

Using the elements of remote technology in the teaching of higher mathematics

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Abstract: The article deals with the practical experience of the use of remote technology elements during the teaching of the "Higher Mathematics" discipline for full-time students in the Moodle learning environment. The revealed shortcomings and difficulties when creating the distance course "Higher Mathematics" requirements of the basic principles of education and suggested their solution.

Keywords: *distance technologies, higher education institution, higher mathematics, Moodle, principles of training.*

Introduction. Over the past two decades, there has been a transition from traditional education to computer-based learning. This became possible, in the majority of cases, with the development of the Internet, which made it possible to send the required number of dummies from one end of the world to another, to freely conduct discussions with other users of the network in on-line mode and to place information on Internet sites, making it accessible to all interested persons. One of the priority directions of the program for the modernization of secondary and higher education is recognized distance learning, which is carried out through information and education technologies and communication systems. The use of distance learning technology at the present stage of providing educational services by educational institutions is a prerequisite for the present [1].

In this article, the form of distance learning is considered as an additional system that is used to supplement the academic disciplines taught by higher education institutions of Ukraine for applicants of higher education in full-time study form.

In the State University of Telecommunications, along with traditional technologies of teaching, remotely are used effectively. This approach to learning involves both a direct contact form and a remote on the Moodle platform, which aims to support the educational process.

The choice of this system is not accidental, since its adjustment allows you to adapt each course not only to the specifics of a particular discipline but also to the requirements of a teacher and a student who can independently build a convenient trajectory of study.

The practical experience of authors in the work and use of distance learning technologies in various educational institutions has allowed to identify certain patterns in the possibilities and features of the use of distance courses of educational disciplines, which are developed and used on the platform of Moodle. It is the incomplete correspondence of the possibility of implementing the main didactic principles of distance learning as developed on the Moodle platform, which prompted authors to share their hands-on experience and identify ways to improve the opportunities or quality of providing educational services through distance learning technology.

The theoretical foundations of the study on distance learning are based on the methodological works of S. Arkhangelskii, Y. Babansky, S. Goncharenko, M. Makhmutov, E. Polota, V. Sagardy, L. Vygotsky, P. Halperin, G. Kostyuk, O. Matiushkin, N. Talizina and others. Scientists S. Batishev, O. Kirsanov,

C. Kupisevich, I. Ogorodnikov, O. Pekhot, L. Romanyshina, P. Sikorsky, I. Kharlamov made significant efforts to create a system of distance learning. psychologists B. Ananiev, G. Ball, V. Vygotsky, M. Danilov and others, whose creative work analyzes the process of individualization of personally oriented learning.

The purpose of the article. Show revealed shortcomings and difficulties when creating a distance course "Higher Mathematics" for students on-line form of learning based on the learning environment Moodle requirements of the basic principles of education and to offer solutions.

Materials and methods. In the course of the work, the following research methods were used: theoretical: systematic analysis of psychological and pedagogical literature, theoretical generalization, comparison of the theoretical positions contained in the psychological and pedagogical and methodological literature, and the teaching experience, synthesis and analysis in order to reveal the main features of the introduction of distance learning technologies; empirical: survey of teachers, pedagogical observation of the learning process; conversations with students and teachers; testing

Results and discussion. The process of training is carried out on the basis of substantiated and proven practice of didactic principles, conditioned by the laws and objectives of education. It is clear that the basis of education, which uses the technology of distance learning, laid in addition to the traditional principles of learning and new ones. But in this paper we consider the possibility of practical implementation of the basic didactic principles that were formed in the book "Great didactics" by well-known Czech teacher Ya.A. Komensky and have not lost relevance to this day, with the creation and use of distance courses on the platform Moodle [2].

Principle of educational visibility. The Moodle platform employs its own program module for creating electronic lecture notes with its text editor. But his ability to edit the text is very mediocre in comparison with the editor of Word. Usually, the teacher prepares, or already has, the lecture material in the text editor Word, and then transfers it, by copying it, to the electronic page of the book through the program text editor, Moodle. This editor allows you to make quick minor corrections to the original text, but there are some complications with: formatting (selecting fonts, colors) of the text; adding to the text of illustrative material (drawings, diagrams, tables, photos); mathematical formulas.

Work with mathematical formulas in the text editor

Moodle is implemented at a very low level. When copying and transferring text from Word Editor to the editor page of Moodle, the formulas given in the formulation, but not in the test mode, are simply lost. The formulas need to be copied, translated into a graphic file (image), stored in a separate place, and then inserted into the text as a graphic file, which is not very convenient for filling the distance course in the discipline "Higher Mathematics". To facilitate this task, the TextAide (free) formula editor or the TeX formula editor is developed for the Moodle text editor. But again, it requires a teacher to redirect all formulas by copying them into text on the Moodle e-book page.

That is, the information page of the lecture should contain theoretical information on this topic, the text material of which is described laconically and accompanied by drawings, includes a detailed analysis of typical examples; For easy perception of the lecture material, it is divided into text pages - one on the screen, which does not require excessive "flipping" and scrolling horizontally; For better perception of text from the computer screen, fonts are used without crop marks; Different font displays are selected in the design of the material - slope, underlined, bold and their location; Different font colors are used to highlight examples, notes or comments, which helps to focus on selected objects. In addition to theoretical materials, to ensure the principle of visibility, it will be appropriate to use videos that are usually more attractive to students.

The use of all elements must be sound and non-abusive, which will enable the simplification and effective perception of the teaching material and will contribute to its better assimilation and positively influence the increase of motivation for learning.

The principle of consciousness and activity in learning. Consciousness in the assimilation of learning material directly depends on the presence of stimulation of an active and conscious process of assimilation of knowledge. To do this, the teacher must clearly formulate his requirements, both during classroom work of students, and with the independent use of the student platform Moodle. A student must clearly understand the purpose and tasks that concern him when studying a particular topic (module). Therefore, we propose the following approach: at the end of the information page of the lecture, there are buttons for the transition for which the user can go either to the lecture plan, or must answer the questions to move further on the content. In the case of a correct answer, there is the opportunity to move on to the next issue of the lecture plan. Otherwise, he is forced to return to the previous item again. This approach will allow the student to process the theoretical material at the proper level, and the teacher will be able to follow what part of the lecture passed each student and his successes.

Principle of learning availability. The teaching material presented in the Moodle learning environment should not contain a large number of abstract considerations, obscure formulas, contain symbols and symbols that are different from those given during classroom work, bulky mathematical calculations, since most students will not be able to understand the essence of the material.

From the teaching experience, we recommend that you submit a training material in the form of a text file in

which for each important definition, hyperlinks are used, and practical tasks are staged step by step with media links in a short video tutorial or YouTube video source. We recommend that you place the video information directly in the Moodle learning environment in order to avoid video loss due to its removal from the Internet.

Principle of scientific teaching. This principle involves the disclosure of causal relationships of phenomena, processes, events, inclusion in the means of teaching scientifically proven knowledge, which correspond to the current level of development of science. It is implemented in the content of educational material, fixed in the curriculum and educational standards. This principle is realized by the rapid possibility of making changes to the educational material presented in the educational environment of Moodle in accordance with the results of modern scientific research.

Principle of systematic and sequential learning. The systematic thinking is to establish associations - the links between the phenomena being studied and the disciplines. In the course of higher mathematics, this principle is ensured by the existing connections between different modules. Implementing Learning in the Learning Environment Moodle allows the teacher to set up successive time intervals for opening and closing access to educational materials, as well as test tasks for controlling knowledge to ensure systematic and consistent mastering, in accordance with the classroom, modules of the course "Higher Mathematics". For students of distance learning, the sequence of modules of discipline can be given at the discretion of the student to activate his educational and cognitive activity with the realization of the possibility of constructing an individual trajectory for student training. Practice shows that most students use the teacher's advice in the sequencing of study modules, but the very ability to choose the sequence of studying the discipline is very positively perceived by students, as an opportunity to emphasize their individuality and the teacher's trust in the student's knowledge and abilities.

The principle of the theory of communication with practice. Practice is the basis of knowledge. During classroom lessons, we allocate a little time for solving professional problems of professional orientation. After all, they require a large conceptual framework, which is connected with special disciplines, which are studied at the senior courses. Therefore, during classroom assignments, applied tasks are usually discarded. In the learning environment, Moodle has no limitations on time or the amount of material. Therefore, it will be appropriate to supplement each module with applied tasks with a sufficient conceptual basis.

The principle of strength in mastering knowledge, skills and abilities. Our memory is also inherent in the process of forgetting. The burial is manifested in the loss of the clarity of what is memorized, its volume decreases, there are errors in reproduction, it becomes impossible to reproduce and, finally, it is impossible to recognize. Deduction is a function of time. If the information obtained is not used for a long time and is not repeated, it is gradually forgotten. The reason for forgetting may be the lack of durability of memorization, because the worse the information is fixed, the sooner it is forgotten. So, in order to prevent forgetfulness it is necessary to learn the

material well. Succession - the process is gradual. Therefore, the purpose of prolonged content in the memory of information is important from the very beginning to ensure its strong memorization and consolidation by repetition.

During the classroom classes "Higher Mathematics" the following control measures are envisaged: modules, colloquiums, credits, exams. These activities are aimed at checking, systematizing, repeating and consolidating the training material through various interval intervals (month, semester, semester, whole course). Unfortunately, their number is not sufficient for a solid assimilation, but due to the Moodle learning environment, this amount can be significantly increased by constantly creating new tests based on the accumulated database of test tasks. Such an approach will make the student continually use the knowledge previously acquired and, as a result, will lead to a better memorization.

Conclusion. The practical experience of using the

learning environment Moodle has shown that the organization of teaching the discipline "Higher Mathematics" will significantly improve the mastering of this discipline for full-time students and help implement all the basic principles of training. When filling the course in Moodle, you must take into account that systematized and structurally identical (similar) look will simplify the psychological algorithm in systematizing the acquisition of knowledge by students.

The use of distance learning technologies, in particular the Moodle learning environment, improves the efficiency of self-employment, provides completely new opportunities for creative expression, finding and consolidating various professional skills, and teachers, in turn, can implement completely new forms and methods of learning.

The purpose of further research is to test other open source software environments for analyzing the possibility (and ease) of placement of distance courses in higher mathematics.

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Использование элементов дистанционных технологий в обучении высшей математике

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Аннотация: В статье рассмотрены вопросы практического опыта использования элементов дистанционных технологии при преподавании учебной дисциплины «Высшая математика» для студены очной формы обучения в учебной среде Moodle. Показано выявленные недостатки и сложности при создании дистанционного курса «Высшая математика» требованиям основных принципов обучения и предложено их решения.

Ключевые слова: Moodle, высшая математика, высшее учебное заведение, дистанционные технологии, принципы обучения.