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CONVERSATIONS ON EDUCATION

Explicit and implicit ethics teaching in engineering education

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Explicit and implicit ethics teaching in engineering education

JNUSTA: *Does ethics feature centrally in Engineering education? Do you get any opportunity to teach about ethics in the courses you have taught? In your view, is ethics best "transmitted tacitly" or overtly taught "within a seminar on professional practice"? Jeffrey Chan thinks neither approach works well – what do you think?*

Laksh: Yes, we focus centrally on ethics in the Engineering curriculum. For example, the Engineering Accreditation Board (EAB) set up by the Institution of Engineers Singapore (IES) to accredit Engineering programmes in Singapore clearly states that Engineering programmes seeking accreditation from EAB (a signatory to the Washington Accord) should demonstrate beyond doubt that its students "understand professional, ethical and moral responsibility". The Accreditation Board for Engineering and Technology (ABET) also requires that students have "an understanding of professional and ethical responsibility". Similar requirements are specified by other accrediting bodies.

Ethics is explicitly taught in the courses I teach. I regularly discuss with students the ethical issues in the specific context of data reporting. Without explicit instructions, there is always a temptation for students to present data selectively that fits the established theory or the expected trends. I tell students that instead of forcing data to fit the theory, there is a proper way to account for data that fall outside the expected. In the context of the final-year project, I highlight ethics of giving proper credit to sources that have informed the research work. I also discuss with students the ethics of authoring manuscripts – to uphold academic integrity through accepted and good academic practice – matters relating to the ordering of authors' names, to avoid presenting the same data or examples in more than one paper, etc. With graduate students, I also discuss cases of unethical behaviour that flare up in the scientific community such as research fraud and plagiarism, and highlight what responsible scientific work is all about. I am, therefore, very explicit when it comes to teaching ethics to students.

Typically, ethics and professionalism are discussed with students throughout the 4-year candidature period:

- Explicitly through a specific module (e.g. a second-year Engineering Professionalism module) where discussions and debates are held using real and synthetic case studies, and the codes of ethics relevant to the profession are elucidated.
- Explicitly through several other modules where opportunities to highlight issues related to ethics and moral responsibility (e.g. laboratory-based modules, capstone design module, final-year project or dissertation, core modules including the statistics and experimental design module).
- Implicitly through modeling for students in the final-year project, research group meetings, etc.

Ethics and moral responsibility are such important issues that they need both implicit and explicit approaches with more emphasis on the latter. They are also such fundamental aspects of one's life that frequent recharging and reminders are needed. Ethics is not a one-shot vaccine; periodic booster shots are needed.

As for jury-type sessions in professional domains like Architecture, we may not go that far in Engineering; however, some role playing, debates and reflective writing are incorporated in the Engineering Professionalism module.