Case Study

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Institutional distance between academia and industry in relation to the pedagogy in a fluid mechanics course

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Abstract

This study investigates the pedagogical approaches in fluid mechanics within aerospace engineering education, exploring the institutional distance between academic teachings and industry demands. Utilizing the Anthropological Theory of the Didactic (ATD) as a theoretical framework, the research examines the relationship between educational practices in fluid mechanics and the societal, institutional, and professional contexts. Through semi-structured interviews with experts from both academia and industry, including professors and professional engineers, the study gathers diverse perspectives on effective teaching methodologies. The responses reveal a clear dichotomy: while academic experts favor a traditional, theory-focused approach involving progressively complex problem-solving, industry professionals advocate for real-world, project-based learning that fosters practical skills and collaborative problem-solving. This divergence highlights an institutional gap where academic programs may not fully align with industry expectations, suggesting a need for curricular adjustments to better prepare graduates for professional challenges. Future research should focus on longitudinal studies to track the effectiveness of various teaching methods and cross-institutional collaborations that integrate practical industry experiences into academic curricula. The goal is to enhance the educational outcomes in fluid mechanics and reduce the gap between theoretical knowledge and practical application, ensuring that graduates possess the necessary skills to thrive in a dynamic professional environment.

Keywords

Fluid mechanics, aerospace engineering, pedagogical approaches, institutional distance, industry-academia collaboration

Introduction

Fluid mechanics is a fundamental and significantly relevant subject within technical and scientific degree programs. For engineers, it is essential for successfully addressing future professional issues such as those related to the management and storage of energy within a continuous fluid medium, a topic of immense current significance and social relevance (White, 2011). Fluid mechanics is taught at intermediate levels in technical or scientific degrees, aligning with the increasingly established scientific maturity of students. The subject begins as a prerequisite in the physical and mathematical sciences in the early stages of engineering education. From these foundations, a juncture is formed that allows for the expansion of quantitative reasoning to natural and observable phenomena (Munson et al., 2009).

Identifying the existing and continuous object of study and understanding with certain rigor the mathematical and physical laws that underpin the conceptualization and modeling exercises are crucial. Additionally, the incipient development of a critical spirit in interpreting results, whose validity requires calibration with the reality under study, is fostered (Batchelor, 2000). From the scientific maturity provided by a course in fluid mechanics, students gain competencies to pursue applied branches within their future specialization fields in the degree, such as hydraulics, thermal engines, plasmas, aerodynamics, and aeroelasticity (Anderson, 2010).

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