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TRAINING OF SPECIALISTS IN THE FIELD OF INFORMATION SECURITY

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Abstract. *In recent years, new educational processes of continuous learning have been formed in the world in the form of express courses, mini-seminars, conferences, etc. The widespread use of nanotechnology products, biotechnologies and other modern fields of science and technology also requires the improvement of modern educational activities. The development of the Internet contributes to the rapid processing of large amounts of information, multidimensional data analysis and the formation of management decisions in conditions of uncertainty and risk. There is a growing need for specialists with risk management skills and rapid adaptation in their professional activities to unstable situations.The situations taking place in the world, such as a pandemic, vaccination, special operations, wars and other uncertainties, show the lack of pre-worked out schemes of action for a person who does not always understand how to behave in certain conditions. Therefore, he has to quickly change his thinking and look for new approaches, because "the number of factors that need to be taken into account today exceeds the capabilities of consciousness".Professional training and retraining of specialists who are able to work in rapidly changing unstable situations and have the appropriate knowledge and competencies is of great importance. Such qualified specialists will be in demand in the coming years in the labor*

Keywords: *education system, information technologies, training of specialists, information systems, information security, information protection.*

The main part. The large-scale introduction of "digitalization", globalization, the growth of competition have significantly improved modern society, having an impact on the economy, politics and other spheres of life. Simultaneously with these processes, fundamental changes took place in the education system, since its transfer to the electronic environment actualized scientific research on information security. Describing security in general, it can be emphasized that this the need for protection from external and internal threats, i.e. prevention of causes and circumstances that generate risks. Professional training and retraining of specialists capable of working in rapidly changing unstable situations, possessing relevant knowledge and competencies, becomes important.

Introduction. Much of what is happening in the world is explained by terms such as VUCA, which characterizes the effectiveness of activities in an unstable, complex and aggressive environment. The word VUCA is an acronym, (volatility, uncertainty, complexity, ambiguity - instability, uncertainty, complexity and ambiguity) combines four concepts that fully reveal the essence of the phenomena of the modern era beyond human control. "The term was coined in the 1990s by the US military, and today it is used in the business environment to denote the conditions in which companies operate" [1, 2].

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New education systems are emerging, among which one can distinguish "Smart education" (from the word "Smart" meaning "smart, advanced") based on the ideas of digitalization and informatization.

At the same time, "the Internet, whose number of users in the world exceeds 1.3 billion a person is a key factor in the formation of Smart universities, turning the learning environment into a more flexible, updated, interactive and personalized" [3]. Smart--universities for our country are the most rational way to organize cooperation between teachers and students, whose main goal is to form a model of a new generation specialist, based on uniform standards and technologies.

Minister of Science and Higher Education Sayasat Nurbek said at a meeting of the Government of the Republic of Kazakhstan that a new form of education has been introduced – online learning. Universities will switch to the smart university model," According to him, this provides for the formation of a student's digital profile, that is, student life track, the development of digital EdTech services, and the optimization of processes in accordance with advanced digitalization trends [4]. In other words, the education system faces new challenges related to the preparation of a person for activities in the virtual world. This makes it necessary to protect the security of information in order to resist attempts to manipulate the consciousness of the student.

Materials and methods. Taking into account the above, the main approach to conducting research is to study all available means of communication of the education system, which would also expand the possibilities of security of virtual communication, which has its own rules and regulations.

The existing forms of training have shown that many technologies used in the personnel training system are insufficiently provided with the necessary software package, there is no unified software standard, there are not enough specialists to service technical devices. An analysis of education in some CIS countries has shown that despite the fact that information security is regulated by law, important issues of information protection have not yet been given due attention.

Results and discussion. In this regard, the education system needs to focus on a comprehensive assessment of the effectiveness of training highly qualified personnel in the field of information security, analysis and comparison of the achievements of the CIS countries with other countries. The model of a new generation specialist should be built taking into account international achievements in educational activities in order to adapt it and apply it in the process of training specialists. To begin with, such a specialist model should be tested on the example of universities that are aimed at training specialists in the field of information security systems. It is important to form the principles of quality and competence of their education at universities and create an innovative educational environment on this basis. At the same time, it is important to actively interact and orient the educational process in the university environment in order to track dynamic changes, synchronize activities related to data protection, and reduce threats and vulnerabilities of information arising in the process.

The main areas of research in this area are the creation of a comprehensive and standardized database for training information security specialists, allowing comparisons with other countries.

Special importance should be attached to the calculations of various indicators, such as:

1) general characteristics of the information security system in the CIS countries and abroad;

2) the number of universities that train specialists at the international level;

3) the need and costs of training qualified personnel, etc.

Conducting such an analysis will help to understand the specifics, demand and needs for specialists both for the country as a whole and for each region.

No less important is the study of the interrelationships between the training system in the field of information security and its effectiveness based on a comparative assessment of the Kazakh model of training specialists with the countries of Europe and Asia. This direction

provides for the consideration of competence-based and innovative approaches in these countries with an emphasis on the application of achievements that provide high-quality training of specialists in this field. The competence-based approach is aimed at strengthening the practice-oriented nature of education, i.e. the presence of diverse experience and skills for the practical application of knowledge. The development of an innovative approach provides for the fundamentalization of education, that is, the real participation of the university in the processes of modernization of the economy.

It is also necessary to determine the structure of the safety training system aimed at finding promising ways to improve the effectiveness of the educational process. The main task should be the differentiation of universities in the international space, which will allow analyzing the structure of training in this field of education, their impact on the development of the economy.

Also, for the purposes of the review, it is recommended to compile comparative tables on the problem under study, allowing for scientific research in the regions and throughout the country, including neighboring CIS countries, their mutual interaction not only in the field of information security, but also in other sectors of the economy. This will allow a deeper study of the problem under study at the international level. This approach will serve as a tool for analyzing the training of personnel in the analyzed countries for decision-making and promotion of activities based on criteria that take into account the realities of each country.

In the process of training specialists of this profile, it is periodically advisable to interact with interested parties and disseminate information through websites, social media accounts, etc., as well as hold online and offline conferences with the participation of well-known professors interested in joint research on the implementation of planned tasks.

International experience. The global education system has a different number of programs related to general issues of training information security specialists, including in business structures.

The analysis and generalization of Internet resources devoted to the problem of training specialists in this field has shown that each country has its own priorities of educational programs in the field of information security. In particular, in the USA, when considering the subject area of bachelor's degree training in information security is distinguished by four enlarged blocks:

1. Information security.
2. Computer security.
3. Investigation of computer incidents.
4. Computer network security.

When preparing masters in this field, in addition to the above, two more enlarged blocks are allocated:

1. Information security management.
2. Economics of information security.

There are also many mixed areas of training, such as "Information security and risk management". At the same time, bachelor's and master's degree programs provide greater flexibility in the choice of disciplines to study and, consequently, greater freedom in individual training.

The French training of specialists in the field of information security is clearly focused on the study of issues related to cryptography, network security and audit of information systems. Among the features of the French school of training specialists in information security, we note that students are given a serious mathematical education necessary to master the mathematical aspects of cryptology and network security.

This is due to the fact that in France, structures are being actively formed to control citizens in cyberspace with a tendency to intercept messages in French (and not only) electronic communication lines.

In Germany, special attention is paid to disciplines related to the collection of evidence and investigation of computer security incidents, the use of software and hardware protection of information, including electronic keys.

In the UK, much attention is paid to the issues of computer expertise, as well as various aspects of information security in open business systems and e-commerce.

In the CIS countries, these aspects are not given due attention. There are a number of universities that train specialists in this field. At the same time, many issues related to the training of specialists are not always solved in a coordinated manner, relying on the experience and achievements of foreign countries, among which one can distinguish:

- lack of programs for the study of various technical systems introduced into the educational process with interactive interaction of learning outcomes and trajectories.
- generalized competencies in the training of information security specialists introduced into the educational process do not provide for a periodic update mechanism;
- insufficient statistical information and data detailing training indicators, etc.

In connection with the above, an important problem of training specialists in the field under study is the creation of a national cloud repository, i.e. a place where any data, electronic educational resources, etc. are stored and maintained on the basis of agreements, standards and technologies common to educational institutions and teachers. There are repositories for storing programs written in the same language (for example, CPAN for Perl) or designed for the same platform. With a certain modification. such an educational environment can be effectively built on the basis of a national cloud-based scientific and educational infrastructure in this specialty.

An important area of expanding access to information is the development of autonomous electronic textbooks covering special subjects on the subjects of training students.

The creation of an intelligent scalable information and educational environment in the training of specialists of this profile is possible using such technologies that open up the possibility of using modern software, electronic educational resources and services aimed at reducing threats and vulnerabilities in the protection of information.

Would especially like to focus on the experience of the Czech Republic. There are many different universities here that are engaged in training personnel to ensure information security. Among them is the Czech Technical University, in which the training system is distinguished by its originality. First, students study the general program, and then they can choose one of the six directions, which are described in more detail in the article [5]. The Institute for Security Studies was established in Prague in 2002. The goal is to move forward in building a just, secure, democratic and free society in the Czech Republic and other post-communist States [6]. For example, the Master's program offers courses that go far beyond regional and transatlantic security issues, covering the Middle East, East Asia and other areas. Special attention is paid to such disciplines as international economics and finance, intelligence gathering and dissemination, as well as global energy security.

In the Czech Republic, the first computer science faculty was established at Masaryk University in 1994. In addition to information technology skills, the program also stipulates that its graduates should be familiar with related fields, such as legal regulation of information security, international relations or security in general.

Taking into account the experience of European education in the CIS countries, it is necessary to create a single national data processing center that will significantly reduce costs and increase the requirements for the qualification of a specialist Important in this regard is the need for prompt response to certain consequences of decisions taken at the state level, which are interrelated and are reduced to:

1. Awareness of the relevance of the training system in the field of information security, possible consequences and the relationship with the efficiency of the functioning of the national

economy.

2. It is necessary to disaggregate a sufficient amount of data on the international training of specialists in this field using entropy methods.

3. Generalization of information should be aimed at identifying various information scenarios of threats and vulnerabilities in order to provide convergent solutions.

Methods of achievement of effectiveness:

1. The sources of initial information will be a review of scientific literature on the subject under study, regulatory provisions and laws of on information security and training in this area. As the primary information for scientific research, the materials of anonymous questionnaires of various categories of students.

2. Methods of information transfer in the field of education aimed at cooperation between universities, allowing access to high-quality, but less expensive knowledge. The main goal of the program is to enable any citizen to receive any education on the basis of universities operating in other countries.

3. Methods of application of telecommunication technologies in multimedia courses on the example of the Open University (Open University) in London (UK), in the USA - the National Technological University in Colorado, which in 1991 united 40 colleges into a telecommunications network.

4. Research methods that contribute to the creation of a close connection between learning and teaching, which will allow to receive operational information about various changes in the educational process and provide access to operational information Such electronic services will allow to individualize learning.

5. Presentation of an analytical review based on methods of identifying the most popular information resources for various categories of users of open communication of teaching staff, students and employers on the organization and content of education. Based on the approbation of the results obtained, it is necessary to develop Methodological recommendations that ensure effective control of students' knowledge in this specialty.

6. Methods for determining the security of information arising in difficult conditions of the internal and external environment (pandemic, crises, changes of power, etc.).

7. Methods of identifying contradictions between urgent educational needs aimed at creating favorable conditions for the development of a system of training specialists in the field of information security, adaptability of standards and forms of training, mobility of trainees, reflexivity and replacement of external control technologies, as well as other forms of unforeseen challenges and crises of the educational environment in the modern world.

Conclusion. The proper functioning of the security of various systems also sets new goals for the "creators" and "consumers" of this information. In this regard, the proposed solutions to the problems of personnel training in the information security system are special for the science the future of which will largely contribute to the progressive development of many spheres of life.

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АҚПАРАТТЫҚ ҚАУІПСІЗДІК МАМАНДАРЫН ДАЯРЛАУ

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Түйін. *Соңғы жылдары әлемде жаңа білім беру процестері қалыптасып экспресс-курстар, шағын семинарлар, конференциялар және т.б. түрінде үздіксіз оқытулар кең таралуда, Бұл әртүрлі білім беру жүйелерінің интеграциясын көрсетеді. Нанотехнологиялық өнімдерді, биотехнологияларды және ғылым мен техниканың басқа да заманауи салаларын кеңінен қолдану қазіргі заманғы білім беру қызметін жетілдіруді талап етеді. Интернеттің дамуы үлкен көлемдегі ақпаратты жылдам өңдеуді, деректерді көп өлшемді талдауды және белгісіздік пен тәуекел жағдайында басқару шешімдерін қалыптастыруды және жалғастыру қажеттілікті туғызады. Тәуекелдерді басқару дағдылары бар және кәсіби қызметінде тұрақсыз жағдайларға тез бейімделетін мамандарға қажеттілік артып келеді. Пандемия, вакцинация, арнайы операциялар, соғыстар және басқа да белгісіздіктер сияқты әлемде болып жатқан жағдайлар белгілі бір жағдайларда өзін қалай ұстау керектігін әрқашан түсінбейтін адамда алдын ала әзірленген әрекет үлгілерінің жоқтығын көрсетеді. Сондықтан ол өзінің ойлауын тез өзгертіп, жаңа тәсілдерді іздеуі керек, өйткені "бүгінгі күні ескерілетін факторлардың саны сананың мүмкіндігінен асып түседі". Тиісті білімі мен құзыреттілігі бар, тез өзгеретін тұрақсыз жағдайларда жұмыс істей алатын мамандарды кәсіби даярлау және қайта даярлау маңызды мәнге ие болады. Мұндай білікті мамандар алдағы жылдары еңбек нарығында сұранысқа ие болады. Бұл мақалада осы саладағы мамандарды даярлау кезінде ақпараттық қауіпсіздікті жүзеге асыру жолдарын ашуға әрекет жасалған.*

Түйінді сөздер: *білім беру жүйесі, ақпараттық технологиялар, мамандар даярлау, ақпараттық жүйелері, ақпараттық қауіпсіздік, ақпаратты қорғау.*

ПОДГОТОВКА СПЕЦИАЛИСТОВ В ОБЛАСТИ ИНФОРМАЦИОННОЙ БЕЗОПАСНОСТИ

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Резюме. *В последние годы в мире сформировались новые образовательные процессы и получают распространение непрерывное обучение в форме экспресс-курсов, мини-семинаров, конференций т.д., что свидетельствует об интеграции системы различных видов образования. Широкое использование нанотехнологических продуктов, биотехнологий и других современных областей науки и техники также требует совершенствования современной образовательной деятельности. Развитие Интернета способствует быстрой обработки больших объемов информации, многомерного анализа данных и формирования управленческих решений в условиях неопределенности и риска. Растет потребность в специалистах, обладающих навыками управления рисками и быстрой адаптацией в своей профессиональной деятельности к нестабильным ситуациям. Ситуации, происходящие в мире, такие как пандемия, вакцинация, спецоперации и другие неопределенности, показывают отсутствие заранее проработанных схем действий у человека, который не всегда понимает, как вести себя в определенных условиях. Поэтому ему приходится быстро менять свое мышление и искать новые подходы, поскольку "количество факторов, которые необходимо учитывать сегодня, превышает возможности сознания". Важное значение приобретает профессиональная подготовка и переподготовка специалистов, способных работать в быстро меняющихся нестабильных ситуациях, обладающих соответствующими знаниями и компетенциями. Такие квалифицированные специалисты будут востребованы в ближайшие годы на рынке труда. В данной статье предпринята попытка раскрыть способы реализации информационной безопасности при подготовке специалистов в этой области.*

Ключевые слова: *системы образования, информационные технологии, подготовка специалистов, информационные системы, информационная безопасность, защита информации*

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