



REEdI – Redesigning Engineering Education in Ireland: VR & AR Integration

Best practices & success cases to support
development of education models

BIObec partners have identified innovative bioeconomy education models/pedagogies and/or best practice examples from industry/education that can inform and enhance the future Bio-Based Education Centres (BBECs) educational design and framework for delivery. These case studies draw on best practice examples from both bioeconomy education providers and outside organisations related to other sectors and industries.



PROJECT PARTNERS



UNIVERSITY OF HOHENHEIM



UNIVERSITY OF EASTERN FINLAND



MTU

Ollscoil Teicneolaíochta na Mumhan
Munster Technological University



Consiglio Nazionale delle Ricerche



Food & Bio Cluster Denmark



Sustainable INNOVATIONS



ZVT | Agricultural Research, Ltd. Troubsko

BIOBEC - Best practices & success cases

BIObec partners have gathered a series of best practice examples representing regional, national, European and International case studies and collaborations. These case studies include many examples from the bioeconomy sector, however, several case studies from other sectors have also enriched the depth and breadth of best practice including examples detailing thematics that focus on: AR/VR technology integration in education; mentoring programmes for AI graduates and best practice in networking the hydroenvironment.

Each case study has been classified under 11 thematic areas:

- 1 Pedagogies
- 2 University engagement and collaboration with industry
- 3 Lifelong learning and continuous personal development
- 4 Clusters/networks /partnerships
- 5 Research & Development supports
- 6 Funding & Investment networks
- 7 Enterprise Development supports
- 8 Mentoring Programmes (academic or industry)
- 9 Digital technologies and integrations
- 10 Diversity and inclusion practises
- 11 Engagement with civic society

Understanding REEdI

REEdI, a government funded project through the Higher Education Authorities (HEA) Human Capital Initiative (HCI) Pillar 3, is a ground-breaking approach to engineering education in Ireland. Student engineers that graduate with a REEdI Bachelor of Engineering (Honours) in Mechanical and Manufacturing Engineering will be perfectly placed to become Engineers of the future for Ireland's Manufacturing sector.



Student engineers work on projects in teams during their first 2 years on campus. Then, they progress into work-based placement opportunities in years 3 & 4 where they work on projects in industry whilst getting paid to study engineering modules of their choice. The REEdI Adaptive eLearning platform is an online learning tree that holds all the engineering content the student engineer will study from year 1 to Year 4.

The REEdI Suite is a purpose-built virtual and physical collaboration space with endless possibilities. It hosts a huge array of the very latest augmented, virtual, and mixed reality platforms, enabling you to think differently whilst learning and working in a unique technology-rich environment. This includes:

- 5x VR Sections, each equipped with high-end wireless VR headsets and touchscreen monitors
- A range of 360 cameras for content creation
- High-end VR kit, equipped with AR-enabled smartphones, tablet, and router for tour creations, exploration, and remote interaction
- Several Microsoft HoloLenses for a true augmented reality experience
- A 70" interactive touchscreen panel for group collaborations and presentations
- A selection of AR-Core enabled Android tablets for mobile experiences
- LiDAR scanners, drones, haptic devices



Who is involved in REEdI?

The project is coordinated across two higher education institutes in Ireland: MTU, and UL. Charles Stuart University in Australia and Harper Adams University in the UK bring an international dimension to the project.

We can differentiate between Industry Partners and Research Centre Partners involved in this project.

On one side, the REEdI Industry partnership is consistently growing. It is comprised of manufacturing organisations across multiple sectors- AgriTech, MedTech, Pharma, Electronic, Automotive and General manufacturing.



On the other side, the involvement of key research partners enables innovations in research to be embedded in the REEdI Engineering Programme. This partnership enables student engineers to engage in work placements around Ireland and provides access to satellite hubs of leading high-tech facilities such as- VR/AR facilities and Smart Manufacturing lines. REEdI leverages the existing networks, facilities, and capital infrastructure of each of the collaborating research partners.

Among these partners we can find:



CONFIRM: focused on the application of digital innovation across the manufacturing value chain to foster growth and competitiveness in the Irish manufacturing industry and enable Irish based manufacturing companies to compete within the rapidly changing global landscape.



LERO: brings together expert software teams from universities and institutes of technology across Ireland in a coordinated centre of research excellence with a strong industry focus. LERO's research spans a wide range of application domains from driverless cars to AI, cybersecurity, fintech, govtech, smart communities, AgTech and Healthtech.



IMaR: Research Centre at MTU Kerry (part of the Technology Gateway Network): a nationwide resource for industry delivering solutions on near to market problems. These world-class research collaborators are central to REEdI success as a robust research base is required to inform future engineering practice.



ACE: a collaboration between Dairymaster, McHale Engineering, Abbey Machinery, Kerry County Council, and Munster Technological University, Kerry to develop cutting edge learning and development solutions for the AgriTech sector. ACE headquarters are based at MTU Kerry.

Why is REEdI necessary?

Ireland has a shortage of Engineering Graduates with the skills that the manufacturing sector requires. REEdI is addressing this by co-designing the REEdI Engineering Curricula with industry partners and embedding world class models of teaching and assessment throughout the curriculum. REEdI will transform the delivery of undergraduate engineering education in Ireland.

Building on the success of world-leading cutting-edge models of engineering pedagogy, REEdI combines an innovative method of curricula design, content delivery utilising new immersive technologies and student access to a network of world class Science Foundation Ireland research centres to deliver a transformative programme of self-directed and self-scheduled learning for the next generation of engineers. This creates a wealth of advantages in undergraduate engineering education provision and simultaneously creates a valuable talent pipeline for the manufacturing sector.

What differentiates this programme from others?

REEdI offers immersive technologies that can be used to amplify student learning and engagement in terms of their technical and their soft skills. For example, students can interact with 3D models using these technologies to prototype, collaborate and innovate with other students resulting in greater knowledge acquisition, a deeper understanding of engineering concepts, better grades, longer retention of knowledge and improved transversal skills for our graduating students.



Benefits for industry partners include:

Developing greater links to higher education institutes for research & development opportunities; access to targeted talent pool; injection of new ideas; opportunities for existing staff to mentor students; access to graduates with high level transversal skills.

Benefits for students include:

Career Benefits; Developing an awareness of workplace culture, Potential for demanding higher wages, Short-term financial benefits, Enhanced employment prospects.

Skills Benefits: Working in a setting which puts theory into practice, developing an awareness of workplace culture, opportunity to develop a range of personal attributes, development of key interactive attributes, building up a network of contacts.

In addition, to enhance learning opportunities REEdI in innovating in different ways:



- VR & AR also give students the opportunity to simulate potentially dangerous scenarios in a safe environment.



- Immersive simulations can be considerably cheaper than traditional training methods.



- Student engineers can learn physical tasks through 'learning by doing'



- VR training environments are accessible 24/7 and students can have an unlimited amount of time working with machines and tools.



- VR & AR gives students access to simulations allowing them to master tasks, and to repeat the task as many times as they want. That wouldn't be the case in the traditional practical laboratory format that is standard in engineering education.



- Immersive technologies allow students to learn in ways that would otherwise not be possible (e.g., work on equipment in challenging conditions etc.)

MORE INFORMATION

REEdI

