Efficacy of Macroethics Education in Engineering

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Description
This page summarizes research into the state of incorporating macroethics into engineering and computing education for undergraduate and graduate students. It includes summaries of 35 educational case studies.

Body

The OEC Project Pages are intended to cultivate a community of practice and allow ethics researchers, educators, and practitioners to more effectively disseminate their work. This Project Page provides a detailed overview and relevant resources for an on-going science or engineering ethics project. Once you've explored this project, visit the "Projects" section under "Resources" to see more ethics projects.
The goals of this collaborative project are to evaluate the various ways in which macroethics is taught in engineering and computing to undergraduate and graduate students (both in and out of the classroom), and to determine the most effective methods that can then be adopted by others.

In order for STEM disciplines to reach their full potential to benefit society, students must be prepared to engage in broad considerations of the ethical issues that face the profession. Established codes of conduct describe standards for professional behavior, but these largely relate to individual actions associated with individual projects, so-called 'micro'-ethical considerations. But engineering and computing must also consider 'macro'-ethical challenges, which consider the societal and environmental implications of technology as the collective responsibility of the profession. Macroethics includes issues such as sustainability, poverty and underdevelopment, security and peace, social justice, bioethics, nanoscience, and social responsibility. The extent to which engineering and computing students graduate with an understanding of macroethical issues is unclear and in need of organization.

This research started with a large survey of engineering and computing faculty across the U.S. This was followed by interviews of selected faculty who are effectively using a diversity of methods to teach a range of macroethical issues. This resulted in a set of 35 educational case studies that can serve as models for others. More detailed outcomes assessments were conducted for 11 of those teaching settings, including student surveys, rubric assessment of student work, and in some cases observations, student focus groups, and alumni surveys. Best practices were identified and are being propagated via faculty training workshops and online resources.

**Leadership**

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Recipient Organizations

- University of Colorado Boulder
- Tufts University
- Seattle University

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Contact Information

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Relevant Links

- Project Homepage
- Teaching Examples Summary Spreadsheet
- Two-Page Summaries of Teaching Examples
Publications, Presentations, and Other Products

Manuscripts


Peer Reviewed Conference Papers


Workshops


Posters

- Zhao, D., A. Bielefeldt, M. Polmear, D. Knight, C. Swan, N. Canney. 2019. Rubric Assessment of Ethics and Societal Impacts Content of Student Assignments. American Society for Engineering Education (ASEE) Rocky Mountain Section
Conference. May 19-21. Laramie WY.


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**Resource Type**

Projects

**Parent Collection**

STEM Ethics Projects (2017-Present)

**Topics**

Goals of Ethics Education  
Evaluation and Assessment  
Pedagogical Approaches

**Discipline(s)**

Teaching Ethics in STEM  
Engineering  
Authoring Institution  
University of Colorado Boulder