

THE DEVELOPMENT OF HIGHER IT EDUCATION IN UKRAINE: CONDITION AND PROSPECTS

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ABSTRACT

The article analyzes the trends of digitization of higher education in Ukraine, characterizes the current state of IT training of specialists in higher education institutions, identifies specific features of IT education, singles out directions for the development of higher IT education, formulates recommendations regarding the need to establish closer cooperation between higher education institutions and IT companies, the unification of requirements for educational courses in IT specialties taking into account the needs of the development of the global and domestic IT industry, the formation of a general strategy for the development of educational programs and standards in the field of IT based on considering the requirements of professional communities for the level of professional competences and qualifications of IT specialists, constructing an integrated three-level system of IT education, creating clusters from leading universities, IT companies and IT associations, deepening international relations of domestic and foreign educational institutions and leading IT corporations. The methodology and the results of the work of focus groups (“Teachers of formal education institutions”, “Educational managers”, “Trainers of informal education institutions”, “IT-business representatives”) regarding prognostic justification of the prospects for the development of domestic higher IT education are presented.

Keywords: digitization, IT education, educational program, university, cluster, methodology, focus group.

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INTRODUCTION

According to the estimates of the World Bank, the IT sphere in Ukraine is confidently becoming one of the most profitable branches of domestic economic activity. In view of this, domestic and foreign experts assign it a leading role in bringing the Ukrainian economy out of the crisis state. This assumption is strengthened by the theoretically grounded and practically proven fact that the status and development prospects of any country in the world and the quality of life of its citizens depend on the level of technological development (On Scientific and Scientific-Technical Activities: Law of Ukraine, 2015). Therefore, it is obvious that the scale and prospects of economic, political and socio-cultural integration of Ukraine with the world will depend on the quality of informatization of its society and all branches of the economy.

Since the informatization of society and economy involves the mass spread of digital technologies not only in the sphere of the economy, but also in production and social activities, the problem of preparing members of the information society for the perception of communication innovations, the formation of personnel potential for the economy of the new technological order, is acute. That is, the informatization of education can be justified in three main directions: narrowly specialized, generally specialized and social. Thus, *three important pedagogical problems of domestic IT education* are singled out: training of specialists directly for the IT industry (narrowly specialized aspect); development of digital competences (of future specialists of all branches of the domestic economy) capable of ensuring their professional flexibility and mobility in a rapidly changing information society (generally specialized aspect); education and upbringing of citizens of the digital society as educated and responsible users of digital products (social aspect).

In one way or another, all areas of formal, informal and informal education are oriented towards solving the pedagogical problems. At the same time, the preparation of young people for life and activities in the digital society in institutions of formal higher education is the most systematic, although not without numerous shortcomings.

THEORETICAL BACKGROUND

The philosophical basis of the research is the works in which the issues related to the research of education and its role in the life of society were widely discussed. The analysis of authentic sources from the philosophy of education (Gadamer, 1976; Gadamer, 2000; Russel, 1932; Marcuse, 1964; Polanyi, 1974) led to the conclusion that traditional educational systems often distance themselves from the values and interests of people, and education does not form a worldview, which would contribute to the solution of the global problems of humanity, and, therefore, pedagogical practice needs the development of new conceptual, methodological and axiological approaches to the education and upbringing of the personality of the new era.

In the domestic scientific discourse, the attention of researchers to the history of informatization of domestic education is constantly increasing, digitization of the educational process (Kremen, Lugovyi, Regheilo, Bazelyuk, N., & Bazelyuk, O., 2021); formation of informational and educational space (Kolos, 2011; Zhuk, 2017); the development of distance and mixed forms of education in the conditions of the pandemic (Grynevich, Ilyich, Morse, Proshkin, Shemelynets, & Rii, 2020), reasons and risks of digitization of education in quarantine conditions (Lokshina, red., 2020; Mospan, Ognevyyuk, & Sysoieva, 2022), development of IT education in martial law conditions (Kyva, Zastelo, & Nakonechnyi, 2022). Although there is a significant amount of scientific progress in the field of research devoted to various aspects of the development of IT education in Ukraine, it remains relevant to define the main problems and prospects of its post-war development.

METHOD

The research uses general scientific methods of analysis, synthesis, comparison, systematization and generalization of pedagogical and scientific-methodical literature, legislative acts and normative-legal documents, educational and methodological documentation, conference materials, conceptual approaches to solving the problem of training IT specialists in institutions of higher education to establish connections between the basic concepts of research and their features, to determine trends in the development of higher IT education in Ukraine. To illustrate the results of the research and ensure the scientific basis of the prognostic substantiation of the initiatives summarized by us regarding the development of domestic IT education, the method of “focus groups” was used.

RESULTS AND DISCUSSION

Several characteristic features of the current state of IT training of specialists in higher education institutions can be identified. First of all, the rapid development of information and communication technologies led to the fact that the student received unlimited access to information resources, and the teaching staff lost its traditional monopoly on knowledge. Therefore, there was a problem of building the authority of a teacher of a higher education institution, improving his training taking into account modern digital challenges (Stynska, Yashchysyn, Yankiv, & Stynskyi, 2021). Secondly, the difference between the constantly growing amount of knowledge of humanity as a whole and the physiologically limited cognitive capabilities of each individual person is constantly increasing (Schedrolosiev, 2010, p. 11). This necessitates the introduction of serious changes to the traditional system of forms and methods of knowledge transfer, the use of innovative methods and technologies. Thirdly, the modern system of training IT specialists in institutions of higher education, designed for 5-6 years, chronically does not keep up with the pace of the revolutionary progress of the latest IT technologies. During the student's studies, some specialties may cease to be relevant or disappear from the IT market, while others may appear. Together with them, there will be a need for new professional skills and abilities, conditioned by new knowledge. This outlines another pressing problem of higher education in the field of training IT specialists – its objective inability to provide students with the so-called “control package” of knowledge and skills necessary for future professional activity, since, according to the words of Professor Emeritus of Griffith University Ian Laue, “a large part of this knowledge and skills simply do not exist yet” (Seidametova, 2007, p. 67).

The popularity of high-paying IT professions in Ukraine is growing rapidly. This is facilitated by Ukrainian legislation, according to which business associations and public associations attach great importance to the provision of educational services (On the approval of the Concept of the development of digital competencies and the approval of the plan of measures for its implementation, 2021), not only actively spreading informal and informal IT education, but also providing employment opportunities in the IT sphere (Actual issues and prospects of human resources in the IT sphere in Ukraine, 2014). The above-mentioned trends put, mostly, the conservative system of formal education in front of the need to find ways and means of a faster response to the informational and economic challenges of modern times in order to ensure its competitiveness in the market of educational services. This actualizes the problem of determining the place and role of domestic IT education in the domestic and global markets of labor and educational services.

Based on the results of a survey of Ukrainian employers conducted by the Kyiv International Institute of Sociology, a ranking of the best domestic institutions of higher education, which qualitatively prepare specialists for the IT field, was compiled. It included National Technical University “Kyiv Polytechnic Institute”, Taras Shevchenko Kyiv National University, Lviv Polytechnic National University, State University of Information and Communication Technologies, National Aviation University, Dnipro National University named after Oles Honchar, Odesa National Polytechnic University, National technical university “Kharkiv Polytechnic Institute”, Kharkiv National University of Radio Electronics, National University “Kyiv-Mohyla Academy” (Poskannaya, E. 2013). Specialists for the IT field are also trained by other state educational institutions, including non-specialized institutions of higher and professional pre-higher education. In addition, IT education is also provided by private schools, public organizations and associations, business associations, organizing corporate training for their employees, as well as conducting trainings, courses, public lectures, webinars, seminars, conferences, etc., the certificates of which are highly valued at employment.

Thus, a fairly extensive system of formal, informal and informal IT education has developed in Ukraine, which has already prepared tens of thousands of IT specialists for the domestic IT sphere. At the same time, most of them, according to experts in this field, do not create innovative products that have the highest demand and the highest price on the IT industry market, but provide outsourcing services (Bakertilli. 5 things that hinder the development of IT in Ukraine, 2017). That is, Ukrainian IT specialists most often act as subcontractors of foreign IT companies, performing fragmentary local tasks for the implementation of large projects and reducing the costs of manufacturing expensive innovative technologies. There is information that Ukrainian IT specialists create up to 85% of programs for foreign companies (UNIAN. Ukrainian IT companies create 85% of programs for foreigners, 2015). However, even under such conditions, the domestic labor market still has a significant shortage of IT specialists. Despite the fact that the global labor market, unlike the domestic one, is highly competitive and high-tech, it also has an excess of demand for IT specialists compared to proposal. And this specificity is a complicating factor for the labor market of Ukraine, from which the outflow of the most qualified personnel to

foreign IT companies with better working conditions and higher wages increases (Korbut, & Zadovny, 2015). At the same time, this led to the flow of specialists without basic technical education from other non-core fields into the IT field, which significantly lowered the qualifications of domestic IT specialists (Dovgan, & Malik, 2017).

The domestic education system, influenced by the growing demand for specialists for the IT industry, reacted with an increase in the percentage of relevant specialties in institutions of higher and professional pre-higher education. (Justifying the opening of new specialties) even non-specialist institutions, relying on the importance of timely training of specialists for the transition of all branches of domestic production to high technologies, were able to prove the importance of training IT specialists for the agricultural, construction, transport and even socio-cultural spheres with budget funds. At the same time, the majority of domestic production is still not equipped with such powerful technological equipment to have a massive need for highly qualified IT specialists. Therefore, the graduates of the vast majority of IT specialties, having received education at state funds, direct their professional potential to the development of the foreign IT industry.

The problem of the outflow of professional personnel outside of Ukraine exposes another problem of training IT specialists in modern institutions of higher education. This is a disproportion between key and professional skills of graduates. After obtaining university autonomy, a tendency to hyperbolize the importance of purely professional disciplines emerged in higher education institutions, which, however, do not always manage to reflect rapid technological changes and prepare students to overcome constant challenges associated with the rapid development of IT technologies (On Higher Education, 2014). Domestic scientists recognize the fact that the management of higher education institutions does not understand the specifics of commercial programming. In particular, S. Popereshniak stressed that it was not enough to learn how to program in order to prepare competitive specialists. Along with purely technical disciplines, it is necessary to introduce courses on the basics of management and marketing, managing commercial projects, working with clients, industrial programming, etc. (Poppereshniak, 2010, p. 128).

It is important to emphasize that the Law of Ukraine “On Higher Education” emphasizes the importance of forming not only professional knowledge, skills, but also graduates’ worldview and civic qualities and moral and ethical values (On Higher Education, 2014). However, as already noted, in institutions of higher education of a non-humanitarian profile, their place is often marginalized. In many technical and other non-humanitarian universities, the awareness of the main purpose of higher education has decreased – to prepare not only a professional, but also an effective personality, a family man and a citizen, i.e. the intelligentsia of the country, which is the main source of the Ukrainian elite – scientific-technical, scientific-pedagogical, powerful. Disciplines of the socio-humanitarian cycle, designed to ensure the quality of the future elite of the country, usually occupy less than 20% of the educational load. There are specialties, the content of which involves only a general introduction of students to such sciences as cultural studies, psychology, pedagogy, religious studies, sociology, political science, etc. This is happening in the conditions of a long Russian hybrid war against Ukraine, which was primarily aimed at conquering consciousness, not territory. This is an information war, the victory of which depends on the quality of education of the youth, on their patriotism, personal, civic and national consciousness. In view of this, the lack of proper socio-humanitarian training of future IT specialists in institutions of higher education looks like a sabotage against the country’s security. An IT specialist without a stable system of common human and state values can become an easy prey for the conquering plans of aggressors and all kinds of fraudsters who direct the professional skills of young specialists against their country or in the direction of terrorist hacker attacks.

It is worth noting that, unlike educational managers, Ukrainian youth have already realized the professional importance of forming key or so-called “flexible” skills. This is evidenced by the results of the analysis of resumes submitted to the most famous all-Ukrainian job search portals. Employers also realized this, as can be seen from the analysis of the job descriptions presented by them. A comparison of supply and demand confirms the fact that Ukrainian graduates are not always able to meet the needs of employers due to the insufficient level of formation of “flexible” skills – complex problem solving, creativity, emotional intelligence, cognitive flexibility, etc.

Many institutions of higher IT education, due to the inability to form these graduates’ skills, are already suffering serious image losses, as evidenced by the analytical materials of many Internet resources (HeadHunter, Eurostat Educational Statistics, UNESCO Database). As a comparison of the age of representatives of the highest paid IT sphere and their level of education showed, 48% of workers in this field are 26-35 years old. At the same time, 56%, as it turned out, do not have completed higher education. This does not mean that they refuse to learn. It’s just that they started giving priority to non-formal and informal education. This is also confirmed by the results of a sociological survey of the Kyiv International Institute of Sociology, according to which domestic educational

institutions attach great importance to the ability to work with a computer and learn languages, while employers in job descriptions emphasize practical skills in working with clients, being able to interact with others, think outside the box, etc. However, according to employers, these skills are easier to acquire in courses and corporate training than in institutions of higher education. Therefore, at job interviews at many IT companies, a university graduate is more often asked about work experience, obtaining special certificates, and taking courses popular in the IT industry than about having a diploma. The findings of the HeadHunter research center showed that the majority of Ukrainian IT workers also do not consider a diploma to be the main factor in a successful job search. Work experience (74%), personal connections and acquaintances (44%), personal qualities (43%) and even luck (21%) are ranked first. At the same time, a diploma of higher education in the ranking of the most influential factors of successful employment was only in the fifth place (17%) (Poskannaya, 2013).

The problems of improving the quality of IT education in Ukraine and developing personnel potential for the domestic IT industry were the subject of consideration at the powerful international Forum “Software Development Forum 5.0.” (Ukraine Association. SDF 5.0: leaders of the Ukrainian IT sphere discussed the main challenges of the industry, 2017), organized in 2017 by the “IT Ukraine” Association with the participation of several hundred participants, including: leading specialists of Ukrainian and foreign IT companies, international organizations, bodies state authorities, institutions of higher education and mass media. A separate discussion panel of the Forum was devoted to the prospects for the development of IT education. The analysis of the results of a survey of more than two and a half thousand IT specialists from all over Ukraine, aged 18 to 36, conducted by the “IT Ukraine” Association, allows us to confirm certain trends that we have highlighted in domestic IT education.

The main centers of the domestic IT industry are concentrated in large cities: Kyiv (50%), Dnipro (14.7%) and Lviv (14.3%). At the same time, almost 60% of its personnel are made up of people from the province. Despite the fact that a significant part (19%) of specialists working in this field are graduates of the National Technical University “Kyiv Polytechnic Institute named after I. Sikorsky”, more than 40% of the surveyed domestic IT specialists did not graduate from leading Ukrainian institutions of higher education.

The specificity of IT education lies in the fact that it has a close connection with the IT industry, which widely uses work with “remote access”. That’s why IT-educated students have more chances to get a job while still studying. According to the results of the survey of the “ITU Ukraine” Association, more than 50% of IT specialists started working in their profession while studying at an educational institution.

A significant percentage of IT-educators in Ukraine stops formal education after receiving Bachelor’s degree. According to HeadHunter, almost 56%, and according to the results of the survey of the “ITU Ukraine” Association – 36% of domestic IT specialists, do not have a completed higher education. This is explained, on the one hand, by the possibility of earning a decent salary even with an incomplete education, and on the other hand, by a significant decrease in the authority of university education in the domestic labor market and, at the same time, an increase in the effectiveness of informal education (in particular, corporate training of employees at the expense of their organizations). T. Hryapina, head of development and education at GlobalLogic, noted that businesses in Ukraine are forced to personally take care of their own personnel, opening “the doors of their educational centers for schoolchildren and students who are interested in information technologies” (Ukraine Association. SDF 5.0: leaders of Ukrainian IT - spheres discussed the main challenges of the industry, 2017). Yu. Titkov, co-owner of the Internet marketing agency SEOGear, while discussing IT education in Ukraine, noted that he “does not believe in higher education in our country at all” and “does not advise spending time on a diploma.” In his opinion, in a couple of months you can, for example, “get a decent applied education at the Be First school” (Poskannaya, 2013). Therefore, non-formal and informal IT education turned out to be less time-consuming and more effective, leading to a noticeable decrease in the number of applicants for obtaining a Master’s degree.

Under such conditions, the authority of private online universities and academies, devoid of state academic bureaucracy, is growing. An example can be the creation in 1999 of the largest non-state institution of higher IT education in Ukraine - IT Step Computer Academy (KROK). As of 2021, the institution has 105 branches, cooperates with 22 countries of the world, teaches 65,000 students, has 2,800 teachers (practitioners from the largest companies of Ukraine) and has already trained 136,000 IT specialists. The university’s educational programs are declared as unique author’s methods that have received high praise from the IT industry, and the university’s teachers are practitioners from the largest IT companies of Ukraine. The university prepares Bachelors and Masters in specialties that are relevant in the modern IT market. Upon completion of studies, students receive a higher education diploma and international certificates from industry leaders (Autodesk, Google, Microsoft, Oracle, Cisco) (STEP IT ACADEMIA. The first higher education institution in Ukraine specializing in IT education).

The university also has a number of programs for adult education (courses in software development, networks and cyber security, computer graphics and design; professional special courses “Autodesk 3ds Max/Maya”, “Front-end” “Internet marketing”, “Testing of software /QA”, “UI/UX”) and children education (school for children of 7-9 years old “First Step”, Small Computer Academy for children of 8-14 years old; comprehensive high school IT Step School; Junior Business Academy; online -programs for children.) The University also implements programs for individual (for those who wish to improve specific IT skills) and corporate training (training of IT specialists to the order of enterprises) (STEP IT ACADEMIA. Education for adults).

The IT industry mostly uses Ukrainian IT specialists to provide outsourcing services, rather than to produce a full-fledged software product. The best domestic IT specialists with fluency in English go to work in foreign IT companies. Outsourced activities that dominate the domestic market of IT services do not require perfect knowledge of a foreign language and therefore do not motivate domestic specialists to improve their English language competence. Only 46% of specialists working in domestic IT organizations rated their knowledge of the English language at a level higher than the average (Upper Intermediate). Therefore, the problem of staffing the domestic IT industry should be a joint matter of the state, Ukrainian business, domestic educational institutions and more than a hundred research centers of large international companies operating in Ukraine today. In particular, the managing director of ERAM Ukraine, the president of the “IT Ukraine” Association, Yu. Antonyuk, emphasizing Ukraine’s acquisition of the status of a world-recognized provider of IT services in the field of digital technologies, emphasized that ensuring the stable growth of the domestic IT industry will depend on the “synergy between state and business” (Ukraine Association. SDF 5.0: leaders of the Ukrainian IT sphere discussed the main challenges of the industry, 2017).

Researchers of the problem of personnel support in the domestic IT sphere, L. Dovgan and I. Malik (2017), suggest a number of steps that should be taken in Ukraine to solve the quality problems of higher IT education. In general, according to the subjects of influence, they can be divided into two groups: aimed at improving the process of forming digital competence in the domestic education system and focused on improving qualifications directly in production. They consider the development of training standards for IT specialists to be the main task for the education system. At the same time, researchers focus on the problem, which can be called “rapid obsolescence” of standards for training specialists in the IT industry. That is, even the best of the developed standards may not meet the demands of the IT industry due to the rapid development of digital technologies and the long period of study in higher education institutions. In view of this, the main function of providing conditions for lifelong learning of employees is transferred directly to IT companies, which already today provide continuous training of their personnel at the workplace and develop a motivation system for those employees who pay attention to professional improvement (New time. IT education is a brick falling from the roof, 2018).

Considering the shortage of personnel in the domestic IT industry and the significant number of graduates of higher education institutions who cannot find jobs in their specialty, an important direction in the development of higher IT education should also be an increased attention to the informational component of professional training in all higher education institutions. Even for students of higher socio-humanitarian education, the basic requirements should be: developed skills in electronic business communication, self-management, use of ICT at the level of an experienced user, work with the main digital educational platforms. To do this, it is proposed to develop a distance form of education, which requires the use of adequate tools, resources and services in the educational process (Stynska, Yashchyshyn, Yankiv, & Stynskyi, 2021, p. 22). Domestic researchers (Gurevich, Osadcha, Spiryn, Stynska, etc.) include the most relevant digital educational platforms that can be used: the Moodle platform (a system for hosting e-materials and presentations; holding lectures and seminars, testing and communication in the chat); Zoom (a service for conducting online conferences and business meetings); Google Classroom (a cloud platform that includes Google Docs, Sheets, Slides, Forms – for creating presentations and texts; Google Drive – for storing files; Google Calendar – for scheduling; Google Meet – for conducting video conferences; Google Chat – for communication; Gmail – for correspondence); Microsoft Teams, Google Meet, Skype and Cisco WebEx – for conducting video conferences and meetings; the Discord program – for quick communication in the distance learning process; a number of resources for creating presentations (Prezi.com, Beautiful.ai, Genially, Desygner), infographics (Infogr.am, Easel.ly), graphic design (graphic editors Canva, Crello, Desygner), services for interactive learning (“Miro”, Flippity, Padlet, Wakelet, Linoit) etc. The use of these services in the process of distance learning not only increases the quality of the educational process, ensures the development of individual educational trajectories of students, but also forms their skills important for social and professional adaptation in the conditions of a digital society and digital economy.

The analysis of the characterized trends indicates the need to establish closer cooperation between higher education institutions and IT companies, which will make it possible: to develop common requirements for licensing educational services in the field of digital technologies; to unify the requirements for educational courses in IT specialties taking into account the needs of the development of the global and domestic IT industry; to form a general strategy for the development of educational programs and standards in the field of IT based on taking into account the requirements of professional communities for the level of professional competencies and qualifications of IT specialists; to build an integrated three-level system of IT education (general, professional, higher) to ensure the projected process of training competitive IT specialists from the range of specialties required for the domestic labor market; to update school computer science programs in a timely manner and ensure their content unity with the programs of higher education institutions; to improve significantly the professional orientation of schoolchildren in IT specialties; to form corporations (clusters) from leading universities, IT companies and IT associations in order to organize high-quality practice for students and an effective system of improving the qualifications of IT business employees; to deepen international ties of domestic and foreign educational institutions and leading IT corporations for the development of joint programs for training IT specialists of an international level. Strengthening partnership ties between education and IT business is also provided for in the Recovery Plan of Ukraine (2022), which includes the national project “Updating IT programs for TOP-5 universities together with the private sector” (Recovery of Ukraine. Projects of the national program. Development of the education system) .

To ensure the scientificity and prognosticity of the conclusions, in our opinion, it was important not only to identify and summarize the existing recommendations, proposals and initiatives for the development of the studied phenomenon, but also to create conditions for their professional analysis and prioritization of implementation. Therefore, the “focus group” method was used, which is ideal for achieving the goal and objectives of our research – identifying development trends and conducting prognostic substantiation of the prospects of domestic higher IT education. To achieve the goal, four groups of experts were formed: educational managers (heads of educational institutions, guarantors and developers of educational programs), teachers of formal education institutions, trainers of informal education institutions, and IT business representatives. 10 participants were invited to each focus group. This number is considered by scientists to be the most optimal, since it provides a diversity of views on the problem and at the same time does not interfere with the full participation of each member of the group in the discussion (Lapshin, ed., 2016, p. 9). We made sure that all focus group participants were familiar with the problems of IT education in Ukraine, had their own successful experience in solving a number of educational problems related to the development of IT education, but were neither professional “respondents” nor moderators of systematic discussions of IT education problems, nor representatives of advertising marketing research who are able to manipulate the course of discussions, professionally imposing their own formed stereotypes on other participants. The results of the rating of initiatives for the development of higher IT education are given in the Table. 1.

Table 1
Prospects for the development of higher IT education in Ukraine

№ of the initiative	Content of the initiative	Focus groups, number of elections				Σ	Rank
		Educational managers	Teachers	Trainers	IT-business		
1	To improve the mechanisms of licensing and taxation of educational services in the field of digital technologies.	2	4	2	3	11	8
2	To unify the requirements for training courses in IT specialties, taking into account the needs of the development of the global and domestic IT industry.	1	8	3	6	18	5
3	To form a general strategy for the development of educational programs and standards in the field of IT based on consideration of the requirements of professional communities for the level of professional competencies and qualifications of IT specialists.	7	7	7	6	27	2
4	To update timely school computer science programs and ensure their content unity with the programs of higher education institutions.	2	3	5	2	12	7
5	To improve the career guidance activities of institutions of higher education regarding the admission of graduates of general secondary education institutions to the IT specialty.	0	1	4	4	9	9
6	To increase the motivation of specialists with work experience in IT companies to teach IT disciplines in institutions of higher education.	9	6	8	7	30	1
7	To deepen the international relations of domestic and foreign educational institutions and leading IT corporations for the development of joint programs for the training of IT specialists of an international level.	9	7	7	7	30	1
8	To form corporations (clusters) from leading universities, IT companies and IT associations with the aim of organizing high-quality student practice and an effective system of improving the qualifications of IT business employees.	7	4	5	8	24	4
9	To develop scientific infrastructure in universities, to create endowment funds to support scientific research, to transfer technologies.	9	4	8	5	26	3
10	To develop a dual form of IT education.	5	3	3	4	15	6

So, the higher education reform initiatives included by the experts in the top five priorities by the total number of elections include: *increasing the motivation of specialists with work experience in IT companies to teach*

IT disciplines in higher education institutions (ranked 1 with the maximum number of elections in the group of educational managers and trainers), *deepening international relations of domestic and foreign educational institutions and leading IT corporations for the development of joint programs for the training of IT specialists of the international level* (1 ranking place with the maximum number of elections in the group of educational managers), *formation of a general strategy for the development of educational programs and standards in the field of IT based on consideration of the requirements of professional communities for the level of professional competencies and qualifications of IT specialists* (ranked 2), *development of scientific infrastructure in universities, creation of endowment funds to support scientific research, technology transfer* (ranked 3 with the maximum number of elections in the education group of relevant managers and trainers), *the formation of corporations (clusters) from leading universities, IT companies and IT associations with the aim of organizing high-quality student practice and an effective system of improving the qualifications of IT business employees* (ranked 4th with the maximum number of elections from IT business representatives), *unification of requirements for training courses in IT specialties, taking into account the needs of the development of the global and domestic IT industry* (ranked 5th with the maximum number of elections in the group of teachers).

CONCLUSION

The analysis made it possible to determine the following factors inhibiting the development of higher IT education: too low passing scores for admission to IT specialties, which lead to the presence of a significant percentage of low-ability students who do not master the program and do not work further in the specialty; inconsistency of the content of educational programs with the needs of the modern IT market; a large percentage of graduates (43%) unable to find a job in their field because of this; the legal unsettlement of the dual form of obtaining education, which could harmoniously combine training and the acquisition of professional skills; lack of educational programs on promising technologies (Internet of Things, Big Data, cyber security, etc.); the concentration of higher education institutions with modern educational programs in the largest cities, which reduces the possibility of attracting a wide range of applicants; the presence of an acute personnel problem due to the high workload of teachers, the low level of payment for their work, a significant outflow of qualified teachers from teaching work to IT companies (it is assumed that the improvement of the higher education system will make it possible to increase the number of specialists on the IT market by 10-12 thousand annually) .

In view of the above, there can no longer be reforms in Ukraine designed for long years of evolution of the national higher education system. We need clearly defined axiological guidelines of the state educational policy, flexible legislation and broad academic autonomy, combined with a high level of professionalism and professional and civic responsibility of educational managers and scientific and pedagogical workers. First of all, it is important to develop university autonomy and the responsibility of the higher education institution, in particular the guarantors of the quality of education, for the content of educational programs and the conditions for their implementation, to develop programs to support students, etc.

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