Engineering Ethics
(Hum 4441)

Lecture 4

Which theory to use?

- Now that we have discussed four different ethical theories, the question arises: **How do we decide which theory is applicable to a given problem**?
- The good news is that in solving ethical problems, we don't have to choose from among these theories. Rather, we can use all of them to analyze a problem from different angles and see what result each of the theories gives us.
- This allows us to examine a problem from different perspectives to see what conclusion each one reaches. Frequently, the result will be the same even though the theories are very different.

Case Study

- A **chemical plant** which is near a small city that discharges a hazardous waste into groundwater. If the city takes water from wells, the water supply for the city will be compromised, and significant health problems for the community may result.
- **Right ethics**, will indicate that this pollution is unethical since it causes harm to many of the residents. And these residents have the **right** to have safe drinking water.
- A **utilitarian** analysis would probably also come to the same conclusion since the **economic benefits** of the plant would almost certainly be **outweighed** by the negative effects of the pollution and the costs required to ensure safe municipal water supply.
- **Virtue ethics** would say that **discharging waste** into groundwater is an irresponsible act, and it is harmful to the individuals and should not be done. In this case, all of the ethical theories will lead to the same conclusion.

Classic case of engineering ethics

- **Aberdeen** is a U.S. Army facility where, among other things, chemical weapons are developed. This case involves 3 managers at the pilot plant at the proving grounds. **Carl Gepp**, manager of the pilot plant, **William Dee**, who headed the chemical weapons development team, and **Robert Lentz**, who was in charge of developing manufacturing processes for the chemical weapons.
- **All three engineers** involved in the case were experts in the chemical weapons field. The U.S. Army has used the Aberdeen Proving Ground to develop, test, store, and dispose of chemical weapons since World War II.

Classic case of engineering ethics

- Periodic inspections between 1983 and 1986 revealed serious problems at the facility, where these engineers worked. These problems included:
  - ***flammable*** *and* ***cancer-causing substances*** *left in the open*
  - *chemicals that become* ***lethal*** *if mixed were kept in the same room*
  - *drums of toxic substances were leaking. There were chemicals everywhere -* ***misplaced, unlabeled*** *or* ***poorly contained****. When part of the roof collapsed, smashing several chemical drums stored below, no one cleaned up or moved the spilled substance and broken containers for weeks.*

Classic case of engineering ethics

- The funds for the cleanup would not have even come out of the engineers' budget. The Army would have paid for the cost of the cleanup. All **the managers** had to do was make a request for the Army clean-up funds, but they made no effort to resolve the situation.
- When an external sulfuric acid tank leaked 200 gallons of acid into a nearby river, **state and federal investigators** discovered that the chemical retaining dikes were unfit, and the system designed to contain and treat hazardous chemicals was corroded and leaking chemicals into the ground.

Classic case of engineering ethics

- In 1976, Congress passed the Resource Conservation and Recovery Act (**RCRA**), and later, the Solid Waste Disposal Act, to assist and to provide incentives to safely dispose of chemical wastes and to establish fines for violations.
- In 1989, the 3 engineer managers were convicted of illegally storing, treating and disposing of hazardous wastes. There was no indication that these 3 persons were the ones who actually handled the chemicals in an unsafe manner, but **as managers** of the plant, they were ultimately **responsible** for how the chemicals were stored and for the maintenance of the safety equipment.
- They each faced up to 15 years in prison and up to $750,000 in fines, but were sentenced only to three years probation and 1000 hours of community service.

Classic case of engineering ethics

- The engineers' views and the Federal government's view of their responsibilities were conflicting.
- The **engineers' views**:
  - Gepp, Dee, and Lentz saw themselves as **chemical engineers** that should solely do their job.
  - They were unaware of the impact of their hazardous-substances-storage practices had on others and on the environment. Their main concern was to fulfill their duty to the US Army.
  - They felt "**separated**" from the citizens and world outside of the plant and, thus, did not see their responsibility to keep society safe, but only saw their military mission.
  - Also, there were no environmental engineers or environmentalists in consultation for the dumping of the chemicals.

Classic case of engineering ethics

- **Federal government's view:**
  - They disregarded the RCRA Act, a congressional law passed to keep others safe from solid chemical wastes.
  - Throughout 1983 and 1986, there were **repeated violations** from the periodic inspections of the plant, and Gepp, Dee, and Lentz, were **upper-level** chemical engineers at the plant, **considered experts** in their field.
  - As engineers, their **moral considerations** should be to the safety of the public, their clients, and to the company they work for. According to the **ASME Code of Ethics**, which is repeated in the code of ethics for many engineering fields, is to "hold paramount the safety, health and welfare of the public in the performance of their professional duties."
  - Since they did not have to pay for clean-up, the engineers could have reported the spills to the US Army for clean-up as an army facility.

Classic case of engineering ethics

- **Federal government's view:**
  - The engineers were also unaware that their experiments and their handling of waste products had social impact, even though they considered themselves to be far removed from the outside world. The leaking of sulfuric acid into Canal Creek quickly disproved their claim of being removed from the outside world. No matter how far an engineer feels removed from society, he still has an effect on it, even if it is an indirect one. Even though the Pilot Plant was located on a military base, it still had to follow the RCRA guidelines, regardless of its military mission.

Classic case of engineering ethics

- **Question comes over here, who is responsible for this hazard?**

- From **utilitarian perspective**, the cost which is accrued and the harm which comes to the society at large by the unsafe processes followed and the irresponsible act of these people in how things were stored or not. The benefit that they get from storing the things in a very unsafe way and not following the processes and the cost that someone has to pay with respect to the safety hazards, which is related to the majority of the people, the environment at large.

- Then, from the utilitarian perspective, we can say, yes these people are **responsible**, and the social cost of their action is much more as compared to the benefits of their action. And, it is a correct decision to hold themselves as responsible for these actions and unsafe actions and charging penalties on them.

Classic case of engineering ethics

- According to **Right** theory, they can tell like we have followed the practice which is generally there. But maybe they have not done their corresponding **duty** of getting to know the correct facts and reporting any discrepancy which they have noticed.

- So, in 1989, these 3 engineer managers were convicted for this case although there was no indication that they were the ones who actually handled the chemicals in an unsafe manner. But as the managers of the plant, they were ultimately responsible for how the chemicals were stored and for the maintenance of the safety equipment.

- So, they cannot tell like this is not a part of their duty responsibility as the primary duty of the engineers are to ensure the safety of the public at large to reduce occurrence of hazardous incidents and happenings. So, even if they have not done things directly, but because they are managers so, they have to take up these responsibilities for this unsafe acts.

Types of Ethics

- **Utilitarian**
  - quantitatively assess the utility or the overall well-being achieved by the society as a whole and then decide if the act should be classified as ethical or otherwise. If an act helps to achieve the best for the most number of people, it surely will qualify as an ethical act.
- **Duty ethics and rights ethics**
  - are two sides of the same coin – **duty ethics** contends that out of the various duties of people, one primary duty is to respect others' rights and **rights ethics** contends that a person's fundamental rights must be respected by others.
- **Virtue ethics**
  - any deed that conforms to or supports good traits in the person's character is considered right and thus any deed that supports bad traits will immediately be considered wrong.

Case Study

- Mr. Karim is a new reporter of a news channel who just started his career as news reporter. His boss ask him to bring some sensational news to boost Television Rating Points (TRPs).
- Recently, there was collision happened between two different religious parties regarding construction of prayer rooms. The Supreme Court released a sensitive verdict regarding this issue.
- Mr. Karim got a chance to interview a famous religious leader to express his opinion about the current heated issue. In the interview, the religious leader used a provocative statement and urged the members of the community to rebel against the court ruling. If the interview is aired, it might spark communal tensions and law and order problem in society. Mr. Karim are very well aware that if the interview is presented to the boss, he will definitely air it to boost TRPs which may lead to the exponential growth of his career.
- In such circumstances, would it be right for Mr. Karim to present the interview to his boss?

Case Study (Continue)

- **Moral Dilemmas Faced**

  - **Freedom of Speech v/s Public Safety:** Religious leader has the freedom to express his opinion on the issue but at the same time there is also a threat to public safety due to his opinion.

  - **Organizational Goals v/s Personal Ethics:** Airing sensational news would be beneficial to boost the TRPs of the news channel. However, personal ethics may restrict one to do so.

Case Study

- A traffic constable Mr. John saw that 3 people riding a motorcycle without a helmet and jumping the red signal. On stopping them, John came to know that one of them met with an accident due to potholes and is severely bleeding and due to non-arrival of ambulance they are taking him to the hospital. On further enquiry, John came to know that the driver does not have a driving license and works as day wager. While on his (driver) way to work, he found the man lying injured on the road and in a rush to take him to hospital, he left his helmet on the site of an accident. The driver expresses his financial inability to pay increased fines. Recently, due to the enforcement of new Motor Vehicles Act, Mr. John are under severe pressure from his seniors for strict enforcement.

  - What are the ethical issues involved and the options available to you in such a situation.
  - Also suggest a course of action you would like to follow.

Quiz-1

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