Teaching ethics as a skill

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Open an engineering textbook and flip to the ethics section—if there is one. Likely you'll find (i) historical *case studies* of technologies gone awry (the Space Shuttle Challenger disaster, say) and (ii) bite-sized versions of *moral theories* (excerpts from e.g. John Stuart Mill on utilitarianism or Kant on why one should follow rules). This is the orthodox approach to engineering ethics pedagogy and, unless something changes, it's likely to become the orthodox approach to informatics and computer science ethics pedagogy—as the informatics–computer science world awakens to the importance of promoting social good.

The orthodox approach, we believe, is the wrong approach (or anyway it's woefully incomplete). For it does not serve what we believe is the right goal: *teaching ethics as a skill*. If what the world needs are students who are prepared to advance social good, they need to know how to do so. They need ethical skills that they can apply to their own work, now and throughout their careers.

The orthodox approach does not provide ethical skills. Case studies of other peoples' mistakes can be instructive, but only to a point. In our work teaching ethics to engineers and computer scientists, students and instructors alike tell us that they feel alienated from such traditional case studies and don't understand what they have to do with their own work. And the abstract realm of moral theory is just that: abstract. It is is rarely operationalizable in practice—nor did Mill or Kant, for example, mean it to be! It gives no guidance in *how* to promote social good.

We have developed an alternative approach, which we've piloted with engineering and computer science students at the Massachusetts Institute of Technology, holding over twenty sessions in 2019. We teach ethics as a skill—in a manner inspired inspired by the fields of value-sensitive design, human–computer interaction, and feminist science studies.

Specifically, we give students skills to answer a sequence of questions:

1. What technology should we make?
2. How do we design a technology to be ethical?
3. How do we uphold our vision for our technology as we make it?

We highlight this philosophy and share what we've found in one of our ethics pedagogy initiatives at MIT. Specifically, we have developed five engineering ethics modules for an interdisciplinary (e.g. computer science, biological engineering, chemistry), undergraduate program called "New Engineering Education Transformation." The program is project-based: over the course of a year, students build a technology (e.g. a self-driving drone, or a biological "microchip" that simulates the human gut). We work with the students on these very technologies, prompting them to ask the above questions about their own projects, and teaching them the skills that they need to answer.