

Innovation Education Accelerating Green Hydrogen Transition

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Abstract

The transition toward a green hydrogen economy requires systemic change that extends beyond technology and infrastructure into products, services, societal attitudes, and social acceptance.

This study presents an education-driven approach to hydrogen ecosystem development at the University of Oulu through the UniOulu Hydrogen Innovation Challenge (HIC), embedded in the Interdisciplinary Product Innovation and Creation (IPIC) Master's Programme. HIC forms an academic year-long learning continuum of four interconnected interdisciplinary courses delivered with ecosystem companies and student associations. The HIC curriculum applies studio-based pedagogy, emphasising open-ended real-world challenges, iterative problem-solving, rapid prototyping, and user-centered design done in collaboration with the ecosystem companies. Interdisciplinary and multicultural teams collaborate in a flexible instruction set-up, where teachers act as coaches and external experts provide practitioner perspectives. Prototyping is strengthened through workshops on Computer Aided Design and digital fabrication in collaboration with Formula Student Oulu and Oulu University's Super FabLab, complemented by public critique and expo events co-organised with student's Entrepreneurship Society. As a novel element, students employ generative AI tools, custom developed on the specific AI-platform, to support shared contextual understanding and creativity across disciplinary boundaries.

Outcomes include novel hydrogen-related product and service concepts and prototypes in domains such as; housing, user safety, education, and agriculture, while fostering University of Oulu's interdisciplinary and industry collaboration and IPIC students' T-shaped competences and improving social acceptance of hydrogen.

Keywords: Green hydrogen; ecosystem collaboration; Interdisciplinary education; Studio-based pedagogy; User-centered design; Innovation prototyping; Generative AI.