

Rethinking Chemical Education for Systemic Sustainability. Beyond Green Chemistry - From Molecules to Mindsets



Prof. Dr. Julia Krause

International Industrial Sourcing and Sales, Faculty of Business Administration, Dresden University of Applied Sciences, Dresden, Saxony, Germany.

Chemical education is at a turning point. While sustainability has become a strategic priority in industry and policy frameworks worldwide, it is often introduced into chemistry curricula as an add-on topic rather than as a structural principle.

This contribution argues that sustainability in chemistry must be embedded by speaking the language of chemists. Instead of abstract ethical appeals, sustainability can be integrated through core chemical categories: materials, reactions, energy systems, process design, resource efficiency, circularity, and risk assessment. By reframing sustainability within the epistemological logic of chemistry, students can understand it not as external regulation but as an intrinsic dimension of chemical innovation.

The presentation introduces a holistic curriculum framework based on a 7P sustainability model adapted for chemical education (Product, Process, Planet, People, Partnerships, Premises, Purpose). This model is aligned with the ORANGE Framework for systemic transformation in higher education, which integrates orientation, research-based learning, alliances, governance, and education culture into a Whole-Institution approach.

Grounded in the ORANGE Framework for institutional transformation and the 7P model for holistic business sustainability, this contribution translates systemic sustainability into the language of chemistry, creating a structured approach for curriculum development in chemical education.

The goal is not merely to “teach about sustainability,” but to educate chemists who think systemically, innovate responsibly, and translate chemical expertise into societal value.

This contribution proposes curriculum strategies that transform sustainability from a compliance topic into a core driver of chemical education and innovation.

Biography:

Julia Krause holds the interdisciplinary Chair of International Industrial Sourcing & Sales at HTW Dresden, bridging procurement and sales to foster holistic perspectives on global value creation. Her research focuses on the systemic implementation of sustainability in business processes and international supply chains, particularly in the chemical and plant engineering industries. With extensive industry experience in international consulting and chemical plant engineering, she combines academic rigor with practical insight. As Chair of the Scientific Advisory Board of the JARO Institute for Sustainability and Digitalization in Procurement, she advocates for integrating sustainability into education as a strategic, structural principle rather than a purely regulatory requirement.