CIRCULAR CITIZENSHIP IN A DIGITAL AGE

A NEW PEDAGOGICAL PERSPECTIVE FOR STEM CAREERS

The concept

The circular economy (CE) concept aims to tackle global issues of resource overuse and waste generation, particularly the significant challenge of managing electronic waste (e-waste). According to the United Nations, in 2021, **the average person produced 7.6 kilograms of e-waste, resulting in 57.4 million tonnes generated worldwide.** Alarmingly, **only 17.4% of this waste is properly collected and recycled.** Even in the European Union, which leads the world in e-waste recycling, only 35% of e-waste is officially reported as properly recycled. The remaining 82.6% often ends up in landfills or is managed through unsafe practices like open-air burning and acid baths.

As reliance on electronic devices increases, so does the volume of **e-waste**, creating a pressing global challenge that necessitates a new perspective on production and consumption.These above-mentioned elements constitute the project's backbone idea that was launched in September 2022. **E-waste spans the entire lifecycle of electronic devices, from design to disposal.** Designers, manufacturers, investors, traders, and policymakers must work together to minimize waste and preserve value within the system. Integrating sustainability-oriented education is also crucial, as future generations of consumers and producers will play a significant role.

The initiatives

European Union initiatives, such as the **EU Circular Economy Action Plan,** emphasize the importance of embedding these principles in education strategies, **including the Digital Education Action Plan 2021-2027.** Specifically, integrating an eco-social perspective in STEM education is essential, as many STEM graduates will likely enter technological and digital fields, where inclusive and environmentally conscious thinking is a valuable asset.

STEM education must adopt new pedagogical perspectives to prepare students for sustainable futures and develop environmentally critical thinking. The shift from an industrialist perspective of learning, focused on memorization and standardized testing, to a modern environment supporting collaboration, critical thinking, and analytical skills, is vital. Overcoming barriers such as teachers' understanding of the circular economy and bridging the gap between schools and the community is essential.

EU-funded projects, like the Circular STEM project, aim to integrate the circular economy into secondary schools by equipping STEM teachers with skills to adapt the curricula. This project is focusing on enhancing digital and entrepreneurial competencies and increasing girls' interest in science subjects. Directly targeted groups include STEM teachers and school principals, while secondary students benefit indirectly through increased knowledge and skills.

In conclusion, integrating circular economy principles into STEM education is crucial for preparing future generations for sustainable IT futures and fostering environmentally critical thinking. The global challenges posed by resource overuse and electronic waste underscore the urgency for a shift in educational approaches. **By bridging the gap between industry stakeholders, policymakers, and educators, initiatives like the Circular STEM project demonstrate a commitment to equipping students with the skills necessary to address real-world issues** through interdisciplinary learning. As we navigate towards a future where sustainability is integral to progress, integrating circular economy principles into education remains essential.