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International Experience and Ukrainian Realities

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Relationship and mutual influence between education and security factors under modernization challenges and external threats are analyzed. New approaches for identification of national security criteria in education sphere based on relevant international experience are proposed. The process of national education system reform is considered. Key issues of the new framework Law of Ukraine “On Education” are identified. Introduction of new forms of education as a driver of modernization of education system according to demands of the economy and national security is considered. The current state and prospects of education, scientific research and innovation sphere convergence are analyzed.

The report may be useful for scientists, education and national security experts, a wide range of readers interested in education, science and national security issues.

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INTRODUCTION

Education is not preparation for life;
education is life itself.

John Dewey

One of the main aims set in the Strategy of National Security of Ukraine approved in March, 2015 is "...endorsement of human and citizens' rights and freedoms, safeguarding of a new quality of economic, social and humanitarian development as well as Ukraine's integration into the European Union, establishing the conditions for Ukraine's integration into NATO"¹. Implementation of these provisions as well as achieving the objective defined in the Strategy as "strengthening Ukrainian state by ensuring the progressive sociopolitical and socio-economic development of Ukraine" requires strengthening humanitarian security. The development of the national system of education is an inseparable part of this process. This implies preventing the system from destruction, maintaining its achievements as well as its modernization that is necessary for the human capital development, progress in the economic, social, political and cultural spheres.

The Strategy of National Security of Ukraine also contains a number of specific provisions dealing with education. For example, there have been determined the following threats to the national security of Ukraine: "information and psychological warfare, humiliation of the Ukrainian language and culture, falsification of the history of Ukraine, the formation of alternative to the reality, distorted information picture of the world by the Russian mass media"; inadequate economic model and insufficient level of media culture in the society.

Among the main areas of national security policy of Ukraine there are some directions which implementation requires appropriate steps in the education sphere. They can be defined as follows: the development of the military patriotic education system, introduction of the military training and civil defense programs in general, vocational and higher education institutions; development of the defense industry complex as a high-tech sector of the economy; setting the conditions for overcoming poverty

¹ Указ Президента України Про рішення Ради національної безпеки і оборони України від 6 травня 2015 року «Про Стратегію національної безпеки України» від 26 травня 2015 р. № 287/2015. [Online] Available from: <http://zakon.rada.gov.ua/laws/show/287/2015#n7>

and excessive property stratification in society, achieving the economic criteria that are necessary for gaining membership in the EU; implementation of nationwide media culture programs. In addition, in terms of security dimension the importance of the current state of education increases in conditions of foreign aggression. Education is one of the key factors of ensuring the ability and readiness of citizens to serve in the Armed Forces of Ukraine (UAF) and of providing the proper state of industry defense potential.

In the context of the aforementioned directions of the national security policy of Ukraine, an important issue of determining national security criteria in the educational sphere arises. They must enable verification and assessment of the results provided by the educational system as well as their compliance with the national security requirements.

Despite the awareness of the relationship between the state of the education system and the sphere of security, this relationship has not been specified. Any quantitative and qualitative indicators to be checked and monitored have not been developed by this time. Such a situation can be explained, *inter alia*, by the lack of international experience applicable to the national circumstances. The issues of national security have not been of paramount importance for many European countries until recently. The experience of subordination of all spheres of life including education to the military and political interests in non-democratic states (such as the former USSR, modern Russian Federation and Peoples' Republic of China, some Islamic states) is not an acceptable model for Ukraine even in the face of external aggression.

HUMAN RESOURCES DEVELOPMENT

One of the primary resources of the innovative economy is the human resources potential of science, education and high-tech manufacturing sectors. The crucial role of research and improvement of the quality of training of the highly skilled personnel, especially young scientists, is emphasized. The solution to this problem requires close cooperation of science and education.

Formation of staffing in the field of science in Ukraine takes place contrary to the global trends. While in the world the number of scientists has increased by 20% in recent years, in Ukraine just in 2015 the National Academy of Sciences of Ukraine (NASU) dismissed 2 730 people, including 95 doctors of science and 511 candidates of science. Also, national science loses a significant amount of money: at least ten years are required to “raise” a Ph.D. candidate, and even more time – for the doctoral candidate. At the same time, the rates of replenishment of the Academy and universities by scientific youth have deteriorated significantly. The reasons for this situation are underfunding of science, low salaries, impossibility to conduct the high-level scientific research due to the low level of the material and technical base, the absence of demand, lack of prospects for career growth, instability, lack of own housing.

The level of “brain drain” from Ukraine, which is by far one of the largest in the world, is becoming increasingly threatening, especially in the course of the general trend towards the leaving of qualified specialists abroad. In addition, the best and most promising young scientists leave the country. Among the scholars who left Ukraine for a permanent residence abroad for the last five years, biologists, physicists, and mathematicians prevail. They are specialists who influence innovation development in many aspects. Also within Ukraine a significant number of young scientists leave scientific activity and go to other segments of the economy of the country. This is also an important reason for reforming this area.

Thus Ukraine needs substantial reform of the system of training highly skilled personnel taking into account international trends of modernization of the doctoral education.

At the present stage development of the knowledge economy has led to the fact that skills and competences that are formed during the postgraduate (doctoral) programs are in demand not only within academic work but also in other areas that are combined with intellectual activities. This led to the low effectiveness of the traditional model of individual “apprenticeship” as a leading form of training of the future researchers, and in combination with the substantial complexity of training and increased mobility of learning, necessitated the introduction of the structured post-graduate (doctoral) programs.

Wide-scale training of doctoral students in the developed countries of Western Europe has led to the reforming of the system for training of highly qualified personnel. This led to the development of increased requirements for the content of training of doctoral students (post-graduate students) in a modern model of European doctoral program: educational programs should be aimed at the doctoral student (with emphasis on personal, professional interests, preparing career for academic and non-academic areas). The essential condition for improving the quality of training is introduction and distribution of the structured doctoral programs. Therefore, the essential component of the doctoral program should be the development of the portable (universal) skills, the formation of which can be carried out on different models.

The state and universities must support and stimulate international mobility of doctoral students, development of the integrated international educational and research programs with the possibility to issue double diplomas or joint degrees. These programs should be based on flexible inter-university, between-university or international structures, like doctoral or research schools in most European universities created by the problem-disciplinary principles.

Doctoral training is carried out in the research group through formal and informal contacts with the scientific tutor(s) and other researchers. This basis of research is supplemented by a well-planned individual educational program. Doctoral students who are preparing for scientific or teaching work, as well as a career in the field of science-intensive business, will obtain a thorough education: advanced vocational training (knowledge in the chosen academic discipline and related fields of knowledge, ability to perform comprehensive analysis, creative skills); competencies in management in the field of research and development (projects management and there financing, professional and ethical standards of scientific and innovative activity); personal effectiveness (organization and planning of scientific activity, managerial skills, career planning, time management, etc.); communication competences.

The main tasks of the doctoral (research) schools are: establishment of clear professional requirements to the process and quality of training; improvement of the quality management system of scientific research and preparation of postgraduate students; ensuring interdisciplinary training and entry of young scientists into the scientific community; development of academic mobility and scientific communications; raising

the scientific level of dissertations research; providing financing for the dissertations research.

Functioning of the research schools leads to the new forms of cooperation between institutes, universities and business (introduction of flexible curricula, conducting of dissertation research in the framework of large research projects). The main principles of their activities are: careful selection of candidates for study in a research school; balanced responsibility of the parties “postgraduate student – scientific supervisor(s) – institute – university – partner enterprise”; inclusion of postgraduate students in research teams that carry out major research projects; interdisciplinary training; inclusion in the postgraduate training program of internships at the leading foreign research centers; availability of a system for monitoring the effectiveness and quality of training; maximum approximation of subjects of dissertation works to topics of research work, co-executors of which are graduate students; orientation of the doctoral programs to the dynamics of the labor market².

Perspective forms of scientists training

A “3D-system” – the system for training postdoctoral students, which is effective for training and career development of young researchers – is popular in the world nowadays. According to it, two mentors (Double Mentor) are working with young researchers. They are members of two Scientific Research Institutes (Double Affiliations) and conduct interdisciplinary research in two disciplines (Double Discipline).

The doctoral research school is oriented on doctoral students and focuses on a specific discipline (research direction), or on a research topic, or on an interdisciplinary field. The mentioned schools are often project-oriented and may involve the creation of the research groups or networks, which may include several universities, institutes, and enterprises. These structures provide links to industry, business and government services. Today there are about 50% of universities in Europe which have research schools to prepare Ph.D. candidates.

In Ukraine, doctoral schools by the model of doctoral schools at higher education institutions of the EU and the USA have been operating in NaUKMA since 2008. Their experience should be used in universities and institutes of the country.

Since the basis of the modern model of the world higher education is an organic combination of science with the educational process, a doctoral student is recognized

² Doctoral Programmes in Europe's Universities: achievements and challenges. [Online]. – Available from: <https://previa.uclm.es/actividades0708/talleres/taller/pdf/documentos/1.pdf>

as the main subject of the scientific process at the foreign university. The key component of studying in doctoral programs is the dissemination of knowledge through the research³. Therefore, it is necessary to introduce more widely doctoral programs in Ukrainian universities and postdoctoral institute. After all, the science around the world is created primarily by the hands of “postdocs”. Since there is actually no postdoctoral institute in Ukraine, the state should establish legal mechanisms for its introduction. Postdoc job vacancies at universities will allow inviting scholars from the leading research centers for carrying out joint scientific researches.

The Law of Ukraine “On Scientific and Scientific and Technical Activity” prompts for the further development of fruitful constructive cooperation between the National Academy of Sciences, national branch academies of science and the Ministry of Education and Science of Ukraine, establishment of partnership relations in development and implementation of a unified state scientific and innovation policy. The organization of joint scientific and educational associations is of great importance for deepening the integration of science and education. Due to the creation of such associations, the boundary between research and education and qualifying work, between the teacher and the scientist will be lost, since science will transfer the latest achievements to education, forming its advanced content, and higher school will provide the scholarly field with the future scientists who are familiar with the modern methodology of science. Therefore, an important step is to make a decision on the creation of Kyiv Academic University as a state-owned scientific institution of double submission – to the National Academy of Sciences of Ukraine and the Ministry of Education and Science of Ukraine⁴.

The primary objective of the mentioned university is to prepare competitive highly skilled professionals in the natural, mathematical and engineering and technical sectors, which have the greatest impact on innovation. In addition, formation of a new generation of the national scientific elite, creation of conditions for the professional of capable young and cessation of its outflow from science, as well as the intensification of integration of our country into the world scientific space – all this should lead the national science and education to a new, higher level, and help to strengthen the state defense and security.

According to the world trends, the Kyiv Academic University should become a new type of educational institution based on the combination of the educational process with the active involvement of professors and students in the research of the institutes of the National Academy of Sciences of Ukraine.

³ Становлення третього циклу освіти в Україні: дослідницькі університети / В.П. Моренець [та ін.] ; Нац. ун-т “Києво-Могилянська академія”. – К. : Пульсари, 2009. – С. 8–12.

⁴ Розпорядження Кабінету Міністрів України “Про утворення державної наукової установи “Київський академічний університет” від 14 грудня 2016 р № 962-р [Електронний ресурс]. – Режим доступу : <http://zakon2.rada.gov.ua/laws/show/962-2016-%D1%80>

The educational process at this university will be organized using the so-called “System of physical science”, successfully implemented at California Institute of Technology, Massachusetts Institute of Technology, and later – at Moscow Institute of Physics and Technology. The mentioned system ensures early involvement of students in the research activities and guarantees their high competitiveness both in the labor market and in the international market of scientific and educational services. This system is characterized by a careful competitive selection of talented young people, motivated to work in the field of natural and technical sciences; high-quality basic physical, mathematical and engineering education, combined with the development of practical skills; individual training of students directly by scientists through their involvement in the research work.

Kyiv Academic University has been created by reorganization of the Physics and Technology Training Center of the National Academy of Sciences of Ukraine. The University will carry out admission of students for a bachelor program based on Taras Shevchenko Kyiv National University, starting from physics and technical low residency school for senior pupils of the Minor Academy of Sciences of Ukraine on the basis of careful selection. Admission to the educational master’s programs of Kyiv Academic University will be implemented in cooperation with the specialized academic institutions of the National Academy of Sciences of Ukraine. NTUU “Igor Sikorsky Kyiv Polytechnic Institute” and classical technical universities of Kharkiv, Lviv, Dnipro, and Odessa should also take part in the preparation of bachelors of the academic university. The next stage should be education programs of the third cycle of higher education, which will be implemented on the basis of the academic institutes of the NASU with the next level of the competitive selection⁵.

In addition, the pilot project on the implementation of the European Full Time Equivalent System (FTE) – a methodology for the equivalent calculation of teaching and research load of a researcher-professor at the European research universities – should be implemented at the university. Adaptation of this methodology (equivalent calculation of full working time) for teachers of the higher education research institutions and research professors of the research institutions will enable more efficient stimulation of the activity of scientists⁶.

An important component of the format of the academic university should be the creation of an international supervisory board, which will be the key to implementing of the best world experience in preparing the scientific elite, integration of Ukrainian science into the European and world research space.

⁵ На спільному засіданні Президії НАН України та Колегії МОН розглянуто питання створення Київського академічного університету [Електронний ресурс]. – Режим доступу : <http://mon.gov.ua/usi-novivni/novini/2016/03/28/na-spilnomu-zasidanni-prezidiyi-nan-ukrayini-ta-kolegiyi-mon/>

⁶ Спільне засідання Президії Національної академії наук України та Колегії Міністерства освіти і науки України [Електронний ресурс]. – Режим доступу : <http://nucpi.nas.gov.ua/news/item/61-2016-03-25-nanu-mon.html>

If the activity of the State Scientific Institution “Kyiv Academic University” will be successful, its experience will be used in the creation of regional academic universities in Kharkiv, Dnipro, Lviv, and Odessa.

The issue of the creation of Kyiv Academic University is considered in the context of the higher education reform. Its priorities include ensuring the quality of higher education, strengthening its scientific component and development of the autonomy of higher education institutions. An essential part of this process is increasing the competitiveness of Ukrainian education institutions, which is accompanied by the modernization of the universities network.

Also, the creation of an academic university is necessary in order to provide training for scientific staff for scientific institutions and higher education institutions, for the formation of a new generation of the national scientific elite of natural-mathematical and engineering and technical spheres, the creation of opportunities for self-realization of talented youth in Ukraine.

Thus, creation of Kyiv Academic University as a state-owned scientific institution of dual submission is essential for the breakthrough development of our state in the field of fundamental and applied research according to the model of the combination of education, science and innovation, and training of highly skilled scientific personnel for national scientific institutions and higher educational establishments and in order to promote integration into the world education and scientific space. Improvement of education standards, the implementation of scientific developments should promote a new quality of socio-economic development, strengthen the country’s defense capability.

An urgent problem of domestic science is an integration into the world scientific space. Ukraine should take a worthy place in the international division of scientific work. It is necessary to create conditions for the establishment of leading scientific institutions of the National Academy of Sciences of Ukraine and leading universities for their transformation into centers for the implementation of international projects and programs. To this end, it is necessary to expand the practice of attracting foreign scientists to research in the framework of scientific exchange, participation of domestic scientists in scientific, technical and innovation projects of other countries and large corporations, in various international forums, as well as in the intergovernmental science-intensive projects, etc.

In the conditions of insignificant funding, domestic scientists need to identify their competitive advantages in comparison with other countries and concentrate on the relevant areas of the science development. These directions should be formed on the basis of forecasts of the development of science and technology in the world. Taking into account financial opportunities, it is important to focus resources on a small

number of promising areas and initiate implementation of 5–10 state programs in those fields of science in which Ukrainian scientists can achieve world-class results.

Problems of the research infrastructure should be solved by spreading the practice of creating centers of collective use of scientific equipment, which will also provide access to up-to-date scientific and technical information. In addition, it is necessary to create a general open database of experimental equipment and informational infrastructure and to introduce a system of the corresponding grants for their modernization and maintenance of functioning.

In order to improve coordination of the work of scientific institutions, economic entities, educational institutions and state authorities, it is necessary (also in accordance with the recommendations of experts of the European Commission) to develop a single interagency Strategy for the development of the scientific-technological and innovation system.

As a result of the reform of science and education in Ukraine, the establishment of their close interaction should be the formation of a system of innovative development of the domestic economy, effective functioning of state and public structures, and ensuring national security.

THE DEVELOPMENT OF EDUCATION AS AN ISSUE OF NATIONAL SECURITY: GENERAL APPROACHES TO THE ISSUE UNDER MODERN GLOBAL CONTEXT

All who have meditated on the art of governing mankind have been convinced that the fate of empires depends on the education of youth.

Aristotle

National security criteria in the education sphere: international experience and its implications for Ukraine

Taking into account current realities the experience of the analysis of security measures in the education sphere implemented in the USA as the country that combines the world leadership in the military and security sphere with the high level of democracy is particularly valuable for Ukraine. It is also very important that in the USA the traditional emphasis on the significance of military power and world leadership maintenance is combined with a high level of transparency and competition of different positions in discussion concerning the most disputable positions on the internal policy. Moreover, education in its pragmatic sense as well as democratic principles and patriotism are among the main components of the American worldview resulting in constant attention to the problems of this sphere.

It is worth noting that over the last decades “the decline of American education” has been one of the permanent issues in the United States socio-political discussions. Therefore, this is one of the reasons why such a decline is not really observed. The United States education system has been successfully modernized in accordance with the current demands and remains a reliable element of the foundation of this country for world leadership.

The analysis of security measures and implications of education policy made by American expert community representatives is characterized not only by the substantiation of the importance of the education sphere in general, but also by the

identification of criteria for the state of education assessment in relation to the needs of the national security as well as proposals for improving the situation. On the one hand, the consideration of such foreign experience is relevant for Ukraine to address issues related to the development of education. On the other hand, it is also relevant in terms of the need to strengthen national security of Ukraine. It is also important to emphasize that the impact of education on national security doesn't imply mere militarization of education or primitive "patriotic" education. It is about ensuring key conditions for the human capital preservation and enhancement, improvement of the state and society protection against actual and potential threats as well as ensuring better future for the country. This is consonant with the way these issues are solved in the leading countries of the world, in particular in the USA.

Expert group of the Council on Foreign Relations has prepared the report "U.S. Education Reform and National Security"⁷ that analyses the issues in the sphere of education and security and their mutual influence. In contrast to the report "The Nation Under Threat" (1983)⁸, which was dedicated mostly to the economic issues (in particular, the level of education of the workforce and the challenges of international competition), the 2012 report is directly devoted to the correlation between the education system status and the state of national security in the context of threats and challenges of the early twenty-first century. In this context, it is necessary to refer to the report "Before It's Too Late: A Report to the Nation from the National Commission on Mathematics and Science Teaching for the 21st Century". In the report its authors stressed the necessity to improve the situation in study of natural sciences and mathematics: "From mathematics and the sciences will come the products, services, standard of living, and *economic and military security (our italics)* that will sustain us at home and around the world"⁹. No doubt, there are problems specific to the United States that are not typical for Ukraine, but a significant part of the conclusions are relevant in the national context. According to the report "American Education and National Security Reform" some problems despite all the differences between Ukraine and the United States are urgent for the national security of both countries. For instance, one of the most important similar problems, in our opinion, is the formation and strengthening of social unity through social sciences (national and world history, political and legal systems). The authors highlight the importance of proper mastering of these subjects as they, in their point of view, act as "the glue that holds our society together"¹⁰.

⁷ Council on Foreign Relations [Електронний ресурс]. – Режим доступу : <https://www.cfr.org/>

⁸ A Nation At Risk: The Imperative For Educational Reform. An Open Letter to the American People. April 1983. United States Department of Education. [Online]. – Available from: <http://www2.ed.gov/pubs/NatAtRisk/index.html>

⁹ Before It's Too Late: A Report to the Nation from the National Commission on Mathematics and Science Teaching for the 21st Century. United States Department of Education. Washington, DC. 2000, Sept. 1. [Online]. – Available from: <http://files.eric.ed.gov/fulltext/ED441705.pdf>

¹⁰ Klein Joel I., Rice Condoleezza, Levy Julia C. U.S. Education Reform and National Security (Independent Task Force Report No. 68). – New York : Council on Foreign Relations Press. – March 2012. – P. 3.

In fact, the report is a detailed answer to the question: “Why is education a national security issue?” Its authors emphasize five main threats that have a high risk of actualization in case of delay in overcoming the negative trends in education. They are as follows:

- threat to economic growth and competitiveness;
- threat to military security;
- threat to information security;
- threat to the United States global interests;
- threat to the unity and unity of the nation.

Thus, as the authors argue in the conclusion, “military power is no longer sufficient to guarantee security. Rather, national security today is closely linked with human capital, and the human capital of a nation is as strong or as weak as its public schools”.

The authors of the report “*U.S. Education Reform and National Security*” offer three broad initiatives aimed at improving the situation in education sphere to overcome the shortfall in the education system performance related to the potential threats to the national security:

- 1) the expansion and strengthening of unified education requirements for all public schools with an emphasis on natural sciences, technologies, foreign languages and social sciences;
- 2) implementation of managerial changes in order to provide pupils and their parents with more opportunities in choosing the school;
- 3) implementation of the annual “security audit” of the education system to determine how secondary schools meet certain criteria, the main of which is the coverage by secondary-level education and success of students and graduates in mastering priority disciplines.

It should be noted that according to the Human Capital Index estimated by the World Economic Forum¹¹, in 2016 Ukraine held 26th position among 130 countries that is 5 ranks higher than a year before¹². According to the indicators of human capital development, Ukraine is not inferior to the USA (24th place), but ahead of Russia and Poland (28th and 30th places in the ranking). Finland is the world leader in human capital development in 2016, as it was in the previous year. The top ten leaders also have not changed. In addition to Finland, which ranks first, they are the following countries: Norway, Switzerland, Japan, Sweden, Germany, France, Australia, Great Britain, and Lithuania, which respectively occupied second to tenth places.

¹¹ World Economic Forum. [Online]. – Available from: <https://www.weforum.org/>

¹² Рейтингові оцінки розвитку людського капіталу 2016 / Економічний дискусійний клуб [Електронний ресурс]. – Режим доступу : <http://edclub.com.ua/analityka/reytyngovi-ocinky-rozvytku-lyudskogo-kapitalu-2016>

It is worth noting that the high rating of Ukraine's human capital is primarily due to high performance of the education sphere. Thus, 100% of the population obtain primary education, and in terms of secondary education, our state is among the first ten¹³. At the same time, many countries even so developed as the United States and members of the European Union have serious problem of the insufficient level of literacy and other basic educational skills¹⁴. At the same time, according to the Global Competitiveness Index, Ukraine is 85th among 138 countries and has lost six positions in comparison with the position it held the year before (as it was the 79th according to the previous ranking)¹⁵. Such results are explained, in particular, by the fact that in our country along with quite high numbers of scientists and engineers, extremely low numbers of specialists engagement in work according to their qualifications can be observed. The index of GDP per capita economic development is extremely disappointing. According to the International Monetary Fund research, in April 2017 Ukraine held 135th position among 190 countries and was ranked among the poorest (Table 1)¹⁶.

Table 1. Gross domestic product (nominal) per capita (\$) (April 2017)

Country	\$	Rank
Honduras	2623	132
Papua New Guinea	2613	133
Vietnam	2306	134
Ukraine	2262	135
Timor-Leste	2254	136
Nicaragua	2208	137
Uzbekistan	2154	138

As a result of comparison of Ukraine's human capital and economy development rating assessments, a significant gap between the high indicators of human capital development and its insufficient engagement in the economic process can be seen. The rating indicators show that the human capital and the education system as a key

¹³ Рівень розвитку людського капіталу України у 2015 році [Електронний ресурс] / Економічний дискусійний клуб. – Режим доступу: <http://edclub.com.ua/analytika/riven-rozvytku-lyudskogo-kapitalu-ukrayiny-u-2015-roci>

¹⁴ Council conclusions on literacy [Електронний ресурс] / Council of the European Union, Brussels. – 2012, November 26–27. – Режим доступу: <http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2015888%202012%20INIT>

¹⁵ Позиція України в рейтингу країн світу за Індексом глобальної конкурентоспроможності 2016–2017 [Електронний ресурс] / Економічний дискусійний клуб. – Режим доступу: <http://edclub.com.ua/analytika/pozyciya-ukrayiny-v-reytingu-krayin-svitu-za-indeksom-globalnoyi-konkurentospromozhnosti-1>

¹⁶ List of Countries by Projected GDP per capita. [Online]. – Available from: <http://statisticstimes.com/economy/countries-by-projected-gdp-capita.php>

factor for its preservation and development are the main resource for Ukraine's future success, and therefore they should become the driving force for positive changes in the socio-economic sphere. At the same time, the mentioned gap in indicators of human development and economic development is the most evident in the highest level of responsibility for actions related to **the reform of the national system of education that is a crucial resource of socio-economic development**. The correlation of economic achievements with the indicators of human capital development of Ukrainian is a necessary condition for the successful future of our country. For this purpose, the national education system should keep all its achievements and the reform of this sphere should be well-thought, be economically and socially grounded and based on the support of educators and the public.

Priority approaches of the development of education in the context of external threats and the necessity of national security strengthening

Economic growth depends on the competitiveness on the global market of goods and services, which requires both higher qualifications of workers and, that is even more important, their increasingly high ability to acquire new knowledge, skills and abilities at a quick pace to adapt to the economy dynamic development and the latest changes in technologies. The same is true for the state defense: the latest military and defense-industrial technologies require qualified personnel that are able to master new knowledge and skills quickly. The above-mentioned report "U.S. Education Reform and National Security" demonstrates that the United States has an acute problem of school graduates' poor health as well as generally low quality of their education. In general, according to the conclusions of the authors of the report, only a quarter of young people meet the requirements for future military personnel in full (health, education, absence of offences)¹⁷.

The involvement of information technology and new media into the economy, social life and the defense sphere determines the importance of computer literacy and media education as part of the curriculum. In view of the further growth of the destructive potential of cyber-attacks and the growing role of various information systems and the development of the Internet of Things, the training of specialists able to adequately protect information systems of state offices and critical infrastructure objects (including some of the most socially important private structures, e.g. telecommunication operators, transport providers and banks, etc.) has become an urgent task. Ukraine also has a specific problem of keeping an adequate level of patriotism and resistance to hostile influences by both the information security specialists themselves and those who directly identify their tasks and overall policy in this area.

¹⁷ Klein Joel I., Rice Condoleezza, Levy Julia C. U.S. Education Reform and National Security (Independent Task Force Report No. 68). – New York : Council on Foreign Relations Press. – March 2012. – P. 9.

Another specific national problem is the intensification of competition with foreign universities caused by high tuition fees, corruption and the relatively poor quality of education at Ukrainian universities, as well as an unfortunately growing proportion of young people and their parents who hope for a better life abroad. According to experts, the number of Ukrainians in foreign universities in the 2014/2015 academic year was 59,648. In the 2016/2017 academic year, at least 68,000 Ukrainian citizens acquired higher education abroad.

Poland, Germany, Russia, Canada, Italy, the Czech Republic, the USA, Spain, Austria, France and Hungary remain in the list of the most desirable countries for education. The dynamics of the growth of the number of Ukrainians studying abroad from 2009 to 2015 is 129%. In comparison with 2014, 2015 shows growth of almost 29%, or of 13 266 students. Moreover, Ukrainian students at universities of Poland made 2/3 of this increase. For instance, in 2015/2016 academic year 30,041 students from Ukraine studied in Poland. The largest student diaspora in Poland is Ukrainian one that is 53% of all foreign students receiving university degree in this country. It is far ahead of the second-largest diaspora of Belarusian students that is almost 10%.

The share of Ukrainian students among foreign students in 2014–2015

The importance of being aware of the international situation and the peculiarities of life in other countries is growing in today's globalized world, so the role of foreign languages is also increasing. For the USA the main factor in this respect is the need to keep its world leader position (protect its global interests). For Ukraine, it is a necessity of European and Euro-Atlantic integration when defense and political issues are to be also considered. Under the conditions of the undeclared hybrid war and the confrontation with the Russian Federation as an aggressor country, the processes taking place in Russia, as well as the prospects for their further development, are important for understanding by Ukrainians. It has a significant impact on the success of confrontation with Russian aggression and the correctness of choosing the future options for Ukraine's policy towards the Russian Federation.

The authors of the "U.S. Education Reform and National Security" report consider knowledge of the history and values of their country to be important for national security, as well as knowledge of international processes and foreign languages. They stress that "understanding of history, politics, culture and traditions is important for a civic position and critical for understanding who are the allies, and who are the opponents of America"¹⁸.

¹⁸ Klein Joel I., Rice Condoleezza, Levy Julia C. U.S. Education Reform and National Security (Independent Task Force Report No. 68). – New York : Council on Foreign Relations Press. – March 2012. – P. 12.

A unified understanding of national values can provide our country as well as any other country in the world with an adequate level of social unity and national consolidation, but only if there is not any significant social inequality and, consequently, inequality in access to quality education.

Unfortunately, the negative impact of socio-economic inequality as a critically important factor can lead to a rapid deterioration of the situation in the coming years due to the socio-economic crisis and slow implementation of reforms in Ukraine. Therefore, the strengthening of national solidarity and bringing young people up in the spirit of mutual trust, respect and assistance are becoming increasingly important.

EDUCATION SYSTEM REFORM: PROBLEMS AND PROSPECTS IN NATIONAL SECURITY CONTEXT

Education is the passport to the future, for tomorrow belongs to those who prepare for it today.

Malcolm X

The new Law of Ukraine “On Education” is a key tool for updating the education system

Today national education that has numerous undeniable achievements and gains needs to be substantially updated along with the needs of social development and national security. The modernization of education is needed due to the factors specific for Ukraine, as well as pan-European and world trends in the development of the socio-economic sphere. The key factors specific for Ukraine are as follows: the problems of the material and technical supply of national education institutions; the necessity of structure and content of education harmonization according to the European standards; the harmonization of knowledge and skills acquired by students with demands of real life; accelerating the process of updating professional knowledge and skills, bringing the training structure into line with real needs and demands of the economy, taking into account the trends in birth rate decline and aging populations.

High responsibility of the current stage of the educational sphere modernization is determined by the adoption and implementation of the basic legislative acts. In 2014 the Law of Ukraine “On Higher Education” was adopted on the basis of the Bologna process on creation of the European Higher Education Area.

On September 5, 2017, the Verkhovna Rada of Ukraine adopted the Framework Law of Ukraine “On Education”¹⁹ that has to and can determine the progressive development of the domestic education system for at least the next decade. Efficient implementation of the Law “On Education” has the potential to provide the relevant

¹⁹ Проект Закону про освіту від 4 квітня 2016 р. № 3491-д [Електронний ресурс]. – Режим доступу : http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=58639

conditions for solving the key problem of the educational sphere of Ukraine: an increase of inconsistency of education content and forms with the demands of the 21st century.

The adopted Law of Ukraine “On Education” contains many positive points, that in case of their proper implementation, can bring domestic education to a new level of quality to meet the requirements of the time.

It is necessary to emphasize the following positive points:

- 1) the introduction of inclusive education;
- 2) legalization of formal, informal and non-formal (self-organized, independent) education. The law provides mechanisms for recognizing the results of non-formal education and informal education by the system of formal education. It enhances citizens' access to education. Also, for the first time in Ukraine, the law guarantees parents the right to choose the form of education for their children, first of all the form of secondary education according to the demands of the Convention for the Protection of Human Rights and Fundamental Freedoms;
- 3) specialization of high schools as a step towards better youth preparation for independent life and successful work;
- 4) implementation of public control at all levels of education;
- 5) quality assurance system updating according to the European requirements (the Agency for the Quality of Education should be set up on the basis of the State Inspectorate of Educational Institutions and have to deal with all the issues of accreditation of schools (except for universities);
- 6) implementation of state and community mutual management of educational institutions, i.e. by setting the authority of parents associations;
- 7) introduction of the system of education and professional qualifications, establishment of the National Qualifications Agency that will provide the linkage between education and professional environment.

Regarding the introduction of inclusive education, it should be noted that Art. 19 of the Law “On Education” is dedicated to the organization of training for children with special needs, ensuring observance of education rights of people with special education needs and requirements for appropriate inclusive-friendly environment in education facilities. This means that the law also contains such a new and progressive notion as “inclusive education environment”.

The success of the framework law of Ukraine “On Education” implementation depends on both consistency and quality of the actions on its implementation, and on solving the issues emphasized by educators, independent experts and representatives of

interested NGO. One of the key issues of the Law “On Education” is its actual dependence on numerous by-laws, legislative acts of a lower level and departmental rules that have to be developed and implemented on its basis.

Thus, the education reforms have two significant drawbacks:

- 1) delays of the envisaged changes (until the adoption of the relevant acts);
- 2) the provision of illegal powers for certain officials to carry out the reform process “in a manual mode” without proper justification and professional and public discussion. Unfortunately, the evidence of this tendency has been already observed, i.e. the experience of implementation of the changes to the Typical Curriculum for grades 10–11 and training programs for grades 5–9.

As the representatives of the expert community and the public point out, the success of the implementation of the provisions of the new framework law of Ukraine “On Education” will mostly depend on consideration of three key issues of a substantive nature²⁰.

1. Despite the discussion nature of the competence approach, the importance of convergence of the national education content with modern socio-economic realities is beyond any doubt in education implementing issue. In addition, the implementation of a competent approach is to be done in order to harmonize Ukrainian education with the EU education, i.e. the relevant Recommendation of the European Parliament and the Council of Europe²¹. Certainly, a competent approach should not be used as an excuse for poor thought out initiatives of content and form of education reform. Moreover, it is a natural extension and development of the traditional educational approaches and methods in the new conditions. In addition, the implementation of a competence-based approach demands its legislation to be harmonized with the National Qualifications Framework²², which is a systematic description of qualification levels and competencies of employees based on European standards and links education with the demands of the labor market.

However, there are no clear mechanisms or specific deadlines for the introduction of a competent approach in the Law of Ukraine “On Education”, but just a specific list of competencies. The document does not identify the relevant methodological, program and organizational measures, and lacks benchmarks for monitoring the implementation of the competence approach.

²⁰ Must have нового закону “Про освіту” [Електронний ресурс] // Українська правда. – Режим доступу : <http://life.pravda.com.ua/society/2017/05/18/224260/>

²¹ Рекомендація 2006/962/ЄС Європейського Парламенту та Ради (ЄС) “Про основні компетенції для навчання протягом усього життя” від 18 грудня 2006 р. [Електронний ресурс]. – Режим доступу : http://zakon3.rada.gov.ua/laws/show/994_975

²² Постанова Кабінету Міністрів України “Про затвердження Національної рамки кваліфікацій” від 23 листопада 2011 р. № 1341 [Електронний ресурс]. – Режим доступу : <http://zakon3.rada.gov.ua/laws/show/1341-2011-%D0%BF>

2. Implementation of updated levels of secondary education, in particular the specialized stage requires careful preparation of its content, material, technical, personnel and organizational basis. Universities should also be prepared for this step. Therefore, special provisions concerning all necessary preparatory measures for the introduction of 12-year secondary education should be provided by the relevant regulations.

3. According to Art. 61 of the Law of Ukraine “On Education”, “the official salary of a pedagogical worker (the lowest qualification category) is set at a rate of not less than four subsistence minimum for able-bodied people”²³. Such an increase in salaries should be implemented on a phased basis and reached by 2023. According to Minister of Education and Science of Ukraine L.Grinevich, “for such increase of salaries for teachers 69 billion hryvnias is needed”²⁴. In addition, the law sets a 20% surcharge for teachers that completed certification procedures. It is important to mention that such a provision in the framework of the Law of Ukraine “On Education” causes the extremely high level of responsibility of the reform. Such government obligation requires its unconditional implementation and will cause undeniable positive result in raising the prestige of educators’ work but also gives rise to significant socio-political risks in the event of failing to provide enough finance to pay these costs.

The problem issue at the Law of Ukraine “On Education” is the lack of legal provisions that regulate the procedures of education institutions operation costs funding. As it was before, such costs are to be covered with the revenue from budget and non-budget sources. The issue of semi-legal “voluntary contributions” that on the one hand, allows many schools to survive, and on the other hand, create significant corruption risks, is not resolved. The way to solve this resonant issue was pointed out by the ruling of the Constitutional Court of Ukraine in 2004 on the available and free of charge education²⁵: to clearly in a Law the level, content and volume of education services provided free of charge, so all the rest can be provided on a fee basis. Therefore, the standard of education (Section IV of the Law of Ukraine “On Education”) should include not only requirements for benchmarks, competences and study load, but also general demands for education institutions funds and facilities that could be used for clear and transparent division between education services free of charge and provided for payment.

²³ Проект закону про освіту від 4 квітня 2016 р. № 3491-д (Текст законопроекту до другого читання 10.07.2017) [Електронний ресурс]. – Режим доступу : http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=58639

²⁴ Зарплата вчителів має збільшитись до чотирьох прожиткових мінімумів – Гриневиц // Укрінформ, 5 вересня 2017 р. [Електронний ресурс]. – Режим доступу : <https://www.ukrinform.ua/rubric-society/2299020-zarplata-vciteliv-mae-zbilsitis-do-cotiroh-prozitkovih-minimumiv-grinevic.html>

²⁵ Рішення Конституційного Суду України від 4 березня 2004 р. № 5-рп/2004 [Електронний ресурс]. – Режим доступу : <http://zakon2.rada.gov.ua/laws/show/v005p710-04>

Ukrainian language and languages of national minorities in education

The expansion of the sphere of Ukrainian language functioning is of great importance for strengthening national security of the country. It mostly depends on strengthening the position of the state language in education.

The change in the approaches to languages in Ukrainian education is set in Article 7 of the Law of Ukraine “On Education” and its Final Provisions. It is as follows:

- 1) since 2020 the national minorities will have the right to study in their own language only in pre-school and primary schools;
- 2) the teaching of general subjects in the primary school (grades 5–9) and the senior profile (10–11, later 12th) will be carried out in the state language;
- 3) in parallel, the study of the language, literature, history of the national minority in the language of the respective national minority will be carried out²⁶.

It was this article that caused the greatest resonance. The criticism of the renewed approach to languages in Ukrainian education does not come from the Ukraine itself, but from official bodies and representatives of neighboring states. The dramatic assessments and judgments of foreign states representatives sometimes go far beyond the common diplomatic practice and are based on the assumption that the provisions of the new Law of Ukraine “On Education” could inevitably hinder the realization of the right to education at all levels by representatives of the respective national minorities that seems to “contradict European values directly”²⁷. Such large-scale criticism was expressed by the embassies of Hungary, Romania, Poland and Russia. The ministers of foreign affairs of Bulgaria, Hungary, Greece and Romania signed a letter to the head of the Ministry of Foreign Affairs of Ukraine expressing “concern” about the provisions of the new Ukrainian law. It is noteworthy that some affluent media in Germany have also joined criticism to the new Ukrainian law. In this case, the main argument against its language-use provisions was the danger of the alienation of Russian-speaking citizens²⁸.

N.B.: Russian context. *It is significant that the criticism of the Ukrainian Law “On Education” by Russia coincided in time with the initiative of the Russian president to*

²⁶ Чи зможуть нацменшини навчатися в школі рідною мовою? Коментує Павло Хобзей // Громадське радіо, 7 вересня 2017 р. [Електронний ресурс]. – Режим доступу : <https://hromadskeradio.org/ru/programs/kyiv-donbas/chy-zmozhut-nacmenshynu-navchatysya-v-shkoli-ridnoyu-movoyu-komentuyepavlo-hobzey>

²⁷ Угорщина та Румунія обурилися через новий закон про освіту в Україні // DW, 8 вересня 2017 р. [Електронний ресурс]. – Режим доступу : <http://www.dw.com/uk/угорщина-та-румунія-обурилися-через-новий-закон-про-освіту-в-україні/a-40410674>

²⁸ FAZ: Ошибка Украины с новым законом об образовании // DW, 14 вересня 2017 р. [Електронний ресурс]. – Режим доступу : <http://p.dw.com/p/2jwks>

*improve the situation with study of the Russian language in Russia and to prevent the reduction of the volume of Russian studies due to the expansion of minority languages studies in Russian Federation*²⁹. Such initiatives in Russia reveals attempts of Russian authorities to receive additional support of ethnic Russians as the most loyal to authorities electorate using measures that do not require any real effort from the state, as in some national regions of Russia Russian is out of any risks while in others its use in fact is no longer subject to regulation from Moscow.

The public criticism of the innovations of the Law of Ukraine “On Education” regarding the use of languages in the education sphere by the representatives of certain EU member states – Ukraine’s neighbors is predominantly caused by the domestic political struggle in these states and by the attempts of populist and nationalist forces to use counter-productive ways to receive support of respective countries voters. Unfortunately, Ukraine is now particularly vulnerable to such hostile steps in view of the ongoing process of European integration, Russian aggression and a certain lack of internal political stability.

It should be emphasized that the need for changes in the approaches to the languages use in Ukrainian education is caused not only (and in the case of Hungarian, Romanian and Polish minorities – and not so much) by the necessity to consolidate Ukrainian society, to strengthen national identity, single cultural and world-view space. The delay in the implementation of provisions and rules of the new Law of Ukraine “On Education” entails the threat of real violations of the rights of representatives of relevant national communities and their discrimination by their language that is very important in the context of interethnic relations and relations with the foreign states.

N.B. Only about 40% of students can pass externally independent Ukrainian language tests due to the lack of Ukrainian language studies in the national schools and the lack of general education subjects in Ukrainian in the regions where representatives of the Hungarian national minority in Transcarpathian region have compact residence³⁰. In general, in 2016 60.1% of Hungarian and Romanian minority schoolchildren that took Mathematics and History of Ukraine exams in one of these languages did not overcome the threshold / completed test of the Ukrainian language. According to the results of exams in the EIA of 2016, in general, in Transcarpathian region, over 36% of graduates received an unsatisfactory score (from 1 to 3 points on a 12-point scale), while in the Berehove district, where Hun-

²⁹ Путин поручил проверить соблюдение прав россиян на изучение родного языка // РИА-Новости, 28 серпня 2017 р. [Електронний ресурс]. – Режим доступу : <https://ria.ru/society/20170829/1501338478.html>

³⁰ Чи зможуть нацменшини навчатися в школі рідною мовою? Коментує Павло Хобзей // Громадське радіо, 7 вересня 2017 р. [Електронний ресурс]. – Режим доступу : <https://hromadskeradio.org/ru/programs/kyiv-donbas/chy-zmozhut-nacmenshyny-navchatysya-v-shkoli-ridnoyu-movoyu-komentuyepavlo-hobzey>

garians live compactly, this figure was 75%³¹. That is these graduates of high school do not speak Ukrainian in an amount sufficient to continue their further education or to start working in Ukraine outside the region of their current residence.

Subjects necessary for further education or work in the rest of Ukraine even if they are properly mastered in the national language can not be used without the knowledge of the Ukrainian language. Thus, after graduation, such graduates have no education that can be relevant and applicable at the vast majority of Ukrainian territory. The preservation of current approaches to the linguistic component of education will mean that the state does not fulfill its constitutional duties, admitting violations of the rights of Ukrainian citizens and their discrimination on the basis of their language.

Consequently, by continuing the practice of studying in the secondary schools using the languages of national minorities, the Ukrainian state today limits movement of hundreds of thousands of young Ukrainian citizens in areas of compact residence of the respective minorities or encourages them to emigrate that is unacceptable. On the other hand, in the event of further emigration of such young people immediately after school, the costs of their education in the language of minority will be a net loss for the Ukrainian economy.

The main measured indicators

In secondary education, the main quantitative indicators for measurement of the situation in and dynamics of the education system for ensuring national security can be data on education coverage, results of external independent evaluation (EIA) and state final attestation (SFA) in priority areas, participation of Ukrainian schools in international studies of student achievement (first of all, TIMMS³² and PISA³³). In higher education for that purpose quantitative indicators of students who receive education in priority areas and their success can be used.

The results of education programs modernization and the introduction of updated education components into the educational process are important qualitative indicators in this area.

Another group of meaningful indicators can be defined by the results of regular sociological studies on determining the levels of: patriotism; awareness of current events, foreign policy situation; readiness for service in the ranks of the Armed Forces of Ukraine.

³¹ Діти із сімей нацменшин повинні мати рівні шанси для отримання якісної освіти // Голос України, 12 вересня 2017 р. [Електронний ресурс]. – Режим доступу : <http://www.golos.com.ua/article/293444>

³² Trends in International Mathematics and Science Study [Електронний ресурс]. – Режим доступу : <https://nces.ed.gov/timss/>

³³ Programme for International Student Assessment. [Online]. – Available from: <http://www.oecd.org/pisa/>

These quantitative and qualitative indicators can become the basis for a regular security audit of the domestic education system (Table 2).

Table 2. Some key education indicators of the security audit

Quantitative indicators	Qualitative indicators
1. Education coverage.	1. Implementation of new components (European education, media education).
2. The results of external independent evaluation (EIA) and state final attestation (SFA) in priority areas.	2. Life-long education.
3. Results of international student achievement research.	3. Expert assessments.
4. Results of sociological research.	
5. Indicators of students health.	
6. Amount of university alumni that work according using education.	
7. Amount of foreign students and Ukrainian students abroad.	

Source: The authors of the report.

To sum up the consideration of initiatives in education reform in its national security aspect, it is worth emphasizing once again that it is important to ensure the highest level of thought and judgment in making significant changes in the education area.

Neither shortcomings in legislative norms, nor any possible defects in implementation should lead to a reduction of availability of education at any level. Therefore, development and work out on legislative acts, the economic, social and political implications of the proposed innovations should be taken into account. For example, a significant reduction in the availability of education in difficult socio-economic conditions may cause not only image problems and deterioration of the quality of human capital, but also become the direct sociopolitical risk due to the replenishment of the labor market by a large number of young unskilled workers who can immigrate or be engaged in criminal activity, including those related to the external hybrid threats.

IMPLEMENTATION OF NEW FORMS OF EDUCATION AS A FACTOR OF MODERNIZATION OF THE EDUCATIONAL SYSTEM IN ACCORDANCE WITH THE NEEDS OF ECONOMY AND NATIONAL SECURITY

Our progress as a nation can be no
swifter than our progress in education.

John F. Kennedy

Reforming the structure of specialists training

In the most developed countries human capital accounts for more than 80% of their national wealth. Consequently, the main goal of reforming national education is ultimately to improve the quality of human capital to ensure “high-tech and innovative development of the country, self-fulfillment of the individual, meeting the needs of the society, the labor market and the state”. The education system today has to look ahead, because the training of a competent specialist is a long process. Consequently, there is an urgent need for predictive planning of the needs of the Ukrainian labor market for a considerable time perspective.

Studies of the Institute of Sociology of the National Academy of Sciences of Ukraine indicate that about 60% of Ukrainians cannot find a job of their trained specialty, and 25% are ready to donate a specialty for the sake of obtaining a job. The participation of employers in training (formerly up to 60% of total investment) has almost vanished. The imbalance of the labor market is largely due to the lack of systematic interaction between the stakeholders, such as public administration, vocational education, workers and employers.

In 2016, in the structure of the unemployed the share of persons who could not find a job after graduation was 15.6%. According to the State Employment Service of Ukraine, on May 1, 2017, 44% of registered unemployed persons had higher or basic and incomplete higher education, 36% – vocational and 20% secondary education.

Another threat poses departure of skilled professionals abroad. In 2016, 51.6% of labor migrants had complete higher education, 35.3% had vocational education, and 13.1% had secondary education at different levels.

Percentage of migrant workers by educational levels

It is worth noting that these data reflect only a small segment of labor migration, which is formed on the basis of data of business entities that carry out activities related to the employment of Ukrainian citizens abroad and have a corresponding license. Equally incomplete are the data, which testifies to the lack of systematic monitoring of employment of graduates of educational institutions in the obtained specialty.

In the process of its functioning, the system of higher education and vocational education is mostly oriented towards the educational services market, which is critically insufficient given the needs of the labor market. A common problem for the Ukrainian educational and labor markets is the lack of forecasting of the necessary economics of specialists and the weak communication of higher education institutions with potential employers.

A number of articles of the Law of Ukraine “On Higher Education” and the draft “On Vocational Education” Law paid attention to the problem of correlation between education market and labor market. Thus, Article 72 of the first of these documents states: “*Indicators of the state order for the training of specialists with higher education are formed ... taking into account the medium-term forecast of the need for specialists in the labor market (italics is ours – auth.)*”.

The objectives of vocational education, as defined in Articles 3 and 4 of the above draft law, are: “... meeting the needs (requirements) of the labor market of the national economy in qualified personnel”; “The implementation of state policy in the field of vocational education is provided by: *determining the balanced structure and volume of training taking into account the needs of the individual, the interests of the state and employers (emphasis ours – auth.)*”.

Consequently, at the state level, the relevance of the problem is realized. On the agenda is the question of formation of mechanisms and structures that can effectively implement public policy to bring the educational market in line with the labor market and the needs of the national economy, as well as the legislative provisions of their functioning. A certain benchmark here may be a successful foreign experience.

Foreign experience of solving the structural problems of professional education

In the White Paper of the European Commission back in 1993, it was emphasized the necessity to anticipate the needs for skills and competences in a timely manner. The urgency of the problem is increasing with time, as confirmed by the Lisbon Declaration of 2007, “Universities of Europe after 2010: Diversity for the purpose of unity”, which states that universities are seeking a consistent dialogue with employers to obtain more complete information on the qualifications of their graduates, and as well as a system for monitoring graduates’ employment. Together with public and private organizations, European universities are aware of the need to address the issue of providing systematic professional orientation services to the students.

So, the problem of economic development forecasts and related changes in the supply of educational services is acutely facing all developed countries. Various structures are involved in labor market research and forecasting in the EU countries: government, academic, tripartite/bilateral structures of social partnership or employers’ organizations, structures of vocational education and training. In recent years, there has been a shift from a large-scale analysis of the needs for qualifications at the national level to the analysis of the required qualifications at the regional and local levels, and even at the enterprise level.

For example, *in Finland*, the Ministry of Education defines the general goals and structures of vocational education and training, develops a list of training programs and gives licenses to local organizations that implement training programs. The National Education Council is developing national training programs that define the objectives and core content of the programs, taking into account the recommendations of industry representatives and consultants. Educational institutions, both public and private, are independent organizations that themselves take decisions on the best ways to organize and implement programs, taking into account regional and local conditions and peculiarities.

The main focus of social partnership at the regional and local levels is to meet the needs of local labor markets and demographic situation. Within the framework of the strategic partnership, networking between vocational education and training institutions and regional development organizations is important because it allows eliminate duplication of training in the same specialties and “overproduction” of specialists that the market does not require.

The effective mechanism of the social dialogue of education with industry and other categories of social partners is a variety of joint management bodies (councils, commissions, etc.). Such informal structures are formed in the case of the introduction of new specialties of training or a change in a particular sector of the economy, when it is necessary to modify the training program. Today, such experience is important for

Ukraine in the general context of decentralization policies and the transfer of significant powers from the center to local levels. To form an effective model of interaction between education and the labor market, it is necessary to develop mechanisms for ensuring cooperation between actors on the basis of social partnership for the active promotion of the state.

The concept of “life-long learning”

Accessibility and quality of education are indicators of the efficiency of the education system of the country. These two basic indicators contain a number of indicators, among which the development of life-long education is particularly important. Life-long education is largely correlated with such important issues as the relevance of labor and education markets, recognition of prior education, the development of distance education, the use of the potential of non-formal and informal education, etc. Obviously, all these areas require legislative support and regulation. Currently, these problems have not yet been clearly articulated in laws and bills.

Today we have only a cursory mention of these areas in the Law of Ukraine “On Higher Education” and the new Law of Ukraine “On Education”. Minister of Education and Science of Ukraine L. Grynevych emphasized that the Law “On Education” should describe at least the main foundations of educational reform: from pre-school education to adult education, and therefore, in accordance with the provisions of the sectoral law, special laws will be developed – “On preschool education”, “On general secondary education”, “On vocational education”, “On the education of adults”.

It is worth making an important remark here. Adult education is part of a wider phenomenon – life-long learning (LLL). Therefore, it is advisable to develop and adopt the Law “On Education for a Life”, which, in addition to adult education, will regulate the state policy regarding various forms and types of education (informal, informational, home, distant, external, etc.).

Today, the confirmation of the results of non-formal education is regulated by the laws of Ukraine “On employment of the population” and “On the professional development of workers”. However, their main focus is on labor professions, which is a significant disadvantage because it does not take into account the global trends in the economy, which show a decrease in the share of labor professions and the rapid growth of the segment of qualified specialists in the non-productive sphere, the IT industry, social communications and services, etc.

According to some estimates, the financial potential of the education market during life in Ukraine is about 117 billion USD per year, which is 7.8% of Ukraine’s GDP, which characterizes education as one of the leading industries in the structure of the national economy. The projected growth is 3–7% annually over the next decade. Thus, by 2024 it will increase to 150 billion UAH.

It should be noted that the LLL concept has undergone significant changes since its inception. In the 1970s and 1980s, continuing education was aimed at giving the non-privileged sections of the population the opportunity to change their status by improving the educational level. In the early 2000s, life-long education was seen primarily as a means of adapting labor to rapid technological change. Today, the concept of LLL increases the motives for personal growth. A survey conducted among the EU citizens showed that 70% of respondents expressed a desire to study. At the same time, 80% believe that education should improve their professional life, and 72% – personal.

Awareness of the importance of education throughout life for human development contributed to the beginning of the XXI century modernization of the European education policy. Thus, at the Lisbon Summit of the Council of Europe in March 2000 a Memorandum of Education for Life was adopted (a Memorandum of Lifelong Learning). The document emphasizes that lifelong education should become the main political program of civil society, social cohesion and employment.

The development of a lifelong education system is essential for achieving the matching of labor markets and education, providing the national economy with skilled personnel, reducing unemployment, and therefore directly affecting the humanitarian security of the state.

World trends in education

The global trend in modern education is the accelerated development of such areas as LLL, informal and non-formal education, distance learning – mainly in online formats. On December 18, 2006, the European Parliament and the Council of the EU adopted Recommendation 2006/962/EU on core competences for lifelong learning. The main competencies here are defined as necessary for all citizens for their personal implementation and development, active citizenship, social cohesion and employment opportunities.

The reference framework defines eight core competencies:

- 1) communication in the mother tongue;
- 2) communication in foreign languages;
- 3) mathematical competence and basic competences in science and technology;
- 4) digital competence;
- 5) learning to learn;
- 6) social and civic competences;
- 7) sense of initiative and entrepreneurship;
- 8) sense of initiative and entrepreneurship.

“The key competences are all considered equally important, because each of them can contribute to a successful life in a knowledge society. Many of the competences overlap and interlock: aspects essential to one domain will support competence in another. Competence in the fundamental basic skills of language, literacy, numeracy and in information and communication technologies (ICT) is an essential foundation for learning, and learning to learn supports all learning activities. There are a number of themes that are applied throughout the Reference Framework: critical thinking, creativity, initiative, problem solving, risk assessment, decision taking, and constructive management of feelings play a role in all eight key competences”.

In order to succeed in an innovative economy, a person must constantly acquire new competencies. The development of technology leads to the displacement of manual work, and skilled labor requires more and more focus on solving unstructured problems and effective analysis of information. Over the past 50 years, the economies of developed countries have sustained job cuts, requiring routine manual and cognitive skills. Instead, there is a growing demand for skilled professionals capable of non-trivial analytical work and specialists with advanced communicative competences.

In future the development of informal education will be influenced by three global trends. The first is the growth of the so-called gignomics (Gig Economy), which is manifested in the fact that more and more people prefer to work on themselves before engaging in traditional work. The second global trend is connected with the aspiration of the modern man to individual self-realization. The third is to decentralize the global educational market. Current consumers of educational services are now deciding what, when and in what way they want to study. Distance education based on information technology allows to take into account these trends. It is also worth focusing on increasing the role of informal online education for career growth. It can be argued that in future such a form of training will allow you to master the necessary level of each discipline, depending on the requirements of the profession.

Implementation of new forms of education as a factor in the modernization of the education system

The global online education market in 2014 was estimated at \$ 165.36 billion. It is expected to grow by an average of 5.08 % on a yearly basis to \$ 243.8 billion until 2022. The key drivers of the growth of the online education market are the rapid increase in the number of Internet users, the flexibility of training, low cost, accessibility.

The positive attitude to the use of new technologies is also steadily increasing in the field of formal education. While in 2002 less than half of the respondents from the United States academic community considered online education as a prerequisite of universities development, in 2012 almost 70% of the US education institutions said

that online education is an important element of long-term strategic development of universities. Experts predict that by 2019 50% of all the US high school courses will be provided online.

A similar situation is emerging in the European education market. According to the Impact of Distance Education on Adult Learning report, only 20% of higher education institutions in Europe that have participated in the survey do not offer any distance courses; 9% offer exclusively online education. Half of the universities offer online courses as additions to the core curriculum, and another 20% – build learning based on a mixed model.

The founder of the open-source online edX course Anant Agarwal offers an alternative to the standard American four-year university education program: students attend the first introductory course with distance learning, they go to the university for the next two years, and have the option to work part-time in the last year and finish online tutorials. In his view, such a model may be more attractive than traditional, especially for those who want to combine learning with work or caring for a child.

The Massachusetts Institute of Technology has developed the online learning platform – MIT OpenCourseWare where you can study for over 2,000 courses in English, but also in a number of other languages. Online courses are used in the education process of the Massachusetts Institute itself, access to them is free. Practice demonstrates that the use of a mixed model of learning is more productive as it enables to intensify the interest of those who are learning to increase their success, and most importantly this model takes into account the changing lifestyle of society.

It can be argued that the world market for education services will be characterized by the rapid development of life-long education, which will take on a growing number of forms of online education.

The newest forms of education in Ukraine

The development of education with the use of modern technologies in Ukraine has not yet reached a tangible distribution. However, certain achievements in this area can already be noted. Very successful is the public project of massive open online courses Prometheus with its own online platform. Starting in 2014, Prometheus now has an audience of hundreds of thousands of students, offering dozens of free online courses. It covers various areas, such as civic education, history of Ukraine, entrepreneurship, the foundations of state policy, data analysis, IT technology, the basis of information security, etc. The cooperation involves both practitioners, representatives of well-known companies (IBM, Microsoft, VideoGorillas, EPAM, etc.) as well as teachers of the leading universities – Kyiv National University named after Taras Shevchenko, National Technical University of Ukraine “Igor Sikorsky Kiev Polytechnic Institute”, Kyiv-Mohyla Academy, Toronto University and others.

It is noteworthy that in 2016, Prometheus in forty days on the platform “Spilnokosht” managed to raise more than 500 thousand UAH that became the second largest amount of funds collected by the crowdfunding campaign in the history of Ukraine. This is an unconditional testimony to a significant interest in the development of the latest forms of education, both for the public and for business.

Several Ukrainian universities have started a mixed-learning project in different cities. New mass free online courses are created and translated by leading teachers of Ukraine and the world. Students can attend lectures of the best teachers and perform tasks online and at higher education institutions they can work on practical classes and finalize their studies.

There is also the EdEra project (Education Era), which creates online courses and educational content of a wide spectrum. More than 25,000 high school students enrolled in the EdEra online courses. Together with experts from all over Ukraine in 2016 the EdEra platform, together with the Ministry of Education and Science of Ukraine, worked on updating the curriculum for the elementary school. Video tutorials for teachers with over 200,000 views have been developed. In collaboration with UNDP, an interactive lesson on anti-corruption topics was created. It is available for all schools.

However, it is worth noting that the problem of recognizing qualifications gained through online education remains unresolved. This problem is relevant not only for Ukraine. Most universities in developed countries that create massive online courses have not yet issued credit points after their completion. The value of the certificates offered by the various platforms of mass online courses is also not defined on the labor market. Therefore, an important task for the Ukrainian education system is the development of mechanisms for the certification of online education courses which has been confirmed by leading education institutions and employers as well as by state education authorities.

In modern conditions for our country in connection with the annexation of the Crimea and the occupation of some of the eastern territories of Ukraine, distance, namely online education, becomes of particular importance. The latest forms of education providing the opportunity to prepare for examinations (training of external qualifications), receive modern knowledge and qualifications play the most important role in this process. The Ministry of Education and Science of Ukraine works to provide young people from the occupied territories with high-level education in Ukraine with the use of state-of-the-art technologies.

Exponential technological development and accelerated growth of knowledge are another important factor that determines the need to introduce innovative forms of education.

The use of electronic textbooks that has high potential for improving the quality and effectiveness of training and for maintaining the health of students is an important direction of introduction of new technologies in the education process. However, in order to realize widespread introduction of e-learning materials in high school practice it is necessary to develop and implement the uniform national standard for electronic textbooks as well as consider the opportunity to use interactivity and present their multimedia content. Providing access to electronic copies of traditional paper books is only a substitute for serious work on the development and implementation of e-learning materials in a broad education practice.

INTEGRATION OF SCIENCE AND EDUCATION AS A SECURITY FACTOR

Socio-political and economic challenges of the present require the development and deepening of the integration processes of Ukrainian science and education as one of the most important ways to increase the efficiency of the scientific and educational sphere, the formation of the knowledge economy, as well as the integration of national science into the world research space.

At the World Economic Forum in Davos (January 17–20, 2017), the Fourth Industrial Revolution was recognized. This will determine economic, political, social and security aspects of the world in the coming decades. The new industrial revolution unfolding before our eyes and influencing the lives of all groups of human community is another vivid proof of the conclusion about the decisive nature of science and technology in the modern world. Science and its related technologies are increasingly becoming a source of growth in labor productivity, and investments provide significantly higher results in the presence of highly skilled workers and the modern technological base. The Fourth Industrial Revolution also testifies the validity of the proven truth: full sovereignty of the state, its international authority and effective national security policy cannot be achieved without science.

One of the key problems of the scientific sphere of Ukraine at the present stage is a systemic contradiction between the availability of a powerful scientific complex capable of producing the results of high world level and the lack of adequate demand from the national economy for the existing and potential results of research and development of Ukrainian scientists. Modern science fully operates where production works and develops. Therefore, a radical solution to the issues of the development of national science, taking into account the scope of the system and its importance for society, requires large-scale transformations that go beyond the scientific sphere itself. First of all, we are talking about the necessity of developing modern knowledge-intensive industries, a competitive environment, and encouraging entrepreneurial activity of citizens.

Since the crisis in the national scientific and technical sphere is largely due to the inadequate management system and the actual separation of science from production, the reform of the scientific sphere involves a complex of structural transformations in the system of organization and functioning of science. The result of the reform of the latter should be the creation of an effective model of interaction “science – education – economy – innovation”.

For the fruitful activity of science, legislative support for reform is extremely important. During the formation of the regulatory framework, special attention should be paid to:

- definition of the priority directions of science and innovations development;
- protection of intellectual property rights;
- attraction of venture investments to financing;
- creation of corporate scientific and educational structures;
- provision of privileged mode of realization of scientific and innovative projects;
- creation of the necessary organizational, legal and resource conditions for the formation of the system of providing innovation in the field of higher qualification personnel.

Effective interaction between science and higher education as an important component of scientific and education reform

Important for the comprehensive development of integration processes is the organization of joint scientific and educational associations, chairs in scientific institutions, promotion of the creation of joint interdisciplinary research and development programs, joint laboratories (also virtual) of academic and university researchers working on specific target programs, in which students and graduate students will be able to work as researchers. There may be the following incentives for such scientific and education cooperation: the inclusion in the conditions of obtaining a research grant for the creation of a mixed composition of the scientific team, the presence of a certain number of young scientists, students and postgraduate students in the team of performers, as well as every encouragement of practice when university teachers work in scientific institutes on the basis of part-time employment, and, conversely, scientists from scientific institutes are involved in the teaching of individual lectures at universities.

An important element of cooperation between science and economics is the development of venture capital and innovation infrastructure. It is necessary to strengthen the activities of the network of innovation centers. The state should assume the role of the engine of innovation development, primarily because of economic methods of activity regulation.

Foreign experience

Ukraine could benefit from the foreign experience of the effective model of science and education system functioning. In particular, the Max Planck Society in Germany could be a successful example of cooperation between science and education, transformation of main results of research into products that promote economic and social progress.

Thus, an important component of the success of this Society is the discovery of 63 joint universities and international scientific centers of the international research schools of PhD. These schools include a system of research groups that lead young scientists with PhD degrees receiving financial support for 5 years. The structures ensuring participation of students in research process during the preparation of masters are additional advantage in the scientific competition. These structures not only provide the training of highly skilled personnel in the field of science, but also facilitate ongoing interaction between the international scientific elite and the most talented youth of the countries in which these schools are located. A high level of fundamental science allows maintaining equally high level of teaching at leading universities.

Scientific work at universities

Science should be presented at the appropriate level to improve the quality of education in Ukrainian universities and corresponding growth of the position of national higher education institutions in international rankings. Only university leaders are able to issue an excellent scientific product in Ukraine. Scientific work is insignificant in the work of most universities. It is hindered by high workload of the teaching staff with purely pedagogical functions, poor technical equipment of university laboratories, lack of access to electronic databases of scientific information and poor collection of university libraries by scientific and education literature.

The important task of the Law of Ukraine “On Scientific, Scientific and Technical Activities” of November 26, 2015 No. 848-VIII is to overcome the gap between science and education. One of the directions of the reform of the higher education system in Ukraine should be establishment of research universities based on the model of foreign universities occupying leadership positions in world rankings.

The reform of the scientific component of higher education is currently hampered by the lack of the legislative basis. The successful implementation of the Laws of Ukraine “On Scientific, Scientific and Technical Activities” and “On Higher Education” requires the introduction of a number of additions and clarifications to these documents that would regulate the following aspects:

- introduction of the mechanism for protection of intellectual property rights of national scientific institutions and scientists for the scientific, scientific and technical result obtained with the participation of foreign partners claiming the right to intellectual property for scientific and technical (applied) development;
- definition of the term of internship for young scientists abroad since national research institutions and universities have no right to retain an employee in the state for more than nine months (clarification of Article 34 of the Law of Ukraine “On Scientific, Scientific and Technical Activities”);
- creation of “professional postgraduate studies (doctoral studies)” that will prepare highly skilled workforce for business which will have research skills, strengthen the scientific and production component of postgraduate (doctoral) technical training, state interaction, science, education and business (addition to the Law of Ukraine “On Higher Education”).

It should be noted that some of the national universities and research institutes of the National Academy of Sciences have been cooperating for a long time actively. There are 12 research institutions operating in the National Academy of Sciences. They are simultaneously subordinate to the National Academy of Sciences and the Ministry of Education and Science of Ukraine. Students of a number of universities are trained at basic departments in 20 institutions of the National Academy of Sciences. In addition, about 1.8 thousand employees of the National Academy of Sciences are taught at higher educational establishments. At the National Academy of Sciences of Ukraine there are 67 centers of collective use, where university lecturers can work on the latest equipment.

The cooperation of scientific and education institutions gives its positive results. For example, in order to improve the system of training for material scientists and metallurgists close cooperation between the engineering and physical faculty of the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute” and institutions of the Department of Physical and Technical Problems of Materials Science of the National Academy of Sciences of Ukraine are maintained.

Establishing cooperation with high-tech production

In order to work the triad “study – scientific research – introduction of innovations”, a higher school, in addition to the structures of the National Academy of Sciences, should interact with high-tech production. The agreements on conducting a pilot experiment signed between State Enterprise “Pivdenne” and the National Academy of Sciences of Ukraine as well as between State Enterprise “Pivdenne” and twenty universities of the Ministry of Education and Science of Ukraine will allow progress in this direction.

The involvement of representatives of enterprises successfully working in national and foreign markets may be one of the ways of forming priorities and government orders for science at universities.

Nowadays, when there is a hybrid war against Ukraine, cooperation between scientists and national enterprises of the defense complex is extremely important. The development of modern Ukrainian hydroacoustic systems that provide detection of underwater vehicles, the automated system of border guarding, systems for counteracting cyber-attacks and other innovations are the products of joint work of students of the Kyiv Polytechnic and defense industry.

In conditions of external aggression and international uncertainty, the political and military leadership of the state needs high-quality scientific, analytical and forecast development. Creation of such developments, first of all in the interests of national security of Ukraine, should constitute a separate direction of scientific and technological development. The fulfillment of this task requires the combining efforts and constant coordination of scientists, representatives of the defense and security sector, civil society. Accordingly, there is a need for a unique scientific center capable to unite scientists working in different institutions and also to ensure constant coordination with the state authorities defining the security policy of the state.

There is a trend to expand the technological and scientific cooperation between universities and foreign industrial firms in developed countries. Ukrainian scientists have world-class experience and the integration of academic and university science can give an additional impetus to foreign investment. In addition, international scientific collaboration of universities that will jointly execute development orders can play a positive role in attracting funds.

Strengthening the scientific component at the university, the development of university science is one of the priorities of the Ministry of Defense of Ukraine. In spite of economic difficulties and limited funds in 2017 financing of research and development of universities and research institutions belonging to the sphere of the Ministry's administration increased by almost 40% – from 366.6 to 507.4 million UAH. Funding research and development at education institutions is currently carried out in a transparent competitive selection that allows choosing the best projects and best teams that can implement them. For example, in 2016 132 education institutions attended the competition. They submitted 834 projects. 511 of them were selected by experts and financed in 2017. The Ministry of Defense of Ukraine is working on improving the order of the competition to increase the number of applied research. Research aimed at improving the country's defense capability and security is among its priorities.

STATE OF EDUCATION ON THE TEMPORARILY OCCUPIED TERRITORIES AND WAYS OF OVERCOMING THE INFLUENCE OF RUSSIAN AGGRESSION ON THE NATIONAL EDUCATION SYSTEM

Education is the most powerful weapon,
which you can use to change the world.

Nelson Mandela

Russian aggression against Ukraine influenced the education system at three territorial levels: 1) occupied territories; 2) front-line districts and territories for the resettlement of refugees and settlers; 3) national level (since the aggression of Russian Federation has become a reality for the whole state, this requires corresponding changes in the content, forms and organization of the educational process in both secondary and higher schools)³⁴. Effective neutralization of its consequences in the field of education, as well as the development of an effective strategy for the protection of the Ukrainian humanitarian space in general, is possible only with the implementation of the complex agreed measures at all specified territorial levels.

For reference. As a result of fighting and criminal activity of Russian troops and mercenaries of illegal armed formations of separatists in some districts of Donetsk and Luhansk regions, hundreds of education institutions of all levels were destroyed or injured. 176 secondary schools, 86 pre-school establishments, 28 vocational schools and 19 higher educational institutions have been partially or completely destroyed in Donetsk region. In Luhansk oblast there was the destruction of various levels of 40 schools and preschool educational institutions. Some of them, still require major repairs or are not subject to restoration after direct hits of mines and artillery shells.

According to the Ministry of Education and Science of Ukraine, 16 higher educational institutions of the III and IV accreditation levels were evacuated from the beginning

³⁴ Донбас і Крим: ціна повернення : монографія / за заг. ред. В.П. Горбуліна, О.С. Власюка, Е.М. Лібанової, О.М. Ляшенко. – К. : НІСД, 2015. – 474 с. – С. 279.

of hostilities in Donbas region from the temporarily occupied areas. On the territory controlled by terrorists in Donets region, there were 515 schools and 558 kindergartens, in Luhansk – 366 and 297 respectively³⁵.

The severity of losses for the education system of Ukraine and Ukrainian society becomes particularly evident taking into account the leading place of Donbas education before the war. Thus, Donetsk region ranked second in the state by the number of general educational institutions, and the first – by the number of students who studied in them.

A certain decrease in the magnitude and intensity of hostilities in Donbas during 2016–2017 allowed some young people to return to study (according to the UN Children’s Fund (UNICEF), by 2015 up to 50 thousand of children in the region did not have an opportunity to get education because of the hostilities)³⁶.

Actualization of the new problems

Firstly, as a result of the chauvinistic Ukrainianophobic policy carried out by the Russian occupiers and their accomplices in the SDDL, curricula of education institutions were distorted by the introduction of atypical (sometimes even frankly propagandistic) subjects (such as: “Language of the peoples of Donbas”, “Literature of the peoples of Donbas”, “History of the Motherland”, “Lessons of the Citizenship of Donbas”, etc.). Teaching is carried out not on programs and materials of the Ministry of Education of Ukraine, but on the imported Russian textbooks, which negatively affects the quality and results of education. In the Crimea, occupied by Russian Federation, the teaching, in general, is carried out exclusively on Russian programs and materials.

Secondly, the language rights of citizens are massively violated in the educational sphere. This, among other things, was recorded in the interim decision of the UN International Court of Justice in the case “Ukraine v. Russia” of April 19, 2017.

As early as 2015, the OSCE Office for Democratic Institutions and Human Rights and the OSCE High Commissioner for National Minorities, emphasized in their reports the fact that learning in Ukrainian language and its study in the Crimea is shrinking due to pressures on school administrations, teachers, parents, and children, therefore the aim is to stop any use of the Ukrainian language in the educational process.

³⁵ Половина шкіл на Донбасі залишилися на непідконтрольній Україні території, – МОН [Електронний ресурс]. – Режим доступу : <http://www.rbc.ua/ukr/news/polovina-shkol-donbasse-ostalis-nepodkontrolnoy-1441388143.html>

³⁶ ЮНІСЕФ: Через війну на Донбасі діти платять найвищу ціну [Електронний ресурс] / Українська правда. – Режим доступу : <http://www.pravda.com.ua/news/2014/12/20/7052702/>

According to experts, at the time of the invasion of the Russian army and the annexation of the peninsula, in the schools of Crimea 12.6 thousand children (about 7.5%) studied in the Ukrainian language. In September 2015, the situation changed significantly. 949 children were studying in Ukrainian, which was 0.5% of the total number of students. The training was organized in 22 general educational institutions in 13 districts of Crimea. In the 2015/2016 academic year, only two first classes with Ukrainian language education were opened. In two schools (cities of Alushta and Feodosia), pupils of grades 1–9 studied in Ukrainian. In addition, it should be noted, that in accordance to the legislation of the occupying country, education in grades 10–11 is carried out exclusively in Russian³⁷. Similar tendencies are observed in the SDDLР occupied by Russia. In the 2016/2017 academic year, the situation has only worsened.

Taking into account abolition of the priority of international law by the State Duma of the Russian Federation, the mentioned decision of the UN Security Council is unlikely to have any effect on anything. Also, Ukrainian language and symbolism in the occupied territories are directly positioned as markers of the enemy.

Thirdly, pupils and students are systematically forced to engage in illegal terrorist activities of the Russian Federation and Russian-separatist illegal armed formations through voluntary and compulsory (sometimes optional and extra-curricular, and sometimes actually instead of training) participation in different militarized events (such as “military field training”) and paramilitary camps (military-sports, military-patriotic, sports and recreation, etc.), events that glorify the leadership of the Russian Federation and self-proclaimed “republics”, as well as militants of the so-called “DPR”, “LPR”, “Novorossia”, etc. (communicative events, meetings of “clubs” such as “Patriot” with the theme “Fame for Donbass we sing” (separately for 1–6 and 7–11 grades), “educational hours” such as “I am a citizen of the Donetsk People’s Republic”, contests of propaganda works such as “Heroes of our school: our graduates are soldiers of the DPR Army”, competitions and exhibitions dedicated to Russian state holidays, etc.). Unfortunately, numerous public disclosures (both at the national and international levels) of this illegal activity of Russian intelligence agencies regarding Ukrainian youth did not help to correct the situation and did not force the Russian Federation to abandon its criminal intentions. On the contrary, given the trends in Russia’s humanitarian (in particular, youth and education) policies, it can be predicted that the situation in the SDDLР and the Crimea in this aspect will only worsen.

It is clear that all this significantly complicates mastering by Ukrainian citizens living in the territories temporarily occupied by the Russian Federation the knowledge necessary for further study in Ukrainian education institutions and needs an adequate response from the Ukrainian state.

³⁷ Олег Охредько: как в Крыму будут учить украинский язык [Электронный ресурс]. – Режим доступа : <http://ru.osvita.ua/blogs/55507/>

Actions of the Ukrainian government and the public

Last year a number of normative legal acts were adopted by which the activities of the displaced higher education institutions were regulated. The adoption of these laws led to the facilitation of conditions for admission into Ukrainian higher education institutions of children from the occupied SDDL, the Crimea, and residents of the so-called “Gray zone”. Last year a significant step towards the education rights of internally displaced persons and citizens of Ukraine residing in the Crimea and the SDDL controlled by Russian terrorists was taken. It was the adoption of the Law of Ukraine “On Amendments to the Law of Ukraine “On Higher Education” on May 16, 2017 for obtaining higher education of persons whose place of residence is the temporarily occupied territory of Ukraine”³⁸. This legislative act provides for a quota of 1,000 places of the state orders based on the results of the admission exams for studying at higher education institutions of Zaporizhzhya, Mykolaiv, Odesa and Kher-son regions for residents of the temporarily occupied territories of Donbas and the Crimea.

In March the Ministry of Education and Science of Ukraine approved the Provision on external studies in general education institutions³⁹, which provides for the simplification of the rules for enrollment in external studies in general education institutions for residents of temporarily occupied territories and persons whose place of residence is the territory of the ATO. An additional session of the enrollment exams to the universities of Ukraine (from July 3 to July 12, 2017) for the pupils and graduates from SDDL and the Crimea was also introduced; a special site (<http://dostupnaosvita.com.ua>) with informational, methodological and educational materials was launched. The Provision provides significant security measures: all their personal data when filing documents will be encrypted⁴⁰. In this way the state not only provided additional opportunities for Ukrainians who became victims of hostilities and occupation. The state has in fact sent to its compatriots a clear and unambiguous signal that they are not forgotten despite all the insinuations of Russian propaganda, they are not citizens of the “second grade” for Ukraine, which is waiting for them in the Motherland.

For reference. According to the Ministry of Education and Science of Ukraine, during the universities admission process in 2016, 12 “Crimea-Ukraine” education centers and 28 “Donbas-Ukraine” education centers operated in Ukraine, which attracted

³⁸ Закон України “Про внесення змін до Закону України “Про вищу освіту” щодо забезпечення права на здобуття вищої освіти осіб, місцем проживання яких є тимчасово окупована територія України” від 16 травня 2017 р. № 2026-VIII [Електронний ресурс]. – Режим доступу : <http://zakon3.rada.gov.ua/laws/show/2026-19>

³⁹ Наказ Міністерства освіти і науки України “Про затвердження Положення про екстернат у загальноосвітніх навчальних закладах” від 13 березня 2017 р. № 396 [Електронний ресурс]. – Режим доступу : <http://zakon3.rada.gov.ua/laws/show/z0416-17>

⁴⁰ Фамилии абитуриентов из Крыма и Донбасса будут шифроваться [Електронний ресурс]. – Режим доступу : <http://qha.com.ua/ru/obrazovanie/familii-abiturientov-iz-krima-i-donbassa-budut-shifrovatsya/173621>

about 3 thousand people from the eastern regions and about 350 people from the Crimea. In general, more than 150 people entered the universities of Ukraine through the “Crimea-Ukraine” educational centers, and 855 people through “Donbas-Ukraine”. The hotline received 4 120 calls, including about 3 thousand from the Crimea and Donbas. In 2016, for the first time in two years, the MES of Ukraine registered an increase in the number of universities applicants from the temporarily occupied territories⁴¹.

It is necessary to emphasize the fruitful and constructive participation of the public (in particular, the Coordinating Center for Displaced Higher Education Institutions, the NGO “Open Politics”, etc.) in joint actions aimed at ensuring the educational rights of Ukrainian citizens from temporarily occupied territories during the 2016 admission campaign. Naturally, such a practice of symbiotic interaction between state authorities and civil society institutions should be welcomed and encouraged in future years.

In this context, it is necessary to note, that according to the preliminary data, temporary cessation of cargo transportation (TCCT) via a contact line within Donetsk and Luhansk regions, introduced in March 2017 by the Presidential Decree “On urgent additional measures to counter hybrid threats to Ukraine’s national security”⁴², despite the fears of some experts, did not lead to a tangible change in the intentions of Ukrainian citizens residing in the temporarily occupied territory, in the educational sphere (in particular, for obtaining the higher education).

Directions for further work

An important direction of government’s efforts is to ensure the proper functioning of the higher education institutions, evacuated from the occupied territory. To do this, it is necessary to resolve a number of legal issues, in particular regarding the settlement and updating of the legal status of such education institutions in accordance with the new conditions, material base and indicators of student and teaching staff. In addition, for such universities, it is advisable to revise the standards regarding the number of teachers and students (given the objective impossibility of preserving the original teaching staff and students through force majeure circumstances).

In the further development of the state strategy (as well as the individual measures) in the education sphere, it is essential to take into account the intentions and efforts

⁴¹ Кількість вступників до ВНЗ з окупованих територій вперше за 2 роки збільшилася – МОН [Електронний ресурс]. – Режим доступу : <https://www.ukrinform.ua/rubric-doneccina/2090989-killist-vstupnikiv-dovnz-z-okupovanih-teritorij-vperse-za-dva-roki-zbilsilasa-mon.html>

⁴² Указ Президента України “Про рішення Ради національної безпеки і оборони України від 15 березня 2017 р. “Про невідкладні додаткові заходи із протидії гібридним загрозам національній безпеці України” від 15 березня 2017 р. № 62/2017 [Електронний ресурс]. – Режим доступу : <http://zakon2.rada.gov.ua/laws/show/62/2017>

of the aggressor, aimed at further separation of the Donbas from Ukraine. Moreover, this does not necessarily mean a complete (like the Crimea) integration of the self-proclaimed “republics” to the Russian Federation, but may be embodied in other forms: from the official full / partial recognition of the so-called “DPR” and “LPR”, their association in a single pseudo-state formation, integration of their “armed forces” into the Armed Forces of the Russian Federation (according to the model of South Ossetia), to the mere recognition by Russia (primarily at the regional level) of education documents obtained in the education establishments in the uncontrolled territories of Ukraine (which is already partially realizing).

In order to prevent the re-orientation of residents of temporarily uncontrolled areas to Russia in the humanitarian and cultural aspect and to ensure the realization of the educational rights of Ukrainian citizens it is necessary to continue the practice of simplified admissions of secondary school graduates from the SDDL and the Crimea to Ukrainian universities and to increase public awareness of the prospects of obtaining education in other regions of Ukraine.

The problem of socialization of children of the XXI century war is a serious challenge for the Ukrainian education system in particular and for the society as a whole. The war not only promotes aggression, violent methods of resolving issues, but also discredits the norms of the morality of peaceful life, norms of law and dialogue as a means of achieving goals, which will largely determine the norms of conduct of Ukrainian citizens, who were formed during the war.

What is relevant is the formation of a positive information and cultural context for such socialization, which is especially important given the massive, purposeful and systematic work of terrorist organizations and their Russian curators with children and young people. The most significant concern is not even a criminal-legal aspect, but a socio-political one: it is likely that the Donbas youth can join the ranks of the extremist pro-Russian “fifth column” in Ukraine, becoming a “lost generation”.

In the face of the opposition of Ukraine to an external enemy, national system of education must function as a powerful mean of asserting the Ukrainian state consciousness and ideology (especially among pupils and students, and in the community of teachers, which, together with the influence of the media, plays a vital role in shaping the views of the broad audience). This requires a particular emphasis on teaching the subjects of the humanitarian cycle, including the improvement of curricula in Ukrainian language and literature, national and world history, social science, the introduction of elements of modern media education in the existing training courses.

Priority in the education system should be given to the personnel issues in order to prevent the use of school classes and university lectures as places for spreading anti-Ukrainian propaganda and the mythology of the “Russian world”.

It is evident that the full realization of the right to obtain education for Ukrainian citizens – residents of the temporarily occupied territories of the Donbas and the Crimea is possible only in case when these areas are returned to the jurisdiction of the Ukrainian state. However, at the current stage, it is necessary to conduct systematic and proactive work in the education sphere of the temporarily occupied areas. First of all, it is about setting up and improving the distance learning forms, so that all those who wish to learn Ukrainian curricula will have the opportunity to do that, take exams externally and receive relevant state-standard documents with the further possibility of joining Ukrainian professional and higher education institutions.

In general, the question of the impact of Russian aggression on the national system of education and issue of problems in education in the temporarily occupied territories, require a separate thorough study due to their complexity and significance.

CONCLUSIONS AND RECOMMENDATIONS

Among the factors that determine problem areas in the education system relevant to the national security, from which the criteria of national security in the education sphere derive, it is possible to distinguish the following factors:

- level of study of social science subjects (history, political and legal systems, universal national values);
- level of knowledge of foreign languages;
- level of mastering of natural sciences, mathematics, as well as the acquisition of practical skills necessary for the development of modern professions, including those related to ensuring national security;
- availability of secondary education (in Ukrainian conditions – negative consequences of possible deterioration of the level of accessibility and quality of secondary education);
- degree of social inequality (in the Ukrainian context – between the rich and the poor, between the city and the countryside);
- ability of the system to attract, train and reward highly qualified teachers;
- degree of correspondence between the knowledge and skills provided by the education system to the needs of economy and tasks, which state and society are facing.

In order to overcome the shortcomings in the work of the education system, related to potential threats to national security, it may be appropriate to adopt a series of measures taking into account national realities and peculiarities. Thus, the reform of secondary education, which involves significant updating of curricula, makes it possible to make corresponding changes in the priority areas of study (natural sciences, technologies, mathematics, foreign languages, subjects of the social sciences cycle).

External independent assessment and the system of final state attestations allow to determine quickly and in detail the current state and dynamics of the results of the education process on priority disciplines. With regard to the choices available to students and parents, under the current domestic conditions, the optimal option for improving the situation is introduction of additional mechanisms for stimulating of training in priority areas accessible to all capable young people, regardless of the property status of their families (including distance education, subject olympiads, collective projects, support for students studying in priority specialties).

The most significant educational directions in the security dimension that should determine specific educational policy measures are:

- maintaining high levels of education coverage and improving its quality;
- improvement of the condition of the study of priority groups of educational disciplines, primarily of natural sciences, social sciences (including Euro-integration), information and technological directions, as well as foreign languages;
- expansion of the sphere of use of the Ukrainian language in order to strengthen the national identity and counteract manipulations by the Russian authorities, which use Russian as a mean of influence, and as a potential marker of “foreignness” at the same time;
- European education component (European history, legal, the political system of the EU, European values, Ukraine as an integral part of single European civilization);
- acquisition of the entrepreneurial skills, promotion of autonomous initiative, as well as skills necessary for teamwork and creativity;
- updating the forms and content of education for better preparation of young people for effective work and protection of Ukraine;
- active introduction of media education as a mean to increase the level of preparation for independent life and simultaneously for counteracting the informational aggression;
- adjustment of the training structure to ensure its compliance with the needs of the national economy.

In the field of vocational training, the close relationship between education and work is significant. This requires knowledge of changes in demand for professional skills for the rapid response of the education system and vocational training to structural changes in the economy and society. The success of initiatives in these areas is determined by the correlation with the tasks of economic and social policy. Ensuring the demand of the system of vocational education and training of specialists in the labor market requires solving a number of tasks:

- creation of structures responsible for the strategic forecasting of education and qualification needs of the labor market both at the national and regional levels;

- development and introduction of effective methods for strategic forecasting of educational and qualification needs of the labor market for Ukraine;
- identification of skills requirements not only at the national level but also at the regional and local levels and even at the level of enterprises;
- attracting employers to the process of training personnel of different education and qualification levels at all stages of the process: planning of volumes and directions of preparation, the creation of training programs, employment after graduation, re-training and advanced training;
- formation of a system for informing vocational training institutions, vocational guidance and employment services regarding the situation and forecasts in the labor market for adjusting the education process;
- taking into account the dynamism of the labor market and the need to respond promptly to its demands, considering the particular importance of the development of the education system during life and distance education.

For the national security of Ukraine, the importance of educational reform in terms of education throughout life is determined by such components:

- additional vocational education, which contributes to the formation of the professional basis of human resources of a modern high-tech economy. Consumers of services in this direction of continuous education is a socially adapted part of the population, which is educated consistently at all levels in accordance with their life aspirations and needs of the economy;
- education aimed at the adaptation and rehabilitation of social and professional groups that are unable to adapt themselves to a rapidly changing social environment. Citizens who, for various reasons, have no access to the formal system of vocational education, which creates a threat of desocialization for them, are also involved in such education.
- satisfaction of various individual educational needs of citizens, for example, language training, obtaining psychological, cultural and other knowledge, communicative skills, special skills, etc.

These components contribute to improving the quality of human capital, economic development, reducing of unemployment and social tension, and meeting the personal needs of citizens, and therefore play a significant role in ensuring the national security of the state.

A solution of the main tasks of reforming the Ukrainian scientific and education system, which directly or indirectly influences national security, aims at high-quality education, scientific results and innovative technologies implemented in the country's economy. One of the most important means to achieve this goal is the integration of education and science, the synergistic development of which will contribute to the formation of an innovative economy, the formation of a new quality of public-state relations, and will provide an adequate level of security, for which it is necessary:

- Organize the organizational and legal principles that determine the development of education and science, primarily the forms of interaction between higher education institutions and institutes of the NASU, mechanisms for implementation of agreements of scientific teams with high-tech production, in particular in the field of defense, and also provision of public-private partnership in the field of scientific developments;
- ensure adequate funding of joint education and scientific projects of the NASU institutes and research institutes of the Ministry of Education and Science of Ukraine, which should provide elite education and conduct innovative scientific research;
- implement a policy of financial and tax incentives for universities and scientific institutions that develop science and are specializing in the creation of innovative knowledge;
- using the experience of the best European and world scientific institutions and education institutions, modernize the system of training of highly skilled personnel for the scientific, education and innovative spheres, create effective mechanisms for supporting young scientists, expanding the career perspectives of doctors and postdoctoral students, ending the emigration of researchers, ensuring social protection of scientists.

Essential factors of neutralization and overcoming the influence of Russian aggression on the domestic education system are:

- elaboration of the effective strategy for the protection of the Ukrainian educational space, subject to mandatory consideration that such influence is exercised at three territorial levels: 1) occupied territories; 2) front-line districts and territories of the resettlement of refugees and settlers; 3) national level;
- creation of the maximum contrast (“windows of democracy”) in the front-line zone in addressing economic, social, cultural and educational needs of the inhabitants of the Donbas districts living in the territory under the control of Ukraine and citizens of the SDDL territories occupied by Russia;
- Implementation of comprehensive support measures for the internally displaced persons (primarily children and youth), creation of the systemic mechanisms for their integration into the Ukrainian social landscape. These include, in particular, the choice of place of residence, the settlement of housing issues, access to education, job security, actual provision of other social and civil rights, etc.;
- activation of state policy in education, scientific, cultural, informational spheres, etc., which involves purposeful work with children and youth from the occupied territories.

In particular, it is necessary to ensure training of specialists in the field of distance education, create conditions (preferential taxation, open contests of the projects financed by state, etc.) to attract IT companies into the development of distance education, to establish system work on the execution of the Order of the Ministry of Education and Science of Ukraine of June 16, 2015 No. 641 “On Approval of

the Concept of National-Patriotic Education of Children and Youth”⁴³, to intensify the development and introduction into the education programs of elements of modern media education as an effective means of confrontation to manipulative technologies, an effective tool for forming the ability to perceive information critically and to think independently;

- accelerate the completion of the development and approval of the Concept of the State Target Scientific Program for the Long-term Development of Pedagogical and Psychological Sciences for the period up to 2025, in which, among the strategic priorities of scientific researches in the field of pedagogical and psychological sciences (except for the theory and practice that are set nowadays, relating to socio-psychological rehabilitation of military personnel from places of war conflicts, families of wounded and dead) also define the practice of providing psychological help to pupils and students who are directly affected by the humanitarian disaster in Donbas.

⁴³ Наказ Міністерства освіти і науки України “Про затвердження Концепції національно-патріотичного виховання дітей і молоді, Заходів щодо реалізації Концепції національно-патріотичного виховання дітей і молоді та методичних рекомендацій щодо національно-патріотичного виховання у загально-освітніх навчальних закладах” від 16 червня 2015 р. № 641 [Електронний ресурс]. – Режим доступу : <http://old.mon.gov.ua/ua/about-ministry/normative/4068->

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Наукове видання

Безпекові виміри освітньої політики: світовий досвід та українські реалії

**Аналітична доповідь
(англійською мовою)**

Проаналізовано питання взаємозв'язків та взаємовпливів освітньої і безпекової сфер в умовах модернізаційних викликів та зовнішніх загроз. На основі актуального міжнародного досвіду запропоновано підходи до визначення критеріїв національної безпеки в освітній сфері. Розглянуто процес реформування вітчизняної освітньої системи, визначено ключові проблемні моменти рамкового Закону України «Про освіту». Висвітлено питання впровадження нових форм освіти як чинника модернізації освітньої системи відповідно до потреб економіки та національної безпеки, проаналізовано стан і перспективи зближення освіти, наукових досліджень та інноваційної сфери.

Для науковців, фахівців з державного управління у сфері освіти, національної безпеки та широкого кола читачів, які цікавляться проблемами розвитку освіти, науки, забезпечення національної безпеки.

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