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USE OF DISTANCE COURSES IN THE STUDY OF ECONOMIC AND MATHEMATICAL CYCLE DISCIPLINES IN THE PROCESS OF PREPARING ECONOMISTS IN HIGHER EDUCATION INSTITUTIONS

The article discusses the main aspects of the use of modern information technology in the study of subjects of the economic and mathematical cycle for students of higher education institutions. Based on the analysis of our own activities and scientific and pedagogical literature on the issue of research, the basic concepts and features of distance learning have been identified, the main, most promising directions for its further development and modernization have been identified, some examples of the use of distance learning system on the example of subjects of the economic and mathematical cycle are given.

Key words: distance learning, economic and mathematical disciplines, training course.

Introduction. Recent sociological studies conducted between 2017-2019 show that the modern system of higher education in Ukraine requires change. There is a number of unsolved problems in this area, they are ambiguous and, due to the inertia of the system itself, cannot be resolved in a short period of time.

In the global context, we can say that there is a significant gap between the requirements that the modern market puts forward for a specialist and those opportunities that the Ukrainian higher education system can offer. At the present stage, much is being done to reform the university environment. But, unfortunately, significant financial investments and time are needed to solve this issue.

So, the number of higher education institutions of Ukraine is on average 5 times more than the number of universities in the most developed countries of the world. This trend has persisted since the Soviet Union, when Ukraine was one of the 15 republics that supplied highly qualified personnel. In addition, even in large universities, there is a shortage of highly qualified scientific and pedagogical personnel. The path from a student to a university teacher is quite long, time-consuming, and does not always pay off financially (in relation to the average salary in Ukraine, the teacher's salary is not high), and the requirements for university teachers are constantly growing.

One of the possible solutions to this problem may be the merger of universities and specialties, which will lead to lower costs for higher education in general, to the opportunity to channel the released material resources to the material and technical equipment of universities, to increase the salaries of professors and teachers, to the emergence of healthy competition. But at this

stage, another question arises: “Will higher education be accessible to every citizen of Ukraine in this case?”. With such a reform, the tendency for higher education to be accessible for every resident of the country, regardless of his place of residence, financial situation and physical abilities, should continue. In this regard, introduction of distance education in the system of modern higher education in Ukraine is becoming very relevant.

Aim of the study consists in the analysis of scientific and pedagogical literature and research on the development and implementation of distance education in the higher education system, highlighting its advantages and disadvantages, directions for further development and improvement on the example of distance courses in subjects of economic and mathematical disciplines during the preparation of future economists.

Analysis of recent publications. An analysis of scientific and pedagogical research and publications in this direction shows that there is no unambiguous interpretation of the concept of “distance learning”. Teachers agree that distance learning, despite the fact that its organization is possible only with a good material and technical base, the ability to use the latest achievements of modern society, should include the traditional methodology in the presentation of the material. This type of training, in its structure, methods of presenting material and technical capabilities, should be intended for a wide range of people, regardless of place of residence, material capabilities and health status.

Various aspects of distance education were considered in the works of M. Y. Bukharkin, J. Daniel, T. P. Zaichenko, D. Kigan, M. V. Moiseev and others. So, E. G. Skibitsky and O. B. Zhuravleva believe that distance learning is a new form of distance education (Zhuravleva, 2001; Skibitsky, 2000). A. V. Khutorskoy takes a completely different point of view that distance learning is a completely different form of the educational process, and its difference from the correspondence in the existence of constant contact with the teacher, in the possibility of discussing emerging issues in an interactive form (Khutorskoy, p. 60).

In their works, B. Holmberg and M. Moore clearly distinguish three main components of distance learning: a student, a teacher, and methods of interaction between them (interaction environment). Moreover, it is the interaction environment that they pay the most attention to. It should be comfortable, modern, technically well thought out and organized so that the teacher-student interaction is most productive for both sides.

Research results. Despite active development of information technologies, and their further introduction into the higher education system of Ukraine, which is regulated by the National Informatization Program and the concept of development of distance education in Ukraine, the pace of development of distance education cannot be compared with its foreign counterparts (The concept of development of distance education in Ukraine, 2000). One of the most significant obstacles in this direction is almost complete

absence of material and technical base, which prevents development of distance learning in small towns or rural areas.

Given the experience gained in this matter, we will analyze the advantages and disadvantages of distance learning. One of the main advantages of e-learning, in comparison with traditional training, is the fact that the basis of this type of training is purposeful independent intensive work of a person, which, based on its capabilities, determines the sequence of study of subjects, time and place of their studies. Distance learning allows you to learn at your own pace, based on your educational needs and personal characteristics.

Among the positive factors one can also distinguish a relatively low cost. Indeed, the cost with this form of training is 30-40 % lower than with the traditional form. But it is worth noting that this can only be done if the educational course is standard and the curriculum is maintained. Then the cost of the course online can really be significantly lower, the learning time can also be reduced by 15-25 %, and the percentage of perception and memorization of the material, on the contrary, increases by 15-20 %. But not everything is so simple. Even a fully developed course cannot simply be taken and transferred to the distance learning mode. In this case, the question arises of the methodological correctness of the presentation of the material, its adaptability to technical training aids. Indeed, the student studies the material on the proposed course on his own, he does not have the opportunity to ask the teacher a question online, therefore, the form of presentation of the material should be somewhat different than with stationary training. Given that the time of communication between the teacher and the student in this type of training is minimal, distance learning courses should contain a sufficient number of tasks and examples with solutions, exercises for independent work, test tasks and tests to assess the level of one's own knowledge.

Distance learning allows you to not limit yourself in choosing an education institution, regardless of which region you live in. In the process of distance learning modern technologies are used, which also allows you to master the skills that will come in handy in the future in work and everyday life. It should be noted that it is such a relationship of distance learning with advanced computer technologies that plays a positive role. So, students and teachers must be "compelled" to learn how to work with software environments, which increases their level of professionalism and makes them more competitive in the labor market.

One of the most important amenities is the ability to adjust and draw up a training schedule, class schedule, as well as a list of subjects.

However, along with the benefits of distance learning there are also disadvantages. Firstly, the lack of personal communication with the teacher and other students. Secondly, the student needs strong motivation to learn productively without the supervision of a teacher. Well, the technical aspect –

students may not always have the necessary technical equipment: a computer or Internet access.

Conditionally, distance learning can be divided into local (distance learning or distance learning courses within the framework of ordinary full-time education, training at the level of the university localization area: city, region) and more extensive training (at the country level, access to the world market).

In the case of the implementation of the latter option (access to the world market of educational services), the situation becomes much more complicated, and only the best universities in the world can allow this type of training. So, according to studies conducted in this direction (General Motors, J.C. Penney, Ford, Walmart, Federal Express), difficulties of the following nature may arise:

- time difference when it comes to large areas;
- inadequacy of training standards;
- issues of professional translation of terminology and language of presentation;
- problems in the arrangement, perception of personality, and as a consequence of differences in national cultures and interests;
- issues of strategic planning (how in what order to present the proposed pieces);
- quality of the courses offered (occupancy rate, material presentation methodology);
- recognition of diplomas and specialties;
- issues of quality and relevance of the software environment and software that accompany the distance learning process.

Therefore, it should be noted that the percentage of those who can and are ready to go completely to distance learning is really low. By virtue of its psychophysiological characteristics, a person is a social being, nothing can replace direct “live” communication, and of course, in any case, the results of full-time education are many times greater than their distance counterparts. As a result, in the system of modern education, the best results are obtained by training, in which the proportion of distance learning does not exceed 40 % (Law of Ukraine, 1998).

This can be realized both due to the fact that some courses are offered remotely, and due to the fact, that within the framework of a separate course some topics are brought to distance learning. Today, such a teaching methodology is the most common in the world and it has shown the best results.

So, some individual issues of using computer training programs in the educational process are considered in the works: G. Krasnova, V. I. Snegurova, N. G. Podaeva, N. V. Rashevskaya and others (Krasnova, 2003; Kuznyak, 2017; Podaeva, 2009).

Existing experience in this direction and own achievements were taken into account by teachers of the Department of Higher Mathematics and Economic and

Mathematical Methods of Simon Kuznets Kharkiv National University of Economics in the development of the remote component of disciplines read by the department. For this, the computer platform MOODLE was used.

MOODLE belongs to the automated learning management information system class LMS (Learning Management System). This system is used in more than 30,000 education institutions in many countries of the world to organize distance learning; it has been translated into more than 80 languages, including Ukrainian.

MOODLE allows you to design, create and manage educational information resources of an education institution. MOODLE is a fairly flexible system: the teacher can independently create and manage a distance course, that is, control access to his courses with his own hands, use time constraints, create his own knowledge assessment systems, control the direction of verification of students' completed tasks, fix tasks that are delayed, allow or prohibit students from retaking control tasks.

The MOODLE system provides convenient content management tools and various forms of organization of classes. A distance course can contain various elements: lectures, practical exercises, forum, chat, wiki. At the same time, you can use text, presentations, tables, diagrams, charts, video materials, Internet links, auxiliary files and other materials. Based on the results of students completing assignments, the teacher can rate and comment.

Teachers of the department read disciplines of the economic and mathematical cycle in 1-2 courses of the university, all of them are basic. Due to their complexity, and the fact that there is no variable component among them, there are no disciplines that are stated only in remote form. Each course (discipline) is accompanied by its electronic counterpart. Despite the great variety of forms of full-time instruction (lecture, practical lesson, laboratory work), according to the work program, almost 60 % of the time is devoted to independent work of students, which once again emphasizes the feasibility of using distance learning elements when studying the course.

The MOODLE platform is more focused on implementing blended rather than purely distance learning. Due to the high "flexibility" in the settings, as well as the open source code, teachers can implement a large number of interesting pedagogical approaches.

It should be noted that the MOODLE system itself has very great potential, but their use is limited both by the time of the teacher (student) and by the requirements of the discipline itself. Considering the fact that the disciplines of the economic and mathematical cycle are quite difficult for students to perceive, and only the study and understanding of the subject itself requires a lot of time, attention and effort, the main emphasis in the formation of the distance component of the courses of economic and mathematical focus was made on the very content course using fairly simple MOODLE functions.

The introductory parts of the courses contain the work program of the discipline, the schedule, the questions to be taken for the exam, the sample of the exam ticket, as well as the criteria for evaluating it. It also contains links to electronic educational resources in the relevant sections of readable disciplines available in the library of Simon Kuznets Kharkiv National University of Economics, news forum (Fig. 1).

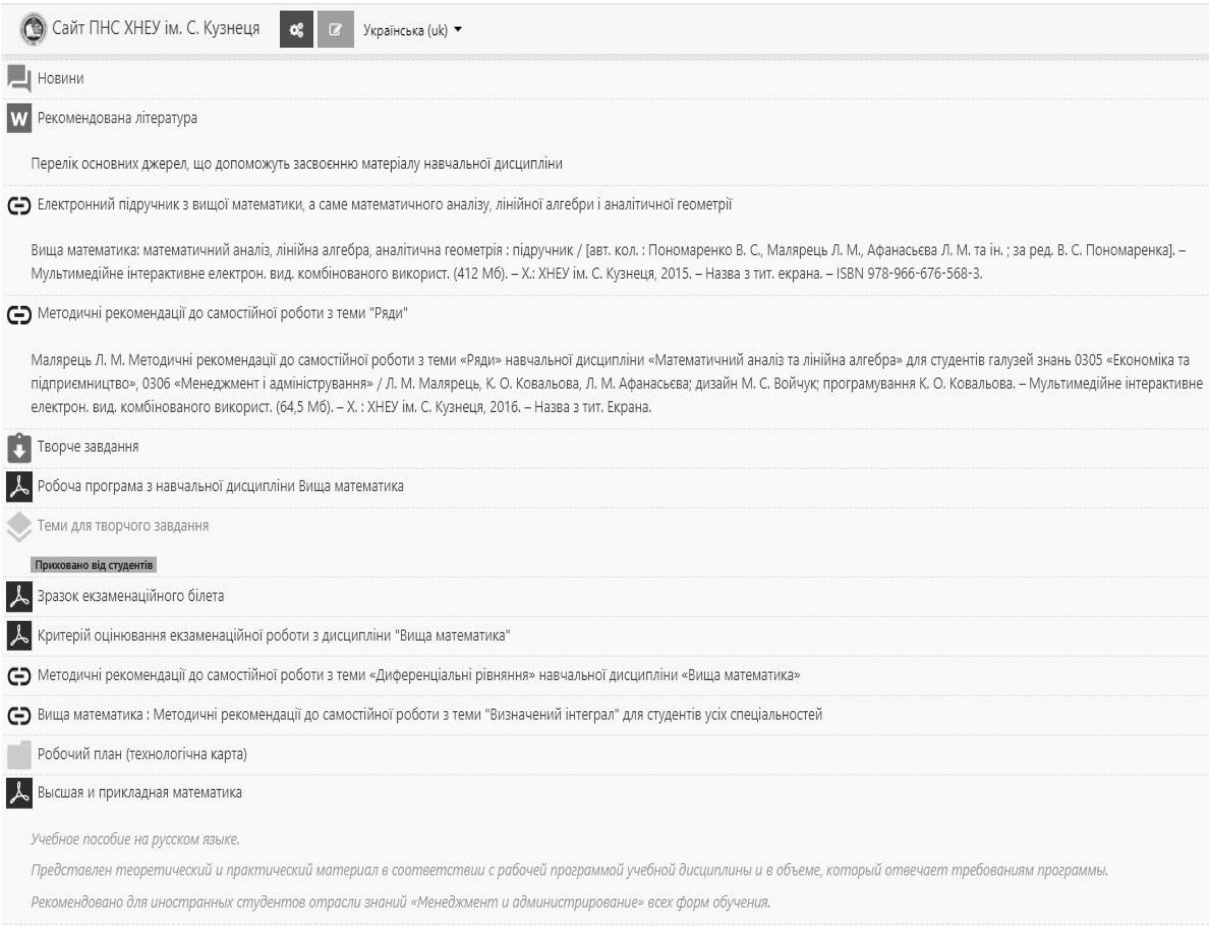

Fig. 1. Introductory part

Taking into account all of the above mentioned, on the website of personal training systems of Simon Kuznets Kharkiv National University of Economics, according to the topic of the course, theoretical material is presented in the form of lectures and presentations, didactic materials for practical exercises and laboratory work, assignments of various types for students' independent work.

Each type of lesson is designed in such a way that the student has the opportunity to form some competence necessary for him, based on his own abilities and experience gained as a result of studying the topic, and a preliminary level of mathematical preparation (Fig. 2).

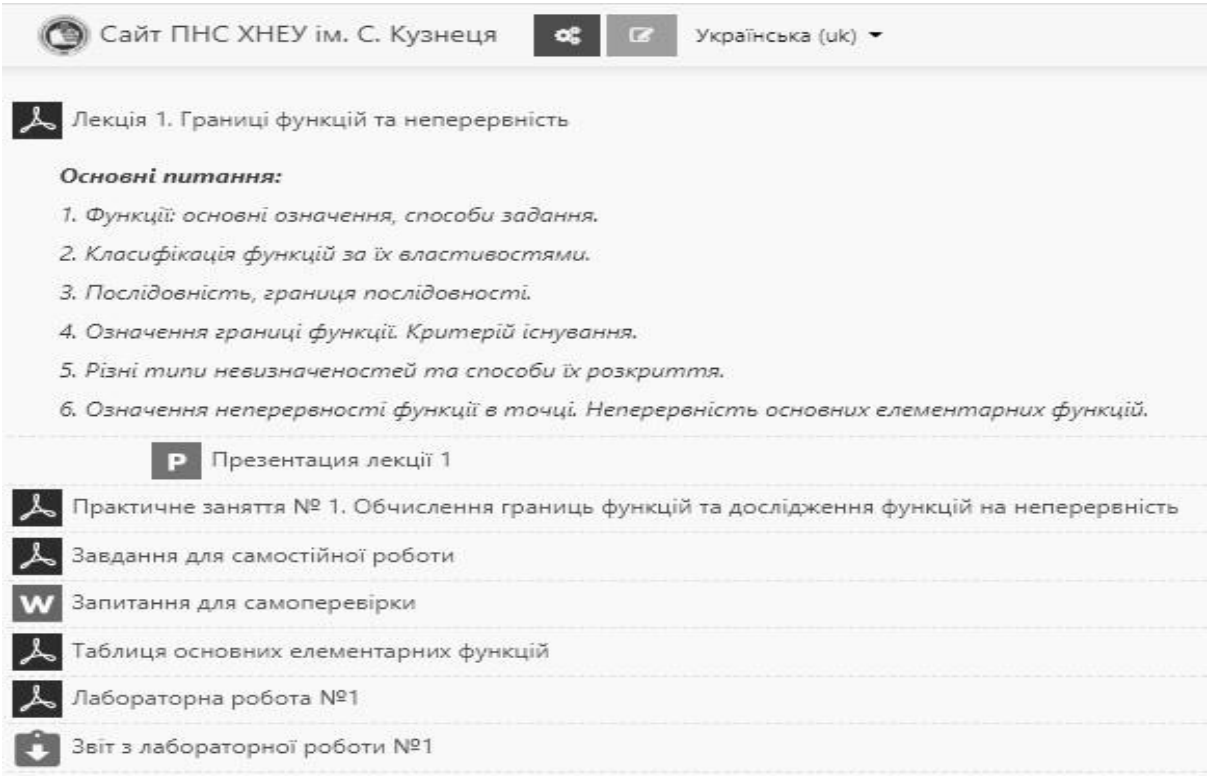

Fig. 2. Weekly course image

So, when developing material for each topic, teachers distinguish three main levels of student perception of material and, accordingly, three levels of mathematical knowledge:

First level (repetition level) is direct repetition of familiar algorithms and technical connections of already known conditions, work with standard familiar expressions and formulas, direct calculations.

Second level (the level of establishing relationships) is based on reproductive activities to solve problems that may not be strictly template, but their solution is a construction of already known methods and techniques.

Third level (level of reasoning and evidence). This level is a continuation of the second level. To solve the problems of this level, it is necessary to use the knowledge acquired at the first two levels, using a creative approach, reflection, mathematical intuition, the ability to independently develop an action algorithm.

Each course is self-developing, since its elements such as Wikki, an interactive glossary and others suggest that they be completed jointly by all students under the supervision of a teacher. All this activates the independent work of students, and also leads to an improvement and enrichment of the content of the courses after each passage by students.

Feedback is provided by a large number of elements being evaluated. All student results obtained in the course of working with a distance course are recorded in the summary sheet, which is generated automatically and can easily be converted, for example, into an MS Excel document and used by the teacher for further statistical processing or summing up.

To control the level of knowledge of students, teachers of the Department of Higher Mathematics and Economic and Mathematical Methods Simon Kuznets Kharkiv National University of Economics actively use tests in MOODLE. This is one of the most complex and heavily used modules. Automatic testing of tests with MOODLE allows you to apply new strategies for using tests that are not possible with manual testing (for example, training tests). The variety of possible use cases and the internal structure of the tests makes it difficult to organize tests using MOODLE. The system allows you to create test tasks of various types. They include both traditional types of tasks (with an open and closed answer form, correspondence, etc.) and more complex in their structure and content.

For effective work with tests, all test items within one course are combined into a question bank, and individual tests are only containers that are filled with links to a question bank, which allows you to use the same task in different tests by entering it into the question bank only time. A specific test is formed by the teacher from the bank of test tasks created by him. The test can be configured both in training mode and in control mode (Fig. 3).

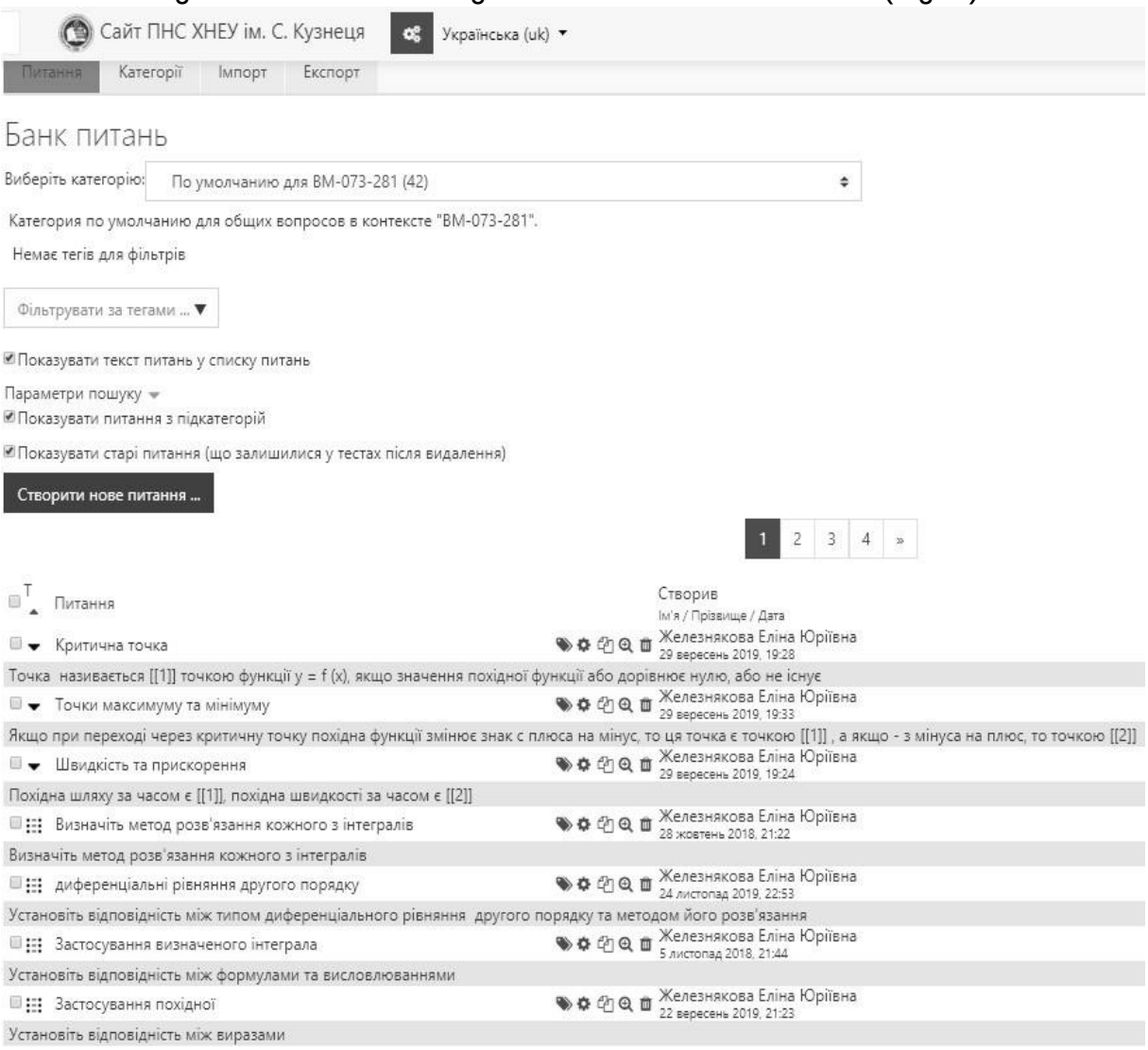

Fig. 3. Bank of questions

Conclusion. The analysis of scientific and pedagogical literature, the analysis of world experience and the results of our own pedagogical activity make it possible to conclude that a complete transition to distance learning, if we talk about high-quality university education, is practically impossible. But the use of such a form for taking various courses, obtaining additional more modern professions on the basis of existing ones, is rather common.

Experience in the implementation of blended learning has shown that successful creation and use of electronic educational courses in educational disciplines of the economic and mathematical cycle should begin with an analysis of the learning objectives, the didactic capabilities of new technologies for transferring educational information. Moreover, when planning and developing electronic educational courses, it is necessary to take into account the basic components of the teacher's activities, namely, presentation of the educational material, practice and feedback. Analysis of the results of the surveys and comparison of the performance indicators of students using and not using the distance learning form show that introduction of electronic mathematics courses in the educational process as part of full-time education improves the quality of the educational process. However, further development is required by such questions as the choice of the ratio of classroom and distance learning, the choice of a model of blended learning that would be most optimal when studying mathematics.

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Концепція розвитку дистанційної освіти в Україні. Затверджено Постановою МОН України, К.Ж НТУ «КПІ» (*The concept of development of distance education in Ukraine.* Approved by the Decree of the Ministry of Education and Science of Ukraine, K.Zh NTU "KPI") (2000).

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РЕЗЮМЕ

Железнякова Елина, **Силичова Татьяна**. Использование дистанционных курсов при изучении дисциплин экономико-математического цикла в процессе подготовки экономистов в высших учебных заведениях.

В статье рассмотрены основные аспекты использования современных информационных технологий при изучении предметов экономико-математического цикла для студентов высших учебных заведений. На основе анализа собственной деятельности и научно-педагогической литературы по вопросу исследования определены основные понятия и особенности дистанционного обучения, выделены основные, наиболее перспективные направления его дальнейшего развития и модернизации, приведены отдельные примеры использования системы дистанционного обучения на примере предметов экономико-математического цикла.

***Ключевые слова**: дистанционное обучение, экономико-математические дисциплины, учебный курс.*

АНОТАЦІЯ

Железнякова Еліна, **Сілічова Тетяна**. Використання дистанційних курсів під час вивчення дисциплін економіко-математичного циклу в процесі підготовки економістів у закладах вищої освіти.

У статті розглянуто основні аспекти використання сучасних інформаційних технологій під час вивчення предметів економіко-математичного циклу для студентів закладів вищої освіти. На основі аналізу власної діяльності і науково-педагогічної літератури з питання дослідження визначені основні поняття й особливості дистанційного навчання, виділені основні, найбільш перспективні напрями його подальшого розвитку та модернізації, наведені окремі приклади використання системи дистанційного навчання на прикладі предметів економіко-математичного циклу.

Доведено, що повний перехід на дистанційне навчання, якщо говорити про якісну університетську освіту, практично неможливий. Але використання такої форми для проходження різних курсів, отримання додаткових більш сучасних професій на основі існуючих, є досить поширеним.

Досвід упровадження змішаного навчання показав, що успішне створення та використання електронних навчальних курсів у навчальних дисциплінах економіко-математичного циклу слід починати з аналізу цілей навчання, дидактичних можливостей нових технологій передачі навчальної інформації. Більше того, під час планування та розробки електронних навчальних курсів необхідно враховувати основні компоненти діяльності вчителя, а саме – презентацію навчального матеріалу, практику та зворотній зв'язок. Аналіз результатів опитування та порівняння показників ефективності учнів, які використовують та не використовують форму дистанційного навчання, показують, що впровадження курсів електронної математики в навчальний процес як частина денної форми навчання покращує якість навчального процесу.

***Ключові слова**: дистанційне навчання, економіко-математичні дисципліни, навчальний курс.*