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Advancing Irish Education for Climate Resilience and Sustainability

Muinín Catalyst Sustainable STEAM project 2022 - 2024

Interim Insights

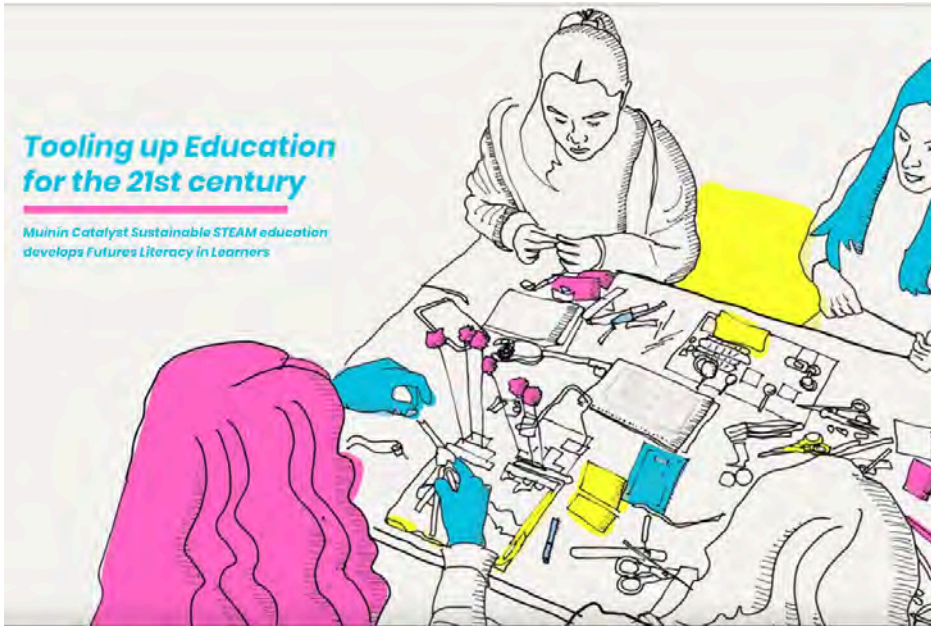
Project Funders: Science Foundation Ireland and Department of Education – Ireland,
Discover Programme 2021

Authors: McKeown, A, White, R.,

Regional Partners: Future Focus21c with Living Iveragh

with contributions from Garska, J. MCSS Project Manager and Content Development Team Manager, SMME, College of Engineering & Architecture, University College Dublin

PI: Prof. Lizbeth Goodman, Full Professor of Inclusive Design for Education and Chair of Creative Technology Innovation, SMME, College of Engineering & Architecture, University College Dublin



Summary

The Muinín Catalyst Sustainable STEAM (MCSS) Project was initiated in 2022, funded by Science Foundation Ireland and the Department of Education through the Discover programme, to address critical gaps in 21st-century education by equipping teachers and learners with skills in STEAM (Science, Technology, Engineering, Arts, and Mathematics), Futures Literacy, and Climate Resilience. The project's design, was based on four years prior research within formal and informal learning contexts and sought to harness Transition year, a unique opportunity in Irish Education to explore Place and Project-based STEAM learning focused on sustainability climate literacy and 21st century skills.

Project Aims

The programme sought to

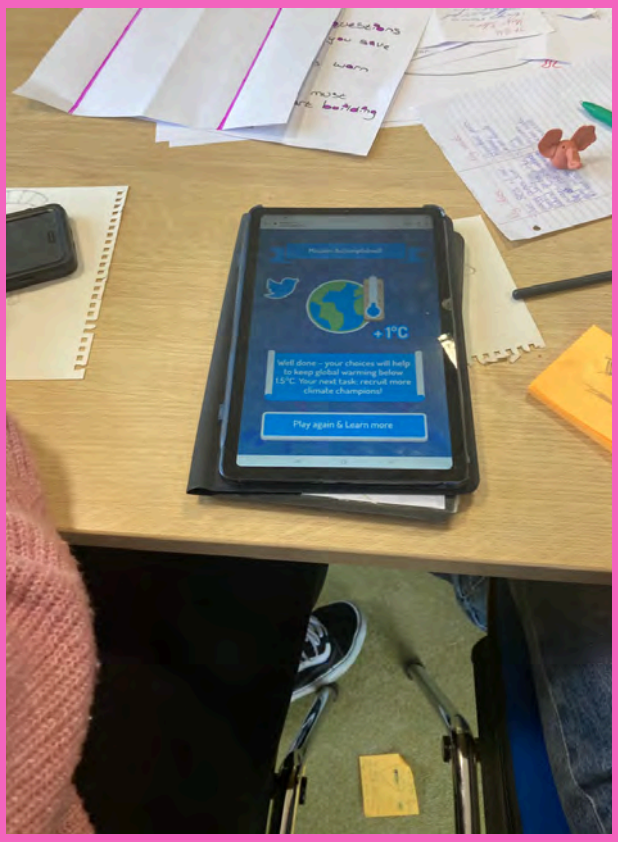
1. responded to the needs and requests of learners and educators as identified through the prior research
2. to explore the potential of in-class CPD to embed innovative pedagogies away from the pressure of curriculum and high-status high- stakes exams
3. mitigate for the lag that will always exist with education systems and fixed curricula and
4. support the transition from outdated definitions of sustainability and an industrialised educational landscape towards a ‘curriculum for all’ designed to address the requirements of the 21st century within the context of a climate emergency.

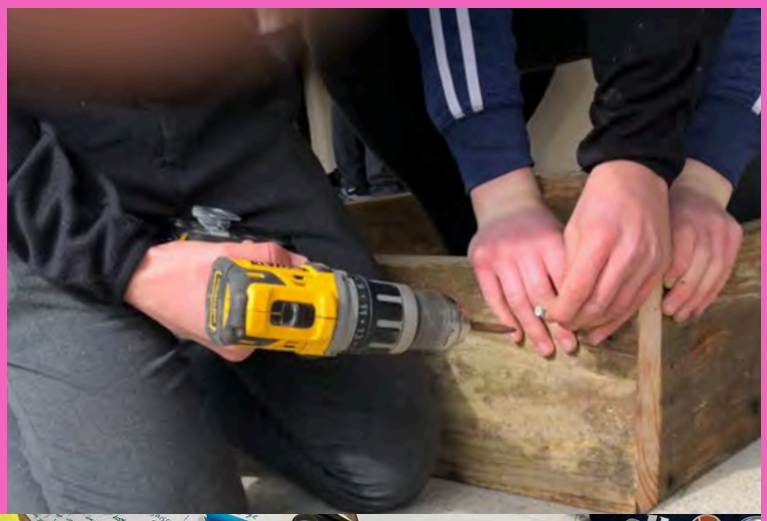
Investigator: Prof. Lizbeth Goodman, Full Professor of Inclusive Design for Education and Chair of Creative Technology Innovation, SMME, College of Engineering & Architecture, University College Dublin

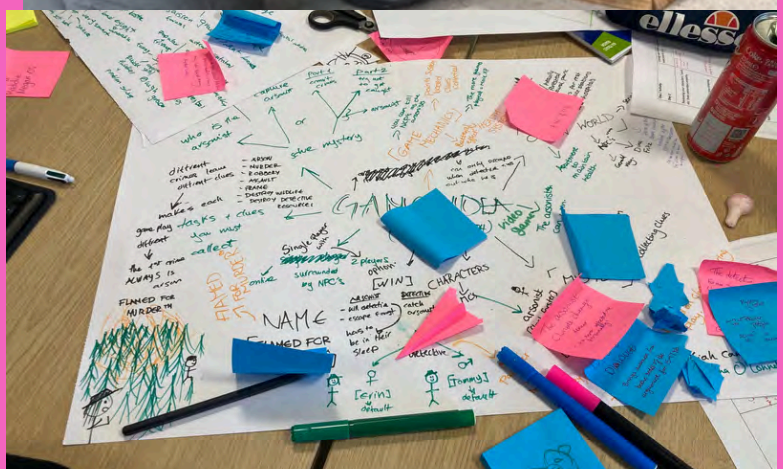
Over two years, the project supported 1291 learners, engaged 133 teachers via the MCSS platform, and registered 48 educators in targeted training. MCSS was designed to respond to the growing demand for skills-based and experiential learning, specifically aimed at bridging the gaps in cross-curricular and climate-related education within Ireland’s national curriculum. UNESCO (2021) reported that fewer than 40% of teachers globally felt confident teaching climate change, despite the importance of the issue. This challenge is mirrored in Ireland, where existing curriculum frameworks do not sufficiently support teachers in addressing complex 21st-century challenges such as sustainability and climate resilience.

Interim Findings:

1. Climate education and sustainability is an add-on: MCSS's interactions with educators, principals and education training boards and desk-based research e.g. reviews of other research and projects revealed that in many instances these areas are still considered as additional burdens to existing curricular / examination priorities rather than considered as a critical transition towards a lens through,which all subjects are taught.
2. Post Pandemic Recovery and Overwhelm: Schools recovering from the pandemic faced severe capacity constraints. Teachers, overwhelmed with increased workloads, had limited ability to engage with new initiatives. Both learners and teachers reported feelings of eco-anxiety and overwhelm when addressing sustainability-related content.
3. Teacher Empowerment and Competence: Over the course of the project, teachers reported substantial improvements in their confidence and competence in delivering climate-related education and STEAM







- programmes. By the end of Year 2, teachers demonstrated a clear ability to incorporate challenge-based and solution-focused Sustainable STEAM learning into their classrooms. Over 80% of participants indicated that they felt more confident in facilitating interdisciplinary learning focused on climate resilience and future challenges.
- Student Engagement and Self-Directed Learning: Students responded positively to self-directed learning models and interdisciplinary STEAM programmes. Students reported a deeper understanding of sustainability, with many developing critical thinking, problem-solving, and collaborative skills. These skills were fostered through in-class teaching, immersive experiences, such as design sprints focused on real-world challenges like marine plastic waste and climate resilience and informal learning contexts.

Interim Findings

- Programme Scalability and System Integration: The MCSS framework was successfully implemented across multiple schools and contexts, demonstrating its scalability. Teachers requested to use MCSS programmes in other years and across subjects, indicating the potential for system-wide integration. The project fostered new pathways between post-primary and third-level education, creating opportunities for both students and educators.

Achievements

Despite challenges such as post-pandemic recovery and recruitment delays, MCSS made progress in its first year and in response to these challenges, the team developed an introductory programme, forming partnerships with new schools and running successful design sprints in collaboration with UCD Earth Institute on topics like Climate Change. By the end of Year 2, MCSS had significantly expanded its reach and delivered the following:

- accessible and searchable platform with over 840 lessons and activity sheets aligned with 10 place-based STEAM programmes.
- Students and teachers engaged in challenge-based, self-directed learning related to SDGs (Sustainable Development Goals).
- Built strong collaborations, with 17 external experts contributing to integrating academic and industry knowledge into post-primary education.
- secured Department of Education funding for on-going CPD using the resources and MCSS pedagogical framework
- The project's success in expanding engagement, including through online platforms, led to the development of a unique standalone website and member areas, which longer-term will support scalable training for educators and sustainable delivery opportunities.

Challenges

MCSS faced challenges during the early phases of implementation due to post-COVID disruptions and capacity issues in schools. However, despite these obstacles, the project demonstrated its ability to enhance STEAM education, improve teacher confidence, and build student resilience through hands-on learning. Teachers, who initially struggled with time constraints and curriculum demands, were able to integrating them into their TY learning plans and adapt them for use across multiple school years / ages.

Recommendations:

To ensure continued progress in STEAM and Climate / Futures Literacy integration within Irish education, the project highlights the following recommendations :
Policy Reform: Embed Futures Literacy and Sustainable STEAM education into the national curriculum across subjects and both the Junior and Senior Cycle levels to prepare learners for complex global challenges.
Teacher Professional Development: Develop ongoing and scalable professional development programmes focused on building teacher capacity in interdisciplinary, challenge-based learning. This should include additional support for integrating climate-related education into existing frameworks as well as teacher cover to ensure uptake.
Resource Provision: Ensure adequate resources are made available to schools, particularly in underserved areas, to deliver STEAM and sustainability education effectively. This includes access to technology, training, and financial resources and support networks to facilitate long-term change.

Conclusion

The Muinín Catalyst Sustainable STEAM project presents a solid foundation for the future of climate education and 21st-century learning in Ireland. However, for systemic change to occur, continued collaboration between educators, policymakers, and stakeholders is essential. The recommendations outlined here provide a pathway toward embedding sustainability, resilience, and innovation into the heart of Ireland's education system. Further support and action are critical to ensure that every student in Ireland is prepared for the challenges and opportunities of the future.