Objectives

Aim 1: You will be able to classify and match the ethical problems

Aim 2: You will be able to relate the ethical dilemmas with the proper solving technique

ETHICAL PROBLEM-SOLVING TECHNIQUES

In this module, we will get to classify and match the most common ethical problems you might encounter in your professional life. Then we will examine the **Problem-Solving Techniques** that can be used to solve these problems. Understanding what the problems you encounter are will ensure that the solution method is successful. Therefore, a good understanding of the contents of this module is important in solving a case.

1- Relevance Problems: In a **relevance problem**, we are not sure whether a principle applies in a particular situation. Whether James' applying the process he developed at Company A to the new situation in Company B is the use of proprietary information or is a relevance problem. Its resolution depends on the prior resolution of the conceptual issue as to how we define "proprietary."

Method for Relevance Problem

- First, set up a series of cases, ranging from a case where the concept clearly applies, through a series of ambiguous cases, to a case in which the concept clearly does not apply.
- Second, the morally relevant similarities and differences among the various cases must be enumerated. There is no magic formula for determining what is and is not morally relevant. Rather, you must rely on your sense of what is morally relevant.
- Third, after enumerating the morally relevant similarities and differences in the various cases, you must determine the line of demarcation between transfers of information that should and should not be proprietary.

2- Conflict Problems: In a **conflict problem**, we are faced with two or more principles that seem to apply to a particular situation, and yet the two principles require different and incompatible actions. The most challenging problem in engineering is conflict problems. An area of ethical problem solving that we will frequently encounter relates to problems that present us with a choice between two conflicting moral values, each of which seems to be correct. Conflict problems can be solved in three ways.

A. **Employing lower level consideration:** Often, there are conflicting moral choices, but one is obviously more significant than the other.
B. **Finding creative middle way:** This solution is an attempt at some kind of a compromise that will work for everyone. The emphasis here should be on the word “creative,” because it takes a great deal of creativity to find a middle ground that is acceptable to everyone and a great deal of diplomacy to sell it to everyone. The sales job is especially difficult because of the nature compromise, which is often jokingly defined as “the solution where nobody gets what they want.” An example of a creative middle ground would be that rather than dumping toxic waste into a local lake, one finds ways to redesign the production process to minimize the waste product, finds ways to pretreat the waste to minimize the toxicity, or offers to pay for and install the equipment at the municipal

water system necessary to treat the water to remove this chemical before it is sent to homes. Obviously, no one will be completely satisfied with these alternatives, since redesigns and pretreatment cost money and take time. Some people will not be satisfied with even a minimized dumping of toxics.

C. **Making hard choice:** Finally, when, there is no easy choice and attempts to find a middle ground are not successful, all that is left to make the hard choice. Sometimes, you have to bite the bullet and make the best choice possible with the information available at the time. Frequently, you must rely on "gut feelings" for which path is the correct one.

3- Line Drawing Method

The line-drawing technique that will be described in this section is especially useful for situations in which the applicable moral principles are clear, but there seems to be a great deal of "gray area" about which ethical principle applies. Line drawing is performed by drawing a line along which various examples and hypothetical situations are placed. At one end is placed the "positive paradigm," an example of something that is unambiguously morally acceptable. At the other end, the "negative paradigm," an example of something that is unambiguously not morally acceptable, is placed. In between is placed the problem under consideration, along with other similar examples. Those examples that more closely conform to the positive paradigm are placed near it, and examples closer to the negative paradigm are placed near that paradigm. By carefully examining this continuum and placing the moral problem under consideration in the appropriate place along the line, it is possible to determine whether the problem is more like the positive or negative paradigm and therefore whether it is acceptable or unacceptable. Let's illustrate this technique using a hypothetical situation. Our company would like to dispose of a slightly toxic waste by dumping it into a local lake from which a nearby town gets its drinking water. How can we determine if this practice is acceptable? Let's start by defining the problem and the positive and negative paradigms.

Case: It is proposed that our company dispose of a slightly hazardous waste by dumping it into a lake. A nearby town takes its drinking water supply from this lake. Our research shows that with the amount of waste we plan to put into the lake, the average concentration of the waste in the lake will be 5 parts per million (ppm). The EPA limit for this material has been set at 10 ppm. At the 5-ppm level, we expect no health problems, and consumers would not be able to detect the compound in their drinking water.

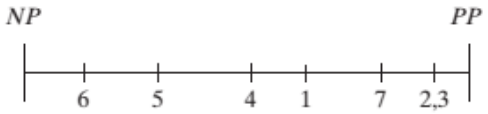
Positive paradigm: The water supply for the town should be clean and safe.
Negative paradigm: Toxic levels of waste are put into the lake.

Let's start by drawing a line and placing the positive and negative paradigms on it:

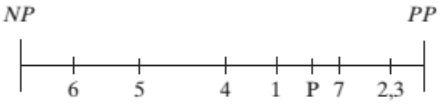
Now let's establish some other hypothetical examples for consideration:

1. The company dumps the chemical into the lake. At 5 ppm, the chemical will be harmless, but the town's water will have an unusual taste
2. The chemical can be effectively removed by the town's existing water treatment system.
3. The chemical can be removed by the town with new equipment that will be purchased by the company.
4. The chemical can be removed by the town with new equipment for which the taxpayer will pay.
5. Occasionally, exposure to the chemical can make people feel ill, but this only lasts for an hour and is rare.
6. At 5 ppm, some people can get fairly sick, but the sickness only lasts a week, and there is no long-term harm.
7. Equipment can be installed at the plant to further reduce the waste level to 1 ppm.

But the exercise should be continued with more examples until it is clear what the proper resolution is. So, redraw our line with the examples inserted appropriately:



After setting up the examples, it may be clear that there is a knowledge gap. For example, in our case, we might need more information on seasonal variation waste concentration and water usage of town. And use the information on potential interactions of the chemical with other pollutants. NP So we have to denote our problem by a "P" and inserting it at the appropriate place along the line.



And now, if the problem far from the positive paradigm, then there are probably better choices that can be made.

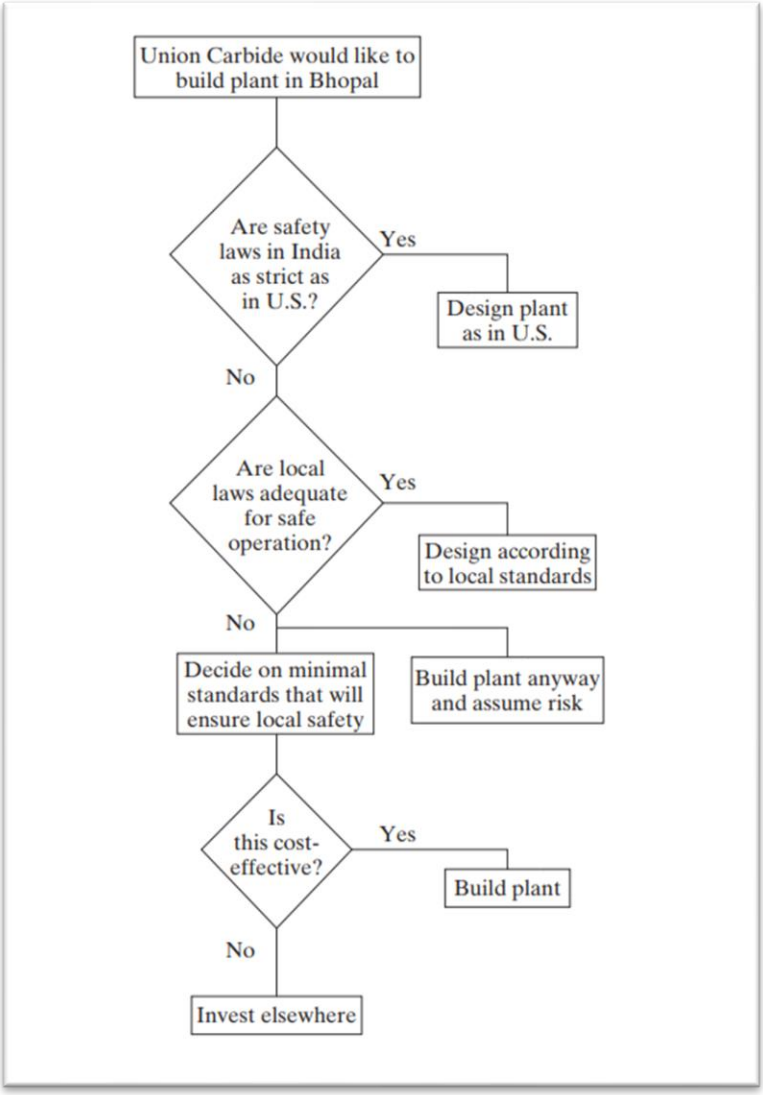
- It should be noted that although this action seems ethically acceptable. There are many other considerations that might be factored into the final decision.
- Although this problem-solving method seems to help with problem analysis and can lead to incorrect results, for example, line drawing can easily be used to prove that something is right when it is actually wrong. (line drawing is only effective if it is used objectively

and honestly) the choice of where to put the examples and how to define the paradigms is up to you.

- You can reach a false conclusion by using incorrect paradigms, by the dishonest placement of the example along the line, and by the dishonest placement of the problem within the examples.

4- Flow Charting

Flow charts are most often used by engineering students, especially in developing computer programs. In engineering ethics, flowcharting will be very helpful for analyzing a variety of cases, especially those in which there is a sequence of events to be considered or a series of consequences that flow from each other. There is no unique flow chart that applies to a given problem. So, different flow charts can be used to analyze the same problem.



Advantages of using flow charts:

• Gives a visual picture of a situation.

• Allows you to readily see the consequences that flow from each decision.

It is essential to be as objective and honest as possible in flowcharting to solve a problem. As indicated in the chart, several paths might have been taken and multiple decisions that had to be made. So, a flow chart helps you to decide which choice is ethical and which is not.

The key to effective use of flow charts is to be creative in determining possible outcomes and scenarios and also not to be shy about getting a negative answer and deciding to stop the project.

REFERENCES

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