



**CHALLENGES AND PROSPECTS IN THE
SYSTEM OF TRAINING STUDENTS
MAJORING
IN OIL AND GAS IN TERMS OF DUAL
EDUCATION**

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Abstract. *The oil and gas industry is one of the most technically demanding sectors, requiring a workforce that possesses both deep theoretical knowledge and practical skills. Dual education systems, which integrate academic learning with industry-based practical training, have gained prominence as an effective approach to preparing students for the sector's challenges. This paper examines the challenges and prospects associated with implementing dual education for students majoring in oil and gas. Drawing on current literature, industry data, and case studies, it highlights key obstacles such as infrastructure limitations, industry-academia coordination difficulties, and the adaptability of students to workplace demands. Simultaneously, it underscores the significant benefits of dual education, including improved employability, enhanced industry collaboration, and the development of a skilled workforce attuned to technological advancements. The study concludes with recommendations for stakeholders to optimize dual education frameworks in the oil and gas domain.*

Keywords: *dual education, oil and gas training, vocational education, industry-academia collaboration, workforce development, practical training, employability*

The oil and gas sector is pivotal to the global energy supply, demanding a workforce with advanced technical and practical competencies. Traditional academic programs often emphasize theoretical knowledge, which can create a gap between graduates' skills and industry requirements. Dual education models, widely implemented in countries such as Germany and Switzerland, have shown promising results by integrating workplace learning with classroom instruction. This approach is increasingly recognized as a solution to equip oil and gas students with relevant skills.

Uzbekistan is actively reforming its vocational education system by integrating a dual education model that combines theoretical instruction at educational institutions with practical workplace experience. This approach is particularly relevant for the oil and gas sector, which demands a highly skilled workforce with hands-on expertise.

In 2022, a presidential decree titled "Measures to Accelerate Reforms and Develop Professional Skills to Elevate the Vocational Education System to a New Level" was adopted, which introduced dual education starting from June 1, 2022. This initiative includes government grants, tax incentives for students and employers, and an annual allocation of 50 million UZS to the top 100 vocational education institutions implementing dual education. Additionally, in 2022, a decree was issued to establish an educational and production cluster in the oil and gas sector aimed at integrating education, science, and production. This cluster plans to implement specialized curricula, organize plant visits, and arrange meetings with industry veterans for school students.

There are certain challenges in dual education for oil and gas training. The first one is infrastructure and resource constraints.

Implementing dual education requires significant investment in infrastructure, including simulation labs, training rigs, and updated curricula aligned with real-world technologies. A 2022 International Labour Organization (ILO) report indicates that in developing regions, up to 45% of technical training institutions lack the facilities necessary to support dual education programs effectively.

One more essential aspect is industry-academia coordination. Effective dual education depends on robust partnerships between educational institutions and oil and gas companies. However, challenges such as misaligned objectives, bureaucratic hurdles, and logistical issues can hinder collaboration. According to a 2023 survey by the World Petroleum Council, only 58% of surveyed institutions reported having strong cooperative frameworks with industry partners.

Moreover, particular focus should be made on rapid technological changes. The oil and gas industry is undergoing a technological transformation driven by digitalization, automation, and sustainable energy technologies. Educational curricula often struggle to keep pace with these changes, leading to outdated training that may not meet the sector's evolving demands.

Furthermore, student adaptability and workplace integration is essential. Oil and gas workplaces are often remote, hazardous, and physically demanding. Students engaged in dual education must adapt to these conditions, which can be challenging. A study by the Society of Petroleum Engineers (SPE) in 2021 found that 37% of students in dual programs reported difficulty adjusting to fieldwork environments.

In addition to challenges, there are certain prospects of dual education in oil and gas training.

The first and the most significant one is enhanced employability and skill development. Dual education graduates possess both theoretical understanding and practical skills, making them highly attractive to employers. The European Centre for the Development of Vocational Training (Cedefop) reports that countries with strong dual education systems have youth unemployment rates 20% lower than the EU average.

Dual education fosters ongoing dialogue between academia and industry, ensuring curricula reflect current and future needs. This collaboration facilitates internships, research projects, and continuous feedback that improve training quality.

By integrating hands-on training with theoretical courses, dual education equips students to work with cutting-edge technologies such as digital oilfield management, robotics, and environmental monitoring systems.

Effective dual education contributes to SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth) by promoting inclusive, equitable, and high-quality vocational training that enhances job readiness.

Summing up our considerations we have developed the following recommendations:

1) Investment in Infrastructure: Governments and industry stakeholders should prioritize funding to modernize training facilities.

2) Strengthening Partnerships: Establish formal frameworks and communication channels to align educational objectives with industry needs.

3) Curriculum Modernization: Continuous curriculum updates to incorporate emerging technologies and sustainability principles.

4) Student Support Programs: Provide mentorship, psychological support, and health and safety training to ease student transition to field environments.

It should be noted that the dual education system offers a robust framework for training competent oil and gas professionals capable of meeting industry demands. While challenges such as resource constraints and coordination barriers exist, the benefits in employability, skill relevance, and industry collaboration make it a vital educational strategy. Strategic investments and partnerships will be critical in harnessing its full potential for workforce development in the oil and gas sector.

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