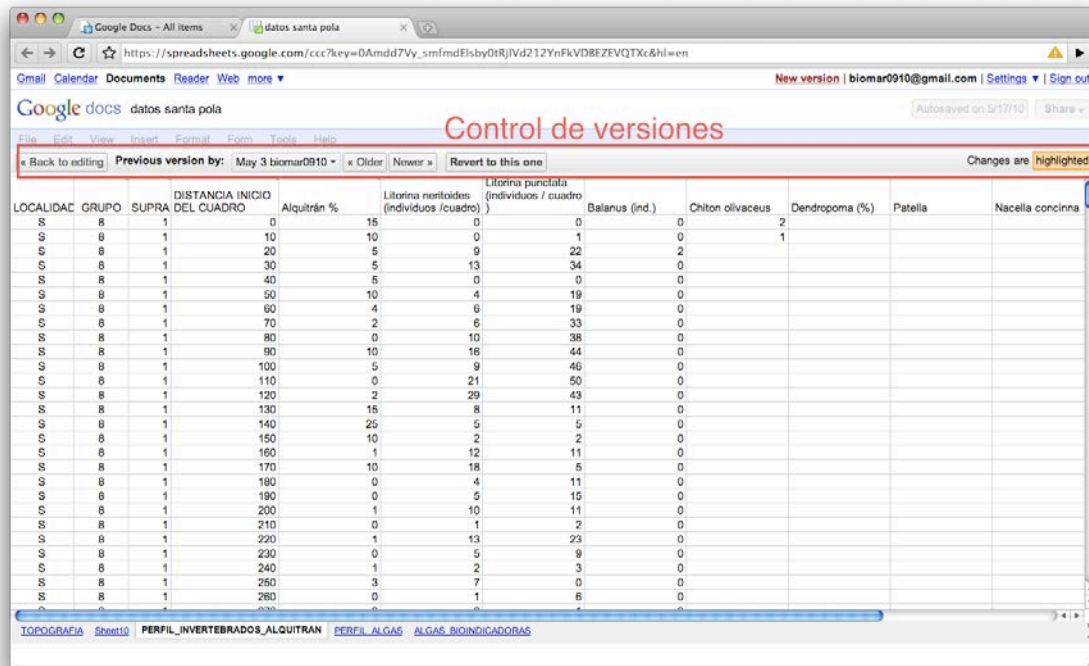


Figure 3. Version Control with Google Docs

Google Calendar: Allows agenda management, planning, shared online calendars and calendar synchronization with mobile devices. In Fig 4 shows a weekly view calendar with a calendar schedule of courses and tutorials. In addition, Google Calendar allows you to issue reminders by sending free SMSs. With this application you can overlay multiple calendars and check the availability of people with various levels of personalization and privacy, allowing it to display only hours available or occupied or the entire calendar. Send invitations and confirmations automatically. It is also integrated into the Gmail account.

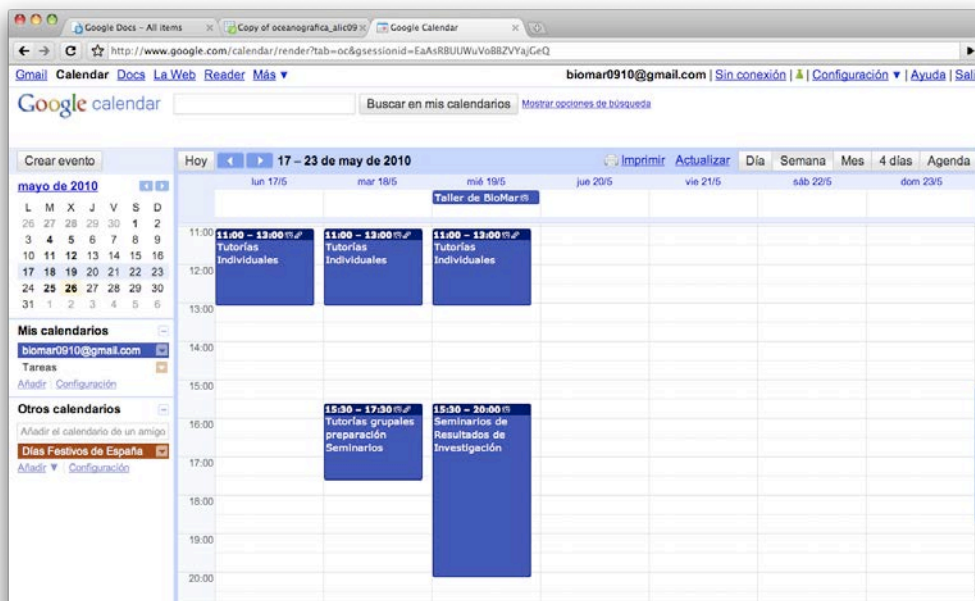


Figure 4. Google Calendar Week View

## 5 RESULTS

Google Docs reveals the goodness of the collaborative and group work as educational strategy, specially when it is used as management tool and to generate contents that could be a part of the teaching portfolio. In our case, the application of the transferable skills between subjects. Besides, it allows going deeper into the development of competences of the group, for example, in reference to the projects of the members, level of participation and quality of the contribution among other possibilities (Blau and Caspi, 2009).

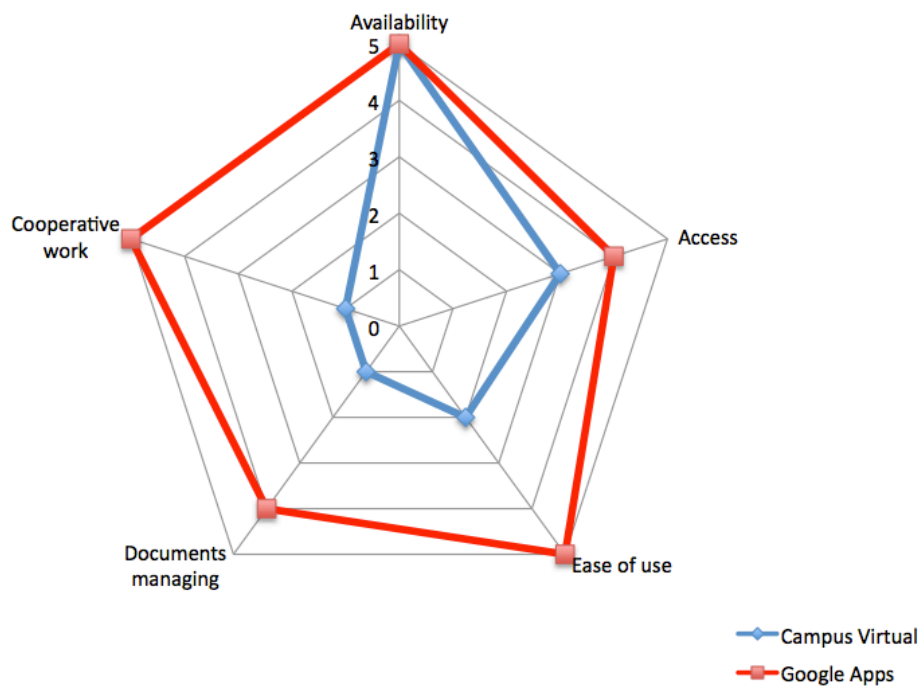


Figure 5. Summary of the main tools' characteristics

The Figure 5 shows a summary of the main observed aspects and their assessment by the users. Both are on line tools, so the mark of the Availability was the maximum. The Accessibility has also been considered and although both tools have a safety system, Google Docs obtained the higher values. In reference to the Management of documents, the Virtual Campus only allows to use the compressed files (.zip), and with a no friendly interface when searching among many documents. Google Docs allows to upload, to visualize and to edit the more common type of documents in an office environment (.doc, .xls, .ppt, .jpg, ...). In addition, due to its user's interface, it is very simple to manage, to rename and to edit documents.

The main goal of our requirements was the possibility of working in a cooperative way, and this one has been the best-valued item of Google Docs. The pupils can edit a document at the same time and in addition, the document is showing the changes that another real time user introduces. Besides, its versions control system allows that no information gets lost and the documents could be compared with previous versions.

## 6 CONCLUSIONS

The development of transferable skills needs several actions that must be adequately planned. The selection of the common objectives, the methodology and the way of carrying out them, are fundamental aspects for the success in the development of educational interdisciplinary projects. The



implementation of this kind of projects must lean on the new technologies, on applications that are widely accepted by the university communities, but especially they must be carried out using on line tools, preferably free and that facilitate the application of the teaching portfolio. In this sense, as we have seen in this study, Google Docs conforms to the basic requirements and moreover, it adds capacities as the control of versions, the simultaneous edition or to share schedule. These characteristics facilitate the implementation of the transversal learning in a virtual teaching portfolio.

In the future, it would be desirable that the tools provided by the University (for instance, Virtual Campus) include the benefits of the web 2.0, the most important aspects of edition and to facilitate the cooperative work and the control of versions. Anyway, the integration with the social networks will be necessary soon and it might be an allied to the development of work group competences and as strategy of dynamic and interactive communication with the pupils.

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