INTEGRATION OF MOODLE QUIZZES

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ABSTRACT

Moodle is one of the most extended Learning Management Systems and is based on the open source (GPL) license agreement. We summarize the advantages of the use of this environment and show our six-year experience with the tools that Moodle provide. It would be of interest that any exhaustively used tool, such as quizzes, could reuse the knowledge that teachers store year after year in the Moodle database. In this work, a web-based tool allowing us to create, integrate, reuse and manipulate questions and quizzes is presented.

KEYWORDS

Moodle, integration of quizzes, tools.

1. WHY DO YOU USE MOODLE? AN EXPLANATORY EXPERIENCE

Blended-learning is an interesting environment to improve the quality of the teaching and learning process. Nowadays, in the framework of the universities at Spain, the use of Moodle is widely extended.

Moodle (Modular Object-Oriented Dynamic Learning Environment) is in this moment, the most popular system for e-learning purposes. In 2002, Martin Dougiamas[1] presented the first version of Moodle. In Brandl, K. 2005, the author summarizes its advantages: "The design of Moodle is based on socio-constructivist pedagogy. This means its goal is to provide a set of tools that support an inquiry- and discovery-based approach to online learning. Furthermore, it purports to create an environment that allows for collaborative interaction among students as a standalone or in addition to conventional classroom instruction".

Dougiamas et al. explain (see Dougiamas, M, et.al. 2003) the key of the success in this way: "Moodle has been designed to be compatible, flexible and easy to modify. It has been written using the popular and powerful PHP language, which runs on any computer platform with a minimum of effort, allowing teachers to set up their own servers using their desktop machines. Moodle is built in a highly modular fashion and uses common technologies such as shared libraries, abstraction, and Cascading Style Sheets to define the interfaces (while still working on old browser technology)."

Moodle is a GNU multi-platform environment used without problems in Linux, Mac, Windows, etc.

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[1] "I'm best known as the guy who started Moodle, the open source course management system that is used by thousands of institutions around the world. Most of the information about that is all at Moodle.org and Moodle.com" (see http://dougiamas.com)

Figure 1. The virtual subject MetNum

In the virtual course named MetNum (see Figure 1), the subject Numerical Methods is teached in a blended-learning framework. The traditional class in the classroom is reinforced with lots of learning units. Nowadays, it is the meeting and working point for the students of our subject.

We agree with the idea of Social constructionism and we check that our students "learn best when they are engaged in a social process of constructing knowledge through the act of constructing an artefact for others" (see Martin Dougiamas and Peter C. Taylor 2003).

In these years we have designed a lot of learning units using lessons, quizzes or questionnaries, tasks, glossaries, forums, wiki, chats cites, books, material available on-line, virtual classes, etc. In Figure 2, we show some of the most interesting activities made in MetNum (see Mora-Bonilla 2006, Mora-Bonilla 2007, Córdoba 2008).

We emphasize the great activity of the 452 students that worked this year in MetNum, 689 questions asked and debated by them in the forums, 5172 quizzes answered with an average of 140 students answering each quiz, and 494 knowledge bits proposed by the students in the glossaries[2], etc. It is one of the workplaces most intensively visited by the students at the Málaga University.

The marks in the subject have been improved from year 2003. We have passed from 30 percent of success until 60 percent whereas the students presented to the exam have risen by a factor of tree.

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[2] In fact, the students enter the glossaries to clarify any doubts, instead of search in the books recommended in the classroom.
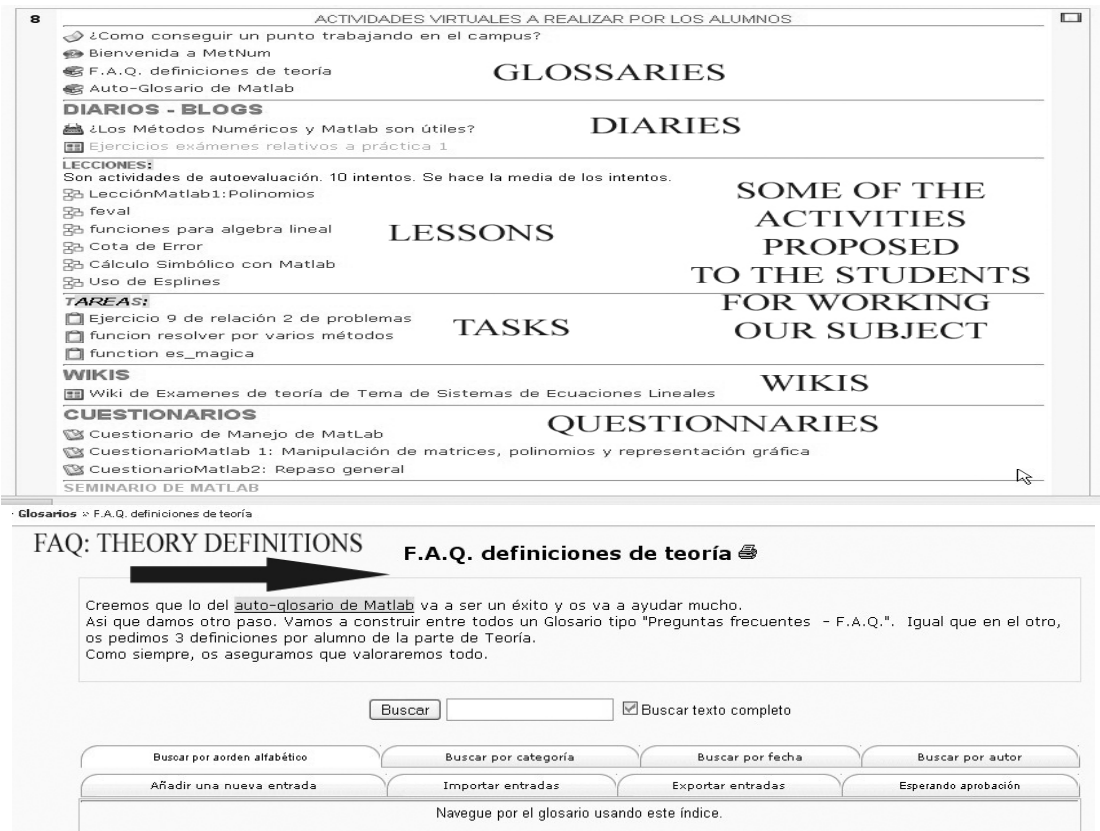
Figure 2. The virtual activities in MetNum

When a new course is coming, we have the hard work of creating new quizzes for the students. In a first stage, we were trying to reuse the old ones and to integrate several quizzes in a new unit, but however we build the new quizzes by adding new questions. It is not easy to reuse the old information stored in the learning units of Moodle. In Fig. 3, a list of quizzes from our Virtual Campus is shown.

Figure 3. Catalog of quizzes in Moodle

We have found other problems when working with this tool: If you select a question of a category and you introduce it in a new quiz, the modifications you make in the question affect to the rest of quizzes; it is not easy to merge some questions from several categories, etc.

In fact, all the problems with quizzes can be summarized as follows: Moodle has not a real database of quizzes. The information in this tool is not organized in a coherent way and therefore the problems of inconsistence, redundancy, non-efficient use, can only be solved with a new tool.

This is the goal of our work: to design a tool to manipulate a database of quizzes.

2. M-QIT: MOODLE-QUIZ INTEGRATION TOOL

A new web application, named M-QIT, has been designed in order to easily manage questions and quizzes which have been previously developed under Moodle. The management of such questions and quizzes under Moodle is quite difficult, especially when the user wants to reuse questions from previous years.

This application allows users (teachers, professors…) to manage a great number of questions and quizzes easily and quickly. Some professors use Moodle intensively throughout their courses, and they can not reuse questions or rewrite them again year after year. With the help of M-QIT, import and export of a whole year quizzes are made in a few seconds. Also, the user can easily modify any question (in order to repair any existing mistake), change question qualifications, and make any task related to the maintenance of quizzes.

Basically, M-QIT is an intermediate application in Moodle, meaning that its input is information related to quizzes, coming from Moodle, and its output is the transformed information, redirected to Moodle. In order to obtain questions and quizzes, M-QIT uses the backup copy made by Moodle in XML format. This file contains all necessary data to rebuild a database with the needed information (questions, answers, quizzes, students, qualifications, etc.). When this database is built, the user can access the most usual options and actions to manage and classify all this information. Thus, questions and quizzes can be added, edited and deleted, with a more intuitive interface and in a more ordered way. These items can also be exported and later imported into Moodle Virtual Campus.

A practical example is: Import a 2 years-old backup copy (all information is now accessible from the application); create a new quiz with the desired questions; once the quiz is completed, export it in GIFT format; import it to Moodle.
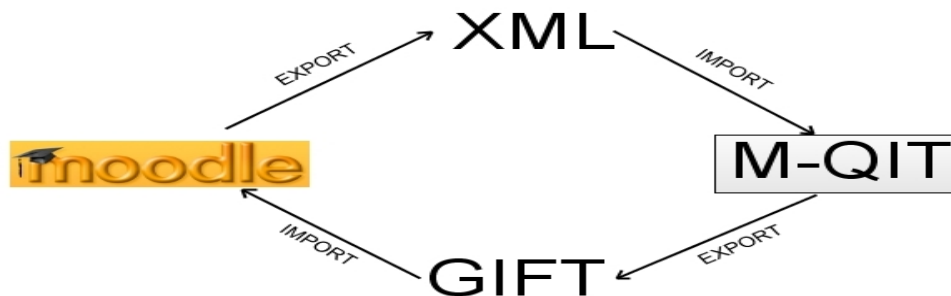

Figure 4. Integration of M-QIT and Moodle

In Fig. 4, the whole process can be observed:
1. A backup copy is generated by Moodle. A ZIP file is created containing the XML version of the database used by Moodle. This compression step is needed in order to reduce the size of the XML file, to be treated in a web server.
2. Import the compressed XML file into M-QIT. All information contained in the XML file is now accessible from M-QIT.
3. Quizzes management. M-QIT provides mechanisms to create, edit and delete questions and quizzes.
4. Export as a GIFT file. M-QIT uses the standard GIFT file format to export all selected questions and quizzes.

5. Import the result file. This GIFT file is an intermediate file that Moodle can import. All changes and additions in questions can be accessed from Moodle.

Security is a very important part of the application, since M-QIT contains databases of possible questions for exams, with their corresponding answers. To protect the access, M-QIT implements an user-password security interface: each time a new user is registered, with its corresponding password, a mail is sent to the system administrator, who certifies the register. Passwords are stored in a database, in MD5 format.

M-QIT also uses a MySQL database to store all the information in the XML backup copy. In this backup, 186 tables are used, including those related to phorums, glossaries… and other activities available in Moodle, but only 30 of those are related to quizzes and questions. These 30 tables are included in M-QIT database. In Fig. 5, these tables are shown.
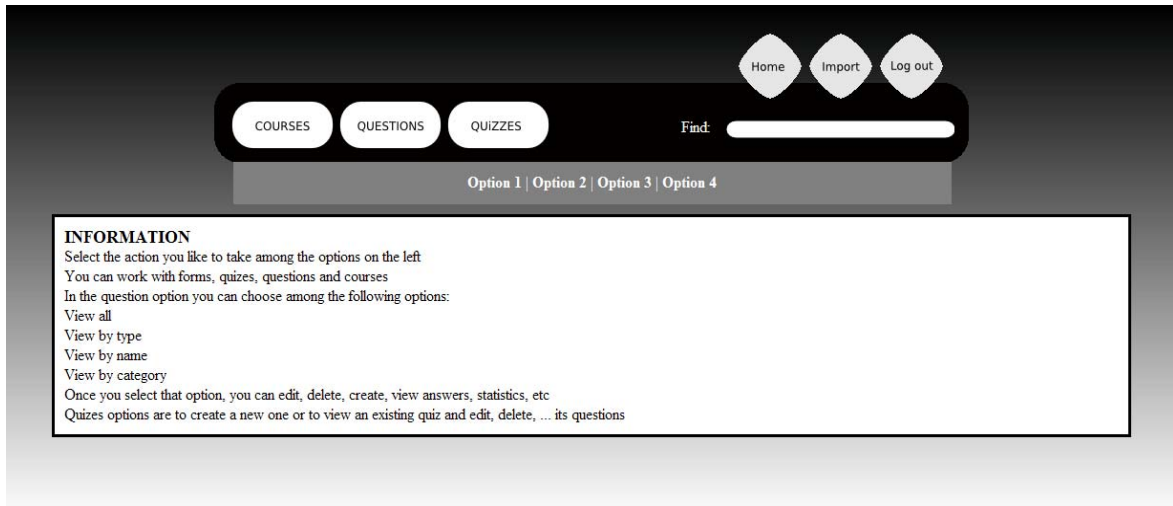
Figure 5. Main window of M-QIT

Let us briefly describe the different sections which may be found in this application:

- Home: the control is back to the main page of the application (see Fig. 5).
- Import (select XML file): used to select a compressed XML file to be imported into M-QIT. This file contains all needed information to rebuild a complete database of questions and quizzes, which can be edited in the application.
- Log Out: exits the application and transfer the control to the login page.
- Course: this section contains all the options referring to courses, such as:
  - Create Course: used to create a new course (see Fig. 6).
  - Delete Course: used to remove a course from the current database.
  - Create Category: is useful to group some courses into a new category. Typical categories associated to Mathematics are: *Algebra, Calculus, Numerical Methods*, or denoted by the academic year: *2005-06...*
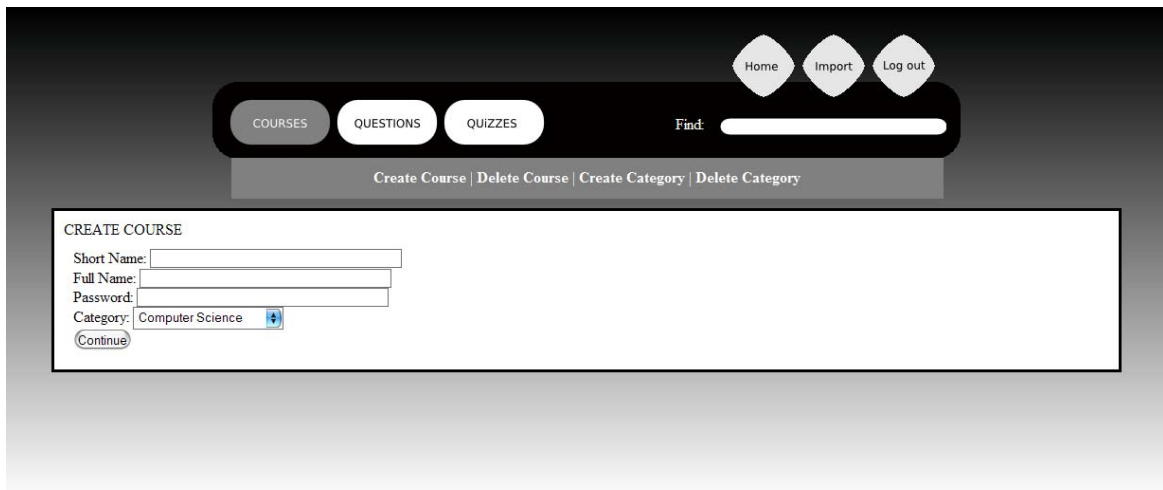 - Delete Category: removes a course category from the database.

Figure 6. M-QIT has an option to create a course

- Questions: the options found in this section are:
  - Create question.
  - Create category: used to create a category to group some class of questions. Typical categories of questions are, in Mathematics: *Polynomials, Differentiation, Interpolation, Mathematical Software…*
  - Query: is used as a advanced search among questions. This option makes a query to the stored database and returns the corresponding results.
  - View all: shows all available questions (see Fig. 7).
  - View by type: classifies all questions into the predefined Moodle types (*calculated, description, essay, match, multianswer, multichoice, numerical, short answer, true/false*), and shows them in an ordered list.
  - View by name: questions are shown ordered alphabetically by its name.
  - View by category: questions are shown grouped into the user-defined categories.

Figure 7. List of questions in the database. The type of each question is shown in the list. There are also options to remove, edit, see answers, export and view statistics

- Quizzes: several are the main options referring to quizzes:
  - Create: used to build a quiz from several independent questions.
  - Delete.

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- o Query: performs a search among all available quizzes.
  - o View: shows all quizzes, and their corresponding questions. M-QIT also computes statistics referring to each question (see Fig. 8).
- Search: allows a quick search in the set of questions and quizzes.

Figure 8. A list of the questions included in a selected quiz. Some statistics about the quiz can be computed

With M-QIT, managing questions and quizzes is made easy. Professors can manipulate questions to create new versions, taking the original ones as model. New quizzes can be created within a few clicks. Thus, generating an online exam is a quiet easy task with M-QIT.

An interesting point is the automatic computation of question statistics, showing the number of students giving a bad or good answer, as well as the number of students associated to each predefined answer, as shown in Fig. 9.

Figure 9. Statistics about a given question: Number of students associated to each grade, and to each separate answer. Also, the list of quizzes in which the question appear is shown

3. CONCLUSION

Moodle is the most extended GNU CMS in the universities of Spain to improve the teaching in a blended-learning framework.

We have explained our extensive experience with Moodle and we have summarized some problems to reuse and integrate old quizzes.

We propose M-QUIT as a tool to easily manage quizzes with an efficient and friendly web-based application to manage a database of quizzes. Now, this application connects with Moodle using the Import and Export options. This is due to security reasons of the administrators of Moodle in our university.

In a new version, we will design a tool, full-integrated with Moodle, and we will allow Moodle users to integrate, reuse, create, etc. their quizzes using M-QUIT.

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