

The use of innovative digital technologies in the educational process of the university

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Abstract — The article substantiates the idea that modern education is becoming a branch of a digital economy, the development of which sets the task of modernizing the education system, including through the use of cloud technologies, electronic educational portals, augmented and virtual reality when implementing training courses, through the development of a distance complete higher education. At the present stage, an important image-forming factor for the university is an offer of various options and methods for obtaining knowledge to students, therefore, within the educational process, it seems appropriate to combine both traditional forms of training and innovative methods based on digital technologies. The thesis that learning through the virtual MOODLE system is of particular importance for future representatives of the tourism industry is approved, as it can contribute to the development of such qualities as mobility, sociability, initiative, tolerance, etc. It is proved that with the help of the MOODLE distance learning system, which is precisely based on the idea of interactivity and freedom of information exchange and editing, the development of this skill seems to be a promising proposal. The purpose of the work is to share experience in solving a specific educational problem within the framework of the training course on a tour design using a modular virtual environment, and also to show how the training material transmitted into digital form becomes an excellent simulator for a tour design.

Keywords — *digital economy, IT technology, virtual educational space, distance learning, MOODLE learning environment, interactive thematic clusters, environmental education, destination, tour design, learning outcomes*

I. INTRODUCTION

Today, the main results of production are not material products, but phenomena that do not have a material hypostasis — such as information, databases, social networks, artificial intelligence, etc., that is, one way or another, knowledge. Obviously, such concepts like “digital economy” and “knowledge economy” correlate with each other. The main object of distribution, exchange and consumption are concepts - types of goods and services. To carry out all these processes, effective communications are required based on IT technologies that contribute to the design of digital models of engineering, natural, social systems. Modern knowledge about human being, society and nature is concentrated in these models.

II. THE ROLE OF DIGITAL TECHNOLOGY IN THE ACTIVITIES OF MODERN UNIVERSITIES

The backbone for the development of digital economy is the Internet through multilevel social communications. The information obtained empirically is replaced by that synthesized by virtual reality, that is, informational analogues of reality. The volume of virtual reality increases dramatically. Physical distance becomes less important: associations of individuals are created by ideological and professional positions. The Internet makes a direct interaction between technical devices, appliances and household items without human intervention possible. The boundaries of the application of artificial intelligence are becoming wider. The university is just one of the territories for the generation of artificial intelligence technologies, and that is why it should remain the area where artificial intelligence is not able to supplant individual and group intelligence. The university should remain a cult zone of original thinking, a stronghold of creativity. The university, as a place of concentration of human capital, is not called, by analogy with an apartment, a house, a city (“smart apartment”, “smart house”, “smart city”) to become only an object of realization of innovative startups, but is intended to be a subject of creation of new meanings. The university should be a stronghold of solving non-material issues related to the state of the moral and spiritual sphere of society. This entails a review of both the content and forms of training of future specialists.

Over the past decade, information technology has played a decisive role in evaluating the activities of Russian universities. Universities optimize their activities by building innovative educational services on a technological infrastructure.

Conditions for transferring applications that provide the educational process to a public cloud on the services platform of the world's leading manufacturers of cloud services are being created. Employees and students have the opportunity to teach or study, regardless of the attachment to a specific audience or location within the university. Service events, such as meetings, are also transferred to the cloud. Digital technologies are actively used, with the help of which it is possible to see the availability of an employee and hold a meeting at any time and anywhere in the space that has the Internet access.

Universities create a catalog of services, monitor them, distributing labor and computing resources.

Cloud information technologies optimize the educational process, greatly facilitating the process of monitoring and evaluating the knowledge of university students. They are large-scale, independent of territorial location and hardware support. Cloud services such as GoogleDisk, YandexDisk, Cloud@Mail.ru MicrosoftOneDrive significantly expand the capabilities of teachers by providing tools for developing authorial teaching methods. The use of virtual and augmented reality technologies, involving the transfer of a large amount of educational material through interactive multimedia, incredibly enriches the educational process, since visual information activates cognitive processes due to brightness and dynamics. Virtual and augmented reality technologies motivate by the method of a live response and visual demonstration to study any processes that are not available in reality for the human sense organs. For example, it is clearly demonstrated how the crystal lattice of some metals changes during their hardening by thermal methods. One can see what will happen if during the process of nuclear fusion the distance between atoms is changed or how a swirl is formed as a result of a rapidly approaching hypersonic flow around an obstacle in the internal channel of a ramjet engine. These processes occur, as a rule, very quickly, inaccessible to human perception, in addition, interference in these processes could have negative consequences for human health. Using the existing methods of computational modeling, as well as virtual and augmented reality, will allow students to “feel” these processes with their own hands, change any parameters, making sure how physical, chemical, social and any other processes function and remembering this information for life. This is the digital economy in action applied to the educational process. Learning time is reduced while increasing the speed of immersion in the process under study.

It is possible to carry out the educational process not only in the classroom, but in any place with an activated Internet network. Virtual educational space contributes to the development of motivation for self-education, professional information competencies of students.

The creation of university educational portals allows the use of digital technology for distance learning, which is especially convenient for people with disabilities, as well as for those who live in regions where there are no suitable universities, for those who wish to constantly obtain new knowledge (life-long learning). The cost of distance learning is lower than full-time and part-time forms, the training schedule is more flexible, the conditions for subjectivity of evaluation are not created, the psychological impact of the student team on the educational process does not occur. The distance form makes it possible to combine study and work, which contributes to the early start of the acquisition of practical experience and work experience in the specialty. Teachers and students interact in virtual classrooms using telecommunication IT technologies and Internet resources. Communication between a teacher and a student is possible through webinars, as well as through electronic mailing, chat in a special forum at certain hours. Teachers use all kinds of forms of monitor, the most common of which are computer tests, essays, tests, creative tasks for different student groups. Students also visit on-line consultations.

III. THE ERA OF ELECTRONIC EDUCATIONAL SYSTEMS

Today, when professionals interact through social communication platforms such as Facebook, Twitter, YouTube, LinkedIn, blogs, MySpace and Wikis, the principles of functioning of these environments are also used to identify and promote new educational opportunities and innovations [1, 2]. The exchange of information on these platforms opens up new horizons for solving various creative problems according to the theories of connectivism, social learning and the Medici effect [3]. Modern electronic educational resources offer innovative methods for organizing the educational process, making it possible to present educational materials in many different ways, for example, using graphics, video, photos, sound and animation [4]. This educational content therefore contributes to the development of students' creative potential because they take a direct part in its design, this content is “live”, that is, it is constantly being transformed, becoming an object of collective creativity.

It is known that the first electronic educational systems appeared in the United States, and one of the successful examples is the modular object-oriented dynamic learning environment, or MOODLE [4–8]. Many Russian schools and universities design their educational site on this platform, which makes it possible to integrate popular social networks, such as VKontakte and Odnoklassniki. The integration concept consists of mirroring electronic MOODLE courses in the form of groups in social networks, as well as in the automated transfer of information from an educational resource to a social network and vice versa [7].

IV. MOODLE INTERACTIVE COURSE DESIGNER

Education through the MOODLE system makes it possible to design unique courses that have no analogues offline: its huge advantage is the provision of channels of continuous interaction between students and the teacher [9], which an arsenal of such interactive elements as forums, tests, glossaries, chats is aimed to. Knowledge transfer is carried out using archives, web pages, lectures, and their verification and consolidation occur thanks to tests and tasks [7, 8].

The system creates individual settings for each course. Colors, prints, the location of objects on the pages of the site, etc. are set. The concept of individualized learning is being realized both by activating the student-teacher dialogue nonstop and through joint educational and research work on a specific topic using the built-in wiki mechanisms [10], seminars, and forums. The automation of fascinating formats of educational activities makes it possible to maximize the mobility of students, stimulate their cognitive activity.

Let's consider the possibilities of the MOODLE system by an example of creating an electronic course for students of the Tourism training course at Novosibirsk State Technical University. In connection with the need to develop tourism in the Novosibirsk region, the search and popularization of its unique tourism resources and their inclusion in the tourist turnover is very important. Students should study the basics of this activity using IT technology. [11]. The main goal of the electronic course created by the author is to develop the ability to independently choose a district, small town or settlement of the Novosibirsk Region and, exploring its natural, historical, socio-cultural resources (for example, lakes, caves, ancient burghs, monuments, towers), which At the moment, are not

objects of a tourist show, to develop programs for new exciting tours in which these objects should be included. The sequence of iterations inherent in the course "Designing a pot-holing to the Barsukovskaya Cave of the Novosibirsk Region" of the MOODLE system on the educational portal of the university is designed to help achieve this goal. Obviously, this destination was chosen taking into account the initiation of students' creative approach and independence when creating a tour.

To organize an electronic course, the format of the sections was chosen according to a specific topic. Each topic includes a lecture that offers theoretical information on the corresponding stage of a tour design, for example, if we take topic No. 1, then this is a methodology for research and assessment of tourist and recreational resources of the territory. Lectures inside topics are accompanied by classes that provide students with materials on the destination chosen by the teacher, in this case, the Barsukovskaya cave of the Novosibirsk region [12–22]. Thus, the classes contain materials on the tour content, as well as on the technologies for transforming empirical material into a tour product. The "glossary" module is used: a word with a definition is highlighted and you can click on an unfamiliar term and immediately get its definition in a supplemental window.

At the end of each thematic cluster, questions are asked according to the logic of which a student should go through a specific path to a next stage of a tour design. For example, what type of tourist accommodation is possible in this particular territory? (campground); what service can be included in the tour, taking into account the features of this natural object? (team building service). It turns out that in the process of passing the stages students "draw up" a tour, while competing with each other. They put out the materials of the task in the "workbook" after each thematic cluster, which they then combine into a single whole - the project - in their

portfolio. The option of viewing by all students of the course both intermediate tasks in the "workbook" and the final works in the "portfolio" according to the stages of the development of the tour is configured.

Final works are transferred to the VKontakte social network, where friends and relatives of students are connected to the discussion, thus, the audience of the course will expand and indirectly serve to enrich its content.

TABLE I. CORRESPONDENCE OF LECTURES AND CLASSES IN THE THEMATIC CLUSTERS OF THE ELECTRONIC COURSE

Topic	Lecture	Class
Investigation of the territory, its resources and identification of the potential objects of a tourist show	The methodology of research and evaluation of tourist and recreational resources of the territory, the concept of "an object of a tourist show", the classification of objects of a show	The concept of a natural monument. The classification of natural monuments. Natural monuments of the Novosibirsk region, their classification. Travel goals to natural monuments. Youth environmental education. The cave as an element of the lithosphere, the study of which allows us to achieve several interrelated educational goals. The phenomenon of rock dissolution by water
Developing a tour idea. The format of the project tour in which the selected object should be included, its purpose, the tour name	Types of tourism. Therapeutic, cultural, educational, eventful, ethnographic, pilgrimage, active (sports). Features of different types	Active tourism (travel based on active movement on any route with great physical exercises). Subspecies: mountain, water, skiing, equine, cycling (caravanning and moto touring), pot-holing is a type of tourism that consists of hiking in various caves for educational or sports purposes. Pot-holing as a form of active and sports tourism. Particularity of pot-holing (variety of relief - wells, blockages, underground rivers), air humidity, lack of light). Pot-holing ethics, attitude to nature underground (consequences of broken stalactite)
Target audience of the project; what tourist needs does it realize	The concept of the target audience, the classification of consumers of a tourist product, the psychological portrait of various types of consumers	A database of psychological characteristics of people who prefer an active lifestyle, values, habits, skills. Small business companies in need of team building. Athletes, professional tourists, organizers of sporting events, tourist and sports clubs, high school seniors and students, young families in need of new experiences.
Contractor definition	The concept of "contractor", types of contractors	Travel agencies, transport organizations, sportswear and equipment stores, event agencies
Organization of services that will contribute to the competitiveness of the tour	Types of services included in the tour. Accommodation services, catering services, transportation services, personal services, tourist services, cultural services, sports services, health services	Tourist, sports, animation services
Route geography, main and additional show objects, a route schematic	Theoretical information on how to build a route geography, what is a schematic map	Data on the Barsukovskaya cave, its geographical location (Maslyanino), type (corridor-labyrinth), depth (19 m), length (100 m), status (natural monument of regional significance), soil composition (karst), information about karst, flora outside (plants listed in the Red Book),

map		fauna inside (species of bats, marmots, beavers, insects) How to get to the cave (from the Cherepanovo-Maslyanino highway). The tourism conditions for the cave in winter and summer
The tour logistics (transport, accommodation, food, medical insurance)	The concept of logistics, ways to optimize costs. Supply, transport, customs, information logistics	Purchase, transportation, storage of materials, equipment, finished equipment and other. The choice of the type of vehicle, the determination of routes, the processes of providing food, secure facilities during the tour
Route program by days and hours	Theoretical information about the program of the route, about what affects the distribution of activities by days and hours. Physiological norms of activities for a certain period of time	Socially important qualities and skills necessary for effective coexistence in a tourist group: The quest for mutual assistance, patience, endurance, the ability to resolve conflicts peacefully, to overcome difficulties together, the ability to take responsibility, purposefulness, and focus on results. The formation of practical skills that will improve the quality of life of the whole group during the trip: planning a route, securing the resources necessary for traveling, preparing a traveler's backpack, orienteering skills, basics of environmental behavior in the bosom of nature, rules for dealing with wild animals, knowledge of forest herbs, mushrooms and berries, etc.
Memo for a tourist going on an active tour	Theoretical information on how to draw up a memo, sections and headings, a format and a design of a memo	Dangers and difficulties (there is a high probability of getting lost, the accumulation of gases in the cave, underground explosions, overhanging boulders). Safety rules (assault and reserve teams, moving prudence, marking method, one-after-the-other movement). Requirements for uniform (special equipment, overalls, candles, lanterns, matches, ropes, "crampon").
Tour promotion tools	The components of a complex of marketing communications, the features of advertising, PR, direct marketing and sales promotion, which of these tools are most effective for promoting pot-holing	Work with agencies; direct marketing (small businesses, tourist and sports clubs, schools and universities of the city), pot-holing booklet, creating a tour page in social networks, a thematic stand at a tourist exhibition-fair
Tour calculation for one tourist	Table of expenses for creating a tour	Accounting for transportation, accommodation, food, equipment, team building services, tourist support on the area, a pay for specialists accompanying the team
Tour pilot testing	Rules for conducting a test tour, criteria for evaluating the results	An experimental check-in, within which it is necessary to assess the degree of achievement of the purpose of the trip, the quality of accommodation and food, team building programs, tourist and animation programs, service culture on the route and in places of accommodation by instructors accompanying the team; psychological atmosphere, relationships between team members, with staff; convenience and speed of transport services.

V. VIRTUAL EDUCATIONAL ENVIRONMENT OPTIONS FOR TOUR DEVELOPMENT

The teacher attaches a text, links to images of the cave and its localities online to the material integrated into a specific class topic, inserts photographs and videos taken in the area during its visit. It also contains a map of the object on the ground, a schematic diagram of how to get to the cave from the highway. The teacher has the ability to model the space, easily moving content using the "Drag and Drop" option.

A test is carried out on one of 12 theoretical questions. The system has a status of checking texts for anti-plagiarism. The teacher makes graphical comments and gives grades according to competencies.

Students can see each other's work, so an option such as "Seminars" makes it possible to evaluate the intermediate and final results of a tour design. There are deadlines for the submission of works after each thematic cluster, a deadline for presenting the project in the "portfolio". Three reviewers are attached to each, who, according to the evaluation strategy indicated by the teacher, put a point and comment on their decision.

In the preparatory process, the "Forum" is very effective, which serves to exchange tips on creating a tour between course participants. Students look through work, consult each other, enter into discussions. The forum is open to the teacher, he observes the history of student messaging and enters the

process of communication in the group. The course author also helps students navigate the process of completing tasks in his "Blog": he gives his recommendations, comments on the intermediate and final works of students in it.

The course implies passing the test. An important advantage of computer testing is the high objectivity of evaluation, since there is an automatic check of the results. Currently, there are hundreds of programs for the preparation, organization and conduct of computer testing. It should be noted that of all electronic educational systems, MOODLE has the most flexible mechanism for creating tests [23]. Tests are generated automatically from those initially entered into the "Database", where electronic literature on the destination, links to articles, etc. are also being accumulated.

The MOODLE testing system allows the teacher to develop almost all currently known types of tests - with multiple choices, in open and closed form, with questions for compliance, with a missing word and with a numerical answer. The teacher determines the dates in the test parameters, that is, the period of time during which students must complete them, as well as the number of attempts if the test can be passed several times. He sees any information about student attempts to pass the test [23]. After completing the work, the teacher summarizes and gives the results on the page of his "Blog".

Students are offered tests with a choice of several answer options in the electronic course on a tour design. The student is given a question and a number of answer options, they need to choose the one that they consider as correct, depending on the question formulation.

The subject of tests is closely related to the main purpose of the course - to teach how to design a tour, stopping in detail at each stage. Each question is related to an educational task. Only questions that are based on real conditions are used. After the results are announced, the correct answers are posted so that students can once again test themselves and consolidate their knowledge. Thus, testing is a means of managing the quality of distance learning.

The best tour is selected, which is organized by the forces of all course participants in the course finale. Offline meetings are planned in the Calendar to discuss the details of its organization. During the joint trip of the course participants, all the details of the tour design are analyzed in detail, and in practice, strengths and weaknesses in planning and organizing pot-holing for the team are determined. The skills that students discover while traveling also affect the overall grade, which is summed up from grades for all types of assignments in the classes of all thematic clusters, quizzes, final tour projects in the portfolio and tests. Thus, innovative teaching methods, when combined with traditional ones, prove to be very effective — a virtual system makes it possible to design a ready-made travel product, helping students to transform theoretical knowledge into practical one. The positive results of educational activities can be seen even in the degree of student online activity, in the intensity of exchange of impressions of the course participants in social networks.

In conclusion, it is worth noting that one of the big problems requiring urgent resolution is the shortage of teachers who strive to work creatively, using innovative digital technologies in their teaching practice.

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