УДК 621.38, 004.9
МРНТИ 28.23.33; 28.17.31; 44.37.29; 44.37.83

DEVELOPMENT OF THE FULL-TIME NETWORK EDUCATION PLATFORM

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Abstract: *Nowadays the distance education becomes more widespread due to propagation of network technologies and the Internet. Distant education provides many advantages like ability to attend classes off the institution, low cost and high flexibility on teacher and students. The universities have already implemented distant education for bachelor's degree. However, the classical distant education does not suit for the high-degree education, because the high-level degree requires full-time classes. There are many education platforms developed like Moodle, aTutor for the distance education but none of them are applicable for the full-time network education.*

The article discusses the process and recommendations for the development of the full-time network education platform also known as learning management system or e-learning platform. The major parts of the platform such as the website, the database, the storage of education materials and the software for conducting the webinars were reviewed.

Keywords: *full-time network education, education platform, distance education, LMS, e-learning platform*

КҮНДІЗГІ-ЖЕЛІЛІК ОҚЫТУДЫҢ БІЛІМ БЕРУ ПЛАТФОРМАСЫН ДАМЫТУ

Аңдатпа: *Қазіргі уақытта қашықтықтан оқыту желілік технологиялар мен ғаламтордың таралуына байланысты кеңейе түсуде. Қашықтықтан оқыту көптеген артықшылықтарға ие, мысалы, мектептен тыс сабаққа бару, студенттер мен оқытушылардың икемділігі жоғары. Университеттер бакалавриатта қашықтықтан оқытуды енгізді. Алайда, классикалық қашықтықтан білім беру жоғары білім деңгейіне сәйкес келмейді, өйткені олар күндізгі оқуды қажет етеді. Moodle және aTutor тәрізді көптеген білім беру қашықтықтан оқыту платформалары әзірленді, бірақ олардың ешқайсысы желіге негізделген оқытуды жүздеген тұлға ретінде қолайлы деп санайды.*

Бұл мақалада «Білім беруді басқару жүйесі» (LMS) деп аталатын, жеке тұлға ретінде білім берудің білім беру платформасын жасау үдерісі мен ұсыныстары талқыланады. Платформаның негізгі бөліктері веб-сайт, дерекқор, оқу материалдары мен вебинарларға арналған бағдарламалық қамтамасыз ету ретінде қарастырылады.

Түйінді сөздер: *күндізгі-желілік оқыту, оқыту платформа, қашықтықтан оқыту, LMS, білім беруді басқару жүйесі*

РАЗРАБОТКА ОБРАЗОВАТЕЛЬНОЙ ПЛАТФОРМЫ ОЧНО-СЕТЕВОГО ОБУЧЕНИЯ

Аннотация: *В наше время дистанционное обучение становится все обширнее из-за распространения сетевых технологий и интернета. Дистанционное обучение предоставляет множество преимуществ, таких как возможность посещать занятия вне учебного заведения, низкая цена и высокая гибкость студентов и преподавателей. Университеты уже внедрили дистанционное обучение в бакалавриате. Однако классическое дистанционное обучение не подходит для более высоких ступеней образования, поскольку они требуют очных занятий. Разработано множество образовательных платформ для дистанционного обучения такие как Moodle и aTutor, но ни одна из них не подходит для очно-сетевого обучения. В данной статье рассматривается процесс и рекомендации по созданию образовательной платформы для очно-сетевого обучения, также известной как LMS – система управления образованием.*

Рассмотрены основные части платформы, как веб-сайт, база данных, хранилище образовательных материалов и программное обеспечение для проведения вебинаров.

Ключевые слова: *очно-сетевое обучение, образовательная платформа, дистанционное обучение, LMS, система управления образованием*

INTRODUCTION

Full-time network education is a type of online-education where lectures and knowledge control are conducted at the distance and laboratory classes are conducted on full-time basis. [1]

Every course divides into modules (Fig. 1). Every module contains lectures, practical, laboratory lessons and home works for the dedicated topic. Every modules ends with total knowledge control. Modules follow one after one; student cannot start the module before ending the previous.

Lectures consist of education material that is read by students asynchronously. Then the teacher conducts a webinar where the teacher explains the material and answers the students' questions. Then the students pass the knowledge control consisting of 8-10 questions and gain the mark.

Laboratory and practical classes are conducted either in a full-time or as a webinar. The practical classes are primarily used to check the laboratory works and consolidate the acquired knowledge.

Homework classes are conducted asynchronously with the teacher being the spectator. When the student send his homework to the platform, 3-5 students get his homework to check and mark. If the marks are suspicious the teacher can download and check the work by himself.

Modules end with the module knowledge control of 80-100 questions closed test. Test are conducted and marked automatically.

The full-time network education requires conducting an attendance control. For asynchronous classes, attendance can be determined in 4 cases:

1. The student went to the lesson page. In this case, before issuing a page on the server, a request is sent to the database to record attendance of an activity.

2. The student has opened or downloaded the material. Before issuing material on the server, a request is sent to the database to record attendance.

3. The student has read the material to the end. A javascript script is installed on the page, which sends a request to the server if the user has reached a certain tag. In this case, this label will be the end of the file.

4. The student read all the materials. If all materials related to this lesson are set to "viewed", then the lesson is considered to be attended.

For synchronous remote classes, attendance can be tracked at the time of the student's connection to the broadcast. This can be done either by clicking on the link or by connecting to the broadcast itself. All plug-ins and live applications have an onConnect or onJoin event that occurs when someone connects to the broadcast. This event contains the user ID, the date of his connection to the broadcast, and what to perform because of the event. In this event, you can record the filling of attendance classes in the database.

For full-time studies, it is impossible to use software for monitoring attendance. We have to rely on the teachers themselves, who will celebrate the students who attended their classes.

EDUCATION PLATFORM

Full-time network education platform or Full-time network e-learning platform is a set of tools and technologies for conducting and managing education process in full-time education. All stages of the education process starting from registering and subscribing to the course until students and teachers performance are implemented within it. The platform provides availability, security of the education and personal data and possibility of future analysis of the history of the learning process to improve the courses and track subscriber and teachers perfomance. All the users of the platform are able to communicate with each other within the platform.

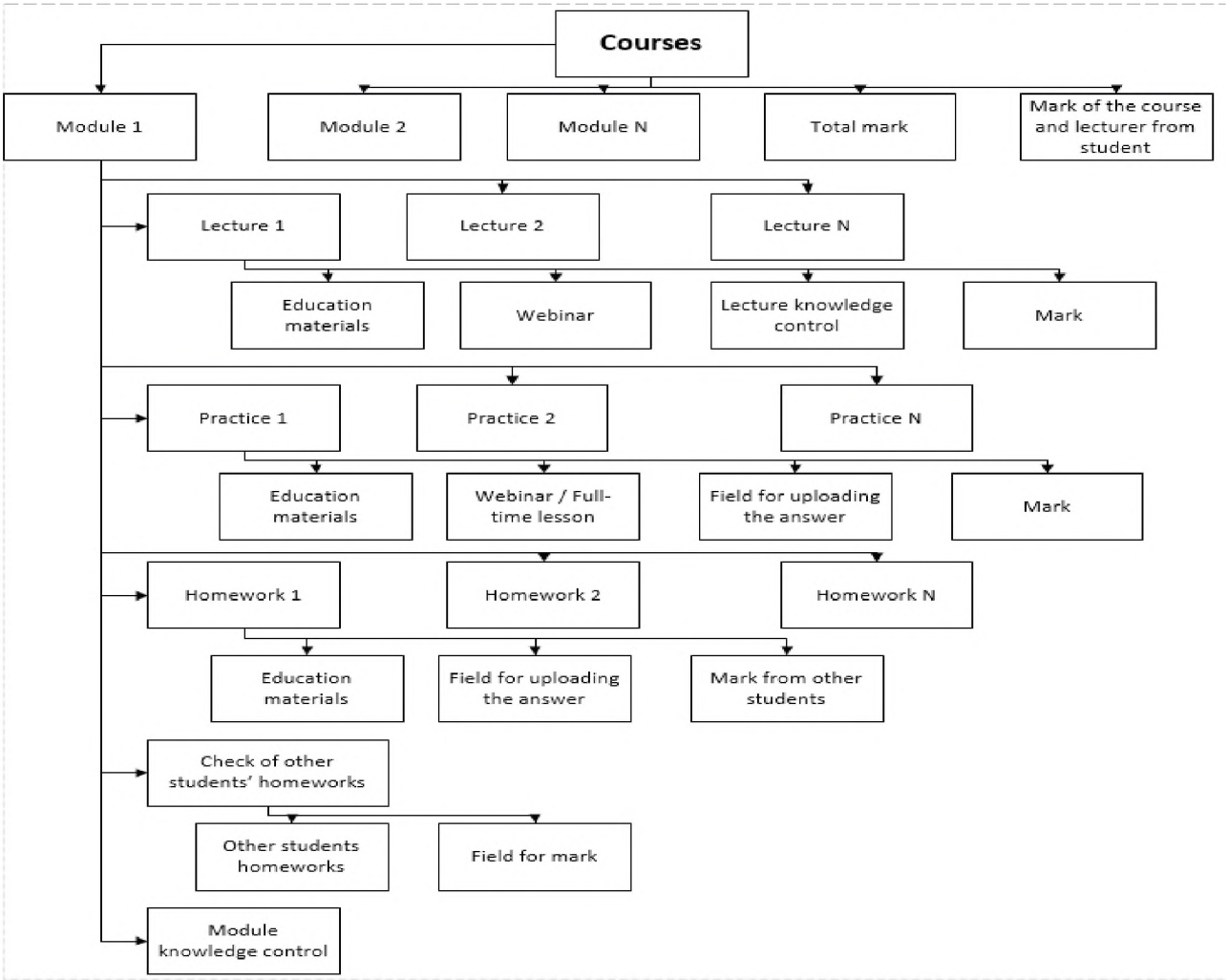

Figure 1. Course structure for full-time network education

This type of the platform must fulfill the following tasks [2]:

- The guidance of students in the direction of education,
- The delivery of knowledge to students in various forms, such as word, word, power-point, flash, video, audio, and so on,
- The ability of students to do interactive applications,
- Assessment of students via homeworks and examinations,
- Delivery of the results to students,
- Communication between student-student and student-teacher (e.g. discussion boards, chat, e-mail etc.),
- Interaction between student-lesson content,
- Registration process,
- Scheduling,
- Class management,
- Keeping records for students, teachers, and system (i.e. logs),
- Entering the examinations and keeping record of the results,
- Collecting the homeworks,
- Grade keeping,
- Reporting,
- Student tracking,
- Tracing student attendance records,
- Students seeing their own education times,
- Distributing e-learning contents on-line, and
- Sharing knowledge and ideas.

Education platform consists of the four major parts:

- Website – where the learning process is conducted.

- Database – contains the information about the courses, lessons, teachers, students, their marks, attendance etc.
- File storage – contains education materials, records of the webinars and students' uploads. It often is situated on the separate server or in the cloud.
- Webinar software.

The website structure is shown on figure 2. The website consints of four main parts:

1. Common zone – webpages accessible for anyone. These pages are FAQ, available courses, information about the institution and list of recommended materials. Available courses page contains a list of courses with their description, amount of credits and the syllabus. If the user is a student he has subscribe to the course from there.

2. Learning zone – webpages governing the actual learning process. This zone contains pages with

3. Administration zone – accessible only for administrators. Contains pages for managing students and teachers, schedule and the platform itself.

The users of the platform have one of five roles and never change them:

1. Student – can subscribe to the courses, attend the lessons, and chat with the teacher of the course and with other students. Students can register by themselves or be registered by the administration if there are places where the platform cannot register him, for instance the local domain.

2. Teacher or lecturer is registered only by the administrator or the post-graduate department. The teacher can manage his own course: add lessons, knowledge control, conduct webinars, and set the formula to count the final mark for the course.

3. Administrator manages the whole platform and can have sub-administrators.

4. Post-graduate department – manages the personal and student groups.

5. Unauthorized – potential student. Has ac-

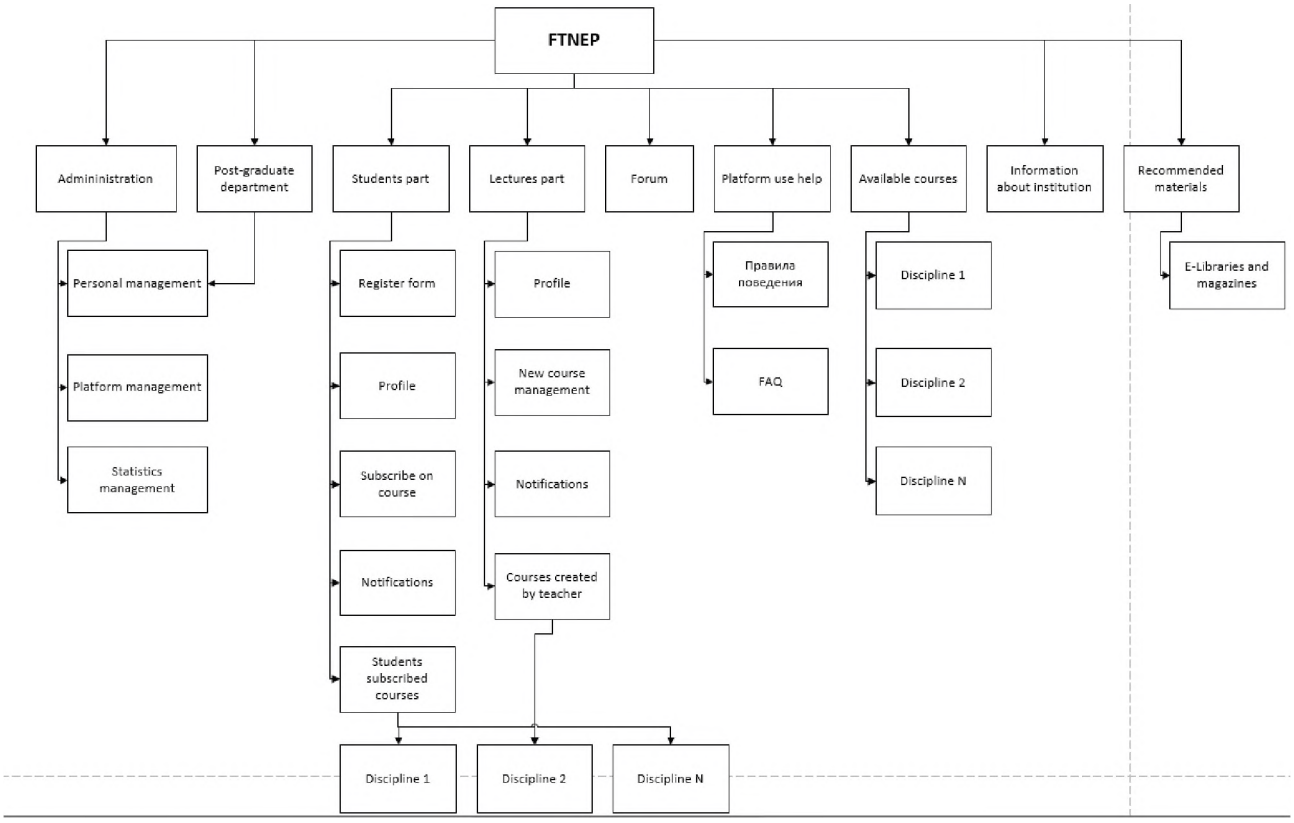

Figure 2. Structure of Full-time Network Education Platform

cess to the list of courses and information about the institution.

Teachers and students can chat via the forum or the comments to the lesson.

The basic *SQL database* for the full-time network education platform contains the tables for courses, modules, lessons, categories, users and the materials. Categories connect to the courses via "categories_courses" table. Modules contain "course" column to connect to the courses, lessons have a "module" column. The users connect to the courses, materials and lessons via the "courses_users", "modules_users" and "lessons_users" respectively. Lesson have multiple materials, which are governed by the "lessons_materials" table.

The courses are divided into categories. The course may be in many categories. Specialty is a category with an official specialty code. Categories can be used as tags for searching.

When the teacher creates a course, the course set him as author. Only author can edit the course. However, the author of the course can provide an access to other teachers to conduct his lessons. These teachers may mark the task but cannot change the course structure.

The platform sets marks for the lessons. The marks of the modules and courses are calculated when the lesson marks are updated and stored in the "modules_users" and "courses_users" respectively.

The attendance mark is governed by "visited" column of the "lessons_users" table. Its value varies from 0 to 1 with 1 meaning the student has visited the lesson and value below 1 means that the student has not completed all the checks and left the lesson early.

When all the lessons of the module have the marks and were visited the "is_finished" parameter is set to true and the module is considered finished. If the student got unsatisfactory mark, the "is_finished" parameter is not set and the student will have to repeat the module.

The platform uses "materials" table to store information about the education material. The materials are divided on 3 groups: education material, students upload and webinar. The last may have no URL because some webinar platforms have different URL for the ongoing webinar and the recording. This method allows the platform to be unworried about the actual location of the materials and their storing methods. The only necessary information for the platform is the URL.

The potential number and size of the materials is extremely huge so it is recommended to use a dedicated server or the cloud to store them. For storing the files outside the local storage the additional "servers" table may be used. It must contain the server address and the links to upload and download the files. When the file is uploaded it is redirected to one of the servers. When the file is requested the URL from the "materials" table is used. Such method allows storing the data on multiple non-connected servers in the World Wide Web, while the user may think that he is downloading the file from one place.

To *conduct a webinar* education platforms often use a separate software and even a separate server. Unlike the website, the webinar requires large amount of data being transferred and computed by the CPU. For instance, the BigBlueButton software – the free open source software for educational webinars requires 4 core CPU and RAM. Most of such software provide an API to effectively communicate with the main platform.

CONCLUSION

In conclusion it is important to mention that implementation of full-time network education platform is crucial because these systems are designed to improve the whole educational life cycle, provide interactivity and communication between teachers and students. They increase the quality of education via provision of modern educational methods such as synchronous distance learning and ability for students to evaluate the educational process and give a feedback on the quality on provided knowledge.

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