Social and Ethical Aspects in Engineering IME-251

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Week3 Agenda

- Ethical Dilemmas and making Moral Choices

Ethical Dilemma

- Conflict of Moral Reasoning
- Unclear Application of Moral Value

❑ Ethical Dilemmas constitute a relatively small percentage of Moral Choices

How Engineers get from thought to thing: Designing Aluminum Can

- Replacement of 'Tin' can with light metal can – Aluminum

How Engineers get from thought to thing: Designing Aluminum Can

- Dilemma of Pull-Tab
  - Pollution
  - Foot Injuries
  - Harm to Fish and Infants
- Solutions
  - Recycling of Cans and Pull-Tab (if possible)
  - Replacement of Pull-Tab with Recyclable Plastic Straw

Moral Dimensions of Technical and Economic Decision Making

- Safety
  - Human Safety
- Environmental Protection
  - Recycling and Sustainable Solution
- Consumer Usefulness
  - Well-being Values
  - Aesthetic Values
- Economic Benefits

Steps in Resolving Ethical Dilemmas

- Moral Clarity: *Identification of relevant moral values*
- Conceptual Clarity: *Clarification of key concepts*
- Informed about the facts: *Obtaining the relevant information*
- Informed about the options: *Consideration of all realistic options*
- Well-reasoned: *Reasonable decision making*

❑ *Right – Wrong Decisions OR Better – Worse Decisions*

Steps in Resolving Ethical Dilemmas

Engineer A, an environmental engineer, is retained by a major industrial owner to examine certain lands adjacent to an abandoned industrial facility formerly owned and operated by the owner. Owner's attorney, Attorney X, requests that as a condition of the retention agreement that Engineer A sign a secrecy provision whereby Engineer A would agree not to disclose any data, findings, conclusions, or other information relating to his examination of the owner's land to any other party unless ordered by a court. Engineer A signs the secrecy provision.[4]

Moral Decision Making as Design

- Attention to practical contexts of issue
- Imaginative awareness of dilemma oriented contexts
- Reasonable integration of multiple claims
- Experimentation to find an optimal solution

❑ *Right – Wrong Decisions OR Better – Worse Decisions*

Discussion Questions

With regard to each of the following cases, answer several questions. First, what is the moral dilemma (or dilemmas), if any? In stating the dilemma, make explicit the competing moral reasons involved. Second, are there any concepts (ideas) involved in dealing with the moral issues that it would be useful to clarify? Third, what factual inquiries do you think might be needed in making a reliable judgment about the case? Fourth, what are the options you see available for solving the dilemma? Fifth, which of these options is required (obligatory, all things considered) or permissible (all right)?

Discussion Questions

Case 1. An inspector discovers faulty construction equipment and applies a violation tag, preventing its continued use. The inspector's supervisor, a construction manager, views the case as a minor infraction of safety regulations and orders the tag removed so the project will not be delayed. What should she do?

Discussion Questions

Case 2. A software engineer discovers that a colleague has been downloading restricted files that contain trade secrets about a new product that the colleague is not personally involved with. He knows the colleague has been having financial problems, and he fears the colleague is planning to sell the secrets or perhaps leave the company and use them in starting up his own company. Company policy requires him to inform his supervisor, but the colleague is a close friend. Should he first talk with the friend about what he is doing, or should he immediately inform his supervisor?

Discussion Questions

Case 3. An aerospace engineer is volunteering as a mentor for a high school team competing in a national contest to build a robot that straightens boxes. The plan was to help the students on weekends for at most eight to ten hours. As the national competition nears, the robot's motor overheats, and the engine burns out. He wants to help the dispirited students and believes his mentoring commitment requires he do more. But doing so would involve additional evening work that could potentially harm his work, if not his family.

Discussion Questions

Case 4. During an investigation of a bridge collapse, Engineer A investigates another similar bridge, and finds it to be only marginally safe. He contacts the governmental agency responsible for the bridge and informs them of his concern for the safety of the structure. He is told that the agency is aware of this situation and has planned to provide in next year's budget for its repair. Until then, the bridge must remain open to traffic. Without this bridge, emergency vehicles such as police and fire apparatus would have to use an alternate route that would increase their response time by approximately twenty minutes. Engineer A is thanked for his concern and asked to say nothing about the condition of the bridge. The agency is confident that the bridge will be safe.[9]

Discussion Questions

Case 5. A cafeteria in an office building has comfortable tables and chairs, indeed too comfortable: They invite people to linger longer than the management desires.[10] You are asked to design uncomfortable ones to discourage such lingering.

Code of Ethics and their Roles

- Serving and Protecting the Public
- Guidance
- Inspiration
- Shared Standards
- Support for responsible professionals
- Education and mutual understanding
- Deterrence and discipline
- Contribution to profession's image

Abuse of Code

- Protection of status quo rather than preserving the profession's public image.
- Unwarranted 'restraints of commerce' on business dealings.

Other Code Related Matters

- Limitations of Code
- Ethical Relativism
- Justification of Code

Discussion Questions

- Please refer to the Book Chapter 2 Exercises

Q & A