

9. Peluso Mam et al. (2005). Physical activity and mental health: the association between exercise and mood. *CLINICS* 60(1): 61-70.
10. S. J. Petruzzello, D. M. Landers, B. D. Hatfield, K. A. Kubitz, V. Salazar. (1991). Meta-analysis of anxiety reduction during acute and chronic exercise. Results and mechanisms. *Sports Med*, 11 (3), p. 143–182.
11. Sammi R Chekroud et al. (2018). Association between physical exercise and mental health in 1,2 million individuals in the USA between 2011 and 2015: a cross-sectional study *The Lancet Psychiatry*. Volume 5, Issue 9, September 2018, pp. 739-746.

DOI: [https://doi.org/10.31392/UDU-nc.series15.2024.3K\(176\).08](https://doi.org/10.31392/UDU-nc.series15.2024.3K(176).08)  
UDK 378.37.091

Mekhed O.B.,  
<https://orcid.org/0000-0001-9485-9139>  
Doctor of Pedagogical Sciences,  
professor, head of the biology department,  
Chernihiv Collegium National University  
named after T. G. Shevchenko, Chernihiv

### APPLICATION OF STEM-TECHNOLOGIES IN THE PROFESSIONAL TRAINING OF SPECIALISTS IN THE FIELD OF HUMAN HEALTH

*The article examines the current aspects of the use of STEM technologies in the professional training of specialists in the field of human health. Focusing on scientific and technical disciplines such as materials science, engineering, computer science and mathematics, the article highlights the benefits and challenges of applying STEM approaches in the educational process. The impact of the specified technologies on the development of key competencies and increasing the efficiency of professional training of future specialists in the field of health care was studied. The article also considers the possibilities of integrating STEM education into training programs, thereby contributing to the creation of better conditions for the successful implementation of these technologies in the field of training specialists in education and human health.*

**The purpose** of the article is to analyze scientific approaches to defining and studying the features of STEM education; the study of existing educational practices related to the development and implementation of STEM subjects and the determination of ways of their respective implementation in the educational process for the purpose of health protection.

**Methodology.** The methodological basis of the research is a systematic and person-oriented approach to the analysis of psychological-pedagogical literature and pedagogical experience on issues of social-pedagogical activity. The work uses a multi-level systematic analysis of scientific sources, which is based on philosophical, general scientific and partly scientific and specific scientific levels of knowledge.

**Scientific novelty.** The scientific novelty of this article lies in the in-depth study and analysis of the impact of STEM technologies on the professional training of specialists in the field of human health. The work highlights the latest approaches to the use of scientific and technical knowledge and skills for health maintenance, revealing in detail their role in the development and improvement of the quality of education in this field. In addition, the article offers innovative strategies and methods of introducing STEM approaches into educational programs to optimize the process of professional training, which contributes to the continuous improvement of educational practices in the field of human health.

**Conclusions.** Studies of the use of STEM technologies in the professional training of health professionals indicate the significant potential of these innovations in the field of improving the quality of education and improving the practical skills of future medical workers. The use of STEM approaches allows not only to effectively combine scientific knowledge and technical skills, but also stimulates critical thinking, creative approach and the ability to solve complex problems in the medical field. The results of the analysis indicate the need to integrate STEM education into pedagogical programs to provide students with a wider range of competencies, taking into account the development of technologies in the modern world. At the same time, it is important to take into account the specifics of human health education and provide adapted STEM strategies to ensure their optimal effectiveness in the context of human health. In general, the use of STEM technologies in the training of specialists in the field of human health is a promising direction that can contribute to raising the quality of health education and training qualified personnel for the challenges of the modern public health system.

**Key words:** STEM education, educational environment, educational institutions, modern technologies, health care, healthy lifestyle.

**Мехед О. Б. Застосування STEM-технологій в професійній підготовці фахівців в галузі здоров'я людини.** У статті розглянуто актуальні аспекти використання STEM-технологій у професійній підготовці фахівців галузі здоров'я людини. Зосереджуючись на науково-технічних дисциплінах, таких як наука про матеріали, інженерія, інформатика та математика, стаття висвітлює переваги і виклики застосування STEM-підходів у освітньому процесі. Досліджено вплив вказаних технологій на розвиток ключових компетенцій та підвищення ефективності професійної підготовки майбутніх фахівців у галузі охорони здоров'я. У статті також розглянуто можливості інтеграції STEM-освіти в програми навчання, сприяючи тим самим створенню кращих умов для успішного впровадження цих технологій у сфері підготовки фахівців з освіти та здоров'я людини.

**Метою статті** є аналіз наукових підходів до визначення та вивчення особливостей STEM-освіти; дослідження наявних освітніх практик стосовно розроблення та впровадження STEM-предметів та визначення шляхів відповідних втілення в освітній процес з метою здоров'язбереження.

**Методологічною основою** дослідження є системний та особистісно-орієнтований підходи до аналізу психолого-педагогічної літератури та педагогічного досвіду з питань соціально-педагогічної діяльності. У роботі використано багаторівневий системний аналіз наукових джерел, що ґрунтується на філософському, загальнонауковому та частково-науковому та конкретно-науковому рівнях пізнання.

**Наукова новизна** даної статті полягає в глибокому дослідженні та аналізі впливу STEM-технологій на професійну підготовку фахівців у галузі здоров'я людини. Робота висвітлює новітні підходи до використання науково-технічних знань і навичок для підтримання здоров'я, детально розкриваючи їхню роль у розвитку та підвищенні якості освіти в цій галузі. Додатково, стаття пропонує інноваційні стратегії і методи впровадження STEM-підходів у навчальні програми для оптимізації процесу професійної підготовки, що робить внесок у постійне вдосконалення освітніх практик в галузі здоров'я людини.

**Висновки.** Дослідження використання STEM-технологій в професійній підготовці фахівців галузі здоров'я вказують на значущий потенціал цих інновацій у полі підвищення якості освіти та покращення практичних навичок майбутніх медичних працівників. Застосування STEM-підходів дозволяє не лише ефективно поєднувати наукові знання і технічні навички, але й стимулює критичне мислення, творчий підхід та спроможність вирішувати складні проблеми в медичній сфері. Результати аналізу свідчать про необхідність інтеграції STEM-освіти в педагогічні програми для надання студентам ширшого спектру компетенцій, враховуючи розвиток технологій у сучасному світі. При цьому, важливо враховувати специфіку навчання в галузі здоров'я людини та забезпечувати адаптовані STEM-стратегії, щоб забезпечити їхню оптимальну ефективність у контексті здоров'я людини. Загалом, використання STEM-технологій у підготовці фахівців галузі здоров'я людини представляє собою перспективний напрямок, який може сприяти підняттю якості здоров'язбережувальної освіти та підготовці кваліфікованого персоналу для викликів сучасної системи забезпечення громадського здоров'я.

**Ключові слова:** STEM-освіта, освітнє середовище, заклади освіти, сучасні технології, здоров'язбереження, здоровий спосіб життя.

**Formulation of the problem.** Traditional approaches to the professional training of future specialists to ensure the proper level of formation of the relevant competences of young people and their motivation for success are organically combined with modern educational practices, which provide for progressive changes in the construction of the national education system, which contributes to ensuring the development of Ukraine as a democratic state, the harmonious inclusion and existence of its in the European space. The approval by the Cabinet of Ministers of Ukraine of the concept of STEM education confirms its importance for the country, but at the same time raises the issue of new requirements for quality training of STEM personnel in both scientific and technical and health care fields. This can be achieved through the development and implementation of innovative teaching methods and relevant educational programs aimed at the development of various skills, such as cognitive, research, engineering, critical thinking, etc. , who choose scientific and technical activity. The relevance of this topic cannot be doubted, since the success of the educational process depends significantly on the effective use of various means and opportunities. [4]. The substantive and procedural component of professional training of teachers requires the introduction of appropriate corrections that will optimize their motivation, bring their reactive and personal anxiety indicators to a moderate level, increase the level of formation of skills to overcome communication barriers, defend one's own opinions, etc. Particular attention should be paid to the formation of independence, the development of initiative, that is, the formation of organizational abilities, and the increase of the adaptation potential of future teachers.

**Analysis of literary sources.** The theoretical foundations of STEM education are covered in the works of pedagogues and psychologists (V. Andrievska, S. Babijchuk, L. Bilousova, O. Kuzmenko, N. Morse, T. Nanaeva, N. Omelchenko, O. Patrikeeva, V. Pikalova, S. Podlesny, N. Polihun, I. Slipukhina, O. Stryzhak, O. Tarasov, I. Chernetskyi, M. Harrison, D. Langdon, B. Means, E. Peters, Burton, N. Morel, J. Confrey, A. House and others). Most scientists state that STEM education includes an integrated and project-based approach and focuses on practical knowledge. Modernization of the content of modern national education in the direction of integration into the European educational space involves the development and implementation of innovative educational systems and technologies, in particular those that have a health-preserving and improving orientation [1, 3]. After all, the young generation will be promising and far-sighted only under the conditions of preserving and strengthening their health in all its aspects [2]. There is also a need to apply health-preserving and improving technologies not only in educational institutions, creating a health-preserving educational environment, but also in everyday life [1, 5].

**The purpose of the article** is to analyze scientific approaches to defining and studying the features of STEM education; the study of existing educational practices related to the development and implementation of STEM subjects and the determination of ways of their respective implementation in the educational process for the purpose of health protection.

**Methodology.** The methodological basis of the research is a systematic and person-oriented approach to the analysis of psychological-pedagogical literature and pedagogical experience on issues of social-pedagogical activity. The work uses a multi-level systematic analysis of scientific sources, which is based on philosophical, general scientific and partly scientific and specific scientific levels of knowledge.

**Scientific novelty.** The scientific novelty of this article lies in the in-depth study and analysis of the impact of STEM technologies on the professional training of specialists in the field of human health. The work highlights the latest approaches to the use of scientific and technical knowledge and skills for health maintenance, revealing in detail their role in the development and improvement of the quality of education in this field. In addition, the article offers innovative strategies and methods of introducing

STEM approaches into educational programs to optimize the process of professional training, which contributes to the continuous improvement of educational practices in the field of human health.

**Research methods.** We used a set of the following methods: theoretical - generalization, systematization, theoretical modeling, specification, comparison, analysis, synthesis; empirical - observation, analysis of the results of students' activities, conversations, questionnaires.

**Presentation of the main research material.** STEM education is the main element of modern education, after preparing students for work in the field of science, technology, engineering and mathematics, it is key in developing innovations and solving complex problems facing society. The STEM methodology makes it possible to increase the level of interest of students in the studied scientific disciplines, develop their creative abilities and contribute to the formation of professional competences.

A project-oriented approach to learning, focused on the practical application of knowledge in projects that are confirmed by students. A problem-oriented approach focuses on solving specific problems or tasks in the learning process. A practice-oriented approach requires the application of theoretical knowledge in practical tasks, which are forever aware of how to use to gain knowledge in real life.

STEM education can help students gain practical skills that can be useful in future jobs and increase their chances of successful employment in fields related to science, technology, engineering and mathematics. In order to effectively teach STEM education, it is necessary to use innovative methods and ensure access to modern technologies and tools

In Ukraine, the introduction of STEM education, in accordance with the mentioned Concept, involves the application of the following principles: constant updating of content, personal approach, continuity, differentiation of educational material, patriotism and public orientation, integration, productive motivation, developmental and problem-based learning. The implementation of the new promising direction assumes that the following types of education will be involved: formal, informal, informal, both on online platforms and in STEM laboratories. The introduction and expansion of STEM is envisaged through excursions, competitions, Olympiads, tournaments, festivals, etc. In addition, it is considered mandatory to involve specialists in a timely manner for the development and implementation of appropriate software, in particular, computer programs directly for each STEM subject. It is also possible to widely use information and communication technologies in the implementation of health-saving techniques and technologies.

When discussing the topic of STEM education, you often have to see the concepts of STEM specialties, STEM equipment, and STEM play equipment. Accordingly, the specified industry has wide development and is very promising. At the moment, taking into account the above, there is already a noticeable shortage of specialists in such areas as mathematics, natural sciences, computer sciences and technologies. We are not talking about health-preserving directions. At the same time, according to the results of analytical studies, 90% of specialties considered to be of high relevance will require STEM knowledge. In particular, against the backdrop of a shortage of specialist physicists, the need for such specialties as chemical engineers, engineers (including mechanical engineers, nuclear medicine and diagnostics engineers, aerospace engineers, construction engineers, etc.), computer system analysts, is expected to grow. roboticists, architects of underwater structures, etc. Complementary STEM equipment is currently being developed and implemented for each educational field. The above indicates the presence of a sufficient number of scientific developments, relevant digital resources, developed and implemented methodological recommendations and appropriate equipment for the successful implementation of STEM technologies in the educational process.

The system of requirements for the implementation of STEM in the promotion of a healthy lifestyle should ensure the scientific nature of teaching using STEM, which will outline the correctness and scientific reliability of teaching the content; availability of training, which is carried out using information technologies; the problematic nature of learning, which is determined by the essence and nature of educational activity; visibility and reliability of training, which is ensured by the combination of the need to take into account the sensory perception of objects and the use of control and measurement systems to determine the correctness of learning the theoretical material; awareness of learning, independence, activation of the activity of the student of education, which involves the provision of STEM independent actions regarding the extraction of educational information while realizing the goals and objectives of educational activities; systematicity and consistency of work when using information technologies; the unity of educational, developmental and educational functions when using STEM, which includes a harmonious combination of modern achievements of computer technology and pedagogy.

In our opinion, the promotion of a healthy lifestyle of teachers in educational institutions is a relevant part of their professional activity, as it ensures timely assimilation and consolidation of health-preserving and hygienic methodical, psychological-pedagogical, theoretical knowledge. -methodological, worldview, competence components in the organization of the educational process and increasing the level of interest in professional activity.

Summing up, regarding the implementation of STEM for the promotion of a healthy lifestyle, it should be noted that this direction contributes to the improvement of the professional level of teachers, the motivation of education seekers to find new non-standard forms and methods of work, including project work. learning, and also promotes the manifestation of creative abilities of both the teacher and his students. This contributes to increasing the interest of education seekers in learning, activation of cognitive activity, improvement of the quality of knowledge acquisition, and contributes to the formation of a healthy lifestyle culture.

**Conclusions.** Studies of the use of STEM technologies in the professional training of health professionals indicate the significant potential of these innovations in the field of improving the quality of education and improving the practical skills of future medical workers. The use of STEM approaches allows not only to effectively combine scientific knowledge and technical skills, but also stimulates critical thinking, creative approach and the ability to solve complex problems in the medical field. The results of the analysis indicate the need to integrate STEM education into pedagogical programs to provide students with a wider range of competencies, taking into account the development of technologies in the modern world. At the same time, it is important to take into account the specifics of human health education and provide adapted STEM strategies to ensure their optimal effectiveness in the context of human health. In general, the use of STEM technologies in the training of specialists in the field of human health is a

promising direction that can contribute to raising the quality of health education and training qualified personnel for the challenges of the modern public health system.

#### Literature

1. Chystiakova I.A., Ivaniy O.M., Mekhed O.B., Nosko Y.M., Khrapatyi, S. PhD Training Under Martial Law in Ukraine Journal of Higher Education Theory and Practicethis link is disabled, 2022, 22(15), pp. 151–163.
2. Griban G., Mekhed O., Semeniv B., Khurtenko O., Koval V., Khliebnikova T., Skyrda T. Technology of increasing physical activity of university students. Acta Balneologica, 2022, 5(171), 451-456. doi: 10.36740/ABAL202205113.
3. Griban G., Myroshnychenko M., Tkachenko P., Krasnov V., Karpiuk R., Mekhed O., Shyyan V. Psychological and pedagogical determinants of the students' healthy lifestyle formation by means of health and fitness activities. Wiadomości Lekarskie, 2021, 74 (5), 1074-1078. doi: 10.36740/WLek202105105
4. Nosko M., Mekhed O., Nosko Yu., Bahinska O., Zhara H., Griban G., Holovanova I. The impact of health-promoting technologies on university students' physical development. Acta Balneologica, 2022, 5(171), 469-473. doi: 10.36740/ABAL202205116.
5. Nosko M., Mekhed O., Ryabchenko S., Ivantsova O., Denysovets I., Griban G., Prysyzhniuk S., Oleniev D., Kolesnyk N., Tkachenko P. The influence of the teacher's social and pedagogical activities on the health-promoting competence of youth. International Journal of Applied Exercise Physiology, 2020, 9(9), 18-28.

#### References

1. Chystiakova I.A., Ivaniy O.M., Mekhed O.B., Nosko Y.M., Khrapatyi, S. (2022). PhD Training Under Martial Law in Ukraine Journal of Higher Education Theory and Practicethis link is disabled, 22(15), pp. 151–163.
2. Griban G., Mekhed O., Semeniv B., Khurtenko O., Koval V., Khliebnikova T., Skyrda T. (2022). Technology of increasing physical activity of university students. Acta Balneologica, 5(171), 451-456. doi: 10.36740/ABAL202205113.
3. Griban G., Myroshnychenko M., Tkachenko P., Krasnov V., Karpiuk R., Mekhed O., Shyyan V. (2021). Psychological and pedagogical determinants of the students' healthy lifestyle formation by means of health and fitness activities. Wiadomości Lekarskie, 74 (5), 1074-1078. doi: 10.36740/WLek202105105
4. Nosko M., Mekhed O., Nosko Yu., Bahinska O., Zhara H., Griban G., Holovanova I. (2022). The impact of health-promoting technologies on university students' physical development. Acta Balneologica, 5(171), 469-473. doi: 10.36740/ABAL202205116.
5. Nosko M., Mekhed O., Ryabchenko S., Ivantsova O., Denysovets I., Griban G., Prysyzhniuk S., Oleniev D., Kolesnyk N., Tkachenko P. (2020). The influence of the teacher's social and pedagogical activities on the health-promoting competence of youth. International Journal of Applied Exercise Physiology, 9(9), 18-28.

DOI: [https://doi.org/10.31392/UDU-nc.series15.2024.3K\(176\).09](https://doi.org/10.31392/UDU-nc.series15.2024.3K(176).09)

**Pryimakov Oleksandr<sup>1</sup>, Stępień-Słodkowska Marta<sup>2</sup>,  
Sawczuk Marek<sup>3</sup>, Mazurok Nataliya<sup>4</sup>, Pilarczyk Jolanta<sup>5</sup>**  
<sup>1</sup>Prof., dr hab., Uniwersytet Szczeciński (Szczecin, Polska)  
<http://orcid.org/0000-0003-0351-486X>  
<sup>2</sup>Prof., dr hab., Dziekan Wydziału Kultury Fizycznej i Zdrowia  
Uniwersytetu Szczecińskiego (Szczecin, Polska)  
<sup>3</sup>Prof., dr hab., Gdańska Akademia Wychowania Fizycznego  
i Sportu (Gdańsk, Polska). Instytut Nauk o Kulturze  
Fizycznej (Szczecin, Polska). <http://orcid.org/0000-0002-5730-5249>  
<sup>4</sup>Dr. nauk technicznych, Państwowy Uniwersytet im. Michała Dragomanowa (Kijów, Ukraina)  
<https://orcid.org/0000-0001-7346-1156>  
<sup>5</sup>Magister Nauk o Kulturze Fizycznej, Uniwersytet Szczeciński  
(Szczecin, Polska)

#### MODELOWE CHARAKTERYSTYKI SPRAWNOŚCI FIZYCZNEJ ŻOŁNIERZY ZAWODOWYCH DWÓCH GRUP WIEKOWYCH

**Pryimakov Oleksandr, Stępień-Słodkowska Marta, Sawczuk Marek, Mazurok Nataliya, Pilarczyk Jolanta. Model characteristics of physical fitness of professional soldiers of two age groups.** The purpose of the work is to analyze the integration and interaction of various components of the structure of the physical condition of professional servicemen of the military unit of the West Pomeranian Voivodeship. 50 professional soldiers aged 26-30 and 50 professional soldiers aged 36-40 took part in the study. The scope of the study included the registration of 12 parameters of physical (FD) and motor (MD) development. Mathematical analysis of the obtained research results was carried out with the help of statistics and graphics programs Statistics 13.5 and Excel-16. The results show that the age of the two groups of servicemen does not affect the value of the FD indicators. However, in the group of servicemen over 30 years old, the indicators of FD are integrated more strongly. Among the parameters of MD, the biggest changes occurred in the parameters of the 3000 m run and body inclinations in the age group of servicemen under 30 years of age. Studies have shown that most indicators of FD and MD are interrelated and depend on each other. Among the FD indicators, the following indicators have the largest number of strong relationships: BMI, water content in the body (%), ratio of body