

Engineering Ethics



Lecture – 5: Ethics and Design – II

Examples with Clear- cut Solutions

James is an engineer in private practice. He is approached by a client who asks him to design a project that both know clearly involves illegal activity.

Engineer Susan is asked to design a product that will require the use of outmoded technology that, although less expensive and still legal, poses substantially greater risk to human life.

James and Susan should simply reject such requests out of hand, even though they could dramatically increase the profits of their firms. The obligations to obey the law and to protect human life so clearly outweigh any obligation to maximize profits that James and Susan should have no difficulty in deciding what is right to do.

Design Problems

- Design problems have better and worse solutions but perhaps no best solution.
- This is also true of ethical problems, including ethical problems in engineering design and practice.
- In neither case should we expect “perfection,” but some success in sorting out the better from the worse is a reasonable aim.
- To assist us in this sorting process, we next discuss two special strategies: *line-drawing* and seeking a *creative middle way*.

Line – Drawing

- An appropriate metaphor for line-drawing is a surveyor deciding where to set the boundary between two pieces of property: We know the hill to the right belongs to Jones and the hill to the left belongs to Brown, but who owns this particular tree?
- Where, precisely, should we draw the line?

Example 1

- A vendor offers an engineer a large sum of money to get the engineer to recommend the vendor's product to the engineer's company. The engineer accepts the offer and then decides in favour of the vendor. The engineer accepts the offer for personal gain rather than because of the superior quality of the vendor's product (which actually is one of the worst in industry) and also most expensive. Furthermore, the engineer's recommendation will be accepted by the company because only this engineer makes recommendations concerning this sort of product.

- In this case, we can easily identify features that contribute heavily in favour of this being a clear-cut instance of bribery.
- Such features include:
 - gift size (large),
 - timing(before the recommendation is made),
 - reason (for personal gain),
 - responsibility for decision (sole),
 - product quality (poor), and
 - product cost (highest in market).

Example 1

Features of Bribery	Paradigm Instances of Features of Bribery
Gift size	Large
Timing	Before recommendation
Reason	Personal gain
Responsibility for decision	Sole
Product quality	Worst in industry
Product cost	Highest in market

Example 2

- Suppose Amanda signs an agreement with Company A (with no time limit) that obligates her not to reveal its trade secrets. Amanda later moves to Company B, where she finds a use for some ideas that she conceived while at Company A. She never developed the ideas into an industrial process at Company A, and Company B is not in competition with Company A, but she still wonders whether using those ideas at Company B is a violation of the agreement she had with Company A. She has an uneasy feeling that she is in a gray area and wonders where to draw the line between the legitimate and illegitimate use of knowledge. How should she proceed?

Negative & Positive Paradigms

- Cases that are uncontroversially wrong we shall call *negative paradigm* cases, and cases that are uncontroversially acceptable are *positive paradigm* cases.
- For example, in Amanda's case, a negative feature of her situation is that she signed a trade secret agreement that may include her ideas and apparently, she has not sought permission from Company A to use her ideas at Company B. A positive feature is that Company A and Company B are not competitors.

Test Case

- Test case is the one on which the analysis is to focus.
- Amanda's situation is the test case.
- As Amanda engages in this comparative analysis, she may find that she has not thought thoroughly enough about certain features. For example, she may not have thought much about the extent to which others at Company A might also have helped develop her ideas. Or, although she developed her ideas on her own time, she might realize that Company A's lab and equipment played a crucial role in their development. Or, although Company A and B were not competitors when Amanda worked at A, they might become competitors in the area in which she developed her ideas, especially if those ideas were jointly developed with others at Company A.

Features of Paradigms

Negative Paradigm (Clearly wrong)	Positive Paradigm (Clearly acceptable)
Negative feature 1 (Vs. signed agreement)	Positive feature 1 (Permission granted)
Negative feature 2 (A and B competitors)	Positive feature 2 (A and B not competitors)
Negative feature 3 (Ideas jointly developed)	Positive feature 3 (Amanda's ideas only)
Negative feature 4 (All ideas developed on job)	Positive feature 4 (All ideas developed off job)
Negative feature 5 (Heavy use of A's lab/equipment)	Positive feature 5 (A's lab/equipment not used)
Negative feature n (etc.)	Positive feature n (etc.)







Paradigm and Test Case Features


Negative Paradigm (Clearly wrong)	Test Case	Positive Paradigm (Clearly acceptable)
Negative feature 1 (Vs. signed agreement)	—X—	Positive feature 1 (Permission granted)
Negative feature 2 (A and B competitors)	—————X—	Positive feature 2 (A and B not competitors)
Negative feature 3 (Ideas jointly developed)	—————X—	Positive feature 3 (Amanda's ideas only)
Negative feature 4 (All ideas developed on job)	—————X—	Positive feature 4 (All ideas developed off job)
Negative feature 5 (Heavy use of A's lab/equipment)	—————X—	Positive feature 5 (A's lab/equipment not used)
Negative feature n (etc.)	—? ? ? ? ? ? ? ?—	Positive feature n (etc.)

Line-Drawing Test of Concepts

- Victor is an engineer at a large construction firm. It is his job to specify rivets for the construction of a large apartment building. After some research and testing, he decides to use ACME rivets for the job. On the day after Victor's order was made, an ACME representative visits him and gives him a voucher for an all-expense paid trip to the ACME Forum meeting in Jamaica. Paid expenses include day trips to the beach and some factories. If Victor accepts, has he been bribed?

Line-Drawing Test of Concepts

Feature	Paradigm (Bribery)	Test case	Paradigm (Not bribery)
Gift size	Large		Small
Timing	Before decision		After decision
Reason	Personal gain		Educational
Responsibility	Sole		None
Product Quality	Worst		Best
Product Cost	Highest		Lowest

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- Victor's acceptance of the voucher might not constitute a paradigm instance of a bribery because although the gift size is large, it was offered *after* he had made his decision.

Creative Middle Way

- A student's supervisor did not have adequate funds to pay the student for his work on a particular project, but he had an excess of funds for another project. So, the supervisor asked the student to fill out his time sheets stating that he had worked on a project that had excessive funding—even though the student had not worked on that project at all. The student really needed the money to continue his college education, and he knew his supervisor had a short temper and would probably fire him if he did not do as requested. However, the student also abhorred lying.

Creative Middle Way

- The student came up with the following creative middle way solution. He told his supervisor, “I know you don’t have money budgeted from the project I worked on to pay me. But my conscience will not permit me to sign a false statement on my time sheet. How about if I just don’t put in a time sheet for my work last week; and if you can, in the future please assign me to projects with budgets sufficient to pay me.” His supervisor was so embarrassed and moved by this response that not only did he never again put the student in this kind of situation but also, he paid the student’s salary for the previous week out of his own pocket.

Convergence & Divergence

Convergence: various ethical theories lead to the *same* conclusion about what should be done in particular cases.

Divergence: various ethical theories lead to the conflicting conclusion about what should be done in particular cases.