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Features of Implementation of a Learning Management System in the Educational Process in a Ukrainian University

Abstract

The issue of regulation of a learning management system (LMS) at the state level of Ukraine is considered in the article. Types and interpretations of electronic educational resources that can be used in distance education are pointed out. The Moodle environment, as an example of one of successful learning management systems, is considered. In particular, the article contains a list of roles that can be shared by users of a learning management system. The general structure of an e-learning course, which can be used by educational institutions, is also proposed.

K e y w o r d s: distance education, electronic training course, electronic educational resource, learning management system, Moodle

Introduction

At present, computer technology and the Internet are developing rapidly, and new ways of learning are developing along with them. Due to the development of the Internet and modern methods of communication and data exchange, e-learning is gaining increasing popularity. It becomes possible to create and apply more qualitatively electronic notes, encyclopaedias, tests, glossaries, questionnaires, virtual laboratories, etc. Elements of e-learning are widely used in distance

learning. Currently, there exists a large number of learning management systems (LMS), including aTutor, Efront, ILIAS, Moodle, and Sakai. Such LMS can be used both for full-time distance learning and for partial tuition of full-time or part-time students.

Regulation of a Learning Management System at the State Level of Ukraine

Electronic Educational Resource as an Element of E-learning

At the state level of Ukraine, there is a slightly different term that includes elements of distance learning, namely, an electronic educational resource (EER). According to the order of the Ministry of Education and Science, Youth, and Sports of Ukraine No. 1060 dated 1 October 2012, with changes in accordance with the order of the Ministry of Education and Science No. 1061 dated 1 September 2016, "Regulations on electronic educational resources," electronic educational resources are educational, scientific, informational, reference materials and tools developed electronically and presented on any type of media or placed on computer networks, which are reproduced using electronic digital techniques and are necessary for the effective organisation of teaching and educational process in the part concerned with qualitative educational and methodological content ("On Approval of the Regulation on Electronic Educational Resources…," 2012).

Thus, an EER is an integral part of the teaching and educational process, has a teaching and methodological purpose, is used to provide educational activities for pupils and students, and is considered to be one of the main elements of the informational and educational environment. The purpose of an EER is to modernise education and content of the educational space, and to provide equal access for participants of educational process – regardless of their place of residence and forms of training – to qualitative educational and methodological materials, created on the basis of information and communication technologies.

Types of Electronic Educational Resources

The main types of EER are ("On Approval of the Regulation on Electronic Educational Resources…," 2012):

- electronic document – a document in which the information is represented in the form of electronic data;
- electronic publication – an electronic document that has been edited and published;

- electronic didactic demonstration materials – electronic materials (presentations, schemes, video and audio recordings, etc.) intended to accompany the educational process;
- information system – an organisationally ordered set of documents and information technologies, particularly with the use of technical means that implement information processes and are intended for storage, processing, search, distribution, transmission, and provision of information;
- computer test – standardised tasks, represented in an electronic form, intended for entrance, intermediate, and final control of educational achievements, as well as self-control; processing of results is carried out with the help of appropriate programmes;
- electronic dictionary – an electronic reference edition in the form of an ordered list of linguistic units (words, phrases, terms, names, signs) supplemented by relevant reference data;
- electronic directory (guide) – an electronic reference publication of an applied type;
- electronic tutorial – an educational electronic edition, whose usage complements or partly replaces the textbook;
- electronic textbook – an electronic educational publication with systematised presentation of teaching material that corresponds to the educational programme, contains digital objects of different formats, and provides interactive cooperation (або interaction);
- electronic instructional materials – an electronic educational edition of explanations on a certain topic, section, or issue of a discipline with a presentation of the methodology of execution of individual tasks, a particular type of work;
- distance learning course (e-learning course) – an information system that is sufficient for training in individual academic disciplines by indirect interaction of distance learning participants; and
- electronic laboratory workshop – an information system that is an interactive demonstration model of natural and artificial objects, processes and their properties with the use of computer visualisation tools.

LMS Moodle

The Main Features of LMS Moodle

Moodle (Modular Object-oriented Dynamic Learning Environment) can be attributed to the course management system (CMS), the learning management system (LMS), or the virtual learning environment (VLE). Moodle focuses primarily on the organisation of interaction between a teacher and students, and can

be used both for the organisation of traditional distance courses and for the support of full-time or part-time studies. The Moodle software platform is a free and open source software, that is, distributed free of charge and as an open source. The Moodle system is widely used in many universities of the world and has a large number of localisations, including Ukrainian ones ("Moodle…").

Moodle is a toolkit for developing both individual online courses and educational Web resources. The use of LMS Moodle provides a number of opportunities: to place interactive teaching materials in the network; to organise students' independent work; to differentiate access to educational materials; to provide control over the process of studying the material and execution of tasks; to automatise the evaluation procedure; to organise the distance interaction of the participants of the educational process; to manage the student portfolio; and to preserve the history of learning (Franchuk, 2011, p. 4; Kostiuchenko, 2016, pp. 5–6; Smyrnova-Trybulska, 2007, pp. 46–47, 163–165).

The teacher at his or her own discretion can use both thematic and calendar structuring of the course. A thematically structured course is divided into sections by subject. In calendar structuring, the study of the course is given as a separate section each week; such structuring is convenient for distance learning organisation and allows students to correctly plan their educational work.

LMS settings allow the user to change the appearance and structure of the distance learning course at any time, which makes it easy to update the content of disciplines. Editing the content of the course is conducted by the course author in an arbitrary order and can be easily implemented directly in the learning process. It is very easy to add various elements to the electronic course: lecture, task, forum, glossary, wiki, chat, etc. For each e-course there exists a convenient page for viewing the latest changes in the course. Thus, LMS Moodle provides the teacher with a significant toolkit for presenting educational and methodological materials of the course, conducting theoretical and practical classes, and organising educational activities, both individual and group ones.

Since the main form of knowledge control in distance learning is testing, LMS Moodle is a great tool for creating tests and conducting training and control testing. A large number of types of questions are supported in test tasks (multiple choice, matching, true/false, short answers, essay, etc.). Moodle provides many features that make testing easier. The system contains advanced tools for a statistical analysis of test results and, most importantly, the complexity of individual test questions for students.

Most elements of the e-course in LMS Moodle can be evaluated. The teacher can create and use different assessment systems in the course. All ratings are collected in a general log, which contains convenient mechanisms for summarising and creating reports. Moodle provides an opportunity to control the attendance, the activity of students, and the time of their academic work in the network; it provides the efficiency and comfort of the process of independent work.

To provide the compatibility of the training modules of different LMS, there exist special standards for the development of these modules that are supported by LMS Moodle. SCORM (Sharable Content Object Reference Model) provides component compatibility and the possibility of their multiple use regardless by whom, where, and with the help of what means they were created. AICC HACP (HTTP-based AICC / CMI Protocol) is a formalised way of exchanging data between learning material and LMS through direct HTTP links, and it also contains rules for creating metadata and packaging of created learning materials. LTI (Learning Tools Interoperability) is a standardised way to integrate educational applications from the most extensive educational content providers (Pearson, McGraw Hill, and others) with LMS.

The use of learning management systems, including Moodle, always entails certain complexities. This is due to the fact that for such systems quite often there is no uniform appearance and unambiguous translation into Ukrainian or another language. Each specific system is installed, adjusted, and refined in different ways. However, there are advantages as well, because one LMS site is not similar to another (an LMS site can be adapted to the form of the educational institution site).

The Course as the Main Element of an LMS

The course is usually represented as a tree and contains many other structural elements. In a general view, the course consists of sections. The course sections include electronic teaching materials of different designation (see Figure 1). Sections and e-learning materials are sometimes referred to simply as elements of the course.

Course
- ***General section***
  - *Electronic educational materials of the general section*
- ***Section 1***
  - *Electronic teaching materials of section 1*
- ***Section 2***
  - *Electronic teaching materials of section 2*
- ***Section 3***
  - *Electronic teaching materials of section 3*
- ***and so on.***

Figure 1. A general view of the course.

Source: Own work.

Roles and User Rights in LMS Moodle

Each visitor of the site operating on the Moodle platform has certain rights to certain actions within the system. For example, the person who installed the system has the most rights: the right to remove the system, to change the name of the site,

etc. On the contrary, a user who is not registered on the system, as a rule, has the least rights: to go to the main page and view the materials placed in free access.

A set of user rights is determined by their role. Moreover, the same user can have several roles in different parts of the system (categories, courses, activity, or resource). In LMS Moodle, there is a role hierarchy (ordered by the granting of rights): administrator, manager (training organiser), course author, teacher, assistant, student, guest (Kostiuchenko, 2016, pp. 13–16; "Moodle…"; Tryus, Herasymenko, & Franchuk, 2012, pp. 16–20).

The system administrator has the widest range of rights. In essence, he or she has access to any system action: from user registration to course editing. However, the administrator's duties, as a rule, include system setup: definition of registration rules, definition of the form, methods of evaluation, connection of additional modules, information security, and so on. The system administrator is assigned only globally.

In the first version of LMS Moodle the duties of the training organiser were performed by the administrator. However, with this approach, firstly, the administrator of the training organisation was very loaded, although in essence he or she had to deal with the technical configuration of the system. Secondly, the user who actually had to engage in learning organisation was provided with critical capabilities as to the technical component. Therefore, to unload the administrator and increase the security of the system, a new role has been introduced – the manager.

The responsibility of the manager is to manage the process of distance learning within the whole system or its individual parts (categories, courses). Accordingly, he or she has the right to edit almost any elements of the system, but not its basic settings. It should be noted that the role of the manager can be provided to the user at the level of the whole site or at the level of a certain category, so the list of rights of such managers will be different. The manager at the site level has the right to administer the entire site and all its categories and courses. The manager at the category level is given the rights to manage this category, its subcategories, and courses of this category.

The following three roles in the list of the hierarchy – course author, teacher, assistant – are combined with one goal, which is the development of courses and the management of the learning process during the course.

The course creator is a user with the right to create a new course in the system without the special permission of the administrator. The author of courses is the developer of courses, who can also teach in them, that is, he or she has the teacher's rights.

A teacher editing is the teacher. The responsibilities of the teacher include editing the course and organising the educational process within it. However, the role of the teacher also gives the right to develop courses, providing that the basis for the course is already established in advance by the user who has a higher role in the hierarchy.

A teacher non-editing is a teacher without the right to edit the course (the assistant). The duties of the assistant include the organisation of training in the course or courses: enrolment of students to the course, the distribution of students in groups, analysis and evaluation of students, and communication in forums and chats.

Organisation of the process of distance learning can be successfully managed without assigning someone as the teacher (teacher editing) or the assistant (teacher non-editing). However, in the presence of relevant tasks and human resources in an institution, one can do the way suggested by the developers of Moodle and define the responsibilities more clearly.

The student is the one whom all who stand higher in the role hierarchy work for. The student is a system consumer. However, what can be understood under the word "consumption" in this case is not only contemplation, learning the material, and performing test tasks. The rights of the student are outlined in his or her activities as part of the training course: reviewing elements of the course, participating in surveys, discussions in forums and chats, performing interactive tasks, tests, etc.

The roles of the course author, the teacher, the assistant, and the student can be assigned as part of the system as a whole (global roles), within the category of courses (for example, organisers of training and course authors by profile of a category), one course (as a rule, this way teachers, assistants, and students are appointed) or even within the element of the course (students).

The guest (anonymous user) has a special role. The fact is that the Moodle system is aimed at the initial closure for external (unregistered) users. As long as the user is not authorised, only a small portion of the material is available for him or her as for all users of the Internet. To open additional access to unregistered users in Moodle, there is the anonymous authorisation method (go as the guest), due to which some courses are available to the user without entering a login and password (guest access must be open in the settings of such courses). However, the guest can only view the materials of the course and get acquainted with them. He or she cannot participate in interactive training, since the implementation of course elements is always linked to a specific user registered in the system.

User actions in accordance with the basic role of LMS Moodle in relation to the course can be defined as follows: the administrator – setup, the manager – organisation, the author of the course – development, the teacher – editing and teaching, the assistant – teaching, the student – studying materials and tasks, and familiarisation.

The roles listed above are presented in the basic version of Moodle 3, but the system makes it possible to create new roles and determine their rights and opportunities. So in particular in the LMS Moodle of the Chernihiv Taras Shevchenko National Teachers' Training University, the role of administration of the faculty (AdminFaculty) was introduced. The user with the role of AdminFaculty has the opportunity to view information about the students' estimates of the corresponding faculty.

The Structure of the E-learning Course

It is clear that in the framework of one LMS of the university, electronic training courses should have the same structure. For this by decision of the Academic Council of the University requirements regarding the structural elements of the electronic training course were adopted.

Elements of the e-learning course should include the following educational and methodological materials: information about the course and the teacher, general information about the discipline, teaching materials for each module (content module), and materials for the final evaluation.

Information about the course and the teacher is a small-volume information material on the discipline, which is placed in the preface to the e-learning course (description of the e-learning course). It should cover the following issues: a brief summary of the discipline, its purpose and tasks; a list of directions of training which the e-learning course is designed for; basic information about the teacher who is conducting this course.

General information about the discipline includes:

- the discipline programme – the purpose and tasks of studying the discipline, requirements for knowledge, skills and abilities (entrance and outgoing) of the student, a list of topics with short annotations; additionally (using an e-learning course for distance learning), there can be an hourly distribution of the study of each content module and the individual issues of these modules; it is represented by a resource like a web page;
- the thematic plan – themes and contents of lectures, seminars, practical or laboratory classes, independent work of the student, subjects of individual tasks; additionally (using an e-learning course for distance learning), there can be hourly planning of lectures, seminars, practical classes, and laboratory classes; it is represented by a resource like a web page;
- criteria for evaluation – data on the assessment system of students' academic achievements for the execution of various types of training activities (both current and final), the distribution of points for the execution of tasks, the scale of evaluation for each content module, the table of relations of national estimates to the ECTS estimates; they are represented by a resource like a web page;
- printed and Internet sources – basic and auxiliary printed sources on the discipline, Internet sources and Internet resources with active hyperlinks; they are represented by a resource like a web page or a database;
- the glossary – the main terms of the training course and their meanings; the author of the course decides on the need to link words in the glossary; it is represented by a resource like a glossary; and

- announcements – teacher announcements available for students, used to announce events or changes in the course, etc.; they are represented by a resource like a forum.

Educational and methodological materials for each module (content module) include:

- theoretical educational material – structured electronic teaching materials (content of teaching materials should reflect the logic of training by the course, provide the student with theoretical data of the module in full form, and be presented as a resource of lesson type), multimedia presentations of lectures, audio, video, animation training resources, reference and regulatory documents (forms, templates, standards, regulations, laws, etc.);
- additional materials (optional) –additional materials available for expanding students' horizons on the topic;
- practical (seminar, laboratory) work – separate resources for each practical (seminar, laboratory) work that contains the main structural elements: purpose and tasks (description of the skills and abilities necessary for the mastering of the topic), methodical instructions on their implementation, a list of individual tasks, forms of presentation of the results of the work, criteria of evaluation, a deadline; if necessary, there are additional structural elements: theoretical information or methodological resources of work, communicative instructions, references to them, sequence of work execution, graphic images, examples of tasks execution; laboratory works, for which special equipment and real objects are required, are performed in classroom conditions, as indicated in the formulation of the task; educational and methodological materials on practical (seminar, laboratory) works should be made in the form of web page (pages), links to various file formats, tasks, seminars; students can send the result of laboratory (practical) work to the teacher in electronic form to the training portal, submit it in paper form or in oral form; after reviewing and evaluating the tasks, the teacher should set points in the ejournal (gradebook);
- tasks for independent work of students – individual resources with tasks for independent execution, which contain the main structural elements: the subject, the purpose, additional theoretical material, examples of additional tasks, a list of individual tasks, instructions for their implementation, questions for discussion in synchronous or asynchronous modes, forms for submitting results, criteria and forms of evaluation, implementation time; if necessary, there are additional educational and methodological resources for self-study or reference to external information resources; the results of the task can be sent to the teacher in electronic form to the training portal, submitted in paper form or orally; after reviewing and evaluating the tasks, the teacher should set points in the e-journal;
- modular control – control questions, tasks with evaluation criteria and forms of presentation of the results of execution, tests (tasks) for self-control, and

a control test (task); such control is necessary to assess the knowledge, skills, and abilities acquired during the study of each module of the course; individual tasks, tests, and questionnaires using control questions can be used; and

- final control – control questions, tasks with evaluation criteria and forms of presentation of the results of execution, tests (tasks) for self-control, final test (task), examples of exam papers, description of the final evaluation; for the final attestation, a test (containing 30 test questions) can be used.

Educational and methodological materials of the electronic training course on disciplines should be structured according to the scheme (see Figure 2).

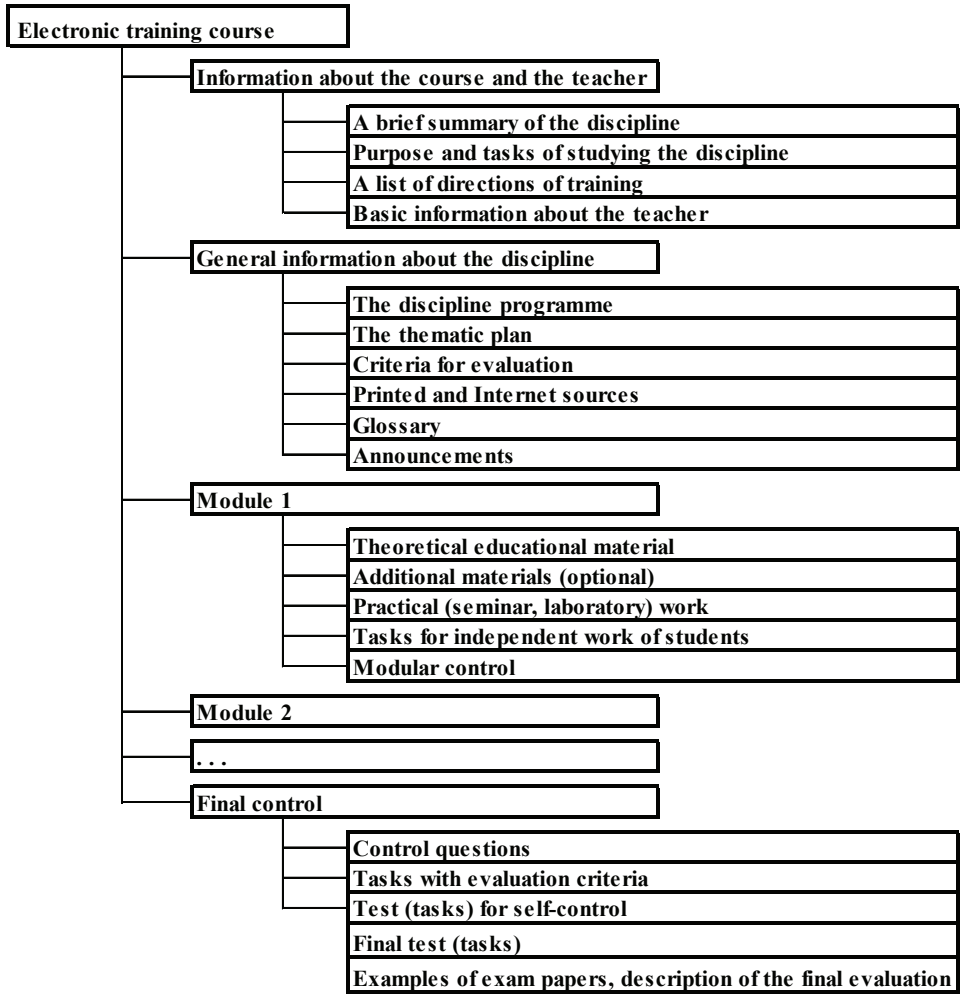

Figure 2. The block diagram of the electronic training course.

Source: Own work.

Conclusions

It can be noted that the use of the learning management system is an effective and convenient way of managing and spreading educational online content with sharing. A well-balanced and uniform structure of the e-learning course provides an opportunity for a more effective use of LMS.

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Andrii Kostiuchenko

Cechy implementacji systemu do zarządzania kursami na uniwersytecie ukraińskim

S t r e s z c z e n i e

W artykule poruszono kwestię regulacji prawnych towarzyszących wykorzystywaniu systemu do zarzadzania kursami na ukraińskich uniwersytetach. Wskazano na typy elektronicznych zasobów edukacyjnych, które mogą być używane w kształceniu na odległość i podano ich definicje. Przedstawiono platformę Moodle jako przykład efektywnego systemu do zarzadzania kursami. W szczególności zwrócono uwagę na role przyjmowane przez użytkowników tej platformy oraz przedstawiono ich listę. Zaproponowano ogólną strukturę kursu e-learningowego, który może zostać wdrożony przez instytucje edukacyjne.

S ł o w a k l u c z o w e: kształcenie na odległość, szkolenie elektroniczne, elektroniczny zasób edukacyjny, system do zarządzania kursami, Moodle

Andrii Kostiuchenko

Особенности реализации системы управления обучением в образовательном процессе в украинском университете

А н н о т а ц и я

В статье рассматривается вопрос регулирования системы управления обучением на государственном уровне Украины. Указываются типы и интерпретации электронных образовательных ресурсов, которые могут использоваться в дистанционном образовании. Рассматривается среда Moodle, как пример одной из успешных систем управления обучением. В частности, статья содержит список ролей, которыми могут пользоваться пользователи системы управления обучением. Предложена общая структура курса электронного обучения, который может быть использован учебными заведениями.

К л ю ч е в ы е с л о в а: дистанционное образование, электронный учебный курс, электронный образовательный ресурс, система управления обучением, Moodle

Andrii Kostiuchenko

Características de la implementación del sistema de gestión del aprendizaje en el proceso educativo en una universidad ucraniana

R e s u m e n

El artículo se dirige a estudiar la regulación del Sistema de Gestión del Aprendizaje a nivel estatal de Ucrania. Se señalan los tipos e interpretaciones de los recursos educativos electrónicos que se

pueden utilizar en la educación a distancia. Se considera el entorno Moodle como ejemplo de uno de los sistemas de gestión de aprendizaje exitosos. En particular, el artículo contiene una lista de roles que pueden compartir los usuarios de Learning Management System. Se propone la estructura general del curso de e-learning, que puede ser utilizado por las instituciones educativas.

P a l a b r a s c l a v e: educación a distancia, curso de capacitación electrónica, recurso educativo electrónico, sistema de gestión del aprendizaje, Moodle