

TRANSFORMATIVE STEAM EDUCATION FOR THE 21ST CENTURY

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ABSTRACT

The 21st Century is presenting an unprecedented number of global crises, including human-induced climate change, loss of natural ecosystems, food security issues, youth obesity, decline in cultural and linguistic diversity. The powerful tools of modernity - science, technology, engineering and mathematics (STEM) - are being heralded as either the cause of or the solution to these crises; views are polarized. However, critical-visionary thinkers recognize that our use or misuse of STEM depends on our ethical values, our ideals, our vision, our humanity.

Transformative learning involves developing higher-order abilities that enable us to establish ethically astute relationships with the culturally different other and with the natural environment. Transformative science education is concerned with preparing future generations to use STEM wisely; to make ethically sound decisions that enable us (collectively) to live sustainably on our planet. STEAM is an emerging inter-disciplinary curriculum perspective that seeks innovative and powerful synergies between the Arts and STEM, aimed at educating the whole person.

Transformative science educators are not unlike the Roman God Janus, who guards gateways by looking cautiously in two directions at the same time. While teaching our STEM disciplinary knowledge and skills, we must be mindful of the need to maintain our vision of what makes us fully human. Innovative STEAM educators are enabling students to develop an ethical basis for judging how to wield the powerful tools of STEM in order to serve the broader interests of humanity, chief amongst which is the urgent need to sustain our planetary life-support system.

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