

UDC 378

OPEN EDUCATION SPACE: COMPUTER-AIDED TRAINING OF THE FUTURE ENGINEER-TEACHER

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Abstract. One of the challenges facing higher education is training of graduates for professional activity in the information society. The solution of this problem is connected with students' competence formation in the field of computer science, computer engineering and information and communication technology. Activation of the formation process of "engineer-teacher" profession requires solving the problem of computer-aided training of specialists in the field of engineering and pedagogy, taking into account global experience, as well as issues of training specialists, that are common to the national higher school. In the article the computer-based disciplines for the field of training 6.010104 "Vocational Education (according to specialty) have been analyzed as professional. The attention is focused on the open education space as one of the means of optimization of these subjects teaching in view of modern popularization of continuous open access to the educational process.

Key words. open education space, computer-aided training, engineer-teacher, "Vocational Education".

Introduction. In the context of the information society the development open education is becoming as relevant as ever, and information and communication technology, distance, electronic, mobile, cloud-based learning form its basis.

Open education involves the creation of common information and education environment of open access, teaching resources of educational institutions (educational plans, programs, methodical recommendations (for laboratory, practical, independent, course, qualifying works), lectures, examinations, the subject of reports, a list of recommended books and etc belong to its repository. Furthermore, the results of researches, projects, cooperation with professionals from other countries that promote the integration of Ukrainian science to the common European and global intellectual space are related to such databases.

Over the past few decades, the system of knowledge generation and transfer has radically changed, and their scope has increased to a great extend. When training at the university it is impossible to prepare a person to the professional activities for life. Nowadays about 5% of theoretical and 20% of professional knowledge is updated annually. The solution of the problem is transition to lifelong learning, where basic education must be supplemented with additional programs and serves as the basis [3]. According to V. Bykov [2], open

education and open educational systems provide use of open learning environment, formation of its means and technologies, with computer-based tools and information and communication technology (ICT) playing the leading role. On this basis information and communication platform for open education is based, thereby informatization, as a social phenomenon is an important factor and modern tool of innovative education development.

Materials and methods. Information and education environment of open education is investigated by domestic and foreign scientists (V. Bykov, C. Zdioruk, A. Ishchenko, M. Karpenko, V. Filipov). They develop the system of educational process with information support and Internet documenting of institutions of different accreditation levels and forms of ownership. So, V. Filipov marks the following principles of open education: open educational planning, that is the freedom of drawing up an individual program of study by selecting courses from the system; freedom of timing and pace of training selection, i.e. the admission of students to universities throughout the year and no fixed terms of training; freedom in the choice of place of study: students can be physically absent in the classrooms most of the study time and they can choose where they learn; transition from the principle of "education for life" to the "lifelong learning" principle; free development of personality, that is an important

factor; whereas the classical model of education allows strict rules, that unify the human personality [7]. Engineering and pedagogical education as the highest centre of common professional training system for the industry or several industries is in the context of open education development. The features of this system are combination of training with students' professional training, that's why the engineering and pedagogical education is referred as the system where the laws of pedagogy and manufacturing are interrelated. The term "engineer-teacher" has a dual character: on the one hand, it is an "engineer of the appropriate specialization" on the other – "teacher" that combines psychological, pedagogical and methodological knowledge and skills [4].

A well-known foreign scientist of professional formation of the engineer-teacher personality Ye. Zeer says: "Engineer-teacher" does not mean "engineer" plus "teacher", it leads to the formation of a new concept "[5, p. 16].

Results. Therefore, the training of future engineer-teachers is in the mastering of modern methods of independent research and analysis of any information using information and communication technology. Formation of IT skills should meet the requirements of educational qualification characteristics (EQC and EPP) of engineer-teacher that summarizes the content of education and reflects its objectives [6]. The main components of computer-aided training must be shaped so that the specificity of the subject area of future professional activity reflects in specific application tasks. Analysis of computer-aided training for the specialization "Vocational Education (according to specialty)" (see Table. 1).

The analysis of state educational standard of the training 6.010104 «Vocational education (according to specialty) » as a source of the content of future engineer-teachers' professional training allowed us to define the scope of informative disciplines and their place in forming students' readiness to professional activity.

The amount of computer-based disciplines in different specializations of the training «Vocational Education (according to specialty)» shows that students' readiness to professional

activity is purposefully formed in specialized and computer-based disciplines.

Analyzing the state of specialists' readiness for the vocational education system, standards of higher vocational education, educational and methodological basis of this training, we can state that nowadays such training occurs in 35 specializations [8]. Among analyzed (15 specialties) one of them is straight directed to the specialists' training in information and communication technologies – «Computer technology». We should accentuate the analysis of correlation of the portion of disciplines which can be attributed to computer-aided training, common quantity of disciplines which are the parts of the curricula of certain specializations of Vocational education. The computer-based disciplines' portion was determined with correlation of credits according to the curricular of educational and qualification level «bachelor».

So the analysis of students' computer-aided training in the specialization «Vocational Education (according to specialty) » provides a basis to assert that the general amount of computer-based disciplines – 29 for 15 specializations, according to the curricular only two disciplines are provided («Informatics and Computer Science», «Engineering and Computer Graphics»). Mentioned disciplines are the parts of natural and scientific training, their aim is to form and develop knowledge, abilities and skills necessary for usage of computer machinery and means of information and communication technologies in the future professional activity. Accordingly, for the specialization «Vocational Education» the portion of computer-based disciplines is about 3-5 %, except the specialization «Vocational Education. Computer Technology», where curricular provide for 14 disciplines relating to the computer-aided training (it's about 30 % from the general educational load).

Conclusion. So, computer-aided of future engineer-teachers provides for additional opportunities of choosing the alternative courses and teachers, which is ensured by means of the integration of educational and methodological and personnel supply of educational institutions into

the common databases available via Internet. In other words, in the open education space.

Table 1. The scope of computer-based disciplines in different educational program specialization on the field of training "Vocational education (according to specialty)"

№	Discipline	Educational program specialization														
		Metrology, standardization and certification	Life and Labour Safety	Electrical Engineering (all specializations)	Computer technology (all specializations)	Electronics	Telecommunications and connection	Radio engineering	Welding	Mechanical engineering (all specializations)	Transport (all specialization)	Publishing and printing	Technology of textile and light industry	Food technologies	Design	Economics
1.	Informatics and Computer Science															
2.	Engineering and Computer Graphics															
3.	Computer Systems and Networks Information Security															
4.	Microprocessor and Microprocessor Systems															
5.	Automated Control Systems															
6.	Computer Design and Multimedia															
7.	Fundamentals of Circuitry															
8.	Theory of Automatic Control															
9.	Modelling and Optimization of Automated Control Systems															
10.	Systems of Information Processing and Transfer															
11.	Modern Robotic Complexes and Flexible Industrial Systems															
12.	Work Training															
13.	Ergonomics of Information Technology															
14.	Computer and Analytical Activity															
15.	Computer-Aided Document Science															
16.	Computer Technology in Educational Process															
17.	Applied and Web Programming															
18.	Design and Operation of Information Systems															
19.	Repair and Modernization of Personal Computers															
20.	Technology in Education															
21.	Peripheral Devices and Interfaces of Electronic and Computer Devices and Systems															
22.	Programming of Electronic Devices															
23.	Digital Circuitry															
24.	Database in Electronic and Telecommunication Systems and Networks															
25.	Telecommunications and Information Networks															
26.	Computer Science and Microprocessors in Telecommunication Devices															
27.	Basics of Information Theory															
28.	Technology of Graphic Information Processing															
29.	Applied Graphics															

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