

For each of the following concepts, explain the meaning of the concept in the context of this course and and how an example used in lecture demonstrates the concept:

a. Normalization of deviance

The normalization of deviance means taking actions that were typically established as societally deviant or unacceptable, and doing them so regularly that they become the norm and are widely accepted by a group or population. An example of this is Bhopal India's Industrial Disaster, where all of the control systems in place were either out of service or disabled for months prior, and it was simply accepted that this is the way things should be in the plant. This deviance was normalized to the point where those working didn't think anything was wrong with what they were doing, leading to a large malfunction.

b. Management of change review

Management of change review is the idea that, with any small change, you must bring in a group of people of different backgrounds to analyze the risks of making even the slightest of changes. This is relevant to the Chernobyl disaster discussed in class, where the engineers working on the test of the reactor on the night of the disaster didn't know the consequences of the test they were doing. The test (done to improve safety) involved running the reactor at 700-1000 MW, but the power dropped too much (30 MW) and the control rods were all pulled out resulting in the reactor melting down. With management of chain review, they would've had to get their test and its changes cleared with a board of people with different backgrounds. They did not have this and, since they didn't understand the risks, resulted in a disaster.

c. Safety Controls (address one of: Engineering vs Administrative; **Preventive vs Mitigative**; Active vs Passive)

Mitigative controls are safety controls which are in place to minimize the residual effect of an incident. Preventative controls, on the other hand, are safety controls that are in place to prevent an incident from occurring altogether. An example of this from lecture is the wine vat in Qhevri, people need to go in and clean the inside between batches. This is dangerous as fermentation causes CO₂ to build up in the vat, so if someone goes in there might not be enough O₂ in there. The safety control in this example is having the person inside the vat sing, and having someone outside listening. This person outside and the signing are a mitigating safety control, where they listen out for the person to stop singing which indicates they have fallen unconscious and need to be returned to O₂. A preventative control would be equipping the person with some sort of breathing apparatus, or automating the process somehow, but then the process would lose its cultural significance.

d. Do/can engineers act objectively?

In lecture, we discussed infrastructure choices, like highway construction, and how it applied to engineering decisions. Highways have historically benefited for some and negative consequences for others. The highway department built the highway in not 'improved' places. The power and

status held by certain communities affects their ability to influence the decisions made that will impact their community. Shaker Heights was able to prevent the highway, while Alabama could not. Engineers claimed that interstate locations were decided based on the distribution of the urban and rural population, motor vehicle ownership, and irrespective of bias. This is not the only factor, as underlying bias regarding race most definitely played a role. Ultimately, engineers cannot act objectively as any situation that requires one to use their judgement, makes it impossible to ignore your own biases.

e. Balance of public vs private rights

The motives of private organizations, including the government in most cases, are largely profit driven. These large private organizations have 'more rights' than the general public, and can act disregarding public rights and opinion. An example of this is the construction of opportunity corridor in Ohio, where the government decided to go forward with the construction of the road despite the community outcry. This brings another question of if the government should always listen to community outcry, as some members of the public have more influence than others, despite having 'public' rights.

f. Disproportionate impact on certain groups

Due to the nature of how communities are built and how people have been divided into specific regions based on their status over time, some decisions made can have a tremendous impact on specific groups. An example of this is the opportunity corridor as well. Here, 76 million families and 16 businesses were displaced. Community members argued that the road's width encourages speeding and that there would be pollution Problems due to high traffic. The neighborhood affected has lower class citizens who cannot really make use of the road due to not being able to afford cars, relying on public transit. As a result, they would be greatly negatively affected, while people who could afford to use the road would benefit greatly.

g. Trademarks can become generic

A company can place a trademark on any product they deem fit. This marks the product as the company's intellectual property and thus they have the right to use that name freely. That being said, if the general public uses the trademarked name in place of the generic name too frequently, then the trademark becomes void. An example discussed in lecture is PTFE, more commonly referred to as Teflon. Professor Lacks referred to PTFE as Teflon in one of his articles without using the trademark symbol, calling the chemical by a 'generic', but trademarked, name. The engineers were concerned about his lack of clarification of the trademark of the name, as they did not want to lose the Patent that Dupont has on PTFE as Teflon. Similar things have happened to Velcro, Yo-Yo, Pilates, and Granola. All of these names used to be brand names, but became so wide spread so it became the generic name and the trademarks for these products were lost.

h. Virtue Ethics – Aristotle's Golden Mean

Aristotle's Golden Mean is an influential branch of virtue ethics that suggests virtues lie on a golden mean in between two extremes which are vices. The most ethical approach is thus the stance that lies at the mean of these extremes. An example of this discussed in the first lecture is allowing people with a prosthetic foot to compete in the olympics. The extremes in this case are to either prevent anyone with a prosthetic foot from competing, or to freely allow them to compete with no rules or restrictions. The golden mean in this situation is to set specific rules and regulations for the athletes, or another alternative is the paralympics.

i. Professional codes of ethics

Professionals are expected to adhere to a code of ethics or rules for conduct for their profession. Ethical questions are much more black and white under a code of ethics, eliminating the questions coming from questions like "should you steal to help your family". An example of this is the high school football coach who boosted some of the grades of one of his students so that they could make it to college and be successful. The coach was acting out of the interest of his players, and had personal ethics guiding his decision. He consequently violated his professional code of ethics, which is inappropriate when the reason is purely based on personal ethics. The coach lost his job and thus his great reputation was tarnished.

j. Do artifacts have politics?

Philosophers have argued the "value neutrality thesis" which says that technologies are inherently neutral - they are mere things that don't care how they're used. Philosophers overwhelmingly reject value neutrality, rejecting the idea that if technologies are used for malicious purposes, we should blame the user rather than the tech itself. An example of this is the politics of technologies that redistribute resources. In terms of the Aral situation discussed in lecture, the river diversion resulted in drying up the rivers, which benefited the USSR as a whole, but hurt the people in the Aral region. They took advantage of a large source of water, specifically feeds to the Aral sea, with no respect to the land they were taking from. This resulted in people growing up there having an almost deserted homeland. These canals/diversions were inherently political due to these targeted effects on people's livelihood.

k. Factual vs. conceptual vs. ethical components of ethical issues

The factual aspect of ethical issues are facts that could potentially influence our answers. The conceptual component deals with key ideas that have ambiguous definitions, and the moral component deals with any distinctly moral issues. An example of this is vaccination, more specifically if it is ethical to require vaccinations. For this example, the factual component is the analysis of health risks of vaccination, needing real and accurate scientific evidence. The conceptual component is dealing with what it means for a vaccine to be safe, and what acceptable risk should be defined as. Finally, the moral component to this issue concerns personal freedom and liberty. The choice to get a vaccine not only affects your health but the

health of others in the community. These 3 key components make up this largely contested ethical question.

Some advice for the AI art part of this assignment:

- You can use any tool you'd like. I found Google ImageFX to work best. It is free.
- It may take many tries and experimenting in order to find a prompt that generates an image that meets your needs.

Choose one of the concepts listed in Question 1, and use an AI art tool to create an image that illustrates a meaningful and specific example of the concept. The image must include a person (or people) who clearly displays emotions related to the concept (no credit will be given for any part of this question if the image does not clearly display people with emotions related to the concept). The example for the image does not have to be related to the example used in Question 1, and it does not have to be related to an example discussed in lecture.

- a. Upload the image



- b. Give the prompt used to generate the image and the AI tool you used to create the image
Prompt given to Google ImageFX: "surgeon entering an operating room eating a burger with colleagues around the operating table smiling and not caring"

- c. Explain how the image illustrates an example of the concept, and how emotions of people in your AI-generated image help illustrate the concept

This illustrates **normalization of deviance** as the surgeon is in the OR eating food and not being sterile at all, even though there are tools used for the surgery being prepped on the table. The emotions illustrate the concept as the surgeon's colleagues are all smiling and laughing, showing a lack of care for the violation of the standard operating procedure. They are also not being sterile and no one is saying anything to keep the area clean, despite one person having gloves on.

Repeat Question 2 with a second concept from the list in Question 1.

- Upload the image



- Give the prompt used to generate the image and the AI tool you used to create the image
Prompt given to Google ImageFX: “three slides total generated, first slide should show a person sleeping at 12:00pm shown on a clock, the second should show the same person drinking a cup of coffee at 12:00pm, and the third image should be someone sitting in a graveyard of coffee cups and coffee pots again at 12:00pm”

- Explain how the image illustrates an example of the concept, and how emotions of people in your AI-generated image help illustrate the concept

This shows **Aristotle's Golden Mean** by showing a man sleeping through the day as the lower extreme, the same man being addicted to coffee at the other extreme, and him being awake with only one cup of coffee at the golden mean. In the first slide, the AI shows emotion through the sleeping man by showing him slightly saddened as a result of sleeping through the day. At the other extreme, the man is more distraught than sad, as he has a crippling coffee addiction and is surrounded by it 24/7. In the golden mean, he is still tired, but looks more content as he has his pick-me-up and can thus be more productive without having an addiction to caffeine.

Repeat Question 2 with a third concept from the list in Question 1.

- a. Upload the image



b. Give the prompt used to generate the image and the AI tool you used to create the image
Prompt given to Google ImageFX: "doctor accepting a bribe from a patient under the table. the briber should hold one finger up to his lips, and the doctor should look agreeable and smile. In exchange for the money, the doctor should give the patient a prescription bottle. show full faces"

- c. Explain how the image illustrates an example of the concept, and how emotions of people in your AI-generated image help illustrate the concept

This shows a doctor violating their **professional code of ethics**. The doctor is accepting the bribe from the patient, invalidating their practice as they should not be taking money to prescribe a seemingly unneeded medication. The briber knows what they are doing is wrong, that's why they look secretive covering their lips with the 'hush' finger. The doctor, like the football coach example, wants to make the patient happy and is thus taking the money in exchange for violating his medical license. Professionally, the doctor shouldn't agree to this, but his emotion presented by the AI is happy and seems very agreeable.