



Scientific Conference on Multidisciplinary Studies

Hosted online from Bursa, Turkey

Website: econfseries.com

11th June, 2025

ENHANCING FUTURE ENGINEERS' PROFESSIONAL SKILLS THROUGH INQUIRY-BASED LEARNING

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Abstract:

Inquiry-Based Learning (IBL) is an educational approach that encourages students to engage actively with learning material by asking questions, exploring problems, and discovering solutions through investigation. This method fosters critical thinking, problem-solving, and independent research skills essential for future engineers. By focusing on real-world challenges, IBL bridges the gap between theoretical knowledge and practical application, helping students develop competencies that are crucial for their professional success. This article discusses how Inquiry-Based Learning enhances the professional skills of future engineers and prepares them for the demands of the engineering profession.

Keywords: Inquiry-Based Learning, engineering education, professional skills, critical thinking, problem-solving, active learning, independent research

In today's fast-evolving engineering landscape, it is essential for educational methods to move beyond passive knowledge transfer and foster active student engagement. Inquiry-Based Learning (IBL) achieves this by placing students at the center of the learning process, encouraging them to ask questions, investigate issues, and construct knowledge through exploration and discovery [1]. In modern engineering education, it is essential to move beyond traditional lecture-based methods and engage students actively in their learning journey. Inquiry-Based



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Learning (IBL) provides an effective framework that motivates students to take ownership of their education by encouraging curiosity and exploration [2]. This learner-centered approach prompts future engineers to formulate meaningful questions, investigate complex problems, and develop evidence-based solutions. IBL enables future engineers to develop essential professional skills such as critical thinking and problem-solving. Instead of simply receiving information, students are challenged to identify problems, gather relevant data, analyze findings, and formulate well-reasoned solutions. This process not only deepens their understanding of engineering concepts but also nurtures a mindset of curiosity and continuous learning [3].

A key feature of Inquiry-Based Learning is its emphasis on real-world application. Students work on authentic engineering problems that require interdisciplinary knowledge and creative thinking. This approach prepares them to handle complex situations and make informed decisions in their future careers [4].

Collaboration is often integrated into inquiry-based activities, fostering teamwork and communication skills. By working in groups, students learn to share ideas, listen to diverse perspectives, and coordinate efforts to solve problems effectively. These experiences reflect professional engineering environments, where teamwork is critical to success [5].

Inquiry-Based Learning also promotes independence and self-direction. Students take responsibility for their learning journey, seeking out resources and managing their time efficiently. This autonomy builds confidence and resilience, qualities that are vital for professional engineers facing constantly changing technologies and challenges. Successful implementation, educators must design inquiry activities that align with curriculum goals and provide appropriate support to guide students without limiting their exploration. Reflection and feedback are important components that help learners connect theoretical knowledge with practical experience and improve their problem-solving approaches [6].

In conclusion, Inquiry-Based Learning is a powerful pedagogical method for enhancing the professional skills of future engineers. By fostering active engagement, critical thinking, collaboration, and self-directed learning, IBL prepares students to thrive in the dynamic and demanding field of engineering.



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