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**THE SCIENTIFIC-CREATIVE COMPONENT IN THE STRUCTURE OF
PROFESSIONAL TRAINING OF PROSPECTIVE ENGINEERS**

Abstract. The scientific-creative approach is identified as a principal vector for the modernization of higher technical education in Ukraine, creating opportunities for prospective engineers to define individually significant creative goals and implement them for effective professional activity. Contemporary challenges faced by engineering specialists, as well as the problems and tasks that must be solved in their professional activity, are becoming increasingly creative, without patterned or standardized solutions.

Based on these tendencies, the problem of forming the personality of an engineering specialist with a developed need for creative self-realization in future professional activity is gaining particular relevance.

The article examines the theoretical foundations and practical aspects of the professional training of prospective engineering specialists for scientific-creative activity in industrial production. The professional training of prospective engineers in the shipbuilding industry is characterized as a system of scientific and creative skills enabling engineering students to structure technical, scientific, and practical knowledge for the effective solution of research tasks in their future professional activity.

Scientific creativity is regarded as the readiness and ability of a prospective engineering specialist to conduct purposeful scientific and research activity in the field of industrial production. It has been established that the formation of scientific creativity skills involves the development of the creative potential and scientific culture of engineering students, as well as their active involvement in fundamental sector research.

The results of the research convincingly demonstrate that the development of scientific creativity skills contributes to the enhancement of the individual creative potential of engineering students and to the advancement of the inventive capabilities of prospective technical specialists. The effectiveness of the process of forming the scientific-creative component of professional training was ensured through the following conditions: the application of active dialogical forms and methods of educational activity, and the involvement of engineering students in the activities of university scientific schools. Courses on the methodology of technical creativity and the fundamentals of scientific research in contemporary engineering also proved to be effective.

Keywords: technical education; professional training; creative approach; prospective engineers; research activity; shipbuilding industry; scientific creativity; sector-specific scientific research.

1. INTRODUCTION

In contemporary conditions, education in Ukraine is recognized as an important factor of the political, social-economic, cultural, and scientific development of society. The main trends in the education of prospective engineers in modern conditions include the fundamentalization of education, the humanistic orientation of professional training, the actualization of spiritual and general cultural components, and the formation among engineering students of a creative approach to the analysis and solution of non-standard technical tasks and social situations. The formation of a competent, highly qualified, and competitive technical specialist with skills of scientific creativity has been identified as the principal objective of engineering education at Admiral Makarov National University of Shipbuilding (NUOS).

The increasing relevance of the scientific-creative approach to the training of engineering specialists is explained both by the social conditions and economic challenges of the country and by the specific characteristics of the future professional activity of engineers, which encompasses the principal spheres of material and spiritual production, public administration, and national culture. Therefore, our attention has been focused on investigating contemporary approaches and developing the necessary conditions for the formation of a creative and socially active personality of a prospective specialist in the shipbuilding industry. Scientific activity is considered an essential condition for the effective preparation of engineering students for intellectual, non-standard, and creative professional activity.

2. AIM AND TASKS

Despite the intensification of research of the theoretical foundations and methodological approaches to the training of prospective engineers, the problem of developing skills of scientific and creative activity remains insufficiently researched. Consequently, there is a need to develop and substantiate the conditions for enhancing the scientific and creative component of the professional training of prospective engineers, which constituted the principal objective of this research.

According to the conclusions of contemporary scholars investigating the theoretical foundations and practical conditions for the implementation of technical specialists' training, engineering activity is inherently cognitive, transformative, and creative in nature [1]. A modern engineering specialist is expected to possess knowledge not only of engineering technologies, contemporary production processes, economics, and ecology, but also the capacity for invention and the skills necessary for a creative approach to professional activity [2]. In particular, researchers emphasize the necessity of training engineering specialists for scientific activity, research work, and the practical implementation of their own creative ideas and concepts [3].

The analysis of scientific works demonstrates that the professional training of specialists in the shipbuilding industry should provide engineering students with opportunities to develop their individual creative potential, cultivate the need for creative self-development, and engage in scientific inquiry aimed at solving complex technical problems [4]. Scientific creativity of an engineering specialist is regarded by contemporary researchers as a personal characteristic determined by the capacity for creative activity, the generation of new original ideas, and the ability to make non-standard and responsible technical decisions [5].

Researchers consider creativity as a specific expression of an individual's intellectual activity, which consists in the ability to carry out the process of cognition beyond the limits of the initial task; thus, the essence of creativity lies in the search for a new and optimal way of solving a problem [6]. At the same time, the creative process requires an individual's ability to effectively perform operations of logical thinking (analysis, synthesis, comparison, classification, etc.) in the course of mastering professional knowledge and the skills necessary for the production process [7]. Researchers have reached conclusions that enable to regard

creativity as the ability to comprehend one's own experience, freely navigate the contemporary information space, and identify optimal solutions in non-standard situations [8]. Consequently, a prospective technical specialist must be capable of applying technologies and creative activity skills that meet contemporary social-economic demands [9].

The conducted analysis demonstrates the increasing relevance of the scientific component in the training of engineering students on the basis of implementing a creative approach. Scientific and creative activity is regarded as a necessary condition for the effective preparation of a competent specialist in the shipbuilding industry, ensured through the integration of the educational, scientific, industrial, and creative activities of the prospective engineer. This integrative process requires the search for ways to improve the training of engineering students aimed at developing skills of scientific creativity.

3. RESEARCH FINDINGS

At the first stage of the study, which involved a review of the literature on the problem and an analysis of practical experience in the training of engineering specialists in higher technical education institutions in Ukraine and abroad, a number of regularities and characteristic features of the training process were identified. These findings were taken into account in the development of the conditions for forming the scientific-creative component of the professional training of prospective engineers. The training of specialists in the shipbuilding industry who meet contemporary social challenges and demands requires purposeful work aimed at identifying and developing the creative potential of engineering students, as well as fostering a creative approach to professional activity. Within this framework, the development of scientific and creative skills becomes essential, which actualizes the problem of forming scientific creativity skills of prospective engineers.

The conducted research demonstrates that a high level of mastery of the necessary professional competences can be achieved through the integration of scientific training of engineering students and the formation of skills for the creative application of theoretical knowledge in the production process [10]. Therefore, it is important not only to teach prospective specialists in the shipbuilding industry to operate knowledge and technologies, but also to prepare them for an active position in social life and to enable them to use scientific and technological achievements for creative activity throughout their lives [11].

The creative potential of the individual is defined as the foundation for the realization of an engineering student as a subject of educational and creative activity in a higher technical education institution. The study demonstrates that the scientific creativity of a prospective engineering specialist in the shipbuilding industry is a dynamic structure of personality expressed through the integration of value-based, cognitive, and activity-related components. In the context of this research, engineering creativity is regarded as the ability to generate new ideas, develop non-standard solutions, and create original inventions.

Scientific creativity of a prospective engineer is defined as a continuous process of identifying and developing individual creative abilities. Under such conditions, the engineering student acts as a subject of creative interaction in the educational process. There is an awareness of the need for continuous creative self-realization based on contemporary

scientific achievements, as well as responsibility for the outcomes of creative activity. The formation of scientific creativity skills requires the development of appropriate training conditions, which include the use of dialogical forms of educational activity and the active involvement of students in the scientific work of the university. The developed scientific and creative skills of engineering students are the result of implementing methodological approaches and techniques in engineering education that correspond to contemporary trends in the development of the shipbuilding industry, society, science, engineering, and advanced technologies [12].

The second stage of the study involved examining the level of formation of students' motivation, knowledge, skills, and experience in conducting scientific and creative activities. To determine the existing level of scientific creativity skills, several validated tests were applied, namely the Guilford test for assessing the level of development of creative abilities; the Torrance Tests of Creative Thinking for diagnosing creativity and creative thinking; the Getzels and Jackson test for studying creative giftedness and high intelligence; the Wallach-Kogan test for pedagogical diagnostics of creative potential; the Remote Associates Test and the Mednick test of verbal creativity. Comprehensive observations of prospective engineers were also conducted.

The analysis of the results demonstrated a relatively high level of motivation among prospective engineers to engage in scientific and creative activity: 78.5% are aware of the necessity of conducting research work; 20% of respondents were unable to clearly formulate the goals and motives of research activity, although they expressed interest in this type of work; 1.5% of respondents do not have clearly formed motives for scientific and creative activity. The study showed that 93.8% of students have insufficient knowledge of research methods; however, they expressed readiness and willingness to study the theoretical foundations of scientific creativity and to participate in the scientific activities of Admiral Makarov National University of Shipbuilding. The presence of skills and experience in conducting research was determined through observation and interviewing, which revealed that only 6.2% of students had knowledge and skills in organizing research activity.

The third stage of the study involved the participation of students and academic staff in experimental work, which included the implementation of the proposed training conditions in the educational process and the verification of their effectiveness in developing the scientific and creative component. The experimental base of the study included the Educational and Scientific Institute of Automation and Electrical Engineering, the Mechanical Engineering Institute, and the Shipbuilding Educational and Scientific Institute of Admiral Makarov National University of Shipbuilding.

The implementation of professional training based on the developed conditions involved the active involvement of prospective engineers in university scientific associations (schools, clubs, laboratories); their participation in special courses such as "Methods of Technical Creativity" and "Fundamentals of Scientific Research in Modern Engineering"; presentations at scientific seminars, round tables, conferences, and symposiums; and publication of research results in collections of scientific papers. The implementation of the experimental methodology was based on thorough instruction, the establishment of feedback mechanisms, and the stimulation of motivation for scientific inquiry. The development of

methodological tools was conducted by specialists in the relevant field of engineering. The main approaches that proved effective in fostering scientific creativity included orienting university activities toward the development of research skills, forming students' experience in scientific work, and encouraging students to solve scientific problems.

The main principles for implementing a creative approach, which we strictly followed during the experimental work, were the observance of ethical norms and standards of research and creative activity. Ethical cognitive activity presupposes a tolerant recognition of the originality and uniqueness of the prospective engineering specialist's personality. The objective creative potential of an engineering student should result in the production of an original and unique research output in accordance with the ethical standards of professional engineering ethics. According to our findings, the ethics of educational creativity is based on volitional qualities of a highly qualified technical specialist, such as perseverance, diligence, organization, purposefulness, and self-control.

An effective means of acquiring knowledge of the methods and principles of organizing scientific and creative activity was identified by 93.7% of engineering students involved in the experimental work as the study of specialized academic disciplines such as "Methods of Technical Creativity" and "Fundamentals of Scientific Research in Modern Engineering," as well as special courses and seminars. Accordingly, 96.5% of prospective engineers noted that participation in student scientific associations (clubs, research groups, and laboratories) contributed to the development of their motivation for scientific inquiry and inventive activity, while also providing opportunities for in-depth study of individual disciplines and mastery of research methodology.

The success of the process of students' creative self-realization is determined by specific scientific and creative outputs: external outputs (reports, essays, abstracts, presentations, articles, innovative inventions, designed devices, engineering developments, etc.); and internal outputs (developed research motivation, values of scientific work, enhanced creative abilities, and skills in conducting scientific inquiry and presenting results). Within the framework of the experimental work, prospective engineers participated in the preparation of reports, presentations, and discussions at the scientific and practical conference of lecturers and students "Innovations in Shipbuilding," which is held annually at Admiral Makarov National University of Shipbuilding.

The effectiveness of the developed conditions for forming scientific creativity is confirmed by numerous publications of student research outputs, carried out under our supervision, in international journals (Tokyo, Toronto, Liverpool, Zurich, Vancouver, and others). According to both lecturers and students, this work contributed to gaining practical experience in discussing and summarizing the results of research activities. Thus, the proposed conditions for the training of engineering students have demonstrated their effectiveness in developing practical skills of scientific creativity.

4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

A necessary condition for the modernization of engineering education is the integration of education and science, as well as the innovative creative activity of prospective

specialists in the shipbuilding industry. This requirement highlights the need to prepare engineering specialists capable of carrying out research and creative activities in the field of industrial production. Therefore, the conditions for developing students' experience in scientific and creative activity require both theoretical substantiation and practical implementation.

The development of the creative potential of engineering students is one of the main objectives of training prospective specialists in technical fields at Admiral Makarov National University of Shipbuilding. The activity of prospective engineering specialists is aimed not only at mastering fundamental technical knowledge but also at developing the ability to creatively apply it in future research activity within the shipbuilding industry. Scientific and creative activity is regarded as an integral component of overall professional training and constitutes a foundation for the preparation of future engineers in higher technical education institutions. The formation of scientific creativity skills ensures the development of a scientific worldview, as well as the individual research, creative, and inventive abilities of a highly qualified and competent specialist in the shipbuilding industry.

The identified trends convincingly demonstrate that the training of specialists in the shipbuilding industry should provide engineering students with opportunities to develop their creative potential, satisfy the need for creative self-development, and acquire the ability to conduct scientific inquiry aimed at solving technical problems. The study has confirmed the positive impact of the proposed training conditions on the effectiveness of forming students' scientific creativity skills. The scientific novelty of the study lies in its specific focus on prospective engineers in the shipbuilding industry. The results of the research may also be applied in the training of specialists in the humanities.

5. REFERENCES (TRANSLITERATED)

1. Obukhova, L., Galustyan, O., Baklanov, I., Belyaev, R., Kolosova, L., & Dubovitskaya, T., 2020. Formation of organizational competence of future engineers by means of blended learning. *International Journal of Engineering Pedagogy (ijEP)*, 10(2), 119. DOI: <https://doi.org/10.3991/ijep.v10i2.12047>.
2. Slisko, J., 2021. Facebook-supported tasks for exploring critical and creative thinking in a physics teaching course. *Knowledge Management & E-Learning: An International Journal*, 13 (1), 58–82. DOI: <https://doi.org/10.34105/j.kmel.2021.13.004>.
3. Amrulloh, M. Sh., & Galushasti, A. (2022). Professional development teacher to improve skills of science process and creativity of learners. *EduLearn*, 16(3), 299-307. DOI: <https://doi.org/10.11591/edulearn.v16i3.20404>.
4. Molefe, L., & Aubin, J.-B., 2021. Exploring how science process skills blend with the scientific process: Pre-service teachers' views following fieldwork experience. *South African Journal of Education*, 41(2), 1–13. DOI: <https://doi.org/10.15700/saje.v41n2a1878>.
5. Chen, H.-H., & Yuan, Y.-H., 2021. The Study of the Relationships of Teacher's Creative Teaching, Imagination, and Principal's Visionary Leadership. *SAGE Open*, 11(3), 215824402110299. DOI: <https://doi.org/10.1177/21582440211029932>.

6. Kuleshova, V., & Aksakova, N., 2023. Research activity of a teacher at higher education institutions. *Grail of Science*, 26, 400. DOI: <https://doi.org/10.36074/grail-of-science-14.04.2023.073>.

7. Laval, J. et al., 2021. Toward an innovative educational method to train students to agile approaches in higher education: The alpes. *Education Sciences*, 11(6) DOI: <https://doi.org/10.3390/educsci11060267>.

8. Kuzmenko, H., Zaitseva, V., Zaria, S., Shman, S., Konolavola, O., & Buihasheva, A. 2025. The influence of interactive educational space on the professional self-realisation of future art professionals. *EduLearn*, 19(1), 265-273. DOI: <https://doi.org/10.11591/edulearn.v19i1.21787>.

9. Tidwell, D., & Edwards, L., 2020. Retrospective self-study: Analysis of the impact of methods on thinking, teaching, and community. in C. Edge, A. Cameron-Standerford, and B. Bergh, editors, *Textiles and Tapestries: Self-Study for Envisioning New Ways of Knowing*. Michigan: EdTech Books.

10. Abelha, M., Fernandes, S., Mesquita, D., Seabra, F., & Ferreira-Oliveira, A. T., 2020. Graduate employability and competence development in higher education – A systematic literature review using PRISMA. *Sustainability*, 12(15). DOI: <https://doi.org/10.3390/su12155990>

11. Romanchuk, N., Maiboroda, O., Biliuk, I., & Savchenko, O., 2026. Formation of science and research competence of future engineers in higher technical educational institutions. *Journal of Education and Learning*, 20(2), 998-1006. DOI: <https://doi.org/10.11591/edulearn.v20i2.23462>

12. Zhuravlova, Y., Kichuk, Y., Yakovenko, O., Miziuk, V., Yashchuk, S., & Zhuravska, N., 2022. Innovations in education system: Management, financial regulation and influence on the pedagogical process. *Journal of Curriculum and Teaching*, 11(1), 163–173. DOI: <https://doi.org/10.5430/jct.v11n1p163>.

НАУКОВО-ТВОРЧИЙ КОМПОНЕНТ У СТРУКТУРІ ПРОФЕСІЙНОЇ ПІДГОТОВКИ МАЙБУТНІХ ІНЖЕНЕРІВ

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Анотація. Науково-творчий підхід визначено концептуальним орієнтиром модернізації вищої технічної освіти в Україні, який створює можливості майбутньому інженеру визначати індивідуально важливі творчі цілі та реалізовувати їх для ефективного професійного функціонування протягом життя. Сучасні виклики, що постають перед інженерними фахівцями, проблеми та задачі, які необхідно розв'язувати в процесі професійної діяльності, стають усе більш творчими, тобто такими, які не мають однозначних, шаблонних шляхів вирішення. З огляду на виявлені тенденції, актуальності набуває проблема формування особисті інженерного фахівця з розвиненою потребою у творчій самореалізації в майбутній професійній діяльності.

У статті досліджуються теоретичні засади та практичні аспекти професійної підготовки майбутніх інженерних фахівців до науково-творчої діяльності в галузі промислового виробництва. Професійну підготовку майбутніх інженерів кораблебудівної галузі охарактеризовано як систему науково-творчих умінь студентів-інженерів структурувати технічні, наукові й практичні знання з метою ефективного розв'язання дослідницьких завдань у майбутній професійній діяльності.

Під науковою творчістю розуміємо готовність і здатність майбутнього інженерного фахівця здійснювати цілеспрямовану наукову, дослідницьку діяльність в галузі промислового виробництва. Встановлено, що формування навичок наукової творчості передбачає розвиток творчого потенціалу, наукової культури студента-інженера, його активне залучення до фундаментальних галузевих досліджень.

Результати дослідницької роботи переконливо свідчать, що формування навичок наукової творчості сприяє розвитку індивідуального творчого потенціалу студента-інженера, розвитку винахідницьких можливостей майбутнього технічного фахівця. Ефективність процесу формування науково творчого компоненту підготовки забезпечувалась наступними умовами: застосуванням активних діалогових форм та методів навчальної діяльності; залученням студентів-інженерів до діяльності університетських наукових шкіл. Засвідчили свою ефективність курси з методики технічної творчості та основ наукових досліджень у сучасній інженерії.

Ключові слова: технічна освіта; професійна підготовка; творчий підхід; майбутні інженери; науково-дослідницька діяльність; кораблебудівна галузь; наукова творчість; галузеві наукові дослідження.

СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

1. Obukhova, L., Galustyan, O., Baklanov, I., Belyaev, R., Kolosova, L., & Dubovitskaya, T., 2020. Formation of organizational competence of future engineers by means of blended learning. *International Journal of Engineering Pedagogy (ijEP)*, 10(2), 119. DOI: <https://doi.org/10.3991/ijep.v10i2.12047>.
2. Slisko, J., 2021. Facebook-supported tasks for exploring critical and creative thinking in a physics teaching course. *Knowledge Management & E-Learning: An International Journal*, 13 (1), 58–82. DOI: <https://doi.org/10.34105/j.kmel.2021.13.004>.
3. Amrulloh, M. Sh., & Galushasti, A. (2022). Professional development teacher to improve skills of science process and creativity of learners. *EduLearn*, 16(3), 299-307. DOI: <https://doi.org/10.11591/edulearn.v16i3.20404>.
4. Molefe, L., & Aubin, J.-B., 2021. Exploring how science process skills blend with the scientific process: Pre-service teachers' views following fieldwork experience. *South African Journal of Education*, 41(2), 1–13. DOI: <https://doi.org/10.15700/saje.v41n2a1878>.

5. Chen, H.-H., & Yuan, Y.-H., 2021. The Study of the Relationships of Teacher's Creative Teaching, Imagination, and Principal's Visionary Leadership. *SAGE Open*, 11(3), 215824402110299. DOI: <https://doi.org/10.1177/21582440211029932>.
6. Kuleshova, V., & Aksakova, N., 2023. Research activity of a teacher at higher education institutions. *Grail of Science*, 26, 400. DOI: <https://doi.org/10.36074/grail-of-science-14.04.2023.073>.
7. Laval, J. et al., 2021. Toward an innovative educational method to train students to agile approaches in higher education: The alpes. *Education Sciences*, 11(6) DOI: <https://doi.org/10.3390/educsci11060267>.
8. Kuzmenko, H., Zaitseva, V., Zaria, S., Shman, S., Konolavola, O., & Buihasheva, A. 2025. The influence of interactive educational space on the professional self-realisation of future art professionals. *EduLearn*, 19(1), 265-273. DOI: <https://doi.org/10.11591/edulearn.v19i1.21787>.
9. Tidwell, D., & Edwards, L., 2020. Retrospective self-study: Analysis of the impact of methods on thinking, teaching, and community. in C. Edge, A. Cameron-Standerford, and B. Bergh, editors, *Textiles and Tapestries: Self-Study for Envisioning New Ways of Knowing*. Michigan: EdTech Books.
10. Abelha, M., Fernandes, S., Mesquita, D., Seabra, F., & Ferreira-Oliveira, A. T., 2020. Graduate employability and competence development in higher education – A systematic literature review using PRISMA. *Sustainability*, 12(15). DOI: <https://doi.org/10.3390/su12155990>
11. Romanchuk, N., Maiboroda, O., Biliuk, I., & Savchenko, O., 2026. Formation of science and research competence of future engineers in higher technical educational institutions. *Journal of Education and Learning*, 20(2), 998-1006. DOI: <https://doi.org/10.11591/edulearn.v20i2.23462>
12. Zhuravlova, Y., Kichuk, Y., Yakovenko, O., Miziuk, V., Yashchuk, S., & Zhuravska, N., 2022. Innovations in education system: Management, financial regulation and influence on the pedagogical process. *Journal of Curriculum and Teaching*, 11(1), 163–173. DOI: <https://doi.org/10.5430/jct.v11n1p163>.

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