The SDG Accord

The University and College Sector's Collective Response to the Global Goals

Beyond Science: Interdisciplinary sustainability learning in Chemistry

WARWICK
THE UNIVERSITY OF WARWICK

SDG focus

☒ Goal 4 - Quality education
☒ Goal 10 - Reduced inequalities
☒ Goal 13 - Climate action

What did you do?

In my first-year "Beyond Science" module at the University of Warwick, I developed an innovative interdisciplinary learning experience where Chemistry students tackle real-world challenges through the lens of the UN Sustainable Development Goals. Using a Mode 3 knowledge production approach—emphasising transdisciplinary collaboration between academia, industry, government, and civil society—students work together to create meaningful projects with guidance from mentors outside of Chemistry. This student-centred curriculum bridges scientific knowledge with pressing sustainability issues, fostering critical thinking, creative problem-solving, and social responsibility. By integrating principles of inclusive education with deliberate focus on belonging and mattering, the module ensures every student, regardless of background, feels valued and empowered to contribute. The module design incorporates weekly reflections, interactive workshops with campus partners, and authentic assessment through SDG-aligned projects that directly impact university sustainability initiatives. This approach provides transformative hands-on learning experiences while cultivating a supportive community where diverse perspectives enhance collective innovation.

What were the benefits and outcomes?

1. Contributed to the university's "living laboratory" ecosystem where Chemistry students collaborate with the Sustainability Team to analyse and improve campus systems. Students conduct energy audits alongside Estates professionals, present evidence-based recommendations to university leadership, and help implement practical solutions ranging from departmental energy efficiency measures to community food waste initiatives. This collaborative approach connects classroom learning directly to institutional sustainability goals while providing students with real-world impact opportunities. Students report building meaningful, interdisciplinary connections and opportunities: *"I really like that it introduces you to other things on campus... The module is beneficial for meeting students in our course we may have never interacted with otherwise, making the course feel more united and close-knit."* The collaborative SDG-focused approach has contributed to improved first-year retention rates and stronger performance across other chemistry courses.
2. Created a pipeline for undergraduate student research engagement with the SDGs, with the module directly contributing to a 58% increase in Undergraduate Research Support Scheme (URSS) applications in 2024 and a 60% increase 2025, significantly exceeding the university-wide increase of 34%. Students cite the SDG-focused projects as key motivators: *"The module opened my eyes to how chemistry research can address real-world sustainability challenges - it made me want to continue exploring these connections through URSS."* With 65% of Chemistry applicants specifically identifying Beyond Science as their inspiration for pursuing further research, this pathway enables students to develop innovative sustainability solutions while building valuable skills for addressing complex environmental challenges.
3. Fostered cross-departmental partnerships by connecting Chemistry students with academics from Engineering, Environmental Sciences, Arts, and Social Sciences, creating interdisciplinary project teams that tackle complex sustainability challenges. These collaborations have strengthened institutional networks, breaking down traditional silos and modelling how diverse expertise can be mobilised to address SDG targets within the university community.

What barriers or challenges did you encounter in embedding sustainability into your learning and teaching practice and how did you overcome them?

1. Navigating disciplinary scepticism about the relevance of sustainability to "pure" chemistry by demonstrating clear connections between chemical principles and SDG applications through carefully selected case studies and successful student projects. This created visible pathways between theoretical chemistry knowledge and practical sustainability solutions, gradually shifting departmental culture toward seeing sustainability as integral rather than peripheral.
2. Addressing varying levels of prior knowledge and confidence among first-year students by implementing a scaffolded learning approach with comprehensive resources, peer support networks, and personalised coaching sessions. This multilayered support system enables students with different starting points to engage meaningfully with complex sustainability challenges while building transferable research skills.

3. Securing institutional buy-in and resource allocation by documenting tangible outcomes through rigorous evaluation—tracking improvements in student satisfaction, retention rates, and research engagement. The evidence-based approach, coupled with student testimonials and visible campus improvements from student projects, transformed the module from an experimental initiative to a cornerstone of Chemistry education at Warwick that is helping influence practices and development of similar modules across the university.

What are your conclusions and recommendations for others?

To effectively embed sustainability into science education, create authentic learning experiences that position students as agents of change rather than passive recipients of knowledge. Start by mapping clear connections between disciplinary content and the SDGs, then build partnerships across departmental boundaries to model the interdisciplinary collaboration necessary for addressing complex challenges. Prioritise inclusive pedagogies that make sustainability accessible to all students, regardless of background or prior exposure to environmental concepts.

Embrace relational pedagogy as foundational to sustainability education—the quality of relationships between students, educators, and community partners directly influences learning outcomes and student engagement with SDGs. Following Felten and Lambert's relationship-rich education model, create structured opportunities for meaningful connection through project teams, mentorship pairings, and collaborative problem-solving that builds both interpersonal trust and sustainability competencies.

Establish your campus as a living laboratory where students can implement sustainable solutions in real contexts, creating tangible impact that reinforces learning while benefiting the institution. Document outcomes systematically to build evidence for institutional support and resource allocation. Most importantly, recognise that sustainability education is not just about content delivery but about fostering a sense of belonging and purpose that motivates lifelong engagement with environmental and social challenges. When students experience their learning as meaningful and connected to pressing global issues, they develop not only technical knowledge but also the agency and collaborative skills essential for creating a more sustainable future.

Web link to further information:

Belonging: Building Belonging Framework

Relational Pedagogy: We are Chemistry