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CHALLENGES AND OPPORTUNITIES FOR TEACHERS IN ORGANIZING OF STUDENTS' SELF-STUDY WORK DURING DISTANCE LEARNING AT HIGHER EDUCATION INSTITUTIONS

In education, this forced educational institutions to transit to distance learning. As a result, it has become, on the one hand, an incentive for the introduction of innovative technologies, and on the other - an indicator of its main problems and shortcomings. The article considers the main challenges and differences caused by the introduction of distance education. It is emphasized that distance learning of subjects without direct communication with the teacher convinced the educational community in the need to create a special didactic system suitable for distance learning. The use of distance learning courses in the education system allows highlighting a number of positive aspects, ensuring the effectiveness of distance learning as a form of students self-study work.

Key words: *distance learning, students' self-study work, Moodle, Technology of construction materials, Materials Science, educational course.*

Introduction. A special period for educational institutions of all types was 2020, when due to the spread of coronavirus, the organization of the educational process occurred using distance learning technologies. As we can see, currently teachers need enhanced methodological support in working with technical means of information technology and distance learning resources.

In this regard, special attention is paid to the introduction of information and telecommunications networks, multimedia, electronic, information and material resources necessary for the organization of educational activities. The new generation of educational standards includes requirements that provide educational institutions with the ability to create and process audiovisual media texts in the course of classroom and independent learning activities, including the use of distance learning technologies.

Analysis of Relevant Research. The organization of the educational process, especially in times of quarantine, needs absolutely new approach to its realization preserving the high quality of training. Achieving a radical improvement in the quality of higher education specialist training is possible through the introduction of modern pedagogical and information technologies, which are a necessary requirement in the field of professional activity.

Analysis of publications has shown that the development and implementation of information and communication technologies in higher education is the subject of investigations of many scientists in our country and abroad. Most of the early publications on the impact of the pandemic on education either advocated the benefits of practices such as social distancing and event cancellation (Tate, 2020), challenges faced by students (B. Supiano), technology choices, and resources (F. Darby) or the broader picture of education and the consequences of the suspension of full-time education (J. Ruf).

In Ukraine, the problems of distance learning at higher education institutions are studied in the following areas: the principles of distance learning (A. Andrieiev, A. Khutorskyi, Ye. Polat, O. Pometun); psychological and pedagogical principles of distance learning (V. Kukhareenko, N. Syrotenko, I. Kozubovska) methods, forms and means of creating distance learning courses (O. Rybalko, Ye. Dolynskyi, H. Yatsenko, O. Sushko); features of information and communication technologies for the training of specialists in technical specialties (M. Zahirniak, O. Sushko) and others.

Aim of the Study. The objective of the article is to determine the role and tasks of the teacher in organization of students self-study work at the technical higher educational institutions during distance learning, the main directions of development and implementation of distance learning courses in the Department of Construction Materials Technology (CMT) at Dmytro Motornyi Tavria State Agrotechnological university (TSATU), as well as acquaintance with one of the possibilities of creating an interactive distance course.

Research methods. We have employed a lot of the tools, using qualitative, quantitative and mixed methods approaches, with a strong focus on students' self-study work, especially in the case of research with students distance learning. We have conducted research in a variety of educational contexts, including classroom-based research, research in higher education online. Observational and action research approaches were widely used within educational research, as were evaluation methods.

Results. Distance learning has become an absolute necessity for higher education institutions, caused by the nature of the extraordinary conditions in which we live. In fact, it is a response to the call for a modern education system that integrates technology and creates flexibility in the learning environment to keep education safe and improve university outcomes. Due to it there is a tendency of reducing classroom hours, the transition to dual form of education, enlarging the amount of students' self-study work (Draft Concept of education development for the period 2015-2025). According to the new standards, the share of extracurricular self-study work of students is about 50% that is rather significant for the educational process. Thus, extracurricular self-study work of students requires the same organization and methodological support as they are given in traditional classroom.

The use of effective teaching methods and techniques provides engaging of students in the creative work during the educational process, developing student personality. From this point of view distance learning as a system allows to fully implementing modern requirements for education, provides a more individual approach, intensifying the process of learning and information exchange.

On the one hand, traditional classroom learning provides with the opportunity to communicate directly with the teacher, receiving immediate answers to questions and explanation. But, on the other hand, it unable to answer all the questions and give clear interpretation. In its turn the system of distance learning allows to change the pace, time and place of education, makes it possible to expand the part of self-study work.

The distance learning system consists of a set of software, methodological and organizational measures that allows to create individual and group courses for different specialties. To date, the most popular service in our country, the system with the largest number of users and developers is the distance learning environment (SDN) Moodle. The Moodle system is focused on cooperation and interaction between the teacher and a student during the classroom and extracurricular activities for the joint implementation of educational tasks. The large-scale implementation of this system in the educational process of TSATU began in 2014- 2015 (Lemeshchenko-Lagoda, Kryvonos, Kolodii, 2020) and it has been updated in 2020 (Fig.1).

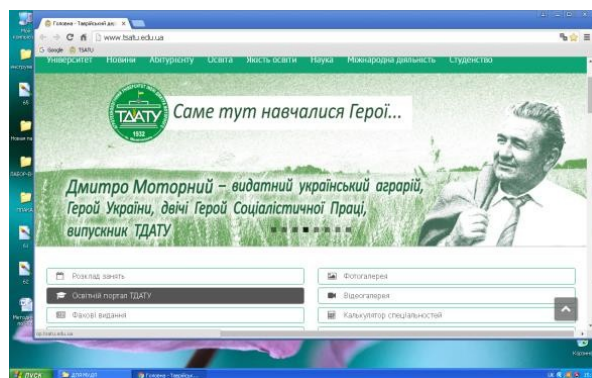


Fig 1. Educational portal of TSATU

The users can customize the platform in absolutely any way, but in TSATU there is basically one template according to it each of the disciplines works. It includes: a brief introduction to the subject, a work program for the course, lecture materials, tests, practical and laboratory work, control and mastery tests (Educational portal of TSATU based on the system Moodle, 2022).

The main content element of the educational process is the educational course (Fig.2), which for the convenience of study can be divided into blocks (terms). MOODLE provides the following functions for the course: management of the educational process; access rights distribution; interaction delimitation between participants of educational process; control and evaluation of knowledge.

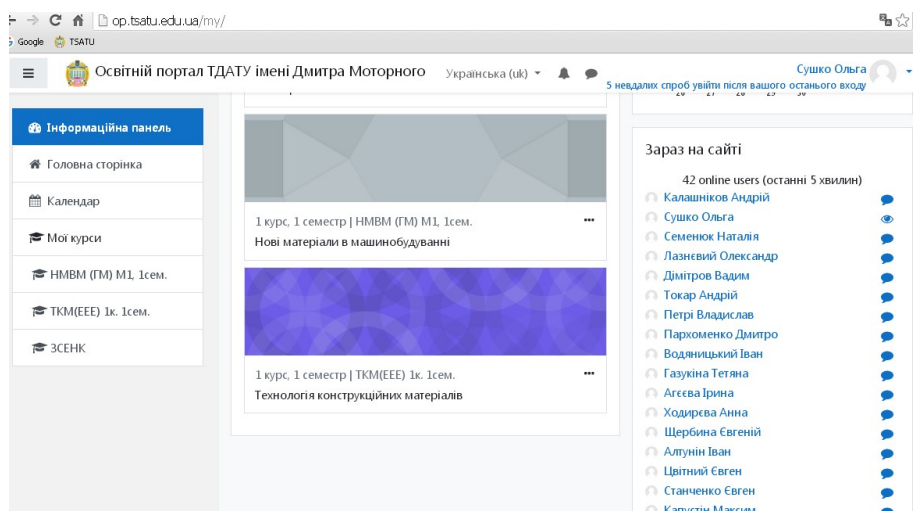


Fig.2. Electronic courses of some disciplines studied at the Department of CMT

The course includes: content part – a structured hypertext textbook, which contains material within the curriculum (Fig.3). The e-textbook is designed to study the discipline «from scratch»; communicative part – a forum of questions and answers; control part – test tasks. The testing system includes theoretical and practical tests of different types (Fig. 4).

Thus, distance learning includes all types of educational activities – obtaining information, direct lessons and knowledge control. All this can be aimed at supporting the work and empowerment of the teacher contributing to the organization of self-study work of students.

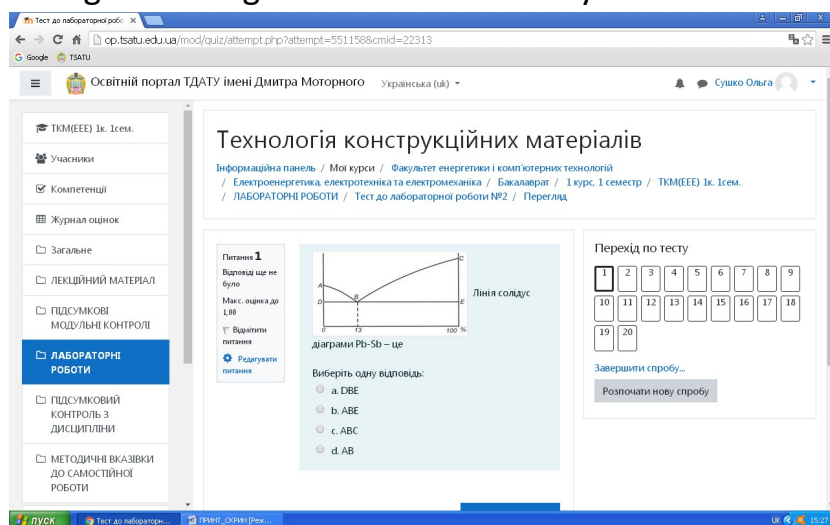


Fig.3. Lecture material of the discipline «Technology of construction materials» and «MaterialsScience»

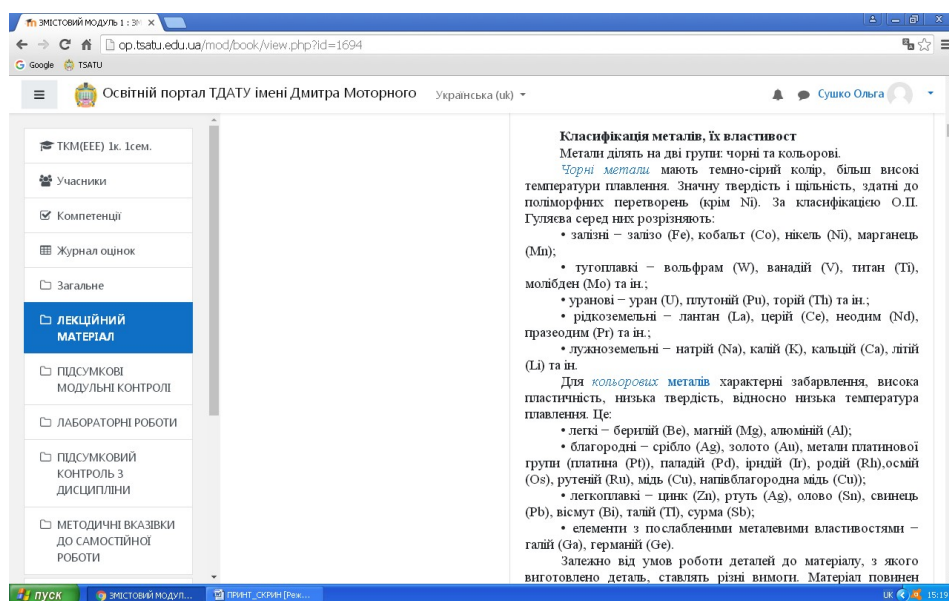


Fig.4. Test tasks to check knowledge of laboratory work

Lecture materials represent the most important of the lecture topic, which allows the students quickly find the information they are looking for in preparation for the next meeting, and those who for some reasons were absent from the lecture will be able to review the information easily.

Tests can be customized individually for each teacher (Fig 5.).

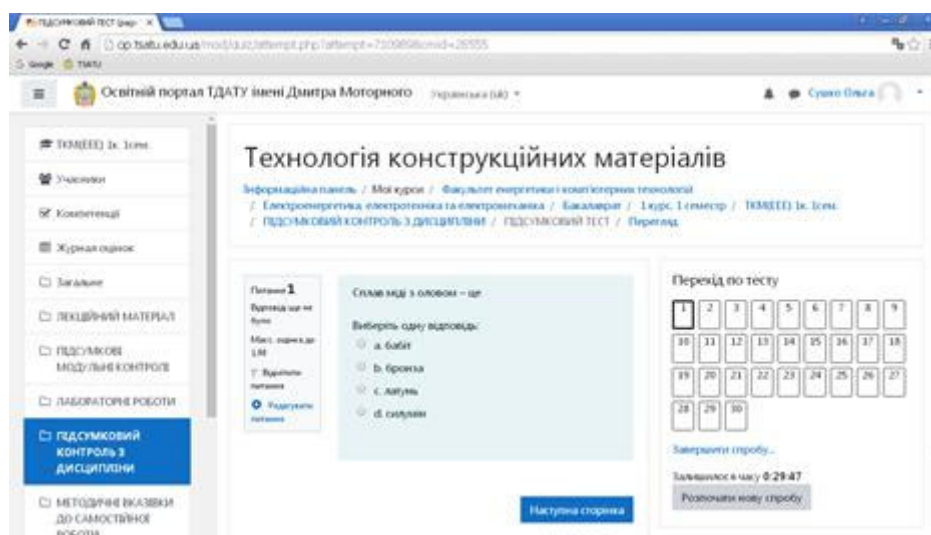


Fig.5. Training manual for laboratory work

Practical and laboratory work is usually divided into groups (topics); they include instructions for implementation, possible short tests and a place to submit the work.

The passage of the platform is designed in such a way that the student must complete tasks gradually, because otherwise, later tasks will simply be blocked. On one side, this obliges the student to familiarize himself with the full course of the subject, and on the other side, it causes some problems with the implementation of some tasks, if there was no need to go through the previous ones.

Optionally, the teacher can fix his contact information as well as a forum where students can discuss with him a question of concern. It is definitely an advantage, because during a pandemic period and distance learning, it can be quite problematic to find out the necessary information.

Introducing e-learning courses for students, it is also necessary to organize a library, which contains all educational materials in electronic form – lectures, tutorials, reference books, control tests, task options for individual work.

Disciplines «Technology of construction materials» and «Materials Science» are the main basic disciplines of future engineers and are studied in all higher technical institutions. Materials Science and Technology of construction materials are among the first general engineering course studied by students at the TSATU (Sushko, Kolodii, 2019). The course contains more than a thousand terms, each of which is the name of a separate technological process, phenomenon, equipment, tool, substance, etc.

The course «Technology of construction materials» aims to provide knowledge about structural materials and their properties, methods of their production, the basic technological methods of forming parts. Discover the physical essence of the phenomena that occur in materials under the influence of various factors in the conditions of production and operation, their impact on the properties of materials, teach the theory and practice of heat treatment and other ways to strengthen materials that give high reliability and durability of machine parts, tools and other means. The bachelor must acquire knowledge and skills on basic issues of basic properties of steels, cast irons, non-ferrous metals and their alloys; about the main characteristics, markings, properties, application of special and electro technical steels and alloys.

But, as mentioned above, due to the reduction of classroom hours, the introduction of a dual system of education and the need for students to work and study, not all students have enough time to master so necessary subjects for future engineers. Therefore, the teachers of the Department of CMT of TSATU has developed the courses for students self-study work on the Moodle, in order to improve student learning, consolidation of lectures, laboratory and practical work material. Students study this discipline only at the university and they have many questions to solve various problems and, especially, to perform computational and graphic work (Sushko, Kolodii, 2019). The distance learning course consists of the courses of lectures on each specialty, the methodical manuals-practicums on performance of laboratory and practical works, methodical instructions to self-study work (Fig. 6), and also test tasks on each practical or laboratory work, questions form content modules and final module controls. Given the lack of prior training in this course, the department has developed journals for laboratory and practical work, the student does not need to spend time drawing the necessary diagrams of instruments, tables, filling in the names of works, construction of some schedules, and it is possible to start solving the set tasks at once. There is also no need to remember what work will be next week, because the work in the journal is listed in the order provided by the work program.

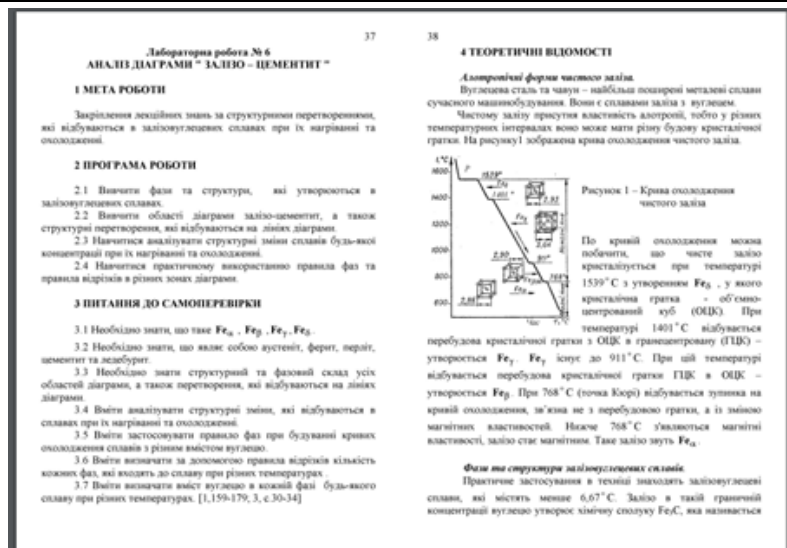


Fig.6. Methodical recommendations for the organization of self-study work

Hyperlinks provide interactivity to presentations, both inside the file and to external sources. They are very convenient when working with large presentations with a complex scheme, where you need to follow the slides in a certain order, not in turn (Fig.7.).

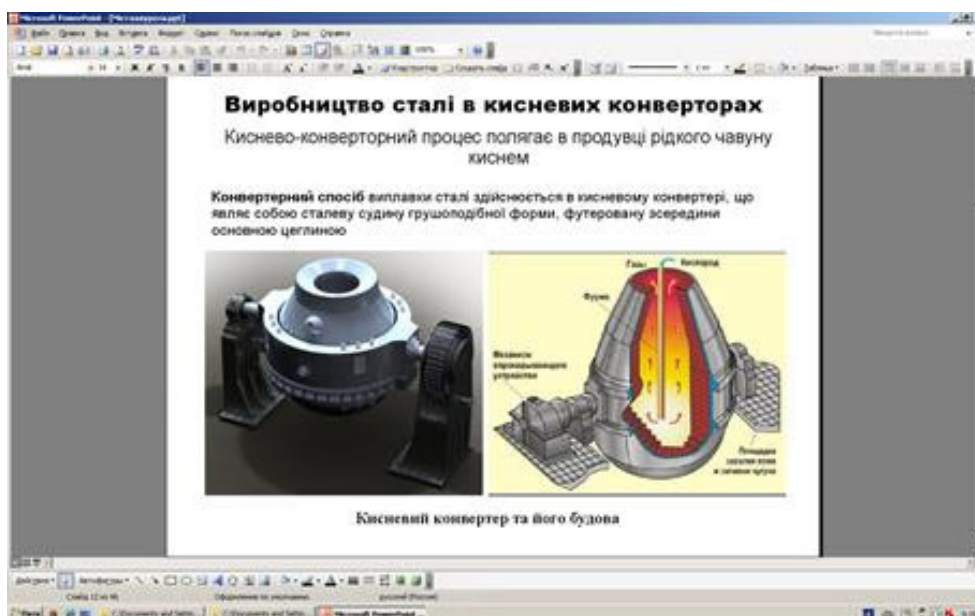


Fig.7. Example of Microsoft Power Point application

After the last months of the distance learning, teachers of the Department of CMT have faced a huge number of problems that have significantly complicated their work. Firstly, it is difficult to monitor the activities of students during online lessons (45%), especially when things are complicated by constant communication failures and unstable Internet connections (30%), a great amount of files with educational materials (15%) or technical problems with computers (10%). Moreover,

most teachers suffer from an overabundance of communication and the need to be in touch (all results were gained in the survey among the teachers of the Department of CMT).

The general situation with the digital educational environment forced teachers to give a new format to traditional professional skills and competencies and quickly master methodological techniques and lecture material without testing it in advance, checking and correcting it. Most teachers had to work on the computer for more than six hours a day, and as a result, the extra hours spent preparing teaching materials turned into endless working hours.

Despite these difficulties most teachers of the Department of CMT managed to build an effective teaching system in a new format, especially those who used reverse mentoring methods when the teacher provided the educational process, and the student also helped the teacher adapt to the digital world.

Conclusions. In conclusion, it should be noted that adapting to new technologies takes time to develop an appropriate educational system and tools for distance or blended learning. A number of negative effects of distance learning in the current crisis have generated a lot of negative judgments from teachers of higher education institution, as they often believe that it is ineffective and destroys the traditional education system. Meanwhile, distance learning contributes to the emergence of a new education system and gives it a new quality.

The use of distance learning courses in the education system allows highlighting a number of positive aspects, ensuring the effectiveness of distance learning as a form of students self-study work. Based on individual student requests, maximum differentiation and individualization of learning can be achieved, the need for independent acquisition of knowledge and skills can be developed, the self-education and communication skills can be formed.

Among other things, this will contribute to the creation of a unified education system and does not reject traditional teaching; it organically integrates various types and technologies of teaching.

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SUMMARY

Колодій Олександр, Лемешенко-Лагода Вікторія, Кривонос Ірина. Виклики та можливості для викладачів в організації самостійної роботи студентів під час дистанційного навчання в закладах вищої освіти.

З 2020 року більшість навчальних закладів світу були змушені повністю або частково перейти на дистанційне навчання. З одного боку, масштабне впровадження інноваційних технологій отримало новий поштовх у розвитку освітніх інструментів, а з іншого – такий тип навчання виявив його основні проблеми і недоліки. У статті розглянуто основні виклики, що постали перед викладачами технічних дисциплін, що насамперед передбачають пряму взаємодію викладача та здобувачів вищої освіти, у зв'язку із впровадженням дистанційної освіти та шляхи їх подолання. Під час експериментальної роботи було використано методи спостереження та дослідження дії, а також якісні, кількісні та змішані методи оцінювання особливостей навчання здобувачів вищої освіти, а саме самостійної роботи студентів під час періодів дистанційного навчання. У статті наголошується на необхідності використання викладачами спеціальної дидактичної системи, придатної для дистанційного навчання, що має потенціал та уможливорює вивчення дисциплін технічного циклу за дистанційної форми навчання. Середовище дистанційного навчання Moodle є одним з тих, що активно використовується закладами вищої освіти та покликано вирішити цю загальну проблему, проте, розробка курсів технічного та прикладного спрямування потребує певного алгоритму дії, який не просто реалізувати за допомогою дистанційних технологій. У статті зазначено за яким алгоритмом викладається кожна дисципліна курсу. Шаблон курсу дисципліни може включати короткий вступ до предмета, робочу програму курсу, лекційні матеріали, контрольні роботи, практичні та лабораторні роботи, тестовий контроль знань, тощо. Однак, навіть за умови повної відповідності основним складникам курсу, перед викладачами постає проблема відсутності практичної складової, необхідної для засвоєння знань на належному рівні. Більш того, важко відслідковувати діяльність студентів під час онлайн-занять, особливо коли ситуація ускладнена постійними збоями в спілкуванні та нестабільністю підключення до Інтернету, великою кількістю файлів з навчальними матеріалами або технічними проблемами з комп'ютерами. Окрім цього, більшість викладачів страждають від надлишку спілкування та потреби бути на зв'язку.

Ключові слова: дистанційне навчання, самостійна робота студентів, Moodle, Технологія конструкційних матеріалів, Матеріалознавство, навчальний курс.