

Title: Moral Reasoning and Engineering Safety Self-Assessment

Length: Day 1 – 50 minutes, Day 2 – 80 minutes

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Problem Statement: Engineering safety requires moral reasoning skills in addition to knowledge of best practices and professional codes of ethics. Moral reasoning skills include moral sensitivity, moral imagination, and reasoning with principles.

Learning Objectives:

Students will be able to self-assess their ethical thinking skills through using the EPSRI moral development instrument.

Students will understand the differences between **pre-conventional**, **conventional**, and **post-conventional** moral reasoning.

Students will practice their **moral sensitivity**, **moral imagination**, and **ethical reasoning skills**.

Students will be introduced to four major ethical theories and their basic **principles**.

Description: This 2-day module is built around the EPSRI moral development instrument (included with the module). Students are given a brief introduction to why ethical reasoning is important in industry settings. They are then given time to complete the instrument. Afterwards, the moral development model is explained. On Day 2, the skills required for the highest stage of moral development, the Post-Conventional stage, are explained and practiced through activities. Students are then asked to fill out the EPSRI instrument a second time and to reflect on how their reasoning and approach has changed.

Day 1: Lecture Topics (50 min)

Ethical Reasoning in Industry

When working in industry, you will face complex situations where you must make decisions that will affect people’s lives, and you will be responsible both for the choices you make and, often, explaining why you made that choice rather than others. These sorts of explanations are examples of moral reasoning. Moral reasoning is especially important in these situations because you will be interacting with people with different values and moral codes than your own, dealing with conflicts between different sets of values, and facing situations without a “correct” answer. The EPSRI moral assessment instrument students will be filling out is based around scenarios that one may face in industry and have been designed with input from working engineers and plant managers.

Opening Activity: Have students fill out the EPSRI instrument (pre-assessment), mark as first assessment.

Introduction to Moral Reasoning

When you were reasoning about what answers to choose and how to rank your concerns on the ESPRI, you were making **moral arguments** to yourself. In logic (the discipline that makes explicit the principles of valid reasoning), an argument is a collection of propositions, or statements that can be true or false. These propositions are either premises or the conclusion. Premises offer support, evidence, or reasons

for accepting the conclusion. In a valid argument, if the premises are true, then the conclusion must be true as well. Moral arguments are a particular type of argument where the conclusion is a proposition about what we *should* or *should not* do. This is opposed to descriptive arguments, where the conclusion is a proposition about what the world *is* or *is not* like. (Moral arguments are about what ought to be, descriptive arguments are about what is.)

Ex: Which argument is Ethical? And which is Descriptive?

1. The cashier gave me too much money back in change.
2. Keeping that money is tantamount to stealing.
3. Stealing is wrong.
4. Therefore, I should give back the money.

VS.

1. The moon is either made of cheese or rocks.
2. All NASA moon samples have failed to find evidence of cheese.
3. Therefore, the moon is made of rocks.

We also call ethical arguments **normative** because they are about **norms**. Norms are conventions, beliefs, or facts about how people ought to act. In other words, norms are ideas or rules that we live by. An ethical or normative argument is then reasoning about *why* we should do something or not do it, why we should live and act one way and not another. Whenever we decide how to act, we are making use of norms even if we do not realize it. Often, we make decisions based on implicit norms that we have learned or acquired without realizing that is what we are doing. In reflecting on ethical reasoning, we try to make those norms *explicit* so that we can ask questions like: are these appropriate norms for *this* situation? In what situations should they guide my action? In what situations might they fail or cause harm in? In applied ethics, we are mostly concerned both with figuring out what the right norms are for a given situation.

Normative reasoning is fundamentally important to our lives because we are **moral agents**. Being a moral agent means that we make decisions that affect others (and ourselves) in ways that might benefit or harm them (or us). We are then responsible for those decisions, and, in particular, any harms that these decisions cause. (Moral) agency and (legal) liability are clearly linked. Both rely on the intuition that the agent could have done otherwise.

EPSRI Instrument and Kohlberg's Stages of Development

The EPSRI instrument you took is based on a certain model of good normative reasoning. This model is called **Kohlberg's Stages of Moral Development**. It is a psychological model that aims to classify what level of moral reasoning someone is capable of, or at what stage of moral development they are. The three stages, in order, are: **pre-conventional**, **conventional**, and **post-conventional**. The stages are based on the reasons one is able to give for deciding to act in a certain way, the *why* or the norms they follow (implicit or explicit), and how they reason about those norms. Because this is a developmental theory, the highest stage, the post-conventional, is seen as better, more advanced or more complete than the earlier stages. It is not a matter of having different reasoning styles, but of whether or not someone has achieved mature ethical reasoning.

Here are the stages:

In the **Pre-Conventional Stage**, someone makes their decisions based mainly on either avoiding punishment or on perceived personal benefit. They follow the rules because otherwise they will face some sort of harm or reprimand, or because they will be given a reward. While these are indeed norms one *can* follow to make decisions, this is the lowest stage because someone in this stage does not have any real understanding of *why* something is good or bad and they are motivated to follow norms only for extrinsic reasons (viz., reasons or forces that exist outside the agent). The main reason they follow prescribed norms is belief in an external authority capable of punishing or rewarding them. They often do not understand themselves as moral agents.

Discussion question: Can you think of some cases where someone does something to avoid personal harm or gain a reward where we would think that action was bad or morally wrong?

In the **Conventional Stage**, someone makes their decisions based mainly on the rules or conventions of their society, profession, or other in-group. For example, if someone makes normative decisions relying entirely on a professional list of best practices or a professional code of ethics, they are in the Conventional Stage. Here a person will have a sense of themselves as a moral agent, and wants to be seen as morally good by others (not just rewarded or punished by them). They may also have a sense that things go better when people follow the rules. This is an improvement from the first stage because a person in the Conventional Stage has an *internal* sense of motivation for doing good things, and for doing good things for their own sake. However, they do not have a deep understanding of *why* something is good or bad.

Discussion question: Can you think of some cases where a group's conventions or norms are morally wrong, and so following them would be an ethical failure even if someone is perfectly following the rules?

In the **Post-Conventional Stage**, someone makes their decisions based mainly on principles and normative reasoning. The reasoner has some conception of principles which explain why some norms are good; and they may also have independent views about **moral intensity** associated with various principles (how important or critical it is to follow or prioritize a certain principle). When reasoning about what to do in a situation, the Post-Conventional reasoner thinks in terms of these principles. An example of such a principle is that "you can't use people (as means to your ends)" or "people have individual rights that must be respected." If asked why they made the choice they did, a person in this stage can respond with reasons and explanations that go beyond "I didn't want to be punished" or "I was just following the rules."

It is important to stress that reaching the Post-Conventional Stage does not mean that one is necessarily morally right about what they should do. These stages are both about what norms someone is likely and able to act on, and how capable they are of reasoning about those norms. It does not track whether the norms someone adopts are the *right* norms, if such a thing even exists (we will discuss different principles more on Day 2). Rather, it means that they follow principles like "I should act in a way that respects people's individual rights and dignity," or "I should act to benefit the greatest good." This may mean they often follow rules or conventions, but they understand why those conventions are good when they are, and when they might actually be unethical. Someone in the Post-Conventional stage has both an internal motivation to follow these principles and a deep understanding of *why* something may be good or bad.

There are complicated cases here. For example, one might be an ethical egoist, that is, someone who takes as a principle that they should act only in ways that benefit them. While this may sound like the pre-conventional stage of only doing things for a reward and avoiding harm, if they understand it as

an explicit general principle to follow and are capable of justifying their actions in terms of this principle, they may in fact be in the Post-Conventional Stage. Often you can differentiate between basic self-interest and principled self-interest by whether or not one is willing to defend it as a principle even if it is unpopular.

Discussion question: what are some cases where someone's deeply held principles may lead them to do something wrong?

Activity: take a case study from the ESPRI or a similar case study. Ask students to generate a list of possible motivations (not necessarily how they would act, but how and why someone might make their decision). List the reasons on the board. Once a good spread of reasons is given, ask students to classify them according to Kohlberg's Stages.

Day 2: Lab / Recitation Topics (90 min, Thursday 4/27)

Review from Day 1 and cover any missed information.

Moral Reasoning and Theories of Ethics

There are at least two different ways to look at what moral reasoning at the Post-Conventional level are like: ethical reasoning skills and ethical theories. Ethical reasoning skills are different abilities or capacities for thinking about the normatively relevant aspects of a situation. Just as having good math or logic skills allow you to "see" or identify the important aspects of a problem and being to see the direction towards which a solution might lie, moral reasoning skills allow you to identify the morally salient aspects of the situation. They describe *how* one reasons well with norms. Ethical theories are accounts that give an explanation for why some set of norms are the right ones or the best ones to follow. They try to answer the *why* question: why is something a good rule or norm to have (in a given context), or why is it not?

Moral Literacy Approach

There are several different approaches to moral reasoning. We will look at one called Moral Literacy from the work of ethicist Nancy Tuana. This approach takes moral reasoning to be a certain way of "reading" situations to think about how we should act in that situation. Three of the major skills that one needs to build according to this approach are Moral Sensitivity, Moral Imagination, and Moral Reasoning.

Moral Sensitivity is the ability to pick out the normatively relevant features of a situation. If someone is deciding which charity to give money to, that they prefer the logo or celebrity spokesperson of one charity to another is morally irrelevant. How effective the charity is at addressing the problem it is focused on, however, *is* morally relevant. Relevance can often be recognized by asking whether that aspect has the potential to benefit or harm someone or something. Moral sensitivity also includes being able to gauge moral intensity. Moral Intensity is a measure of how morally relevant certain features are relative to others, or how critical it is to respond to a problem relative to others. If something can cause greater benefit or harm, it is likely more important (more morally intense) than something that causes less benefit or harm. An intuitive way to think about Moral Intensity is how concerned you are with the different aspects of a situation. For example, an ethical issue with high moral intensity might be a decision about whether to fire an employee who has been repeatedly reported for violating security standards. The consequences of the decision are significant, the behavior is widely seen as morally

wrong (especially because it puts other people at risk), and the decision must be made relatively quickly. In contrast, a decision about whether to change the company's logo might have lower moral intensity because the consequences are less significant, and the decision is less urgent.

Moral Imagination is the ability to think of possible responses one could have to a situation (even those situations that we have not, ourselves, personally experienced). Practicing Moral Imagination means learning to think from multiple perspectives and viewpoints to try to get a broader sense for how the moral agents involved might view or understand their situation. Moral Imagination asks what the likely outcome would be for different possible responses. Here the important questions are: what can I or someone do to address an issue or problem once it's been identified? What, if anything, has already been tried? Who or what might succeed at addressing the problem and what tools might they need? What might be reasonable to expect or require someone to do, and what would be unreasonable? Who will be affected by the different actions?

Moral Reasoning is about settling on your own approach by considering different possibilities for action and even the conflict between these possibilities. The ability to think about these different possible actions, give justifications for them, and weigh them relative to each other. Ideally, this leads to a decision about what you ought to do that is well-justified (i.e., a good moral argument). Here one should ask which of the actions imagined best addresses the normatively relevant features of the situation? Does that action violate any important principles (e.g., individual rights or human dignity)? Are more people benefitted or less harmed by this action than the other possible actions? Is this action something that anyone in the same or similar decision-making context can be reasonably expected to do?

Activity: Give students a case study. Have them first practice moral sensitivity by picking out which features of the case study are morally relevant and which are morally irrelevant. Next, ask them to practice moral imagination by having them brainstorm different viewpoints one might take on the problem, different possible actions and the likely possible outcomes of those actions (what happens, who is affected, are they harmed or benefitted, etc.). Finally, have them pick one or several of the actions and give reasons for why it is the best course of action, normatively speaking.

Major Ethical Theories:

Ethical theories try to distill well justified patterns of moral reasoning. They capture in formal and abstract terms the sorts of justified reasons that humans (often across history and cultures) have given for their decisions or have used to guide actions. Like other forms of logic, these patterns can be learned and applied. They often give us deeper insight into why we intuitively think one principle of action is better than another, and they give an account of why something is good or bad, usually through providing some basic principle (remember the importance of principles to Kohlberg's Post-Conventional Stage). These theories try to account for why something is good in concise ways, usually with one or a few basic principles. For theories, it is important both to have an explanation of what makes something good or bad, and that the theory be as consistent as possible (that is, it doesn't say the same action is both bad and good at the same time). The more principles one accepts, the less likely one is to be consistent in their moral reasoning.

While people would like to have a settled answer to what is right and wrong, ethics is an open-ended and on-going discipline (and has been for thousands of years). It is based on the insight that people ask for and give reasons to explain their action and that this exchange of reasons is fundamental to human relations. The fundamental questions are still open problems, as are the questions of how to apply

ethical principles in complex, concrete situations. This is why ethics is not just an issue of training people to be able to reason at the Post-Conventional level. Rather, being about to reason Post-Conventionally is a condition for doing Ethics well. Reasoning well does not solve the problem of which principles are most correct, but it gives us the ability to engage with that and other important problems. That said, there are several major traditions in Ethics that have stood the test of time. We will here give the major principles of four such traditions and some known problems with each. Each of these principles is an example of what one could use to reason with in the Post-Conventional stage.

Utilitarianism

Principle: Do the greatest good for the greatest number of people.

Intuition: When deciding how to allocate effort or resources, you should put them to where they can do the most good.

Problem: Sometimes actions that fit this principle violate people's rights and dignity

Kantianism/Deontology

Principle: Act in such a way that the rule you follow could be universally followed (e.g., no one should ever kill). Most important of these universal rules is to never use someone as merely a means to an end.

Intuition: You should not carve out a special exception to yourself for a rule you want everyone else to follow.

Problem: Sometimes following universal rules means choosing an action that harms more people than another possible action.

Virtue Ethics

Principle: People should cultivate their virtues (good traits like courage, wisdom, generosity, etc.).

Intuition: Responding to moral difficulties begins with asking what a good person would do.

Problem: While virtues are always good to have, this theory doesn't always provide a clear principle for what action to choose in a specific situation.

Care Ethics

Principle: People should prioritize the well-being of people in their care (that is, people who depend on them or who they are responsible for) over abstract concerns.

Intuition: It is ok to prioritize those whom you know and love.

Problem: This prioritizing may lead to favoritism, nepotism, and similar problems.¹

Activity: Return to the different actions they gave reasons for in the Moral Literacy activity. Ask students to identify the various justifications they gave with one of the four ethical traditions listed above. Ask them to explain how the reason they gave is an example of that tradition's principle. If one of the traditions is not represented, ask students what different action that tradition might suggest and why.

Final Activity: Have students fill out the EPSRI instrument (post-assessment), mark as second assessment.

Works Cited

¹Interestingly, Care Ethics was originally formulated by Carol Gilligan, a student of Kohlberg's who argued that his original model was too restrictive and specifically excluded common ways that caregivers reasoned Post-Conventionally. Philosophers have since developed it into a more general position.

Butler, Brittany; Bodnar, Cheryl; Cooper, Matthew; Burkey, Daniel; Anastasio, Daniel. (2019) "Towards understanding the moral reasoning process of senior chemical engineering students in process safety contexts." *Education for Chemical Engineers*. Vol. 28, 1-12. <https://doi.org/10.1016/j.ece.2019.03.004>.

Gilligan, Carol. (1993). *In a Different Voice: Psychological Theory and Women's Development*. Harvard University Press. <https://doi.org/10.2307/j.ctvjk2wr9>

Kohlberg, Lawrence. (1984). *The Psychology of Moral Development: The Nature and Validity of Moral Stages (Essays on Moral Development, Volume 2)*. Harper & Row

Tuana, Nancy. (2007) "Conceptualizing moral literacy." *Journal of Educational Administration* 45, no. 4: 364-378.

Further Reading for Ethical Theories

Deontology: Kant, Immanuel. *Groundwork of the Metaphysics of Morals*.

Utilitarianism: Mills, Jon Stuart. *Utilitarianism*.

Virtue Ethics: Aristotle. *Nicomachean Ethics*.

Care Ethics: Noddings, Nel. (1984) *Caring: A Relational Approach to Ethics and Moral Education*. University of California Press.