

Development Interactive Courses of Education in Microbiology Based on E-Learning System Applying in Technical College of Yambol

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Abstract

The purpose of the article is to represent the results of the development interactive courses of education in Microbiology based on virtual learning environment. The virtual learning environment has been created using Moodle software platform and has been implemented in many different disciplines in Technical College of Yambol. The advantages of this way of education is the unlimited access of the training materials in convenient of the learner time, as well as the interactive method of acquiring the knowledge's in form of test or by creation of multimedia presentations.

The performance of virtual study environment allows improving the efficiency of the learning.

Keywords: *e-learning, Moodle, course organization, lessons, quiz, new feature in Moodle*

1. Introduction

The rapid development of information and communication technologies (ICT), especially the recent explosive growth of Internet capacities, offers tremendous educational opportunities. The future growth and development of e-learning technologies is, perhaps, the most important of these trends in the realm of education. In fact, e-learning in particular is slowly being accepted as one of the criteria of a progressive, innovative, and leading higher educational institution. The Internet has created a new paradigm of learning which can allow teachers and students to teach and learn collaboratively via web-designed courses (Al-Fadhli, 2009).

The development of information technologies has contributed to growth in online training as an important education method (Fazlollahtabar and Yousefpoor, 2009). New developments in information and communication technologies (ICT) to support learning have brought about increasing interest by both academic and non-academic institutions in e-learning. These developments in ICT are principally multimedia and the Internet with its World Wide Web. Interest in ICT supported learning is also fuelled by the associated (expected) cost reduction and easy expansion of education to the increasing and flexible market that is difficult to reach by traditional delivery (Abel Usoro & Bridget Abiagam, 2009).

2. Material and Methods

Moodle is a Course Management System (CMS), also known as a Learning Management System (LMS) or a Virtual Learning Environment (VLE). It is a free web application that educators can use to create effective online learning sites. Moodle is a course management system designed to help educators who want to create quality online courses. The software is used all over the world by universities, schools, companies and independent teachers. Moodle is open source and completely free to use (<http://moodle.com/?moodlead=moodle.general>).

Moodle is the leading open-source virtual learning environment with over 50,000 installations world-wide. Moodle is a free and open source e-learning platform designed to assist educators in creating online courses and resources (<http://www.synergy-learning.com/?moodlead=synergyie.courseware>). The word MOODLE is an acronym for Modular Object-Oriented Dynamic Learning Environment. It is handy for an online course that has students all over the world. Moodle has many capabilities including forums, journals (private between student and teacher), quizzes, resources, and a section for displaying assignments. Currently there are 6429 sites from 137 countries, which have registered by using Moodle. Currently there are language packs for over 60 languages (Williams, 2005).

3. Results and Discussion

The architecture of Moodle is compatible with the hardware and software of Technical College – Yambol (Nedeva, 2005). The incorporation of LMS will be done during the building and use in Intranet network. We created Microbiology courses, according to the international requirements for e-learning – SCORM and IMS, and the recommendation of the administrator of Moodle (Figure 1).



Тема	Име	Резюме
1	Тема №1 Предмет и задачи на микробиологията. Създаване и развитие на микробиологията като наука	Микробиологията като наука
2	Тема №2 Микроорганизмите в биотехнологичната промишленост.	Микроорганизмите в хранително-вкусовата промишленост
3	Тема №3 Прокариоти. Форма и големина на бактериите. Строиж на бактеријната клетка. Рикетсии, хламидии и микоплазми. Размножаване. Разпространение и значение.	Прокариоти. Форма и големина на бактериите. Строиж на бактеријната клетка. Рикетсии, хламидии и микоплазми. Размножаване. Разпространение и значение.
4	Тема №4 Строиж на бактеријната клетка – капсула и стена	Строиж на бактеријната клетка – капсула и стена
5	Тема №5 Цитоплазма и цитоплазмена мембрана при бактериите	Цитоплазма и цитоплазмена мембрана на бактериите
6	Тема №6 Включенија и ядрен апарат при бактериите	Включенија и ядрен апарат при бактериите

Figure 1. The screen shot of the Microbiology resources – topic units

There are three different formats for the class (course) – Weekly, Topic, and Social. The weekly format organizes the class into weeks, with assignments, discussion boards,

tests, etc, all residing in a week-by-week block. The Social format is built around a forum (bulletin board), which is good for announcements and discussions. The Topic format organizes everything by topics (or units); regardless of how long they take. Our courses are in topic format. They are used for e-learning by our students, who use the resources of their home PCs by logging into <http://tk.uni-sz.bg/e> (Nedeva, 2005). The online training environment enables learners to undertake ‘any time, any place’ customized training. Moreover, information technology allows both trainers and learners to be decoupled in terms of time, place, and space (Fazlollahtabar and Yousefpoor, 2009).

The Lessons module is exactly that – lessons you develop and post online for your students to navigate. Questions at the end of each page in a lesson can be multiple choice, true/false, short answer, numerical, matching, and essay. As an example, to create a question page you would decide on the type of question, give the page a title, add page contents (for example, ask the question), provide the answer(s), include feedback to be displayed depending on the student's answer, and also supply a "jump," to where the student should go next depending on the answer given (Bransburg, 2005).

The lessons of Microbiology are separated by topics (Figure 1.). After every new topic the quiz took place. Each quiz includes materials of one or several themes. Questions are stored in categories for easy access, and these categories are "published" that make them accessible. Quizzes are automatically graded, and can be re-graded if questions are modified. Quizzes can have a limited time window outside of which they are not available. Quizzes can be attempted multiple times, and can show feedback and also the correct answers, if they are in adaptive mood. Quiz questions and quiz answers are shuffled (randomized) and that option reduces cheating. Questions allow HTML and images to be included. Full activity reports for each student are available with graphs and details about each module. A database of questions has been created and can be used and re-use in different quizzes (Figure 2.).

Тема	Име	Достъпът до теста се прекратява	опити
1	Тест №1	Saturday, 6 March 2010, 04:45 PM	Преглед на отчетите за 227 бр. опити (44 Студенти)
2	Тест №2	Saturday, 10 April 2010, 02:55 PM	Преглед на отчетите за 141 бр. опити (43 Студенти)
3	Тест №3	Saturday, 10 April 2010, 05:20 PM	Преглед на отчетите за 131 бр. опити (41 Студенти)
4	Тест №4	Sunday, 11 April 2010, 12:10 PM	Преглед на отчетите за 143 бр. опити (40 Студенти)
5	Тест №5	Sunday, 11 April 2010, 02:55 PM	Преглед на отчетите за 133 бр. опити (40 Студенти)
6	Тест №6	Wednesday, 14 April 2010, 02:10 PM	Преглед на отчетите за 135 бр. опити (39 Студенти)
7	Тест №7	Wednesday, 14 April 2010, 03:55 PM	Преглед на отчетите за 109 бр. опити (37 Студенти)
8	Тест №8	Wednesday, 5 May 2010, 06:30 PM	Преглед на отчетите за 112 бр. опити (37 Студенти)
9	Тест №9	Thursday, 6 May 2010, 03:55 PM	Преглед на отчетите за 114 бр. опити (41 Студенти)
10	Тест №10	Wednesday, 5 May 2010, 08:30 PM	Преглед на отчетите за 138 бр. опити (39 Студенти)
11	Тест №11 А	Friday, 7 May 2010, 11:35 AM	Преглед на отчетите за 111 бр. опити (36 Студенти)
12	Тест №11 Б	Friday, 7 May 2010, 01:05 PM	Преглед на отчетите за 106 бр. опити (39 Студенти)
13	Тест №12	Wednesday, 5 May 2010, 04:50 PM	Преглед на отчетите за 104 бр. опити (39 Студенти)
14	Тест №13	Friday, 7 May 2010, 02:15 PM	Преглед на отчетите за 127 бр. опити (39 Студенти)
15	Тест №14	Saturday, 8 May 2010, 10:00 AM	Преглед на отчетите за 109 бр. опити (36 Студенти)

Figure 2. The screen shot of the Microbiology resources – available quizzes, created after each topic

Quizzes can be attempted multiple times, if desired, or restricted. Multiple-choice questions supporting single or multiple answers include: Short Answer questions (words or phrases); True-False questions; Matching questions; Random questions; Numerical questions (with allowable ranges); Embedded-answer questions (cloze style) with answers within passages of text; embedded descriptive text and graphics (Figure 3.).

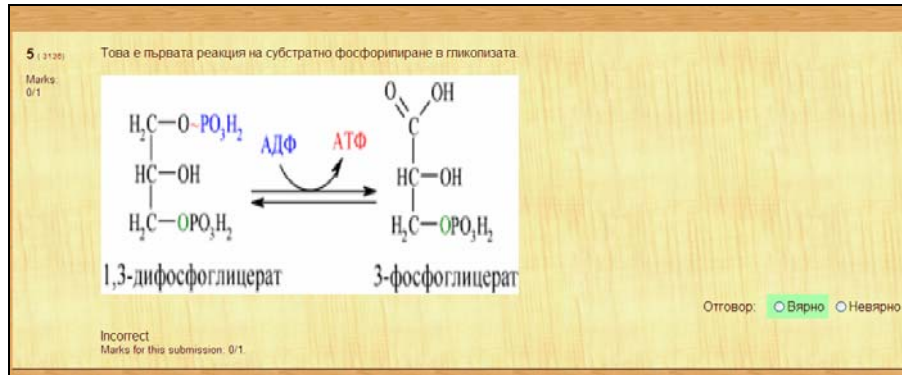


Figure 3. The screen shot of the Microbiology resources – question from the quiz, adaptive mood with the correct answer, after submission of student choice.

Moodle has revolutionized the learning process, by offering an advanced and user-friendly solution for encouraging the collaborative work of students and teachers. It comes with a toolbox full of online teaching techniques that facilitate and enhance the proven teaching principles and traditional classroom activities. The philosophy behind Moodle states that through an accent on collaborative learning, students get better motivated to engage themselves in the training process (<http://www.ntchosting.com/elearning-web-hosting.htm>).

Moodle allow reader and student to have full view of complete report activity of the student for each of the items. The reader can use many new techniques and web-resources (images, links, videos and etc.) to make the unit lessons more attractive to the students and enough visual, demonstrative, to give illustrative examples, where is considered necessary (Figure 4).

The student's attending the course of Microbiology also have the possibilities to make their own presentations that are published in the e-learning virtual environment and in that way to take feedback from the reader and their collegians.

The **new features** that we implement in this course are described bellow (Marcais, 2009).

One of the major changes is that Moodle now **uses a set of Roles** throughout its system. Roles are mostly managed and maintained by your system administrator, but as a teacher, you do need to know the basic concept of the roles. A role is basically a collection of permissions defined for the whole site that you can assign to specific users in specific contexts.

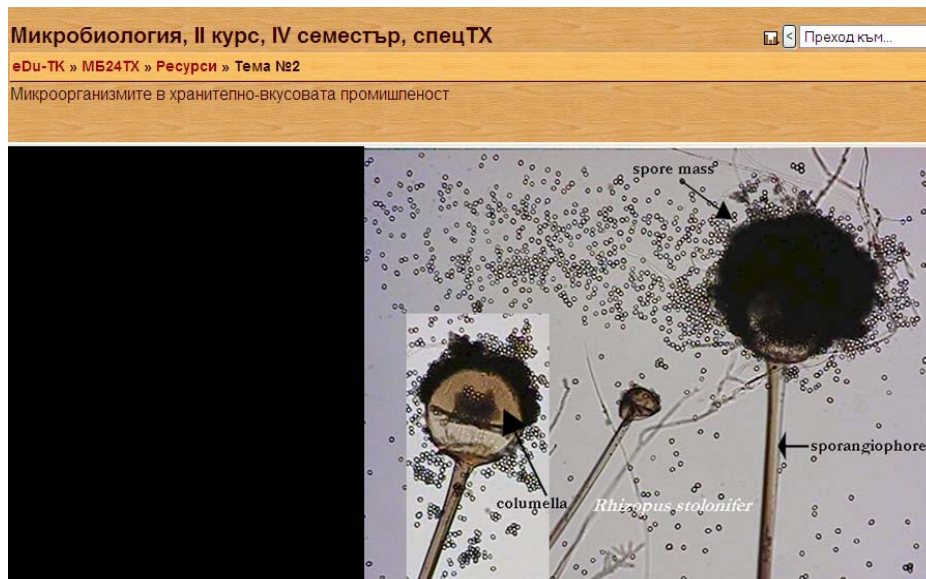


Figure 4. The screen shot of the Microbiology course – student view

For example, you may have a Role called "Teacher" that is set up to allow teachers to do certain things (and not others). Once this role exists, you can assign it to someone in a course to make them a "Teacher" for that course. You could also assign the role to a user in the course category to make them a "Teacher" for all the courses under that category, or assign the role to a user just in a single forum, giving that user those capabilities just in that forum. Roles can only be added to activities by editing the activity after it has been created.

One of the nice new enhancements to Moodle, is that you can now see exactly what your students see when they log into your course! To do this, look at the top right corner of your course. Using the choices from the drop-down menu, you can switch temporarily to another role.

The roles available are the same as the roles that you are allowed to assign to people. Your Moodle administrator can make additional roles as needs arise on your Moodle system. Any of the permissions given to users in the Moodle system can be added or removed from these custom roles. For example, in our system... we have created a role called "Student – No Time Limit on Quizzes" or "student_notimelimit" for short. This role is identical in every way to a normal student role... EXCEPT... it has been set to ignore any time limits placed on quizzes. This means that if you have any **students with learning disabilities** who need extended time on their quizzes, you can simply set their role in your class as a "student_notimelimit" rather than as a "student". Then, every time they take one of your quizzes... they won't be timed, even if you have a time limit set for the other students. The possibilities for custom roles are extensive, and certainly add a huge level of flexibility to the Moodle system.

The Backup section now allows you to choose not only the type of activity you want to backup but you can also choose between individual activities as well. All you have to do is choose the individual activity you want, decide if you want to include the user data, and then you can back up your course as usual. The great thing about this enhancement is that now you know exactly what is being archived! Likewise, when you restore a course, you will have the option of exactly which activities you wish to restore to your course.

When you use the **Import Course Data link**, you will also have the option to import items on an activity-by-activity basis. This makes it much less confusing when you're trying to transfer information between two classes.

This page allows you to remove user data from your course, while retaining any activities and other settings you may have implemented in your course. Types of user data you can remove include: Students, teachers, course events, logs, and/or groups. You can also reset the course start date. Also, you have the option to remove posts and/or subscriptions from any forums created in your course. **USE CAUTION** when using this feature, because once you click the “reset course” button, your user data from the course is gone for good!

The link in the Administration block that was previously named “logs” has changed its name to **“Reports”**. There are now additional features available in this section. The reports page is divided into four boxes, or sections.

The top section entitled **“Choose which logs you want to see:”** is almost identical to the previous version. However, you can now also narrow your results from the “all actions” dropdown menu by type of action (view, add, update, delete all changes). You can also choose how your results will be displayed (Display on page, download in text format, download in ODS format, or download in Excel format).

The second section has a link for **“Activity Report”**. When you click on this link, you'll see a summation of all the activity in your course. The third section lets you run a **participation report**. Here, you can choose an Activity Module, a period of time to “Look back”, which users to show, and which actions to show.

The final section has a link for **“Statistics”** (if this is replaced by the phrase “Statistics is not currently enabled” this means that your administrator hasn't activated this feature). When you click on the “Statistics” link, you will see graphs and tables which show how many hits there have been on various parts of your site during various time frames.

In Moodle 1.8, **the concept of Groupings is introduced**: a way of organizing various groups in a hierarchical structure. While this approach may prove to be more powerful, using groups is no longer as intuitive. For example, a teacher teaches four sections of the same class. The teacher could have 4 groupings (i.e. one for each section). Within those sections the teacher could assign various students to various groups within the groupings. Another great advancement is that students may now belong to multiple groups.

To add students to a group, the teacher must follow these steps: Create a grouping; Create a group in the grouping; Assign users to the group.

After you've created your groups, you'll be able to edit them by using the various buttons.

One of the huge enhancements to Moodle is that it now **supports blogs**. Blogs allow students, teachers and administrators to have a public web log. This online journal has various settings to control who can read them. Every user can create their own blog by

going to their profile page (by clicking on their name, anytime it appears on a Moodle page as a hyperlink). Once you are at your profile, notice that there is a tab called “Blogs” at the top.

If you made your blog entry only visible to yourself... no one else will be able to see it. If you made it visible just to anyone on the site... people will only be able to view your blog if they're already in the Moodle system. However, most people want to find a way to share their blog with people outside of their Moodle system. To do this, your entries must be set to be available to “Anyone in the world”. Once that is done, you can generate RSS feeds for your blogs. There are basically three types of blogs you can view in Moodle... a user blog, a course blog and a site blog.

The **Database activity** allows the teacher and/or students to build, display and search a bank of record entries about any conceivable topic. The format and structure of these entries can be almost unlimited, including images, files, URLs, numbers and text amongst other things. You may be familiar with similar technology from building Microsoft Access or Filemaker databases. One useful way to use activity in a classroom would be to use it as a student portfolio area, where students could share their work.

4. Conclusion

Moodle is a Course management system (CMS) - a software package designed to help educators easily create quality online courses. Such e-learning systems are sometimes also called Learning Management Systems (LMS) or Virtual Learning Environments (VLE). It has been designed with pedagogy in mind and fully supports different learning styles (face-to-face, blended and e-learning). It has a comprehensive feature set covering all types of content ranging from basic documents, RSS feeds and videos via different types of assessments (formative and summative) to forums, questionnaires and blogs. Moodle fully supports student management, course and curriculum management (<http://www.synergy-learning.com/moodle/>).

Creation the virtual learning environment in the College has positive influence on the prosperity of the students, due to the more interesting and useful materials that are offered. E-learning encourages the collaborative work of students and teachers and overcomes the shortcomings of the traditional forms of learning. The online teaching techniques facilitate and enhance the proven teaching principles and traditional classroom activities. Students are more satisfy from the evaluation of their knowledge's, because the factor of subjectivism is missing. It has been registered that students get better motivated to engage themselves in the training process.

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