PAPER • OPEN ACCESS

Principles of internet education for students on the subject "information technology and mathematical modeling of processes" on the basis of "moodle" distance learning system

View the article online for updates and enhancements.

Principles of internet education for students on the subject "information technology and mathematical modeling of processes" on the basis of "moodle" distance learning system

A S Baydullaev, Z U Mamatkulov, N H Samigova, K K Shadmanov and D Z Narzullaev

Tashkent pharmaceutical Institute, 45, Oybek street, Tashkent, 100015, Uzbekistan

E-mail: davr1960@mail.ru

Abstract. This article gives a brief description of the principles of organization of Internet education in the teaching of "Mathematical modeling of information technology and processes" to students on the basis of "Moodle LMS" system distance learning at the Tashkent Pharmaceutical Institute and shows its main features and advantages. Extensive use of educational technologies, optimization, humanization and innovation in the National Program of Personnel Training to solve the tasks of training and educating young people to be highly moral, spiritual and enlightened, conscientious at work, deeply aware of their responsibilities to society and family, competitive, qualified professionals. The organization, management and control of the learning process on the basis of methods is relevant. Nowadays, a wide range of opportunities are being created for students to have fast, plentiful, reliable information and to acquire knowledge independently. In particular, electronic systems allow students to use important information related to science at any distance, depending on their capabilities. "Moodle" open source software complex is a system designed specifically for the management of the educational process using the Internet (Learning management system - LMS). Distance learning is a modern form of organizing the learning process using distance learning technologies. Its development was due to the increase in the number of Internet users, the availability and quality of open learning electronic resources. The use of distance learning technologies undoubtedly has a wide range of advantages: the organization of the learning process in an Internet environment, so the student location does not prevent high-quality training, regardless of the location of the educational institution. Distance learning is based on the principle of independent preparation of students through teacher guidance and allows you to choose a convenient time for lessons. It includes interactive communication between teachers and students, information resources of the educational institution and information resources of the Internet, the rapid delivery of the Internet in electronic form.

1. Introduction
The quality of higher education, that is, the training of quality personnel, has always been and will remain a topical issue in all higher education institutions around the world. The issue of quality is becoming increasingly important, especially in the late twentieth and early twenty-first centuries.

The Law of the Republic of Uzbekistan "About Education" and the "National Program of Personnel Training" require the widespread use of information technology in the educational process in the training of modern mature personnel. Education is one of the most important processes for a rapidly

developing society today. The well-being of the people depends on the quality and effectiveness of education.

In the current complex economic situation, it is very important to increase the number of highly qualified personnel in all sectors of the economy. Extensive use of modern pedagogical and information and communication technologies to solve the tasks of training and educating young people to be highly moral, spiritual and enlightened, conscientious at work, deeply aware of their responsibilities to society and family, competitive, qualified professionals in the National Training Program. Organization, management and control of the educational process on the basis of optimization, humanization and innovative methods are relevant [1; 2].

Nowadays, a wide range of opportunities are being created for students to have fast, plentiful, reliable information and to acquire knowledge independently. In particular, electronic systems allow students to use important information related to science at any distance, depending on their capabilities [3; 4].

2. Moodle LMS software package
The following teaching materials are used in teaching in Moodle system:

- textbooks (modules);
- audio, video materials;
- Electronic and multimedia textbooks;
- on-line courses.

"Moodle LMS" Open source software complex is a system designed specifically to manage the learning process using the Internet (Learning management system - LMS).

The main task of the electronic complex on the basis of Moodle LMS is to increase the effectiveness of education through the exchange of various electronic resources between faculty and students, the placement of tasks and issues in the complex [5; 6].

To work on the system, it is necessary to use a server that supports the movement of the MySQL database management system (MBBT) and is capable of running on any platform with a PHP preprocessor.

System deployment (including server configuration and software) is done in a few days. It is then possible to structure the structure of personal education.

The advantages of the electronic complex based on the Moodle LMS system are as follows:

- Students will have the opportunity to pre-download the required information and study independently by visiting this block.
- The professor will be able to make operational changes to the system, such as making additions to the system, posting relevant materials, posting important announcements and evaluation results.
- There will be more opportunities for teachers to demonstrate their pedagogical methods, multimedia resources can be placed directly, and most importantly, the responsibility of teachers to ensure the quality of system materials will increase.
- Students will be able to access data remotely and paper costs will be reduced.

The Moodle LMS system has a wide range of options for the use of more than 20 course elements to perform any educational functions, in particular:

- assignments that allow the learner to send answers in any form (text, file, etc.);
- forums to discuss a wide range of management options;
- chats;

- test systems, including Gift and HotPot formats, which allow you to accept assignments in any test preparation system;
- course management system (number of topics, structure, calendar schedule, etc.);
- action accounting system, maintaining logins of all categories of users throughout the year;
- authorization and authorization system that restricts the access rights of different categories of users and provides distribution of functions;
- development of messaging system, etc.

3. Level of educational content of the course "Information technology and mathematical modeling of processes" created on the basis of the educational system Moodle LMS in all areas of the Tashkent Pharmaceutical Institute

Moodle LMS distance learning system recommended for use in the educational process by the decision of the Central Methodological Council of the Tashkent Pharmaceutical Institute (table 1).

Table 1. Research results.

No	Index name	Quantity
1	Educational-methodical support in Moodle system	100 %
2	Using the Moodle system in the learning process	100 %
3	Quality of task and exercise performance in Moodle system	+
4	Submit independent work in the Moodle system	+
5	Assessment of independent work submitted by students	+
6	Time to master the topics by students	Decreased
7	Formation of positive motivation to learn in the Moodle system	+
(+) An increase in performance when working in a Moodle system		

Currently, 1st and 2nd year students of all directions of the Tashkent Pharmaceutical Institute are members of the course "Mathematical modeling of information technology and processes" (figure 1). In this course, teaching materials and other information are updated, which is a very large and complex process: because all the components of the system are constantly updated to prepare students for the lesson.

Provision and replenishment of the database for each subject was entrusted to professors and teachers of the subject.

4. Discussion

The course "Information Technologies and Mathematical Modeling of Processes" describes the modeling methods proposed in [7-9], original methods of pattern recognition [10-17], methods for reducing the dimension of the original feature space for the problem of pattern recognition in relation to solving medical and other problems [18-22]. The course also includes: the results of studies of the spectra of electron paramagnetic resonance and infrared rays in order to consider the possibility of changing the interfacial layer of the nanocomposite [23]; the results of electron microscopic studies of the morphology and X-ray structural analysis of the phase composition of the nanocomposite, which showed that the dispersed phase mainly consists of metallic copper nanoparticles with the size of 33.94 nm [24]; results of studies of the frequency dependence of the conductivity of composites based on glass and cadmium oxide [25]. The study of the above methods allows to expand the horizons of students of the Tashkent Pharmaceutical Institute in terms of the application of mathematical modeling methods in solving problems in medicine and pharmaceutics.

5. Conclusion

Moodle LMS system is installed on a separate server at the Tashkent Pharmaceutical Institute, Center for Information Technology and is available at http://moodle.pharmi.uz.

From the I and II semesters of the 2020-2021 academic year, the system http://moodle.pharmi.uz was tested and tested in the teaching of students in computer science and information technology.

The results of the experiment showed that the use of the Moodle LMS system in the organization of independent learning of students is convenient for both faculty and students, and students made suggestions for teaching other subjects using the Moodle LMS system. The general view of the course is shown in figure 1.
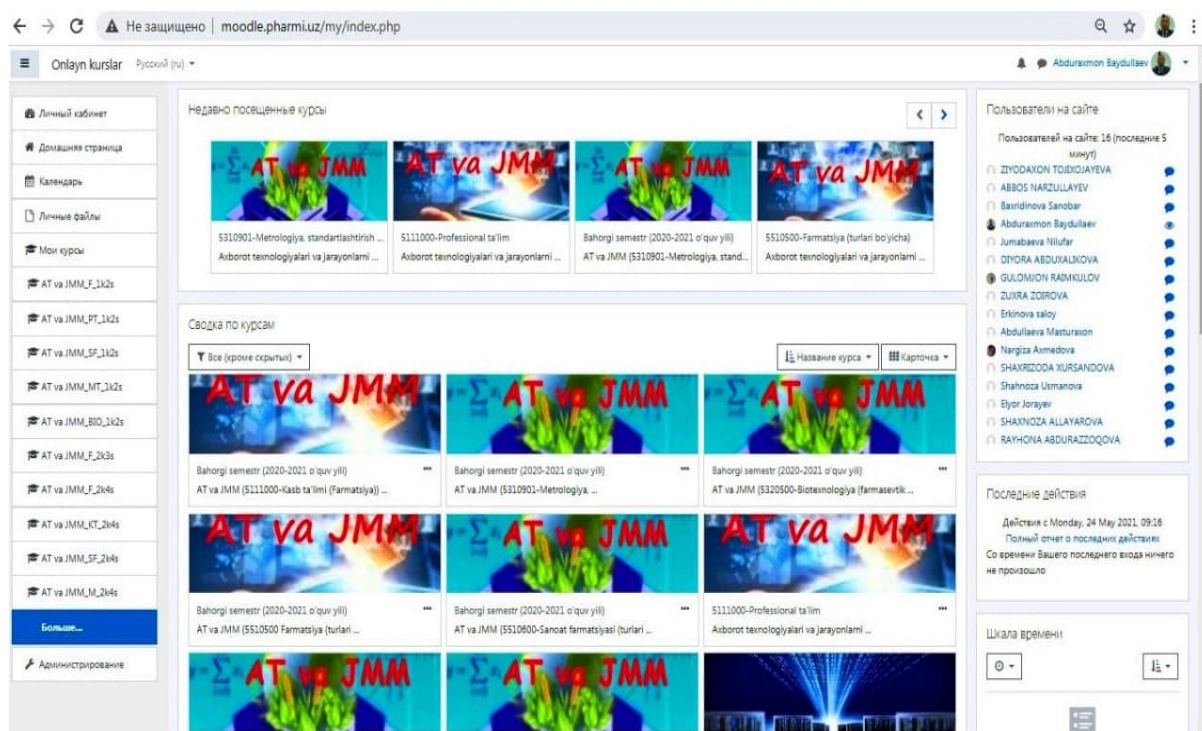

Figure 1. Overview of the course "Information technology and mathematical modeling of processes" created in the Moodle educational system of the Tashkent Pharmaceutical Institute.

References
[1]   Law of the Republic of Uzbekistan "On Education" 1997 *Bulletin of the Oliy Majlis of the Republic of Uzbekistan* **9** 225
[2]   Angelov N, Dechev Y, Marinov M and Velkova C 2017 Online training courses for marine engineers at the NVNA by the disciplines mechanics of materials and fluid mechanics. *An assessment of the first results 18th Annual General Assembly of the International Association of Maritime Universities - Global Perspectives in MET: Towards Sustainable, Green and Integrated Maritime Transport* 54–61
[3]   National training program 1997 *Bulletin of the Oliy Majlis of the Republic of Uzbekistan* **11-12** 295
[4]   Chupandina E E, Semenikhina A V 2018 Online education at Voronezh State University. *Vysshee Obrazovanie v Rossii* **27(8-9)** 103–110
[5]   Anisimov A M 2009 *Working in the Moodle Distance Learning System, Tutorial 2nd edition, revised and enlarged* (Kharkov:XNAGX) 6-34
[6]   Kristanda M B 2019 Moodle LMS resources prediction: Exponential moving average approach. *International Journal of Advanced Trends in Computer Science and Engineering* **8**(4) 1308–1311
[7]   Ilhamov K S, Narzullaev D Z, Ilyasov S T, Abdurakhmanov B A and Shadmanov K K 2021 Model of a turbulent flow of a two-phase liquid with an uneven distributed phase

concentration in a horizontal pipe. *IOP Conference Series: Materials Science and Engineering* **1047** 012021

[8]   Narzullaev D Z, Shadmanov K K, Baidullaev A S, Rajabov E E and Tursunov A T 2021 Automated farm management system in Uzbekistan. *IOP Conf. Series: Earth and Environmental Science* **723** 032036

[9]   Narzullaev D Z, Abdurakhmanov B A, Baydullaev A S, Ilyasov S T and Shadmanov K K 2020 Transformation of types of signs for a task of the regression analysis. *IOP Conference Series: Materials Science and Engineering* **862** 052065

[10] Fazilov S K, Mirzaev N M, Rajabov S S and Mirzaev O N 2018 Determining of parameters in the construction of recognition operators in conditions of features correlations. *CEUR Workshop Proceedings* **2098** 118-133

[11] Kamilov M, Fazilov S, Mirzaeva G, Gulyamova D and Mirzaev N 2020 Building a model of recognizing operators based on the definition of basic reference objects. *Journal of Physics: Conference Series* **1441(1)** 012142

[12] Nishanov A, Avazov E and Akbaraliyev B 2019 Partial selection method and algorithm for determining graph-based traffic routes in a real-time environment. *International Journal of Innovative Technology and Exploring Engineering* **8(6)** 696-698

[13] Fazilov Sh Kh, Mirzaev N M and Mirzaeva G R 2019 Modified Recognition Algorithms Based on the Construction of Models of Elementary Transformations. *Procedia Computer Science* **150** 671-678

[14] Nishanov A Kh, Djurayev G and Khasanova M A 2019 Improved algorithms for calculating evaluations in processing medical data. *Compusoft* **8(6)** 3158-3165

[15] Kamilov M, Nishanov A and Beglerbekov R 2019 Modified stages of algorithms for computing estimates in the space of informative features. *International Journal of Innovative Technology and Exploring Engineering* **8(6)** 714-717

[16] Nishanov A Kh, Turakulov Kh A and Turakhanov Kh V 1999 A decision rule for identification of eye pathologies. *Biomedical Engineering* **33(4)** 178-179

[17] Nishanov A Kh, Turakulov Kh A and Turakhanov Kh V 1999 A decisive rule in classifying diseases of the visual system. *Meditsinskaia tekhnika* **4** 6-18

[18] Fazilov Sh, Mamatov N and Samijonov A 2019 Selection of significant features of objects in the classification data processing. *International Journal of Recent Technology and Engineering* **8(2 11) 11** 3790-3794

[19] Fazilov S, Mamatov N, Samijonov A and Abdullaev S 2020 Reducing the dimensionality of feature space in pattern recognition tasks. *Journal of Physics: Conferens Series* **1441(1)** 012139

[20] Nishanov A Kh, Djurayev G and Khasanova M A 2020 Classification and feature selection in medical data preprocessing. *Compusoft* **9(6)** 3725-3732

[21] Fazilov S and Mamatov N 2019 Formation an informative description of recognizable objects. *Journal of Physics: Conferens Series* **1210(1)** 012943

[22] Fazilov Sh, Mamatov N and Niyozmatova N 2019 Developing methods and algorithms for forming of informative features' space on the base K-types uniform criteria. *International Journal of Recent Technology and Engineering* **8 (2 11) 11** 3784-3786

[23] Umarov A and Kamalova D 2020 Investigation of ultrafine expansion in Epr studies of a polymer composition based on polystyrene. *AIP Conference Proceedings* **2308** 030019

[24] Umarov A V, Abdurakhmanov U, Khamzayev H E, Kattaev N T and Tozhiboev A G 2019 Synthesis and Structural Investigations of Metal-Containing Nanocomposites Based on Polyethylene. *Zeitschrift fur Naturforschung - Section A Journal of Physical Sciences* **74(3)** 183-187

[25] Umarov A V, Askarov M A, Makhmudov R H and Kasimova G A 1997 Investigation of the electroconductivity of resistive compositions based on glass and cadmium oxide with alternating current. *Turkish Journal of Physics* **21(2)** 200–205