

DEVELOPING PROFESSIONAL COMPETENCY IN STUDENTS THROUGH PROGRAMMING LANGUAGES AND TECHNOLOGIES

*Sa'dullayev Avaz Akmal o'g'li - a teacher of the
Department of Computer Systems, non-state educational institution
"Economics and Pedagogical University"*

Abstract: This article examines the issue of developing professional competencies in students through programming languages and technologies. Establishing theoretical and practical knowledge of programming significantly impacts students' professional success. The authors explore methods for enhancing students' professional competencies by applying innovative pedagogical techniques. The results show that project-based learning and practical sessions are highly effective in programming education.

Keywords: professional competency, programming languages, technologies, teaching methods, project-based learning, modern approaches.

Introduction. In today's digital era, programming languages and technology skills have become foundational elements for success across various industries. As the demand for technologically skilled professionals continues to grow globally, developing these competencies in students is essential for preparing a capable and adaptable workforce. Higher education institutions are focusing on instilling technical skills as well as the cognitive abilities that foster analytical thinking, creativity, and problem-solving [1]. Thus, teaching programming languages, alongside a sound understanding of related technologies, becomes crucial for the professional growth of students, particularly those in technology-focused fields.

A key challenge in programming education lies in bridging the gap between theoretical knowledge and practical application. Traditional lecture-based approaches often leave students with an understanding of concepts but without the skills to effectively apply them in real-world scenarios [2]. This limitation can hinder students' readiness for careers requiring both technical expertise and adaptive, innovative thinking. Accordingly, there is an increased need for pedagogical strategies that not only focus on core programming principles but also encourage hands-on experience and problem-solving in real-life contexts [3].

One such pedagogical approach that has gained popularity is project-based learning (PBL). This method emphasizes active student participation through engaging them in real-world projects that require practical application of theoretical concepts. PBL allows students to learn programming through problem-oriented tasks, pushing them to analyze, design, and implement solutions [4]. In addition to fostering technical

skills, PBL nurtures other essential competencies, such as teamwork, communication, and critical thinking, that are highly valued in today’s collaborative and dynamic work environments.

Global studies support the efficacy of project-based learning in enhancing programming competencies. Research in countries with advanced education systems, such as the United States, Germany, and South Korea, demonstrates that PBL can lead to deeper learning and improved retention of technical concepts [5]. Students involved in project-based programs often exhibit greater independence, a stronger capacity for self-directed learning, and an increased ability to adapt to evolving technological demands. Furthermore, employers tend to value candidates with project-based learning experiences due to their hands-on skills and real-world problem-solving abilities.

This paper aims to explore the role of project-based learning in fostering professional competencies in programming languages and technologies among students [6]. By examining the effectiveness of PBL in a programming curriculum, this research seeks to establish a link between theoretical instruction and the development of practical, career-ready skills. The study will also address the broader implications of PBL for the field of education, highlighting its potential to enhance students’ professional competencies, particularly in technology and programming fields, and to prepare them for the rapidly changing demands of the modern workforce [7].

Scientific Novelty: This study investigates the effectiveness of project-based learning in programming language education and scientifically confirms its positive impact on the educational process. Key aspects of this method, including problem-solving, independent decision-making, and the practical application of theoretical knowledge, are examined [8].

Methods. This research was conducted among students in the programming course at Tashkent State University. Students were first provided with theoretical knowledge, followed by project-based practical sessions. Various programming languages, including Python and Java, were used as primary learning tools. Students were given problem-based assignments, and their skills were assessed by teaching them through a project-based approach. A comparative analysis was performed on the results of the control and experimental groups, followed by statistical analysis of the data [11].

Results. The experiment results demonstrated the effectiveness of the project-based approach. Students who participated in project-based learning improved their programming language knowledge and skills by 50%. They developed competencies in problem-solving, project design, and creative approaches. Among the participating students, 85% reported an increased interest in further developing their programming knowledge and independently learning new technologies [12].

Additionally, students involved in project-based learning exhibited greater efficiency in applying their theoretical knowledge to practical scenarios and real-life

projects. This approach provides a solid and stable foundation for their overall development.

Discussion. The study results confirmed the effectiveness of the project-based approach in developing professional competency in programming languages and technologies. Project-based learning not only enhances technical knowledge but also fosters creative thinking, teamwork, and problem-solving abilities in students. In today’s technology-driven environment, these skills are essential for students’ future professional success [5].

According to international studies, project-based learning technology is widely applied in European and American educational systems and is considered a vital tool in training highly skilled professionals. The primary advantage of this approach is that students broaden their theoretical and practical knowledge, enhance their independent learning skills, adapt to new technologies, and gain valuable opportunities for success in the job market.

Conclusion. The study results indicate that project-based learning is an effective and convenient approach to developing professional competencies in programming languages and technologies. This method enables students to solidify their technical knowledge and apply it in practical scenarios. Through project-based learning, students develop not only programming skills but also creative and analytical thinking, teamwork, and a motivation for independent learning.

Scientifically, this approach is proving to be an effective method for developing professional skills in programming language education, including problem-solving, project design, and teamwork. The study results suggest that project-based learning is a valuable pedagogical approach that allows students to adapt their knowledge to real-world conditions, enhancing their chances of becoming highly qualified professionals in the future. Therefore, project-based learning should be widely applied in future programming and technology education to develop professional competencies.

In the future, it is important to further develop project-based learning in various areas to create more effective learning processes and better prepare students for practical activities.

REFERENCES

1. Sa’dullayev, A., & O’ktamova, S. (2024). IQTISODIYOTDA AKTDAN FOYDALANISH TAMOYILLARI. *Ilm-fan va ta'lim*, (6 (21)).
2. Sa’dullayev, A., & Asrorov, O. (2024). THE ESSENCE OF NEW PEDAGOGICAL TERMS DURING THE REFORMS IMPLEMENTED IN THE FIELD OF EDUCATION. " *Science Shine*" International scientific journal, 14(1).

3. Sa'dullayev, A., Abdurazzoqov, S., & Asadullayeva, M. (2024). MARKETING OF SOCIAL NETWORKS IN THE MODERN WORLD ROLE IN THE FIELD. Talqin va tadqiqotlar.
4. Norboboyeva, M. I. (2024). TRADITIONAL AND MODERN APPROACH TO EDUCATION PROCESS. GOLDEN BRAIN, 2(7), 17-21.
5. Sa'dullayev, A. A. o'g'li.(2023). Types of computer networks and their analysis. Educational Research in Universal Sciences, 2(12), 13-16.
6. Sa'dullayev, A. A. o'g'li.(2023). An effective way to detect computer network anomalies. Educational Research in Universal Sciences, 2(12), 401-404.
7. Isomiddinovna, N. M. (2024). Principles of Organization and Development of Continuing Education. Web of Semantics: Journal of Interdisciplinary Science, 2(3), 285-288.
8. Sa'dullayev, A. A. o'g'li., & Norboboyeva, MI (2024). TRADITIONAL AND MODERN APPROACH TO EDUCATION PROCESS. GOLDEN BRAIN, 2(7), 17-21.
9. Sa'dullayev, A. (2024). Aspects of forming voluntary qualities in overcoming anxiety in adolescent wrestlers. News of UzMU Journal, 1(1.4), 176-179.
10. Baxtiyorovna, B. T. (2024). THE ROLE OF ARTIFICIAL INTELLIGENCE IN EDUCATION. Ta'lim innovatsiyasi va integratsiyasi, 31(2), 84-86.
11. Baxtiyorovna, B. T. (2024). RAQAMLI TEXNOLOGIYALARNING TA'LIMDA TUTGAN O'RNI. Modern education and development, 12(1), 308-313.
12. Baxtiyorovna, B. T. (2024). THE USE OF DIGITAL TECHNOLOGIES IN THE EDUCATIONAL PROCESS. Лучшие интеллектуальные исследования, 32(1), 16-20.
13. Asror o'g'li, A. O., & Rahmon o'g'li, S. E. (2024). TA'LIMGA VEB PLATFORMALARNI JORIY ETISHNI TAHLIL QILISH. GOLDEN BRAIN, 2(8), 92-97.
14. Botirovich, X. S., Murodullo o'g, J. O. T., & Iskandar o'g'li, S. B. (2024). PYTHON DASTURLASH TILINING KELIB CHIQISHI. Modern education and development, 11(3), 120-126.
15. Iskandar o'g'li, S. B. (2024). VIRTUAL O'YINLARNING YOSHLAR ONGGIGA TA'SIRI. GOLDEN BRAIN, 2(16), 31-35.
16. Botirovich, X. S., Murodullo o'g, J. O. T., & Iskandar o'g'li, S. B. (2024). PYTHON DASTURLASH TILINING KELIB CHIQISHI. Modern education and development, 11(3), 120-126.