



APPLICATION OF THE DUAL EDUCATION SYSTEM IN THE TRAINING OF ROAD INDUSTRY SPECIALISTS: THE CASE OF NUKUS TRANSPORT TECHNICAL SCHOOL

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ABSTRACT

The dual education system integrates theoretical instruction with practical workplace experience, providing students with both academic knowledge and hands-on skills. This approach is increasingly adopted worldwide in technical and vocational education to enhance workforce readiness. This article examines the application of the dual education system in training road industry specialists, using Nukus Transport Technical School as an example. It explores the system's implementation, benefits, challenges, and its implications for the road industry. The study highlights practical case studies, student internship outcomes, and industry collaboration, demonstrating the system's effectiveness in preparing highly qualified professionals.

Introduction. The road industry is a critical component of national infrastructure, requiring specialists who can combine technical knowledge with practical competencies. Traditional education often emphasizes theoretical learning without sufficiently preparing students for the realities of workplace challenges. This gap highlights the importance of the dual education system, which integrates classroom learning with real-world work experience. Countries such as Germany, Austria, and Switzerland have successfully implemented this approach for decades, achieving significant outcomes in workforce readiness and industry innovation. In Uzbekistan, the Nukus Transport Technical School has introduced the dual education system to align educational outcomes with industry needs. This system ensures that students acquire practical skills while understanding the theoretical principles underlying road construction, transport management, and vehicle maintenance. The approach also fosters collaboration between educational institutions and local transport enterprises, creating a mutually beneficial system [4, 13-20].

The dual education system and its relevance to the road industry. The dual education system is designed to link theoretical knowledge directly to professional practice. In the road industry, students learn engineering principles, materials science, traffic management, and road safety standards, while simultaneously applying these concepts in practical settings. Students benefit by developing technical skills such as operating construction machinery,

performing vehicle diagnostics, and managing logistics for road projects. At the same time, they cultivate soft skills including teamwork, problem-solving, and time management, which are essential in professional environments. Educational institutions benefit by ensuring their curricula remain relevant to industry demands, while companies gain access to a workforce trained according to current operational standards. The system also contributes to innovation in the industry. Students often bring fresh perspectives from their theoretical studies into practical projects, introducing new ideas and methods that enhance efficiency and safety in road construction and maintenance [6, 24-32].

Implementation at Nukus Transport Technical School. At Nukus Transport Technical School, the dual education system is implemented through a carefully structured curriculum that integrates classroom learning with workplace training. Students spend part of their time studying subjects such as road engineering, vehicle mechanics, and transport safety, and the remainder participating in practical internships at local companies and municipal road authorities. Students engage in hands-on projects, including the construction of small-scale road sections, maintenance of transport vehicles, and traffic flow analysis. These projects are supervised by both school instructors and industry mentors. For example, a project might involve evaluating the quality of asphalt layers on a new road and recommending improvements based on engineering principles learned in class. This approach allows students to apply theoretical knowledge in a controlled but realistic setting. Internships typically last six months and involve rotations through various departments, including road construction, vehicle maintenance, and transport logistics. Students work closely with experienced engineers and technicians, learning to operate modern equipment, follow safety regulations, and adhere to project timelines. The internship schedule is designed to complement the academic calendar, ensuring that students can balance practical experience with ongoing classroom learning. Nukus Transport Technical School has established partnerships with local and regional transport companies, municipal authorities, and private construction firms. These partnerships enable students to gain practical experience while contributing to real projects. Companies provide mentoring, feedback, and evaluation, which informs both student learning and curriculum development. The collaboration also ensures that graduates are well-prepared for immediate employment in the road industry [1, 67-73].

Benefits of the Dual Education System. The dual education system offers numerous advantages for students, institutions, and the road industry. Students gain practical experience that significantly enhances employability, as they graduate with skills that are directly applicable to professional tasks. The integration of theory and practice also deepens understanding, as students see the real-world applications of classroom concepts. Educational institutions benefit by maintaining curricula that are closely aligned with industry needs. Teachers gain insights from industry partners, allowing them to adjust instructional methods and introduce practical examples into the classroom. Employers gain access to a workforce already familiar with professional standards, reducing the need for additional training. Students trained under the dual system are more adaptable, able to solve practical problems, and understand workplace culture and safety procedures. This combination of skills, knowledge, and professional experience contributes to higher-quality work in the road industry. The system also encourages lifelong learning. Students who have experienced both

theoretical and practical learning are better equipped to adapt to technological and regulatory changes in the transport sector.

Challenges and Strategies. Implementing the dual education system can present challenges. Coordination between school schedules and industry requirements requires careful planning. To address this, Nukus Transport Technical School maintains close communication with partner companies and develops flexible timetables. Another challenge is maintaining the quality of practical training. Not all enterprises have the capacity or expertise to provide consistent instruction. The school addresses this by providing mentor training, conducting regular audits, and developing standardized assessment criteria for practical skills. Students may also face difficulties balancing academic requirements with work-based responsibilities. Guidance programs, mentorship, and counseling services help students manage these demands effectively. The school monitors student performance closely to ensure that neither academic learning nor workplace experience is compromised.

Case Studies and Practical Outcomes. A notable example of the system's effectiveness is a student project involving the construction of a new road section in Nukus. Students participated in surveying, materials selection, laying the foundation, and asphalt application under the guidance of experienced engineers. After the project, students reported increased confidence in applying classroom knowledge, while companies noted that student involvement reduced project costs and improved workflow efficiency. Another example involves vehicle maintenance. Students in workshops performed diagnostics and repair tasks on public transport vehicles. Through these exercises, students learned to identify mechanical faults, apply standard repair techniques, and follow safety protocols. Feedback from company supervisors indicated that graduates were immediately ready for professional tasks without additional training. These practical outcomes demonstrate that integrating workplace experience into education not only benefits students but also supports the local road industry by creating a skilled, ready workforce.

Implications for the road industry. The dual education system has significant implications for the development of the road sector in Uzbekistan. It addresses the shortage of skilled professionals, which is critical for maintaining and expanding infrastructure. Graduates contribute to innovation, as they combine practical knowledge with theoretical insights to improve project quality and efficiency. Collaboration between educational institutions and industry strengthens knowledge exchange, encourages the adoption of modern technologies, and ensures compliance with safety and regulatory standards. This approach contributes to sustainable development in the road sector, improves transport efficiency, and supports economic growth.

Conclusion. The dual education system provides an effective framework for training road industry specialists. By integrating classroom instruction with practical workplace experience, students develop both theoretical knowledge and technical skills. The experience of Nukus Transport Technical School demonstrates that successful implementation requires careful planning, strong partnerships with industry, and support mechanisms for students. Expanding this approach can enhance technical education quality, address workforce shortages, and contribute to sustainable development in the road industry.

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