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THE MODEL OF MULTIMEDIA TECHNOLOGIES USE
IN THE PREPARATION OF FUTURE CIVIL ENGINEERS

The article is devoted to the description of the model of the future civil-engineers' preparation to the use of multimedia technologies in educational and future professional activity.

Currently, the quality of higher education in Ukraine is considered to be an important factor in the stable development of the country, which means economic, informational and technological development. One of the most important problems, facing the educational system today, is the increase of education quality in higher educational establishments. The successful fulfillment of these tasks is dependent upon the formation of students' professional competences and the introduction of new multimedia technologies to the teaching process.

In view of this, it should be noted that the need of the state to train specialists, who have deep professional skills and abilities in their specialty, have such professional qualities as: scientific position, imagination, initiative, erudition, can think creatively, have their own, non-standard view on solving the problem, can work independently, and have research skills. It is the use of multimedia that allows you to form and develop these qualities.

The developed model of future engineers' preparation to the use of multimedia technologies is directed to the formation of their knowledge and skills of multimedia technologies use in their educational and further professional activity. It consists of three stages: initial, main and final. The initial stage is devoted to the obtaining of knowledge and skills of multimedia technologies use. It contains the theoretical course "Multimedia in the educational process of a higher technical school", where are introduced to the terms like "Multimedia", "multimedia technologies", "Multimedia space", etc. The main and final stages are devoted to the training of the obtained knowledge and skills in practice. They contain modeling of professional situations, and the creation of projects, tests with the use of multimedia technologies. The effectiveness of the proposed model was proved experimentally with the participation of the students of four higher educational establishments of a building profile.

The aim of the article is to determine the nature and the criteria of readiness of future civil engineers to the use of multimedia technologies, and to describe the model of their preparation for the use of multimedia in educational and future professional activities and show their effectiveness in practice.

Key words: *multimedia technologies, readiness, civil engineers, educational activity, professional activity, professional training.*

The analysis of the literature on the problem. Many works of famous teachers and psychologists are devoted to the problem of readiness. Thus, such scientists as M. Dyachenko, F. Ivashchenko, L. Kandybovich, B. Ananyev, V. Krutetsky, etc. are engaged in the problem of readiness, study its questions and develop new ideas. A. Derkach, A. Linenko, F. Genov, E. Ilyin, N. Levitov, L. Nersesyan, V. Pushkin, D. Uznadze, A. Puni, S. Kubitsky, G. Agabayan, M. Kulakova, V. Andryushchenko, R. Vavrik, L. Grigorchuk, P. Matvienko, O. Voloshina, L. Korzhova, V. Arestenko, I. Kovalchuk, O. Perets, I. Bogdanova, K. Durai-Novakova, R. Gasparyan, A. Nagornaya, K. Platonov, V. Shadrikov, and others.

In an explanatory dictionary edited by S. Ozhegov [9, p. 329] the concept of "readiness" is seen as an agreement to do something, a desire to contribute to something. In the psychological encyclopedia edited by S. Stepanov [8, p. 59] "the readiness to professional activity" is considered as psychological phenomenon, an pre-starting human's activity, that includes human's realization of his abilities, the estimation of the present conditions, the determination of the most probable ways of action; the forecasting of motivational, volitional, intellectual efforts, probabilities of achievement of result, mobilization of forces, self-suggestion in achievement of the purposes.

Thus, A. Derkach [2; 3; 4] considers "readiness" as a holistic manifestation of personality, occupying an intermediate position between psychological processes and personality traits. The scientist puts forward the following definition of this concept: "readiness" is an organized system of accumulated social information, attitudes, behaviors, etc., which, being activated, can provide the individual with the opportunity to effectively perform their functions. "Readiness for professional activity" the scientist considers as the display of all parties of the person in their integrity, giving the chance of effective performance of the professional functions and allocates the follow-

ing conditions of formation of professional readiness: independence and critical mastering of culture; active participation in solving socially significant tasks; special development of creative potential of the person.

B. Ananiev and V. Shadrikov [1, p. 17; 9, p. 30] explain "readiness" as a manifestation of a person's abilities, which give him the opportunity to carry out a certain type of activity. And "readiness for professional activity" is considered as a direction of abilities of the person on performance of highly productive professional activity.

M. Dyachenko and L. Kandybovich, V. Krutetsky [3, p. 13; 4, p. 18; 5, p. 22] define readiness as a quality of personality and as a complex psychological education, which includes the following components: motivational (positive attitude to activity); orientation (knowledge of the features of this type of activity); volitional (self-control, ability to control actions); operating (mastery of methods and techniques of professional activity); value (self-assessment of readiness for activity). Readiness for professional activity is considered by these scientists as a stable characteristic of personality and activity, as a holistic process that includes motivational, intellectual, emotional and other variables, adequate to the requirements of the content and conditions of activity.

R. Gasparyan, E. Kozlov, L. Nersesyan, A. Puni [3, p. 61] interpret "readiness" as a set of motivational, cognitive, emotional and volitional qualities of the individual, the general psychophysiological state, providing the actualization of opportunities. Readiness for professional activity is explained by these scientists as the orientation of the individual to perform certain actions in the professional sphere.

From the point of view of A. Linenko "readiness" [6, p. 30] is a holistic sustainable education that mobilizes for inclusion in activities. The scientist believes that readiness is not an innate feature, but is acquired as a result of a certain experience based on the formation of its positive attitude to a certain activity, awareness of motives, needs in it, objectification of its subject and way of interacting with it.

K. Platonov [7, p. 54] considers "readiness" as a combination of psychological, moral and professional qualities of the individual, aimed at carrying out a certain type of activity. And "readiness for professional activity" is interpreted by the scientist as the focus of the above qualities on the acquisition of personal experience in the professional sphere.

Presentation of the main material. Thus, in the analysis of psychological and pedagogical literature, we can give the concept of "readiness" the following definition: "readiness" is an individual, psychological quality of personality, which reflects its ability to carry out any activity, overcoming difficulties on the way to achievement goals. In addition, we are of the opinion that readiness implies a clear awareness of the goal, the availability of means to achieve it and devel-

oped psychological qualities, such as: will, flexibility, internal self-regulation, initiative, perseverance and self-confidence.

And "readiness for professional activity" is considered as a psychological feature of the person, that gives the chance to carry out a certain kind of professional activity, thus applying knowledge, skills, abilities and professional qualities (activity, initiative, scientific judgement, confidence in the correctness of decision-making), and also personal (will, internal self-regulation, etc.), received during training, work experience and in the course of vital activity.

Under "readiness of future civil-engineers for professional activity in terms of multimedia technologies use" we will understand a specific psychological characteristics of future engineers, that gives the opportunity to set objectives, to find the ways of their achievement, to control your own actions, to be able to forecast the ways of the increase of the effectiveness of your own engineering and construction activities with multimedia technologies use in the presence of the following professional and personal qualities: will, internal self-regulation, erudition, initiative, imagination, scientific position, as well as knowledge of skills in special and socio-humanitarian cycles, knowledge of multimedia and skills to work with them, which will allow them to carry out their future professional activities.

In the structure of readiness of future civil engineers in the application of multimedia technologies, we have identified four components of the readiness of future civil engineers to use multimedia technologies: motivational, substantive, procedural and reflective-evaluation.

Motivational component of readiness to multimedia technologies use implies students' interest to the use of multimedia technologies; the awareness of the expediency of using multimedia in the process of studying at the university; students' understanding of the meaning and functions of the use of multimedia in the classroom and in future professional activities.

Cognitive component of readiness to multimedia technologies use includes theoretical knowledge on the subject and skills of special and humanitarian subjects; knowledge of features of multimedia technologies use in special subjects, social and humanitarian; a set of knowledge that allows to develop and use multimedia tools.

Conscious-practical component of readiness presupposes the presence of practical skills and abilities to apply multimedia programs in the study of special and social-humanitarian disciplines; the ability and desire of students to constantly improve the acquired skills and abilities for the effective use of multimedia programs; creating favorable atmosphere in the classroom (the ability to work with the use of multimedia in groups and independently).

Reflexive-evaluative component of readiness includes the ability to analyze, think, and scientifically substantiate their ideas; formed skills of creating construction schemes, drawings and projects with the use of multimedia programs; students' ability to objectively analyze their work.

Based on our proposed components of readiness, we distinguish the following criteria: **motivational**, which corresponds to the motivational component of readiness. The indicators of this criterion are: interest in the use of multimedia technologies; awareness of the expediency of using multimedia in the process of studying at the university; understanding the meaning and functions of the application of multimedia technologies in the classroom and in future professional activities. **Cognitive**, which corresponds to the content component of readiness. The indicators of this criterion are: a set of theoretical knowledge, practical skills and abilities in subjects of the special and socio-humanitarian cycles; students' awareness of the peculiarities of the application of multimedia technologies in classes in special and social sciences and humanities; students' awareness of the choice of multimedia programs in accordance with the objectives of classes in special and social-humanitarian disciplines.

Conscious-practical, which corresponds to the procedural-activity component of readiness. The indicators of this criterion are: a set of practical skills and abilities to the use of multimedia programs in the creation of construction schemes, drawings and projects; the ability to improve the acquired skills for the effective multimedia technologies use; the ability to develop multimedia programs, to analyze the features of their application in the performance of engineering works. **Reflexive-evaluative,** which corresponds to the reflexive-evaluative component of readiness. The indicators of this criterion are: the ability to analyze, think creatively and scientifically substantiate the proposed ideas; the ability to evaluate their own achievements, identify the pros and cons of working with multimedia technologies; availability of skills and abilities to assess the quality of construction and installation work.

The experimental model of professional training of future civil engineers developed by means of multimedia technologies includes three stages: initial, basic and final. Structurally, the model presents the following components: purpose, stages, pedagogical conditions, forms and methods of work.

At the initial stage of future civil-engineers' preparation for multimedia technologies use, students must be displayed the emotional attraction of educational activity, and future professional activity by means of multimedia technologies use. To do this, it is advisable to acquaint future civil-engineers with audio and video materials such as: "Multimedia in educational process of a technical high school", "Using multimedia programs for engineering purpose in special and humanitarian subjects: (architectural designing, engineering geodesy, foreign language)", "Prospects for professional engineering with the use of multimedia technologies" in order to interest future civil engineers to the use multimedia technologies in the course of educational, as well as in future professional activity.

Thus, it should be noted that the theoretical training of future civil engineers at this stage will include familiarizing students with the structure and functions of multimedia teaching aids, the relevance and appropriateness of their use in the classroom and the possibilities of multimedia tools.

At the main stage of preparation of future civil engineers for the use of multimedia technologies, it is necessary to organize the educational process on the basis of systems of attic use of multimedia technologies. To do this, teachers should use multimedia presentations in special subjects (geodesy, architectural design, engineering graphics) and foreign language. In addition, the data on the stages of students will demonstrate the opportunities of different application of computer multimedia programs when studying the above-mentioned subjects. For example, at the classes of geodesy such multimedia computer programs are used: "Geonics" – the program to perform the project plan of vertical design of premises, the creation of relief surfaces and contour line cards. "Praxis" – a program for calculating the stress-strain state of the system – foundation – foundation – structure. "3D Tunnel" is a program for calculating the stress-strain state of the soil base system.

At the classes of architectural design such multimedia computer programs are used: "Home Plan 5.1.39", "Visicon", "3D House Architect Design Deluxe" – the program for creation of project plans of the building. "Acronhome" is the program designed to create a landscape project. "Sketch up" – a universal program of three-dimensional modeling. "ArchiCad" – the program, used for walls, roofs, window and doorframes. "Roofmaker – 2" – the program for creating a project of rafters. "Staircon 340 SP 3" – the program developed for the design of stairs, railings, thresholds.

At the classes of "Engineering Graphics" such multimedia computer programs are required: "Autodesk 3 ds Max Design" – the program for plan-project drawing, "T-Flex" – the program for automatical design of building objects.

At the classes of foreign language such multimedia computer programs are applied: "Tell me more" – for the development of monologue and dialogue speech skills, "Listen" – for the formation of listening skills, "Bridge to English" – for grammar material training, "Repetitor multimedia" – to consolidate lexical and grammatical skills.

At the final stage of preparation of future civil engineers for the use of multimedia technologies, it

is necessary to form students' readiness for the systematic application of multimedia technologies. In view of this, it is necessary to hold a special course "Multimedia technologies at the classes of special and social-humanitarian cycle". In the course of presentation of the first module the students were introduced to the lectures about multimedia assets, the essence, methods and purpose of multimedia technologies use in Ukraine and abroad.

In the course of the second module presentation, students were told about the classification of multimedia technologies, and technical assets of teaching, educational multimedia editions and resources, the Internet, about the advantages and disadvantages of multimedia use in Ukraine and abroad. In practical classes, students were asked to create presentations, work on searching for information on the Internet and in the electronic library, to characterize the advantages and disadvantages of multimedia in the form of dialogue.

The third module was devoted to the application of multimedia at the classes of special subjects and foreign language. This module includes lectures on the following topics: "The experience in the use of multimedia technologies in the educational process of the University", "Methods and means of forming the readiness of future civil engineers to use multimedia in classes in both special and socio-humanitarian cycles", "Professional activity of civil-engineers in terms of multimedia technologies use", "The analysis of professional activity of civil-engineers in terms of multimedia use". In practical classes, the students were offered: an integrated lesson (one special subject + English), where the students were shown a film adaptation of the English text "The Construction of a building", after which the students had to compose dialogues in English on the topics: "Building", "The construction process technology", "The work of a civil-engineer". All three modules include independent and individual work of students.

At the end of this stage, as a control for the acquisition of knowledge, acquisition of skills and abilities to use multimedia tools in the classroom, we offered such types of work as creative project competitions, mutual evaluation of works, collective discussions.

The conclusions. From the above we can conclude that the preparation of future civil engineers for the application of multimedia technologies should be consistent, aware, and focused in order to ensure a high level of readiness of future civil engineers to the use multimedia in their future professional activities, which, in our opinion, will help to improve the skills of future civil engineers in their professional activities.

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Дубініна Н. В. Модель підготовки майбутніх інженерів-будівельників до застосування мультимедійних технологій

Стаття присвячена опису моделі підготовки майбутніх інженерів-будівельників до використання мультимедійних технологій в освітній та майбутній професійній діяльності.

Нині якість вищої освіти в Україні вважається важливим чинником у розвитку стабільної країни, що означає економічний, інформаційний та технологічний розвиток.

Однією з найважливіших проблем, що стоять перед освітньою системою сьогодні, є підвищення якості освіти у вищих навчальних закладах. Успішне виконання цього завдання залежить від формування професійних компетенцій студентів, а також використання засобів мультимедіа в навчальному процесі.

З огляду на це варто зазначити потребу держави в підготовці фахівців, які мають глибокі професійні вміння та навички зі своєї спеціальності, мають такі професійні якості, як: наукова позиція, уявлення, ініціатива, ерудиція, здібності до творчого мислення, наявність власного, нестандартного погляду на вирішення професійних завдань, уміння працювати незалежно один від одного і здатність до проведення досліджень. Саме використання мультимедіа дозволяє формувати та розвивати вищезазначені якості.

Варто також зазначити, що для формування цих якостей у майбутніх фахівців необхідно провести теоретичний спецкурс із використання різних мультимедійних додатків із метою їх

подальшого використання в навчальній та майбутній професійній діяльності, моделювати різні професійні ситуації із застосуванням засобів мультимедіа, а також навчити студентів розробленню професійних проєктів.

Метою статті є визначення природи і критеріїв готовності майбутніх інженерів-будівельників до застосування мультимедійних технологій, а також опис моделі їх підготовки до здійснення навчальної та майбутньої професійної діяльності.

У статті подано докладний аналіз психолого-педагогічної та методичної літератури з висунутої проблеми, запропонована і детально описана модель підготовки майбутніх інженерів-будівельників до застосування мультимедійних технологій у навчальній та майбутній професійній діяльності, її етапи, компоненти і засоби реалізації.

Варто зазначити, що підготовка майбутніх інженерів-будівельників до застосування мультимедійних технологій має бути послідовною, спрямованою на набуття високого рівня готовності вищезазначених фахівців до застосування засобів мультимедіа в навчальній та майбутній професійній діяльності, що, на нашу думку, допоможе вдосконалити професійні навички майбутніх інженерів-будівельників.

Ключові слова: мультимедійні технології, готовність, інженери-будівельники, освітня діяльність, професійна діяльність, професійна підготовка.