

THE USE OF MOODLE LESSONS IN TEACHING ORGANIC CHEMISTRY

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Abstract

In the last years, the Information and Communication Technologies have made possible the appearance of interactive spaces between teacher and students. A vast number of e-learning systems are developed to achieve this interaction. Among all of the Virtual Learning Environments, (VLEs), the most outstanding is the management platform of educational content Moodle. Moodle contains a wide range of activity modules that can be used to build up any type of course. In particular, in this paper we will focus on the use of Lesson module in Moodle in teaching Organic Chemistry. We have prepared two Lessons of Moodle for the subject "Organic Chemistry I" in the second year of the Degree in Chemistry about "Functional group interconversion by nucleophilic substitution" and "Nucleophilic substitution reactions involving formation of new C-C bonds". Lesson of Moodle is an interesting, flexible and interactive way to show the students different topics of a subject, where they read some content, and after that, they have to answer some questions. Based on the answers the student gives, the system sends him/her to another page in the Lesson.

Keywords: Virtual Learning Environments, Moodle, Lesson of Moodle.

1 INTRODUCTION

In the last years, a great expansion of ICT (Information and Communication Technologies) has been seen in all aspects of our lives, including at university. The ICT have made possible the appearance through university intranets of interaction spaces between teacher and students, these are, without doubt, a very important pedagogical tool to support or complement to classroom university teaching.

A vast number of e-learning systems are developed with the aim to achieve this interaction. Among the most widely used systems are Virtual Learning Environments (VLEs) also well known as Learning Management System (LMSs), which support a number of activities for course creation, administration and delivering, as well as facilities for communication between participants and sharing information on a course.

LMSs allow students to find information and learning resources relevant to the development of the subject, they can also submit homework and classwork assignments, perform self-assessment quizzes, check their grades, participate in debates, etc. Teachers can create lessons with specialized lesson tools, or they can create them in web-ready HTML form with multimedia data. Even the teacher can use them for tutorials and create a forum per subject where students can ask teachers and classmates and also post any kind of document.

According to Marqués Graells [1], these sites help students to organize their study in an autonomous way and move properly on academic content for each subject.

In short, the use of computer and telematic techniques in university teaching has a number of advantages, which are summarized in the possibility of acquiring knowledge anytime and anywhere, depending on the availability of time and the training needs of students. In addition, the learning process is not only more flexible but also more individualized or customized, as students can study at their own pace according to their academic needs taking advantage of electronic means.

In this context, teaching materials that are uploaded to the platform become a key factor in this kind of training, to the extent they contain the material that must be assimilated by the students and the learning objectives pursued and, consequently, the evaluation will fall on them. Furthermore, in addition to training, platform may include resources for further study (basic or additional bibliography, interesting links, related news ...) or to compare and assess the degree of learning (self-evaluation exercises of different types ...).

Nevertheless, the support for the teaching materials is varied as they may be more or less dynamic, interactive or hypermedia and upgradeable.

Among all of the VLEs, the most outstanding is the management platform of educational content Moodle, designed using known pedagogical principles to help the educators create effective online learning communities [2].

Moodle is a software package for producing Internet-based courses and web sites and is provided freely as Open Source software (under the GNU General Public License)[3].

Moodle provides teachers a wide range of possibilities as it allows from a basic use of the platform (as a repository of resources for students) to a fuller use as a learning space (online training course that allows students to interact with each other, access to content, perform tasks and activities while the teacher can make a full tracking of their activity in the classroom and virtual classroom).

2 RESULTS

Moodle contains a wide range of activity modules that can be used to build up any type of course. In particular, in this paper we will focus on the use of Lesson module in Moodle in teaching Organic Chemistry. We have prepared two Lessons of Moodle for the subject "Organic Chemistry I" in the second year of the Degree in Chemistry about "Functional group interconversion by nucleophilic substitution" and "Nucleophilic substitution reactions involving formation of new C-C bonds".

Moodle enables teachers to create a lesson in a form of a set of HTML pages. Lessons are created through the Lesson module and provide teachers the possibility of directing a special itinerary of the learning. These pages can be presented in a linear fashion, like a slide show, or in a non-linear, branching manner, or a combination of the two. It can be graded, with questions, or not graded and used simply as a resource.

Lessons can be an interesting change of pace for students. They require more preparation by the teacher that other tools and planning the order in which they will enter the contents, but they provide many benefits.

A Lesson is simply a way of presenting sequentially a training content. This content is presented in a series of pages, each one ending with a question. If the students answer it successfully, they may continue. Otherwise, they can be sent back to review the lesson or directed to a remedial page. This allows students to spend as much time as they want or need on tricky questions [4].

A Lesson of Moodle consists of **content pages** and **question pages**.

The **content pages** can be equipped with several navigation buttons which enable students to choose what page they want to read next. Figure 1 shows a typical content page of a lesson in Moodle.

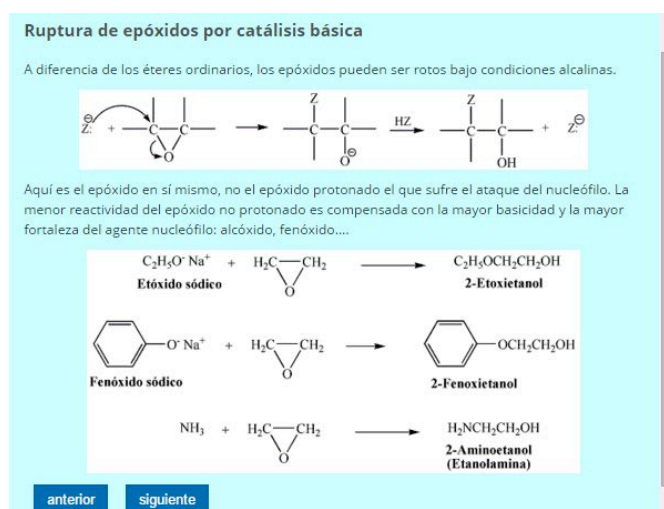


Figure 1. Content page of a lesson of Moodle

The **page content** covers the central part of a page; buttons are under the content, while the map of the lesson is placed on the left (Figure 2). The lesson map contains captions of all content pages as hyperlinks. The question pages are not visible in the map. The teacher decides how many buttons will be on each content page and for each button what is the target page ("jump to"). The "Next page"

button allows direct guidance of a student, i.e. he/she will follow the default path determined by the teacher. The other buttons along the map of the lesson allow the students create their own path through the lesson.



Figure 2. Map of the lesson

Also, **question page** allows choosing several types of questions available via the Lesson module: true/false, multiple choice, numerical, pair matching, short answer, essay, and so on. Teacher can decide which page the learner will see next in case of correct answer, and in case of incorrect answer. After submitting an answer to a question, the student gets the appropriate response and follows the path predefined by the teacher [5]. The figure 3 shows a typical question page of a lesson in Moodle.

¿Cuál es el producto principal de la reacción que se indica?

a

b

c

d

e

e

c

a

b

d

[Enviar](#)

Ha alcanzado el 37% de esta lección

37%

Figure 3. Question page of a lesson of Moodle

Depending on the student's choice of answer and how the instructor develops the Lesson, students may progress to the next page, return to a previous page or redirected down a different path entirely.

The interaction of the teacher and the student with the Lesson module is shown in Figure 4 [5].

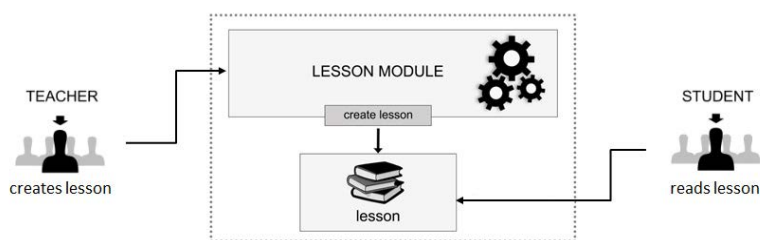


Figure 4. Teacher's and student's interaction with the Lesson module

So Lessons require more advanced planning than many of the other tools. It is necessary to take a few minutes to draw a flowchart for the lesson. What will the first page display? What are the options? Where will they be the options taken by the students? It is important to answer these questions for each page of the lesson to avoid getting lost while you are actually creating the content [6].

Figure 5 shows an example of one of the Lessons created with the Lesson module of Moodle.

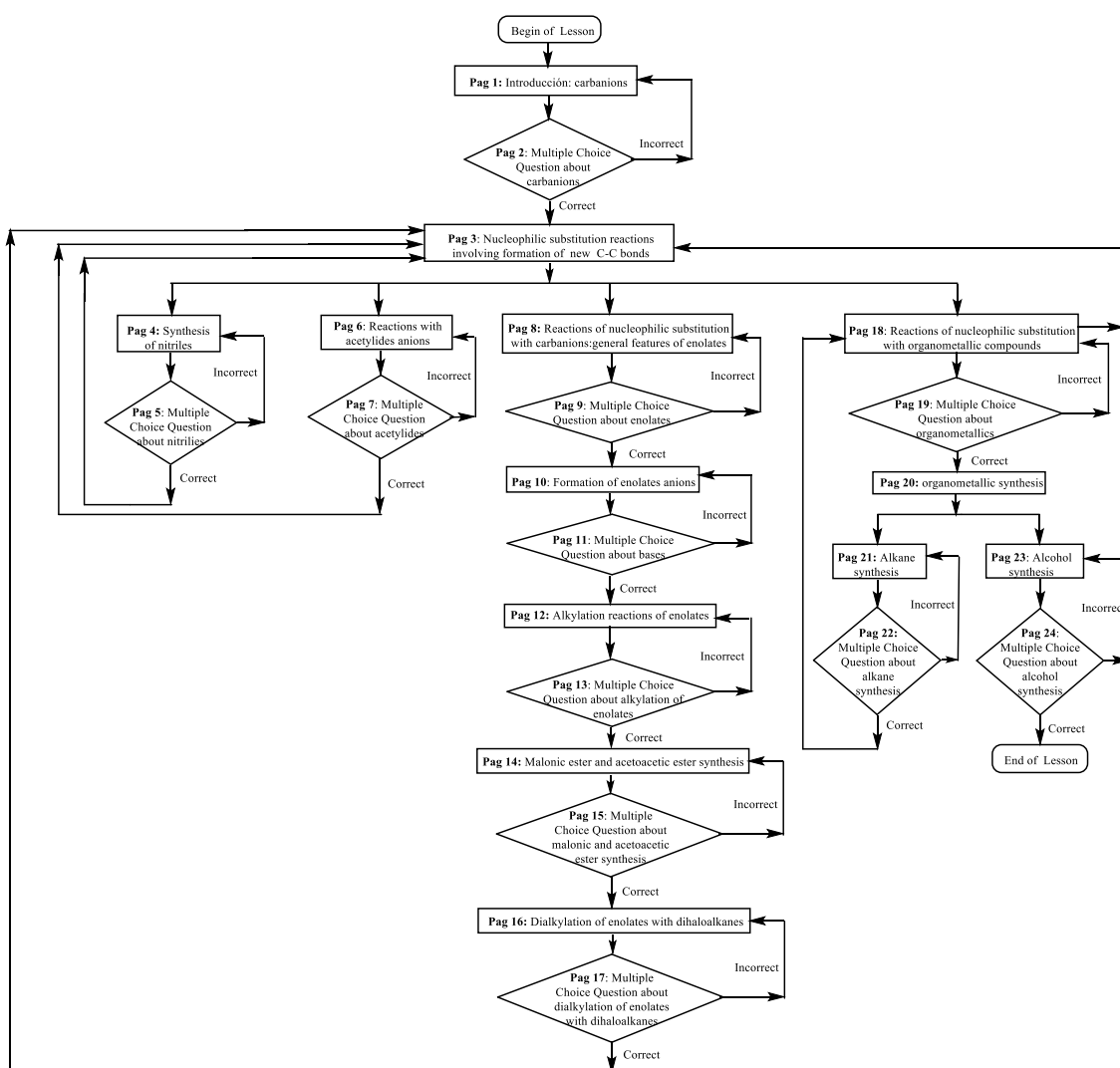


Figure 5. Moodle Lesson: "Nucleophilic substitution reactions involving formation of new C-C bonds"

When the lesson contains more than one page the teacher has the option of moving pages, that is, changing the order of the pages. Thus, once the lesson is under construction the teacher can add pages, edit pages, remove pages and move pages (Figure 6).

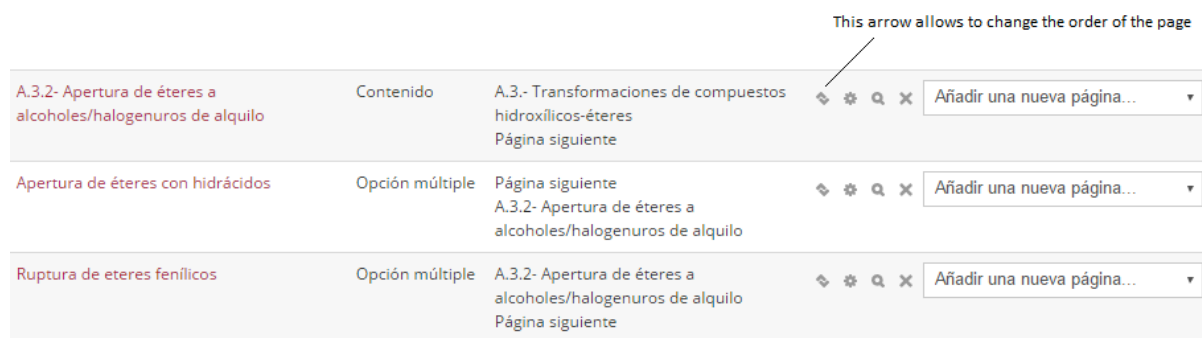


Figure 6. Option of moving pages

As with any lesson, it is a good idea to have a plan before starting the presentation. Simple lessons that basically go from the start to the end in a straight line path, one page after the other, can be created from an outline. More complicated lessons require more planning [7].

The most basic structure of lesson is the test of tree. We use the branches to diversify itineraries or to organize groups of questions about different concepts of the course.

Therefore, the content page can also be designed to offer the student the possibility to choose different options to study the lesson as Figure 7 shows.



Figure 7. Different options to study the Lesson

As it allows the students to create a self-directed path through the lesson, the Lesson module is often claimed as adaptive [8]. The main difference between a Lesson and other activity modules available in Moodle comes from its adaptive ability. With this tool, each choice the students make can show a different teacher response/comment and send the student to a different page in the lesson. Question pages are scored and added to the student's cumulative grade.

There may be circumstances when the teacher does not want to end a page with a question and a set of answers. This is allowed; the students are simply shown a continue link and are shown the next page in the lesson [9].

A lesson may be graded, with the grade recorded in the course grade book, but they are more useful as Formative Assignments where the grades, although some measure of activity, are not generally counted in the final mark for the course.

On the other hand, students like to get a perfect "score" and giving grades may well be an incentive for the student to repeat the lesson until they get the 100%.

Another advantage of the Lessons is the fact that the student does not have to go through the entire lesson in one "sitting". If a student goes through some pages and then breaks off, the next time he/she views the lesson and is asked whether he/she wants to start at the beginning of the lesson or at the point where he/she left off.

3 CONCLUSION

In conclusion, Lesson of Moodle is an interesting, flexible and interactive way to show student different topics of a subject, where they read some content, and after that they have to answer some questions. Based on the answers the student gives, the system sends the student to another page in the Lesson. These questionnaires on lessons made sure that Lessons were read before jumping the next section. Besides, Lessons are very flexible; but do require some set-up and more preparation by the teacher than other tools.

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