CBL/CBR Case Study Template for campusengage.ie

Community-based learning and research are academic approaches that seeks to engage and accredit students, within the curriculum, for working in partnership with civic and civil society organisations (CSOs) to act on local societal challenges.

Health and Wellbeing

Project Title:	**Universal Design Innovation**
Brief overview of project: (60 max)	Students in the School of Engineering participate in a compulsory 10ECTS "Service Learning" module, working with community groups to help address genuine user needs. This particular module is called "Universal Design Innovation" (UDI). The students work in small design teams, focused on solving universal difficulties experienced by people in the community related to their Activities for Daily Living (ADLs).
Community Partner(s):	The students form their own user and stakeholder groups comprising of a combination of: • Elderly, infirmed or disabled relatives • Clinicians • Medical device engineers • Carers • Occupational therapists, pharmacists etc. • Groups such as Age Ireland, TILDA, Mercer's Institute for Successful Ageing (St. James Hospital) • Specialist consumer group representatives from the National Standards Authority Ireland (NSAI) • Community groups such as local nursing homes, NCBI and the National Disability Authority.
Faculty:	School of Engineering, Trinity College Dublin, the University of Dublin
Brief outline on community-based learning/research activity (800 words max)	Data were collected from the community residents and which allowed the student researcher to measure the energy requirements and carbon intensity of the community. Through the development of appropriate methodologies to measure the energy requirements and carbon intensity of the community, a carbon account and a material flow account of the community was completed. In addition, participation in the Global Protocol for Community-Scale Greenhouse Gas Emissions (GPC) Pilot project produced a complete inventory of Greenhouse Gas emissions that occur as a result of the activities of residents within the community. The project reviewed and assessed the effect that targeted policies can have on the sustainability of this Irish rural community using the published Sustainability Evaluation Metric for Policies Recommendation (SEMPRe) Model. The SEMPRe Model was adapted to quantify the effectiveness of candidate policies selected as appropriate for rural communities to increase the Sustainable Development Index (SDI) of the

	community. Futures Scenarios, both technological and behavioural, have been developed to guide the BEP+C.
Student learning outcomes: **please list and detail the various learning outcomes e.g. effective communication, high level cognitive, intercultural, leadership, entrepreneurial agility, analytical and interpersonal skills, (set out in Ireland's National Skills Strategy 2025).**	**Learning Outcomes** On successful completion of this course, students will be able to: • Critically evaluate a number of different design processes. • Apply an appropriate design method to 'needfind', generate ideas and evaluate design concepts. • Implement a design process from beginning to end. • Apply engineering sciences through learning-by-doing project work. • Communicate and work effectively in teams. • Present their work orally through public presentation using posters and slide shows. • Conceive, design, implement and operate tangible prototypes. • Value the differences in peoples' abilities through the participation in a Universal Design/ User Centred Design project working with community groups. • Promote social responsibility and civic awareness. • Optimally design machine components for use in design. • Correctly select standard components for use in design. • Propose suitable materials for use in design. • Correctly use AutoCAD and CREO Parametric to draw and to solid-model parts and assemblies. • Understand the benefits of Computer Aided Manufacture (CAM) and to output code from CAD to a milling machine to machine a part. • Develop code in LabView to acquire and process data, and to output signals to actuate components for some useful purpose. • Have insightful hands-on knowledge and understanding of the workings of internal combustion engines. • Understand and describe both the advantages and the limitations of FEA as an engineering modelling tool in design, process investigation or defect analysis. • Understand the concept of element stiffness and be able to derive the underlying mathematical expressions used in the development of an element stiffness matrix. • Set up and model simple 2D structural and thermal problems using two commercial software packages and incorporating realistic loading and constraint conditions. • Interpret the results of the analysis, e.g. stress/thermal distributions, but more importantly recognise errors in the results arising from incorrect or insufficient input data or the setup of the FEA model. • Apply and use a commercial FEA software package to an open ended design problem.

	- Use a selection of mechanical workshop equipment such as milling machines (manual and CNC), lathes, welding equipment, bench press etc. - Discuss critically the benefits of different mechanical workshop processes. - Understand industry structures and to interact directly with technical professionals and members of engineering industry. - Write professional technical reports documenting design work.
Community outcomes (Aims and Objectives): 800 word max	Using tools from Stanford University's D-School, the students conduct "Needfinding" with the community, including interviews and observance of the users, and investigate difficulties with ADLs and their community partners related to activities such as cooking, eating, managing medication, washing clothes, transportation, and communication. The students identify their own project, which must be based on building a working electro-mechanical prototype to address a real need of the community member. Through user-centred design, the students work with the community group/ members to project completion. The end results are working prototypes that address the need that has been identified by the partner community. Examples from 2017/2018 include: - Automated panic alarm prototype which connects to pre-programmed numbers and the emergency services. - A wearable device to protect an elderly person's hip in case of falls. - A mug that enables those with tremors to enjoy their drinks without spilling and incorporates an LED temperature control.
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High quality photo/ logo from project:	