Connecting Communities and Curriculum in the Bachelor and Masters Degrees in Engineering (BAI & MAI)

Universal Design Innovation

About the Module

All Junior Sophister students on the Mechanical and Manufacturing Engineering programme take the Universal Design Innovation (service-learning) component of a Computer Aided Engineering and Design module. Students participate in a design process project in conjunction with a community group such as the National Disability Authority, National Council for the Blind of Ireland and specialist consumer groups. Working in groups, the students identify user needs of people with limited visibility, short stature, Multiple Sclerosis, advanced aging or limited mobility through interviews with community partners. Students apply universal design principles and user-centred design processes to prioritise people’s needs and define their own project brief to come up with an innovative design solution to assist with everyday tasks e.g. emptying a bin or boiling a kettle.

The students develop concept variants through divergent thinking techniques (e.g. Stanford University’s: Design Thinking) before evaluation and definition of a final concept. The student groups move down the design process iteratively to manufacture a tangible working prototype. Community partners are involved in the process throughout including a final competitive showcase. At the showcase, students present their design solutions for scrutiny and assessment by a panel of consumer design advisors. Projects to date have included thermally engineered smart clothing, a mechanism built into a staircase to carry bags up and down the stairs and bracelets that vibrate to inform patients of when to take their medication.

Benefits

“Such curriculum reform and activity is in line with the University’s strategic plan and similarly the School is committed to reinvigorate the civic mission of higher education and to instil in students a sense of social responsibility and civic awareness.” Prof. Margaret O’Mahony, Head of School

Challenges

- The User Centred Design process requires user involvement at every stage of the design process. This takes careful planning, especially with large student cohorts, and funds to pay for travel and time.

- The Design process allows for open ended questions to be explored without constraints. However, students still want a clear timeline for the project and defined project outcome expectations. Teams of students need to meet individually - this requires significant extra time and human resources.

Tips for Colleagues

- Believe in the students and give them space. They will always exceed expectations.

- Respect the community partners and allow them a sense of ownership of the course.

- Ensure the community partners are involved at the end so that they see outcomes and that their input has been addressed or at the very least considered.

- Allow enough time and resources and plan thoroughly.

For further information

Contact Dr. Gareth J. Bennett
Module Coordinator
School of Engineering
gareth.bennett@tcd.ie

Supporting Staff
Dr. Sonja Hermann
Mr. Paul Normoyle

Jury for the student competition were: James Hubbard (NDA), Sinead Burke (Co-chair of our Working Group 7 of Design Advisors), Dr. Sonja Hermann (Adjunct Lecturer TCD), Prof. Gareth J. Bennett (Course Designer and Coordinator), Norah O’Byrnes (MS Ireland), and Christopher Robson (Age and Opportunity).

A programme participant presents his final project.

Binyu Awozu, Mohammad A. Bayyari, Paul CSBnwell, George Walsh, and Rohman Khan present their project, SpeedTran.