



HEA Teaching and Learning Conference December 2024

Driving Changes in Teaching and Learning through Policy and Innovation

HEA AN tÚDARÁS um ARD-OIDEACHAS
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Design of adaptive augmented reality system to enhance learning outcomes: a case study for electronic/mechanical engineering applications

Name of Institution/Organisation
South East Technological University (SETU)
Who led the initiative?
Dr Haider Al-Juboori, SETU-Faculty of Engineering & Built Environment, Dept. of Electronics Engineering and Communications.
Date and timeframe of the initiative
The academic year 2022 – 2023 and ongoing.
What was the reach of the initiative?
Around 30 students in initial case-study

Aims/Objectives
The primary goal of this initiative is to explore the potential of Virtual Reality (VR) technologies in enhancing the educational experience for engineering students, particularly in fields like electronics and aerospace engineering. The focus was on how immersive digital environments can support learning by making complex concepts more accessible and engaging. This includes the development of workshops and training sessions using VR tools, such as the Oculus Quest 2 system, to simulate real-world scenarios (like space missions) for educational purposes [1,2].
References: [1] Al-Juboori, Haider, and Gina Noonan, V. O'Brien, and D. Picovici. "Instructional Considerations For Virtual Reality In Engineering Training And Education: Preliminary Research Results." (2023). [2] Al-Juboori, Haider, and Gina Noonan. "Leveraging the Power of Digital Immersive Technologies to Enhance Engineering Education and Learning." In 2024 IEEE Global Engineering Education Conference (EDUCON), pp. 1-5. IEEE, 2024.
Rationale and Identified Needs
The initiative was motivated by the need to address challenges in teaching complex engineering concepts that are difficult to convey through traditional methods. It was recognized that immersive technologies could simplify complicated topics, make learning more interactive, and cater to students' varying levels of understanding. Furthermore, the COVID-19 pandemic highlighted the necessity for remote learning solutions, making VR an attractive option for virtual labs and simulations. This need is especially relevant in disciplines requiring practical engagement with sophisticated systems and scenarios



Frameworks, Policies, or Strategies Aligned (internal, local or national)
The projects align with several internal and national frameworks:
<ul style="list-style-type: none"> • Strategic Alignment of Teaching and Learning Enhancement (SATLE): Supported by funding from the National Forum for the Enhancement of Teaching and Learning, emphasizing the integration of digital tools in higher education. • SETU's Vision: The focus on digital transformation within the university's Strategic Plan 2023-2028, Connecting for Impact, foregrounds innovative teaching, learning and assessment strategies. • Irish National Framework for Digital Skills: This aligns with the national agenda to boost digital competencies in education, particularly through immersive technologies.

Categories	Elements	Topics	Target Groups
		Digital Transformation	Students
		Education for Sustainable Development	Staff
	Innovation in Teaching	Academic Integrity	
	Professional Development	Inclusive and Equitable Teaching Practices	
	Research and Evaluation		
		Student Engagement and Partnership	
		Collaborative and Interdisciplinary Approaches	