

Digital technologies in the educational space

Yurkevich N. P.¹, Sauchuk H. K.¹, Akhmedov A. P.², Khudoyberganov S. B.²

¹Belarusian National Technical University

Minsk, Republic of Belarus,

²Tashkent State Transport University

Tashkent, Republic of Uzbekistan

The paper examines the use of digital technologies in the educational process. The features of conducting classes online are shown, the main difficulties faced by teachers and students in the digital educational process are considered.

More and more attention is now being paid to digitizing educational processes. It is not only about supplementing the classical educational process with computer courses or digitization of the taught material. Now it is a trend to create so-called "digital twins" in the concept of "Industry 4.0" technology [1–3]. This technology implies the development of digital models of "everything": from a single subject, to complex processes, including educational, and even to the creation of a digital twin of the student.

The purpose of this work is to consider the issues of developing digitalization of the educational process at the present stage.

Digital resources for individual disciplines have been developed for a long time, such as [4]. At the same time until now there are no clear answers to a number of questions: whether digitalization can be dominant in the process of specialist training; to what extent these technologies should be used; what role in training specialists should play various online courses and online educational platforms; what is the status of online course certificates; what quality should be the material and technical base for the educational process; what resources students have to participate in digital education; how ready and interested

These and other questions are multiplying every day, as virtual digitalization is penetrating more and more into all spheres of society, significantly increasing its influence throughout the educational space.

In the context of digital technology application in higher education institutions, all these issues are relevant, especially in the training of specialists in engineering and technology.

The issues of developing documentation for the transfer of the educational process into digital format in general have been solved by now. However, the

question of developing the concept of a digital educational platform for an individual university remains open. As a rule, ready-made platforms like Microsoft Teams, Moodle and others are used, which allow online conferencing with students, laying out tasks and digitized teaching materials of the studied courses in general physics. When working on the platforms, two important tasks arise for teacher-student interaction.

The first one is related to the provision of methodical materials of proper quality and the organization of control for testing knowledge.

At BNTU Department of Physics, within the framework of providing digital educational process, a number of electronic resources have been developed, which allow to fully conduct online learning of students on the course of general physics in a technical university. There are electronic educational and methodical complexes in the form of the developed program, which can be successfully embedded in the video mode to show in the process of conducting classes with a group of students on all sections of the course of general physics, in particular [5, 6]. A number of electronic publications for methodological support of practical classes and laboratory physics practical work on certain specific topics have been developed, as presented, for example, in [7–9].

The experience of conducting online training by teachers of the department has shown that in online mode it is often difficult to simultaneously track the work of the entire group of students, even using the video mode. Therefore, more time is required when determining the student's proficiency level, as it is necessary to ask more questions and narrow the time interval for the answer, so that the student could not use "hints" from the Internet or other sources. Testing in this case is a form of control. Using testing as a tool to determine the level of students' proficiency has shown that the instructor needs to consider the following factors when preparing methodological materials for testing: optimal testing regulations for each task, a large volume of questions for a random sample, the short duration of fixing answers provided that the test is accessed repeatedly. Part of the difficulty in testing is to find out how deeply a student understands the material being studied. Therefore, in order to get a good learning process using digital technology, the instructor needs extra time for a short individual conversation about the material, which increases the instructor's workload many times over.

The second task is the student's independent work with electronic materials. As a rule, they are presented in the form of a pdf-file or a presentation. Experience shows that when conducting an online lecture, it is necessary to give students the opportunity to take notes and record the material at least in a thesis format. Taking notes, followed by independent study of the material, is more effective in its assimilation. As a rule, students are not always ready for such work, as more time will be spent studying a particular topic than in offline mode

and direct contact with the teacher. Besides, not all students are able to organize such work properly, for example, due to the fact that phones have small screens (fatigue of a student comes much faster), and not everyone has tablets with good viewing parameters.

Based on the above, we can conclude that for the organization of the digital educational process is the right to use the platform, all the rest is the work of the teacher to create content and communication in the Internet space.

In general, it can be noted that at the initial stage digitalization of the educational process was perceived by teachers for various reasons in a somewhat negative way. Nowadays, digitalization is already perceived by teachers of universities as a part of the educational process which allows increasing its efficiency in terms of enhancing students' independent work, accessibility of materials, as well as ensuring a higher receptivity of students when used off-line due to some opportunities of visual perception of methodological materials (bright, color presentations, video clips of physical processes, computer models and demonstrations).

In conclusion, we would like to focus attention on the emergence of all kinds of online training courses. For example, a very famous platform is Coursera [10], on which quality courses in a wide range of specialties and specializations from leading universities and specialists from all over the world are collected. Here you can get an online education in various specialties with obtaining a qualification diploma. However, such an education is quite expensive, and not all students can afford. Completion of courses with a small, at the level of symbolic, payment or free courses allows you to get a certificate, which you can except to share in networks and show your friends. But even in this case, you can get useful information and acquire some skills. However, this is all very far from what is called in the classical sense of education. Those wishing to be educated on this kind of digital courses should be clearly aware of what document they will receive at the end and what status this document gives them. The pluses of online courses are the ability to choose their time deadline, the proposed program, the possibility of learning at a convenient time for the learner.

Thus, the development of digitalization of the educational process is a given, which requires the creation of a certain material and technical base in universities, training of faculty, not only technically working in a digital environment, but also psychological, development of appropriate teaching methods. The experience of distance learning has shown that at this stage, digitalization cannot replace the learning process, which involves the direct participation of the teacher. Communicative relations will always be important in the educational process, in the process of which not only the transfer of knowledge takes place, but also the development of the learner as a person of

human society. These parts of the educational process are so complex that it is unlikely that they will ever be digitized.

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The use of solar panels to power the air conditioning and ventilation system of vans

Akhmedov A. P.¹, Khudoyberganov S. B.¹, Yurkevich N. P.²

¹Tashkent State Transport University
Tashkent, Republic of Uzbekistan,

²Belarusian National Technical University
Minsk, Republic of Belarus

The automobile air conditioning system does not use electricity, but part of the power of the internal combustion engine, taken from its crankshaft by means of the drive belt. It is proposed to install portable mobile solar air conditioners in vans, which are powered from solar panels. The solar panels, on the other hand, are placed on the roof of the minibus. This ultimately leads to a significant reduction in material costs of hydrocarbons.

Car air conditioning system is a type of air conditioning system installed in the car and allows you to cool the air in the cabin, as well as to clean it from moisture and foreign odors. In modern cars, it is an integral part of the ventilation and heating system in the cabin. The peculiarity of such an air conditioner from a technical point of view is that it does not use electricity, but part of the power of the internal combustion engine, taken from its crankshaft by means of a drive belt, sometimes common with the generator belt or a separate one. The air conditioner condenser is usually located under the hood, and in order to avoid the influence of the engine heat on it, it is placed closer to the front bumper of the car, in front of the radiator, but in such a way that the air-cooling of the radiator does not suffer. Drainage of water from the air conditioner evaporator is carried out directly under the car, therefore it is often possible to see a puddle under the car with a working conditioner. Modern air conditioning units are usually structurally combined with the cabin heating system, using common air ducts and control system. Controls of heating and air conditioning systems in