

## **E-learning Methods Applied in Full Time Learning System**

by

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**Abstract.** *On-line supervised learning methods are more and more broadly spread and used. In this paper we militate for the use of e-learning methods in the full time learning system, since they provide a way to encourage the students to systematically work and study in an individual way to a specific subject.*

**Keywords:** e-learning methods, Moodle, quiz

### **1. Introduction**

According to Gagné [3], the learning process has four phases: receiving, acquiring, storing and updating. The face to face learning style from the higher education system provides mainly the source of information and there are little possibilities to offer personalized feedback needed for the last phase of the learning process, the updating. An important part of the learning system [2] is the evaluation. The pedagogy teaches us that the continuous evaluation is a good mean to update the teaching style and also for the students to check if they acquired and stored correctly the knowledge provided, in other words, to update based to the feed-back obtained by the evaluation [1].

At our Faculty, the on-line learning platform Moodle [5, 4] has been installed, and used successfully at the course "Operating Systems". In an

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independent way we have studied and used this platform in an European Project for Human Resource Development were the potential of such a method of study for any subject was noticed, so we have decided to apply it for the subject Computational Logic. In the case of Computational Logic, the learning activities are courses and seminars. From time to time students must work individually and present homework at the seminar, and also there is a partial paper in the first half of the semester. But we have noticed that not all of the students are working week by week to all the courses. They are preparing in a week to a course, in another week to another course and so on, as if in that week for them only one subject exists. In this way, a lot of subjects must be understood and assimilated in a short period of time, which is done by using the short term memory and in this way the students will retain very little in long term.

But the on-line activity on Moodle can be organized weekly, so we proposed a set of quizzes, one for each week, one for each course and seminar. So we force the students to study in each week the course and the seminar, to understand better the subjects discussed, to assimilate them in time and also to notice the large volume of knowledge they have to prepare for the final exam.

## **2. What can be done in Moodle**

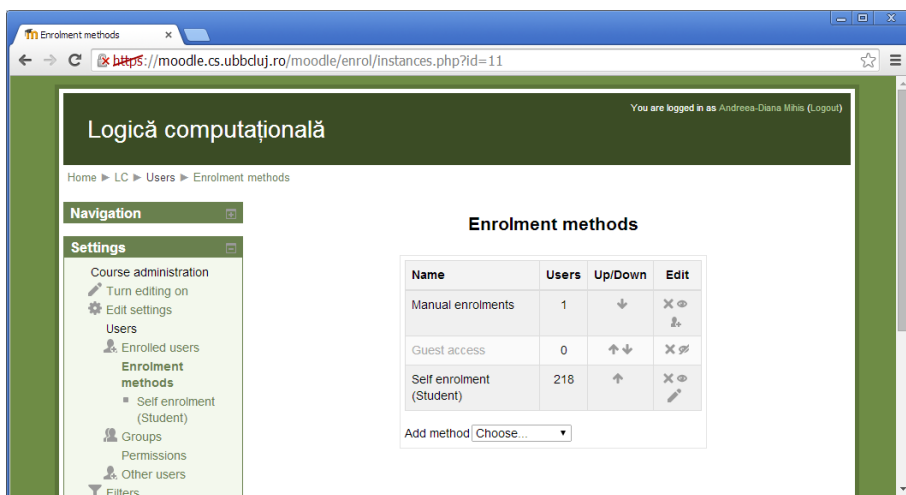
If is to be made a short presentation of the Moodle learning platform, in Moodle exist three main categories of users: administrator, teacher and student. The administrator can manage courses and other users, the teacher is the main information provider, he can manage course materials and marks, and the student is the information consumer, he can use course resources and solve the given assignments. The main advantage of using Moodle is that it offers a very good platform for knowledge sharing and communication between teachers and the enrolled students.

### 3. Personal approach to the teacher side

From a teacher point of view, teachers can administrate the course, manage the activities, resources and the grades book.

For a course the teacher can set the default properties: name, description, type and further on. He can also set the student enrolment options (see Figure 1), from self enrolment to manual enrolment. Also he can manage the special users, assigning other teachers with full rights (including editing – managing resources and activities) or only with the right to give marks.

But the most interesting part is that of course resources and activities management. The difference between the resources and the activities is that a resource doesn't have a predefined period of time in which is available, and also, it doesn't require a specific effort from the student side. Examples of resources are: files, web pages, and so forth (see Figure 2).



The screenshot shows the Moodle course management interface for 'Logică computațională'. The page title is 'Enrolment methods'. The breadcrumb trail is 'Home > LC > Users > Enrolment methods'. The user is logged in as 'Andreea-Diana Mihis'. The main content area displays a table of enrolment methods:

Name	Users	Up/Down	Edit
Manual enrolments	1	↓	✕ Ⓞ
Guest access	0	↑↓	✕ Ⓞ
Self enrolment (Student)	218	↑	✕ Ⓞ

Below the table is a dropdown menu labeled 'Add method' with the text 'Choose...'.

Figure 1

The activities require the student involvement, they can be defined to be available a short period of time or a longer one, and the student activity

can be checked by the teacher which can mark it. Some types of activities require students working in groups, such as “Wiki” or “Database”, some individual activity (see Figure 3). The most general type of activity is an “Assignment”. The teacher can require the students to do a specific task, and after the student finishes the task, he will upload his work and wait for the teacher to mark it.

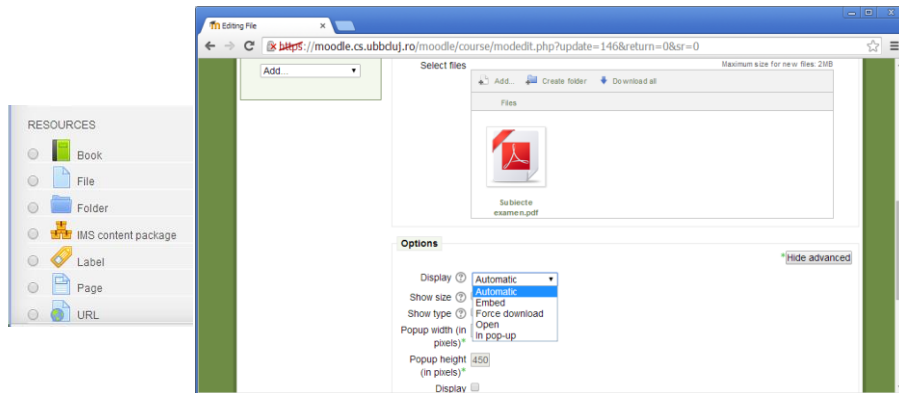


Figure 2

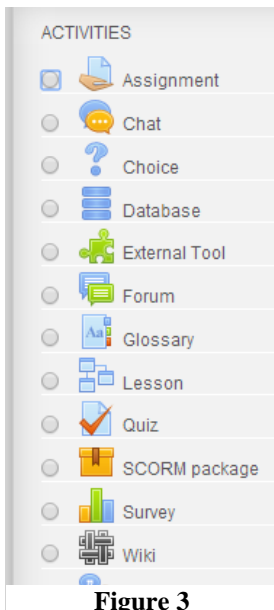
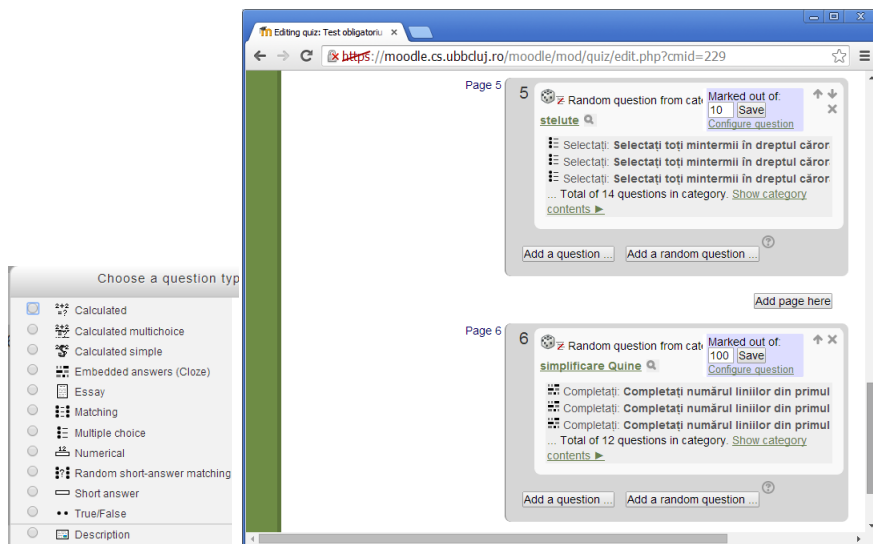


Figure 3

In the case of Computational Logic course, the “Quiz” type of activity was chosen since it allows the creation of a randomize quiz which can be marked automatically, so the teacher role is minimized to the creation of the test. This is a good choice, since to the course attends about 200 students and the assignments are given in each week. By using the automatic type of questions, the creation effort for each quiz is compensated by the possibility to reuse the quizzes from a generation of students to another, in the following years the teacher effort is diminished greatly. So, the open type of questions, “Essay”, was not chosen, but mostly

“True/False”, “Multiple choice”, “Matching”, “Short answer” and “Embedded answers (Cloze)” were chosen. The other types of questions, “Calculated” being unsuitable for the Computational Logic course. Because we wished to give the students the possibility to obtain feed-back for each time they attend a quiz and improve their results, each quiz was available one week, and the students could try to solve the quiz maximum 10 times, the best mark being kept. So, for each question from the quiz a set of - in average - 10 random questions from the same type were provided (see Figure 4). In this way, even if a question had a probability to repeat itself during those 10 tries of a student, the probability to repeat the entire test was minimized. Each test contains at least 3 questions and lasted a predefined period of time, from 15 minutes but not greater than 1 hour (see Figure 5).



**Figure 4**

Even if the predefined type of questions offers a limited range of possibilities, we have used this type of quizzes to check if the students understood the subjects, could apply the discussed methods and solve problems. For instance, in the first quizzes we used “short answer” type of questions, in which the students were expected to write the result of a

simple arithmetic operation in a given base. The type “True/False” of questions were used to check if to a particular propositional formula a specific decomposition rule applies or not. And in order to check if the theoretical notions were assimilated, “Matching” or “Multiple choice” type of questions were used, requiring or to select the components of a specific definition or theorem, or to order the steps of an algorithm.

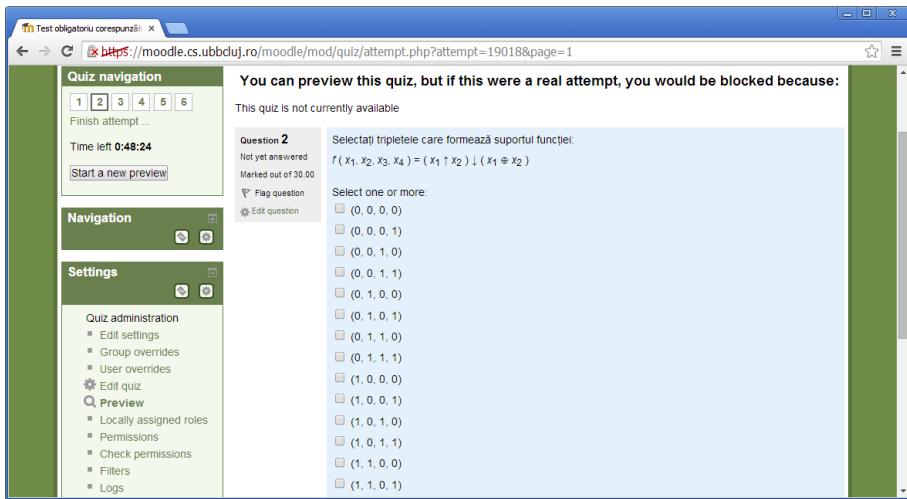


Figure 5

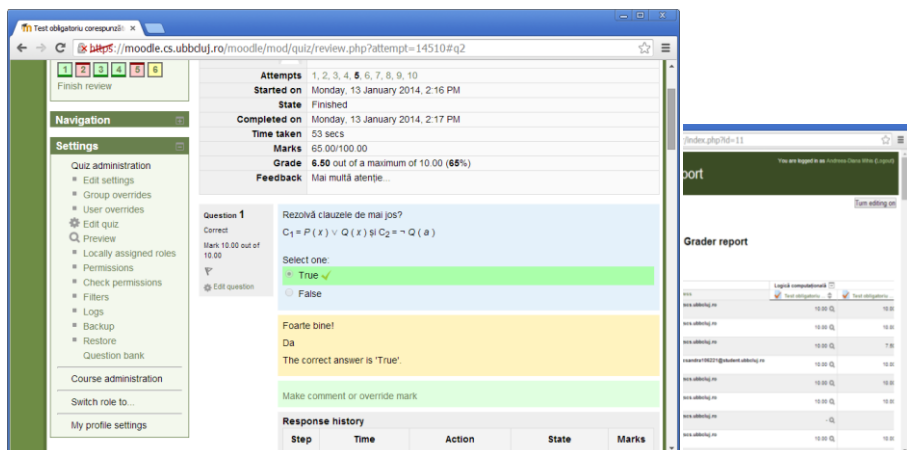


Figure 6

The teacher can check the Grade book and also see the student's attempts and their responses, and he can change the marks or offer a personalized feed-back if he wishes (see Figure 6). Also, the grade book can be exported into other formats.

#### 4. Moodle experiment

For the Computational Logics course, 10% of the final mark represented the on-line activity in order to encourage the students to prepare themselves systematically.

From the results point of view, there was a difference in average of 0.48 points between the partial mark and the on-line quizzes which precedes the test. The average partial mark increased from the previous year (when Moodle wasn't used) from 5.83 to 7.56, and the graduation rate from 83.5% to 91.04%. Also, the percentage of absence decreased from 12.5% to 7.46%.

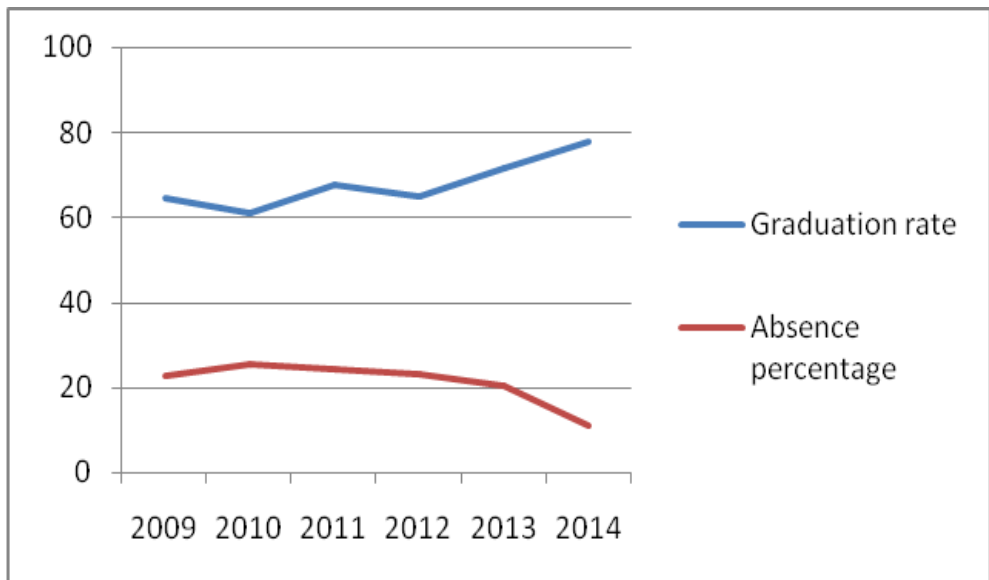


Figure 7

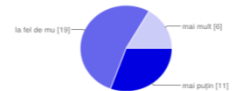
Regarding the final exam, a difference of 1.24 points in average exist between the final mark and the on-line quizzes average, and also the

graduation rate increased and the absence percentage decreased comparing to the previous years of study, but these results cannot be explained entirely through the Moodle activity.

### 5. Students feedback

Because the Computational Logic course has no laboratory activity included, there was no certitude that all the students will solve by themselves the tests. So we required in the following semester their anonymous feed-back. From those 200 students, only 36 answered, and their impression is summarized in the following table:

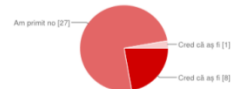
53% of the students considered that they have spent the same amount of time studying during the semester to the Computational Logic as to the other subjects



64% of the students considered that they have spent the same amount of time studying during the session to the Computational Logic as to the other subjects



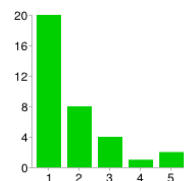
75% of the students considered that they have received the mark that they deserved



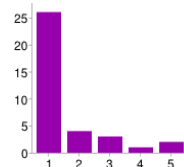
75% of the students considered that the on-line activity stimulated them to prepare in a systematic way



57% of the students recognized that they have solved by themselves all the tests

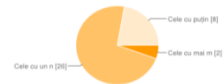


72% of the students recognized that they have solved by themselves at least once all the tests

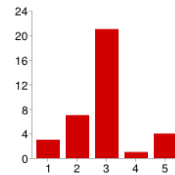




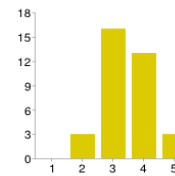
the preferred question types were: True/False (75%) and Selection (60%)



the preferred length of the quiz was the medium length both from the point of view of question number and time



the majority of the students considered that the predefined time limit for the tests was enough/exceeded a little the need time



72% of the students considered that a similar on-line activity may help to some of the other subjects



**Table 1**

## 5. Concluding remarks

Another colleague used the Moodle question based activity in a different way: having labs, the first time the students are allowed to give the tests was in the lab, and in order to enter at the exam they were required to have an average greater than 70% to the marks received at the on-line activity. In this way, the students had two choices: or to learn all the time, or if they obtained a small mark, they had to repeat the test many times in order to increase their marks. No other student being disposed to help in this case, the students were forced to learn by repetition. At that subject, the promotion percentage increased from 50% to 90%.

Thus, in the conclusion, we promote the usage of an on-line learning platform such as Moodle in the full time learning system as a mean to improve the student's results.

## References

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- [2] C. Cucoș. *Pedagogie*, Polirom, 1998.
- [3] R. M. Gagné. *The conditions of learning*, second edition, Rinehart & Winston, 1970.
- [4] Moodle official site, <https://moodle.org/>.
- [5] Moodle platform from UBB, <https://moodle.cs.ubbcluj.ro/>.