

## **Sustainable Innovation 2023**

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## **Climate Change Engage: STEAM Educational Resources for Sustainable Design-Led Innovation and Youth Leadership.**

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This paper presents the interdisciplinary project *Climate Change Engage* devised by members of UCD's Earth Institute to collaboratively develop a 'serious gaming' instructional pack for secondary school students and their teachers. The project integrates knowledge from game design, open-source culture and practice, post-primary STEAM education, sciences and social sciences to reflect post-primary student perspectives on how to resolve complex problems using game design.

The project builds on prior research (McKeown et al, 2022) that evidenced the need and importance of youth-led agency and the impact of youth-focused design for sustainability. The paper presents the co-design approach that explored how to enhance the agency and voice of students in confronting the challenges of climate change in a way that moves beyond standard modes of 'participation' to create a co-developed product. Using an existing 5-day design sprint methodology (McKeown et al 2022) adapted for game design, the team worked with 16 sixteen-year-olds over the 5 days to support the students to develop games that addressed emerging themes from the team's expertise on climate mitigation and adaptation and the students' own knowledge. The paper presents an overview of the design sprint process and key findings around the project's key objectives

- to introduce students to contemporary concepts within climate mitigation and adaptation, disruptive innovation and serious games / game design
- to maximise the potential for deep learning about climate change related scientific and social concepts by resonating with divergent learning styles.
- to mobilise multi / interdisciplinary expertise and lay knowledges in co-developing an interactive heuristic with secondary school students and their teachers that synergistically address

Sustainable Development Goal Targets 11.2 -11.7 and 13.1-13.3.

The project sought to co-develop a climate change problem-solving and educational resource as a suite of resources for schools across the nation. The paper concludes with reflections from the team and the students' learning process as they sought to co-develop a suite of downloadable materials to facilitate experiential learning using game design / design led processes with regard to UN Sustainable Development Goals numbers 11 (Sustainable Cities & Communities) and 13 (Climate Change).

The resulting resources empower students to co-produce solutions to raise awareness of climate change and adaptation for learners 15 - 17 years using game design and scaffolds teachers with the confidence and competence to deliver a design-led project irrespective of their subject knowledge. Further, the project introduced students, some of whom were gamers to serious games and what game design entails as well as 21st century skills and concepts that will be a necessity for their futures, irrespective of their chosen career paths.