

## PEDAGOGY AND EDUCATION

# Prospects of using elements of STEM - education in the training of pharmacists

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STEM - education combines interdisciplinary and project approaches, the basis of which is the integration of natural sciences into technology, engineering creativity and mathematics [1]. The implementation of the STEM - education system is dictated by the requirement of the "new economy" to be competitive both within the country and on the international arena [2, p. 25]. It is impossible to list absolutely all academic disciplines that belong to STEM - education and are tangential to pharmacy (for example, a block of chemical disciplines: inorganic chemistry, analytical chemistry, physical and colloidal chemistry, etc.), but even an incomplete list makes it clear how important the component is such education in the preparation of a future pharmacist.

Knowledge related to STEM - contributes to the development of bio- and pharmaceutical technologies and the development of new devices. Creating a reliable and high-quality foundation of STEM education through well-thought-out educational programs and the filling of training courses is one of the most important tasks of teachers of chemical disciplines [3, p. 34].

To date, the STEM - scientific and technical education system is the most innovative and gaining popularity all over the world. Its implementation allows students to solve problems, find the necessary information in professional literature and databases of other sources, analyze, evaluate and apply this information. STEM also creates conditions for adaptation and action in a new situation, making informed decisions, working in a team and being reliable members of

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the team, society and country.

The possibilities and directions of STEM - education are of particular importance in connection with the need for an ever-increasing transition to distance learning with the use of digital technologies. The functioning of distance education is characterized by an intensive search for new approaches to education, innovative forms of organization of the educational process, effective pedagogical and information technologies [4, p. 7].

The use of elements of STEM - education in pharmaceutical education contributes to the implementation of state policy, taking into account the new requirements of the Law of Ukraine "On Education" regarding the strengthening of the development of the scientific and technical direction in educational and methodological activities at all educational levels; creation of a scientific and methodological base for increasing the creative potential of students and the professional competence of specialists.

However, the results of the implementation of these technologies in the training of pharmaceutical students are insufficiently covered. Chemical disciplines are one of the basic, fundamental disciplines in the system of higher pharmaceutical education, which are aimed at training a highly qualified pharmacist and are one of the most important courses in the system of medical and pharmaceutical education.

The teachers of the department, when studying the courses of chemical disciplines in the preparation of students of the II (master's) level of higher education, fully provide students with educational and methodological support of educational disciplines, which include a complex of normative, educational and methodological materials necessary for the effective implementation by students of programs of the corresponding educational and qualification level the amount of training provided for by the work programs of educational disciplines and curricula of the corresponding training direction, specialty.

During the search process, students develop abstract thinking skills, the ability to solve typical and complex specialized tasks and practical tasks in the educational process, which involves conducting research and/or implementing innovations and is characterized by the complexity and uncertainty of conditions and requirements.

Thanks to the use of elements of STEM - education, the teachers of the department create appropriate opportunities

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for students to increase their interest in studying disciplines, activate independent work during practical classes, provide theoretical foundations for students to master pharmaceutical disciplines (clinical pharmacology, pharmacognosy, pharmacotherapy with pharmacokinetics, etc.), which involves both the integration of the teaching of basic pharmaceutical disciplines and the acquisition of in-depth knowledge of chemical disciplines, the ability to use this knowledge in the process of further education and in further professional activity to solve the tasks of the pharmaceutical profile. At each practical session, students analyze theoretical material, summarize conclusions, relate the studied material to medical and pharmaceutical situations, offer their own solutions to practical tasks using the acquired knowledge.

Working in the main directions of STEM - education, the teachers of the department use various teaching methods based on the logic of transmitting and receiving educational information: inductive, deductive, analytical, synthetic, forming important qualities of future competent specialists in students.

They lay the foundations for the formation of students' skills to effectively solve professional tasks based on the chemical analysis of data on typical medical and pharmaceutical processes, states, reactions using deep theoretical knowledge and practical skills, the ability to recognize a problem, identify possible aspects and connections in a given task.

In this way, students acquire skills of critical thinking, analytical and creative skills, formulation and expression of their own thoughts, the ability to solve situational problems, which are of practical importance in the further professional activity of the future pharmacist.

This approach develops the pharmacist's professional abilities for clinical thinking, lays the foundations for the formation of cognitive skills, the ability to acquire and apply theoretical knowledge in professional and personal development. Therefore, the introduction of elements of STEM - education will allow students to become goal-oriented, increase the ability to learn and acquire knowledge and understanding of the subject field and understanding of professional activity, apply knowledge in practical situations, be able to think critically, be a creative person. STEM- education provides an opportunity to create sufficient

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conditions for modern pharmaceutical students to understand and know fundamental medical and pharmaceutical sciences at a level sufficient to solve professional tasks in the field of health care.

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