СЕКЦІЯ І
СВІТОВИЙ ДОСВІД ТА ПЕРСПЕКТИВИ РОЗВИТКУ ВИКЛАДАННЯ НАВЧАЛЬНИХ ДИСЦИПЛІН В КОНТЕКСТІ ЗАСАД STEAM-ОСВІТИ

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FEATURES OF STEAM EDUCATION IN CYBER SECURITY TRAINING

The development of the national education system in modern conditions, taking into account the radical changes in all spheres of social life, the challenges of the XXI century requires a critical understanding of what has been achieved and the concentration of efforts and resources on solving the most acute problems that hold back development and prevent the provision of a new quality of education. Today, a consistent state policy aimed at the activation of innovative processes, the formation of an innovative culture of society, and the improvement of the country's innovative and intellectual potential, its competitiveness on the world market of technologies, scientific knowledge and labor resources is determined.

STEAM education opens up opportunities and significantly increases the effectiveness of educational and scientific activity (open learning, flexible learning, blended learning) of subjects of higher education institutions (HEIs) based on integrated, interdisciplinary, transdisciplinary approaches in the organization of group and individual cognitive and research activities in a professionally oriented the direction that determines the use of innovations (elements of virtual and augmented reality, 3 D technologies, simulator programs, artificial intelligence).

Currently, there is a problem with training highly qualified and competitive specialists in the field of cyber security. The professions of the future require the acquisition of professional competencies using STEAM technologies, which create conditions for finding optimal ways to interest young people in the learning process, increase their mental activity, encourage creativity, and develop scientific and research abilities. The complexity and multifacetedness of STEAM education require the participation of specialists from transdisciplinary areas of scientific research.

Therefore, it is expedient to follow the intersection of generating fundamental concepts from informatics, law, professional disciplines (for example, in the process of studying information technologies in cyber security, virtualization (principles, hypervisors), mathematical foundations of cryptography and shorthand, medullary calculations; symmetric and asymmetric cryptosystems, etc.) to form in students of soft skills education.

One of the directions of innovative development of education is the STEAM training system, thanks to which subjects of training develop logical thinking and

technical literacy, learn to solve tasks and become innovators, and inventors. STEAM training will allow us to strengthen and solve the most pressing problems of the future, which is aimed at improving the social and economic effects.

Thus, the need for innovation is more relevant today than ever before, which is connected with the need to restore the economy of Ukraine, and innovation can become an effective means of achieving this goal with the change in the ways of functioning of the economy and society as a result of modern technological transformations in the conditions of development Industries 5.0. (implementation of artificial intelligence technologies, blockchain, industrial Internet of Things, STEM education technologies: 3-D printing, 5G communication, augmented and virtual reality, etc.), which fundamentally change the processes of logistics, training and knowledge accumulation, and the formation of STEAM competencies.

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TECHNOLOGICAL ASPECTS OF TEACHING PHYSICS AND TECHNICAL DISCIPLINES BASED ON STEAM TECHNOLOGIES

The technological process in education is learning, so let's consider the concept of «learning technologies», which we consider in the institution of higher education (hereinafter – HE). According to S. Vitvytska [1], each pedagogical technology has basic methodological requirements and technological criteria, which are reflected in the components of STEAM education, which is important to consider in the process of teaching physics and technical disciplines. The identified criteria of manufacturability ensure the educational process of HE:

- conceptuality, which reveals the foundations of the STEAM concept and examines the psychological, didactic, social and pedagogical justification of the educational goals of teaching physics and technical disciplines;
- systematicity in the teaching of physics and technical disciplines (the presence of all features of a system based on STEAM technologies);
- interconnection of all elements of the system (for example, physics and professionally oriented disciplines: avionics, radio electronics, electrical engineering, principles of flight, flight safety, etc.) taking into account their logical and integral combination;
- manageability, which characterizes the design of the learning process in physics and technical disciplines; taking into account the diagnosis of each stage of the educational process, as well as the variation of methods and tools of STEAM