

Invited Lecture 11

Pioneering change: the role of training in environmental and sustainable transitions

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Abstract

Background: As global environmental challenges intensify—ranging from climate change and resource depletion to biodiversity loss and pollution—organizations, governments, and communities are increasingly recognizing the urgent need for sustainable solutions. However, achieving meaningful progress toward sustainability goals requires more than just policy shifts or technological innovations. It demands a fundamental transformation in how individuals think, work, and collaborate across sectors. This transformation begins with education and capacity-building. Many professionals, regardless of their field, lack formal training in sustainability principles and practices. As a result, there's a growing demand for structured training programs that equip individuals with the knowledge, tools, and mindset needed to address complex sustainability challenges. These programs serve as a critical bridge between awareness and action, helping learners not only understand key concepts like circular economy, climate resilience, life cycle thinking, but also apply them within their professional and personal spheres. **Objective:** To show the outcomes of several training programs related to sustainability, held by a Research and Technology Organization, directed to industrial stakeholders. **Methods:** This work reviewed the contents, learning outcomes and feedback from the participants of 8 different programs, in a total of 25 editions (Fig. 1).



Figure 1. INEGI's training programs related to sustainability.

Results: One of the key insights gathered from feedback in circularity-focused courses is the vital importance of raising awareness. Many participants begin these programs with only a limited understanding of circularity. Through interactive learning experiences, they are introduced to core concepts such as resource efficiency, waste minimization, and life-cycle thinking. Educators often rely on real-world case studies to demonstrate how companies have effectively adopted circular practices. This exposure helps shift participants' perspectives and inspires them to spot circular opportunities within their own industries. In addition to theoretical insights, successful training programs emphasize hands-on learning, equipping participants with practical skills essential for implementing circular solutions. Feedback consistently highlights the value of the sessions, which provide practical tools that enable participants to apply the techniques to real-life challenges, developing actionable skills. In doing so, they are better positioned to drive circular initiatives within their organizations. As circularity often demands collaboration across disciplines, including designers, engineers, managers, and policymakers, participants frequently emphasize the value of networking and teamwork opportunities. Many courses include group projects that simulate real-world circularity challenges, encouraging participants from varied backgrounds to co-create innovative solutions. This collaborative approach not only reflects the complexities of real-world implementation but also cultivates professional networks and promotes interdisciplinary thinking. **Conclusions:** As industries and societies increasingly shift toward sustainable models, the concept of circularity has gained prominence. While technical innovations play a vital role, it is the training and education of stakeholders that often become the driving force behind successful implementation. This work provides insights gathered from circularity-related courses highlighting how training empowers individuals, organizations, and communities to transition from linear practices to circular models.

Keywords: circularity training; sustainability education; life cycle thinking

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