

Integration of Humanities and Professional Disciplines as a Factor of the Development of Students' Creative Potential in a Technical University

V. P. Frolov

Moscow State University of Civil Engineering
NRU MGSU
Moscow, Russia
history@mgsu.ru

Abstract — The article examines the integration of humanities and professional disciplines as an important factor of the development of students' creative potential in a technical university. The author determines the need for the promotion of students' creative activity and reveals its essence based on the analysis of foreign and domestic scientists works on the development of the creative potential of future specialists in the technical field. Creative potential is usually associated with the shaping of social skills, the assimilation of historical experience, the correlation of cultural and historical consciousness and professional competencies. The problem of creative personality development in a technical university is solved on the basis of an integrated approach to the creation of universities educational space. This space includes educational, scientific, and social activities of students, traditional and innovative forms of work with students, the motivation of students in relation to professional activities, the active use of interdisciplinary methods in training, and the combination of practice-oriented training of future specialists with the development of universal skills. The article substantiates that the challenge of developing innovative and creative qualities in students can be successfully responded in the context of the integration of humanitarian, natural-scientific and technical disciplines. The determination of interdisciplinary connections, the development of skills to solve cognitive and technological issues in the frame of interdisciplinarity is of great heuristic value, what forms the specific knowledge necessary for professional activities. The comprehension of moral aspects of science, issues of engineering ethics, and the analysis of the complex relationships “man–society–nature” as a part of construction and creative activity are of particular importance, they become open for research in intersubject communications.

Keywords — *individual potential; creativity; initiative; integration of humanities and technical knowledge; professional development; construction education.*

I. INTRODUCTION

In the modern model of education, an important role is played by the creation of conditions for the development of students' creative potential in a technical university. The problem of training a creative personality is solved on the basis of an integrated approach to the making of educational

space, which includes the interaction of teachers and students, the relationship of academic, scientific and educational work, traditional and innovative forms of teaching, motivation of students to take a part in professional activities, etc. [1].

The topic of students' creative potential in a technical university correlates with a wide range of historical, philosophical, sociological, psychological, pedagogical, and cultural aspects. One of the important factors in the development of students' creativity is the integration of humanitarian, natural and technical knowledge in the framework of vocational training for students of technical universities [2]. In addition, one of the critical tasks of research in the field of education is to determine the meaning of this integration, its historically established forms and current state, the ways in which such integration of scientific and educational processes influence the emergence of new research methods and the activation of scientific creativity [3].

II. RESULTS AND DISCUSSION.

The analysis of the works written by famous researchers, foreign and Russian scientists shows that the development of human creativity, the creation of educational systems aimed at encouraging individual creativity have always been in the focus of research.

For instance, Aristotle emphasized the danger posed by morally inferior citizens to society. J. Dewey justifies the role of knowledge integration for the development of creative intelligence in his works, which proves the need for a pragmatic approach to education and, within the framework of this approach, determines the methods of thinking development [4]. One of the founders of semiotics, a famous researcher of culture Yury Lotman paid special attention to the role of creative individual freedom in the development of culture as a whole [5]. In modern pedagogical research of I.A. Zimniaya, dialectic unity in the educational space of humanities and special professional disciplines is determined as an important condition for the implementation of the competency-based approach [6].

The justified integration of the disciplines of the humanitarian, natural-scientific and technical cycles creates effective conditions for the training of innovators and creators, including those in the technical field.

The determination of interdisciplinary connections and the creation of interdisciplinary models activate learning activities contribute to the formulation of new cognitive tasks and the application of innovative methods. The development of a creative atmosphere in the educational space, the formation of social and communication skills, the ability to work in a team and show creative skills are also included in the list of critical aspects. The integration of humanities and technical knowledge contributes to the expansion of subject areas of knowledge, extrapolation of research methods and techniques, the development of skills to identify new objects of knowledge and technological activity [7]. This process and its results are associated with the activation of creative interest in the problem under study, with the innovative use of the results of cognition in their professional field. It should be noted that creative activity includes not only heuristic approaches, but also general scientific methods, such as observation, analysis, induction, etc.

The directed independent creative activity of students ensures the unity of the teacher's work and the reaching of the creative potential of student's personality. The organization of such independent work should include the development of an original style of thinking, the ability to identify a problem situation and creatively solve it with the help of new ideas and methods.

Moreover, the determination of general moral aspects of science and modern technologies, which are associated with both solving current issues in the development of society and meeting human needs, as well as in the future of human civilization, has a great influence [8]. Understanding the ethos of science and engineering ethics by students of technical universities is connected with the development of systems thinking, the interpretation of the value foundations of modern technical education [9]. At the same time, all of the above is not only necessary conditions for a harmoniously developed personality, but also for the training of technical personnel capable of self-realization in the complex system of "man–society–nature" [10]. Therefore, if a university conducts an individual approach to teaching, students will form the skills of creative use of knowledge and develop some rational ways of solving complex problems.

The activation of students' learning process is promoted by the providing of cognitive tasks on interdisciplinary nature, what stimulates creativity, develops cognitive activity, forms systemic thinking and further help to solve non-standard issues in different areas of professional and social practice [11]. Learning effectiveness on the basis of interdisciplinary connections is usually achieved by innovative activity in its goals, content, forms of organization of the educational process, by developing students' self-organization, forecasting and modeling skills.

III. CONCLUSION.

The development of creative potential is related to cognitive activity, understanding of the unity of continuity and innovations in all social fields, setting of heuristic tasks, determination of the practical significance of scientific and creative activities, and acquaintance with the latest scientific and production technologies. Its vocational guidance, simultaneous fundamentalization and substantive pragmatization of the educational process, including humanities as its mandatory element, is an integral part of this process. For example, the role of historical subjects in the training of students of construction universities is based on understanding of the cultural significance of the historical object in question, perception of the originality of architectural styles, developmental stages of building technologies and the historical era in which they existed. Universal competencies are formed during lectures and practical classes at construction university in order to solve complex problems (a creative approach to the study of history and construction, the ability to work in a team, a critical analysis of the results) taking into account basic knowledge and personal skills [12]. As a rule, students' attention is focused on creative searches, initiative, perseverance in the implementation of individual urban development projects.

Young people should be interested in scientific and technological achievements, scientific discoveries with the participants of the events that are crucial for the country, in particular with professional builders – designers, fixers, operators, repairmen, etc. The period of transformations in the field of technology, science, construction appears as an era of creativity. At lectures and practical classes, during educational excursions, students' attention is drawn to new materials, structures, mechanisms, technologies of the 21st century that have raised construction to a higher level. The role of innovative ideas in the development of the construction industry is also emphasized.

Studying the subject History in a construction university enables students to see the dynamics of the construction industry in the broad historical and cultural context of the country's life. At the same time, the relevance of the History course can be revealed with the help of topics dedicated to the capital of Russia. It is important to show Moscow "creating", which grew, built and developed at an unprecedented pace, setting the style for urban life in Russia and forming the image of a new capital. Learning about the heroic history of Moscow allows us to imagine how gradually, difficultly and actively at the same time the Russian capital was created over the course of many centuries, what creative ideas were laid in its layout and architectural appearance. In the educational process, students of a construction university get acquainted with the growing possibilities of introducing new materials and technologies, the results of the creative work of scientists, architects, engineers. Biographies of famous people of the construction industry in the educational material contribute to the formation of a personal attitude not only to the history of students' country, but also to achievements in the field of their future professional activity. For example, the review of the biography of A.F. Loleit helps students to focus on how he creatively revealed the potential and aesthetic capabilities of reinforced concrete in his works.

The students of construction universities will not be indifferent by the story about the skillfully innovative use of metal by Russian engineer V.G. Shukhov, one of his creations is the famous TV tower of hyperboloid construction on Shabolovka street.

Particular attention should be paid to the fact that new design capabilities contribute to the development of an advanced system of high-rise construction, improvement of the artistic characters of architecture, and distribution of restoration innovations, giving the capital of Russia a renewed unique look. It is important to mention that the scale of construction projects of the Moscow subway and the artistic uniqueness of its stations are due to innovative ideas in this construction industry and a creative approach to the design and implementation of this ambitious project as a whole.

In the frame of a creative competition through the prism of its analysis, it is necessary to understand that the culture of construction production is designed to convey traditions and experience, ensure constant movement and innovation of the industry, seeking its renewal and improvement [13].

Therefore, the integration of humanitarian, natural and technical knowledge in educational space of technical (including construction) universities is an important factor in the development of the creative potential of students' personalities. Several characters of this factor can be distinguished [14]: 1) a value basis that accumulates not only the norms of cognitive and professional activity, but also sets the possibilities for creative cultural reflection [15]; 2) the interdisciplinary field of interacting sciences is a special source of creative extrapolation of methodology and creation of fundamentally new approaches and techniques; 3) in the process of mastering a system that includes the knowledge of different disciplines, various scientific and communicative practices are assimilated, thereby forming the necessary communicative and activity competencies; 4) the inclusion of humanities in the training of students of technical universities contributes to the formation of ethical principles not only in scientific and educational, but also in future professional activities, in understanding this activity as an integral part of the development of society and culture.

References

- [1] V.I Gorbunov, O.K. Evdokimova, and A.I. Mineev, "Continuing humanitarian education in the system of training bachelors in technical areas," *Studia Humanitatis*, vol. 1, 2017, p. 7.
- [2] G. Tejedor, J. Segalàs, and M. Rosas-Casals, "Transdisciplinarity in higher education for sustainability: How discourses are approached in engineering education," *Journal of Cleaner Production*, vol. 175, 2018, pp. 29–37.
- [3] M. Moore, M.L. Martinson, P.S. Nurius, and S.P.Kemp, "Transdisciplinarity in Research: Perspectives of Early Career Faculty," *Research on Social Work Practice*, vol. 28 (3), 2018, pp. 254–264.
- [4] E.F Tomina, "Pedagogical ideas of John Dewey: history and modernity," *Bulletin of OSU*, vol. 2 (21), 2011, pp. 360-366.
- [5] Yu.M. Lotman, *Education of the Soul*. St. Petersburg: Iskustvo-SPb, 2003.
- [6] *The education strategy in the educational system of Russia* (ed.: I.A. Zimnaya). Moscow, 2005. p. 17.
- [7] C. Kottaridi, K. Louloui, and S. Karkalakos, "Human capital, skills and competencies: Varying effects on inward FDI in the EU context," *International Business Review*, vol. 28, 2019, pp. 375–390.
- [8] D. Navratilova, "Environmental and ethical values within technological education at the universities," 15th International Multidisciplinary Scientific Geoconference (SGEM), Bulgaria, 2015, pp. 281-288.
- [9] M. Moore, M. L. Martinson., P.S. Nurius, and S.P. Kemp, "Transdisciplinarity in Research: Perspectives of Early Career Faculty," *Research on Social Work Practice*, vol. 28(3), 2018, pp. 254–264.
- [10] S.-M. Khoo, J. Haapakoski, M. Hellstén, and J. Malone, "Moving from interdisciplinary research to transdisciplinary educational ethics: Bridging epistemological differences in researching higher education internationalization(s)," *European Educational Research Journal*, 2018, pp. 1-19.
- [11] S. Kudo, H. Mursaleen, B. Ness, and M. Nagao, "Exercise on transdisciplinarity: Lessons from a field-based course on rural sustainability in an aging society," *Sustainability*, vol. 10, 2018, p. 1155.
- [12] J. Balsiger, "Transdisciplinarity in the classroom? Simulating the co-production of sustainability knowledge", *Futures*, vol. 65, 2015, pp. 185-194.
- [13] V.P. Frolov, "Formation of students' creative potential in a technical university," *Features of integration of humanities and technical knowledge, "National Research Moscow State University" (NRU MGSU); Institute of Fundamental Education*, 2018, pp. 354-360.
- [14] T. Malti and S. Perren, "Social Competence," *Encyclopedia of Adolescence*, Elsevier, 2011, pp. 332–340.
- [15] C. Kottaridi, K. Louloui, and S. Karkalakos, "Human capital, skills and competencies: Varying effects on inward FDI in the EU context," *International Business Review*, vol. 28, 2019, pp. 375–390.