I would like to argue here in favor of a values-based approach to engineering ethics because of what such an approach can provide. By a values-based approach I mean simply a perspective on one’s professional (or personal) life that focuses on identifying and enacting values. And by values, I mean those moral goods intrinsically valuable to human beings, such as fairness and freedom. A professional ethics that is directed to common moral commitments or values is not necessarily easy, but it is concrete and it focuses ethical thinking on questions like “What is important?” instead of on “What is legal?” or “What is expected?” My argument for a values-based approach proceeds in three parts. First, I consider why a values-based approach to engineering ethics is best and I make use of some of the current works on engineering ethics. Second, I discuss what values should be focused on and, third, I explain how to use a values-based approach.

I

Let me begin by considering two common misunderstandings that students have about engineering ethics. One typical student response is: (1) Only managers or employers have to worry about ethics so engineering ethics doesn’t have anything to do with me. We might call this the “fear of responsibility” response. A second response is: (2) Only laws and professional codes of ethics can provide answers to the ethical problems of engineers so all I need to know is how to look up answers. This response can be called the “hope for easy answers” response. Schlossberger refers to these same misunderstandings when he describes how practicing engineers often think that ethical problems are not really their concern since legal and company rules determine what an engineer should and should not do (4).

As we know, these responses are wrong and in fact dangerous. One of the goals of engineering ethics must surely be to help students see that all professional workers face issues of ethics, of how to professionally practice, of how to balance work commitments, of how to treat clients, employers, co-workers, and so on. The “fear of responsibility” response is not a moral or professional way for an engineer to work. It is also clear that laws and codes of ethics are inadequate by themselves as answers to problems of ethical practice. Laws and codes are abstract and general. Most actual problems require at least interpretation of the codes which the codes themselves don’t provide. The “hope for easy answers” response is naïve and unwarranted. So a second goal of engineering ethics must be to help students see that laws and codes do not provide simple answers and
hence, in order to come to answers regarding the ethical practice of engineering, they need some additional skills. (For example, Frankel criticizes the engineering codes for being defined in narrowly professional and legal terms and ignoring moral and environmental issues, [37].) Thus, the overcoming of these two misunderstandings can be accomplished by a values-based approach in which responsibility is fostered and value considerations become the tools to arrive at thoughtful answers.

A second way to show why a values-approach is desirable and what it can do is suggested by Harris, Pritchard, and Rabins in their talk of a “preventive ethics.” According to them, a preventive ethic for engineering students enables students to think ahead, anticipate consequences, and decide what is right. They identify five objectives for such an ethics: (1) stimulate moral imagination; (2) recognize ethical issues; (3) develop analytical skills; (4) elicit a sense of responsibility; and (5) tolerate disagreement and ambiguity (17-18). Interestingly, some of these hoped-for skills require precisely the sort of attention and thinking that students are trying to avoid, as evidenced by the two misunderstandings considered earlier. Consider especially numbers three, four, and five. Students aren’t convinced that they are or will have to be responsible for making decisions relating to ethical practice. And students don’t think they need analytical skills in moral decision making because easy answers are provided by the codes which are supposed to eliminate disagreement and ambiguity. Again, my claim is that a values-based approach to moral decision making is exactly what such students do need. A values-based approach can encourage a sense of responsibility and it can give students tools for analyzing problem situations and ways of dealing with the inevitable disagreements and ambiguities.

Now, concretely, what are the advantages of a values-based discussion of ethics in engineering practice? I believe that a values-based approach is best for three reasons: (1) values are fundamental; (2) values are familiar; and (3) values are inclusive and pluralistic. Let me explain these briefly.

By saying that values are fundamental, I mean that they are more basic than theories, codes, and laws. They are more universal, which is to say, less arbitrary and legalistic than other approaches to ethics. With values, we don’t get as caught up in technicalities; instead we focus on what is of importance.

When I say that values are familiar, I mean that values language is accessible and concrete. It is language we use in ordinary conversation. Values are everywhere. A choice to pursue a particular profession reflects values, a choice to speak to a colleague in a particular way reflects values, and so on. If, as I am claiming, the best way to talk about ethics is in terms of values, then ethics is everywhere. Ethics isn’t “outside” a technical practice; it is already there. We just have to make it explicit.

Finally, by calling values inclusive and pluralistic, I mean that a values-based approach allows that many goods are at stake, namely, that there are many values. This encourages a comprehensive look at issues, and an openness to what is of concern to others. This feature of a values-based approach allows for the recognition of competing values and the
need for dialogue among those expressing divergent values. Tolerance of plurality should be a by-product of a values-based approach.

As further evidence for the desirability of a values-based engineering ethic, many of those writing in the field refer to values. For example, Eugene Schlossberger in *The Ethical Engineer* (42, 44) says: “Engineering is not just a way of making a buck – it is also a moral commitment… engineering, by its nature, is dedicated to … key VALUES…”5 Mike Martin and Roland Schinzinger in *Ethics in Engineering* (63) state that: “The general features of morally responsible engineers [are]…a conscientious commitment to live by moral VALUES, a comprehensive perspective, autonomy, and accountability…”3 And finally, Rosa Lynn B. Pinkus et al in the text *Engineering Ethics* (25) claim that: “The ethical dilemmas engineers are faced with center on how personal, professional, and organizational VALUES affect moral decision making in engineering practice.”4

II

The next question for a values-based approach is what values to focus on. There are several possible value systems proposed by those writing about engineering ethics. As you will see, they have a number of things in common although each scheme is slightly different. I’ll consider a few here as examples.

1. One scheme is that of Martin and Schinzinger who seem to concentrate on four values (63).3 They speak of: (1) a primary obligation to protect the safety of and respect the right of consent of human subjects; (2) a constant awareness of the experimental nature of any project, imaginative forecasting of its possible side effects, and a reasonable effort to monitor them; (3) autonomous, personal involvement in all steps of a project; and (4) accepting accountability for the results of a project. It is not clear that the authors consider all four of these points to be about values. In an earlier passage, only the first seems to be referred to as a moral value. In addition, the second point seems to be more about methodology than it is about what is valuable, that is, it is more about how to do moral deliberation than it is about what is important.

2. A second list of values, this time explicitly labeled as such, is proposed by Pinkus et al.4 They list three professional values for the engineer (33, 52). They claim: “The ethical engineer is one who is competent, responsible, and respectful of Cicero’s Creed II. Cicero’s Creed, engineering’s oldest ethic, directed engineers to place the safety of the public above all else.” Again, this list is helpful and right to stress the responsibility commitment and the safety commitment of the engineer. However, to my way of thinking, competency is part of what it is to be an engineering professional and not primarily a value that guides the practice of the professional. Competency is assumed in professionals; values focus on how the professional’s competency is expressed in practice, in other words, on how we use our expertise in ways that enact our and our profession’s moral commitments.
3. Instead, I prefer a third scheme that focuses squarely on what is to be valued and not on questions of methodology or technical expertise. This scheme proposes that professional engineers (and for that matter, any professionals) share a commitment to these six values: integrity, respect for persons, justice, compassion, beneficence and nonmaleficence, and responsibility. Let me explain these values.

Integrity is a commitment to the values that a person or a professional adheres to. Integrity includes upholding honesty, loyalty, and promise keeping. Respect for persons means not performing actions that violate a person’s basic dignity and working to promote the dignity of persons. Justice is fairness and it requires being sensitive to the ways in which people are similar to and different from each other and treating them accordingly. Compassion means working to alleviate the suffering of those with whom one is professionally related. Beneficence and nonmaleficence require a professional to benefit others and avoid harming them. And finally responsibility means that professionals must take on obligations knowingly and discharge them carefully.

A focus on these values has the advantage of highlighting the responsibility of engineers. Not only is accountability itself recognized as something of value to the profession but the other values have also made explicit what the engineer is responsible for: acting with integrity and compassion, respecting persons and treating them fairly, and benefiting and avoiding harm to others.

III

The next issue is how to use values. And as soon as we begin to work to realize values, it becomes clear that the hope for easy answers is misplaced. In concrete situations, engineers are often muddled and pulled in several directions at once. If we can teach students how to use values, then ideally they can learn a strategy for moral decision making as well as learn to be comfortable with the complexity of the plurality of values and viewpoints which reflect them. They also learn to take responsibility for the decisions that they come to.

Here are some guidelines on how to use values. A values-based approach requires interpreting values in concrete situations. Values can be discussed and defined in theoretical terms but they must ultimately be interpreted, applied, and enacted. Discussing cases is a good way to learn to enact values. Let’s consider a case (324-35).

After completing your undergraduate engineering degree, you are hired by Kitchen Appliances, Inc., (KAI), a company that manufactures microwave ovens and other time saving kitchen appliances. Your first task is to test a series of microwave ovens to determine their defrosting capabilities. In your lab, you find a few dozen microwave ovens in their boxes. Every brand of microwave oven is there, including all of the competitors’ brands.

You unpack all of the microwave ovens and begin your tests. As you wait for test items to defrost, you begin to dig through the cabinets in your lab. You discover that the lab was previously used to test microwave oven doors for radiation
 permeability (the amount of radiation that escapes through the glass door of
the ovens). You find a piece of hand-held equipment that apparently was used to
measure radiation levels. You can’t resist trying it out.

You switch on the meter and point it around the room. You notice that when
you point it at some of the microwave ovens it gives a very high reading. You turn off
all the other ovens and discover that the reading is not a fluke. The ovens you
are standing in front of are emitting much higher than average levels of radiation.
You discover that one of the ovens is from KAI and the other is from a
competitor. These microwave ovens are currently the best-selling ovens on the
market, perhaps because they are the least expensive. It appears that these
bargain ovens may not be as safe as they seem.

You decide to look around a little more. You find the test report that discusses
the radiation emissions from all of KAI’s models of microwave ovens. You learn
that only the top of the line and the mid-level models were tested. The results
from the bargain ovens apparently were extrapolated from the test results on the
other ovens. What should you do?

Possibly what first comes to mind are several approaches to this case that are not
values-based. For instance, we might try to help students think about this case by applying
engineering codes of ethics to the case. So we might direct students to the NSPE code
that says: “engineers hold paramount the safety, health, and welfare of the public” and
“engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the
professional reputation of other engineers.” Or, we might encourage discussion of the
case in terms of certain “problem categories.” The authors who include this case cross-
reference it according to these problem categories: environmental concerns, quality
control, product liability, responsibility arising from others’ actions, and safety and
health.

These strategies are useful, but the values-based approach operates differently. It follows
four guidelines. First, consider all relevant values. That is, it asks: what is morally
valuable in the situation raised by the case? What moral goods are at stake and ought to
be enacted? Looking at the case this way, students will see that the engineer in the case
has information that is relevant to many: to the public, to KAI, to a competitor, to those
who previously worked on the radiation-measuring project, and to those who accepted
the results of the earlier project.

In a values-based approach, we recognize that there are integrity issues, like “How can
the engineer be honest and loyal?” and “How can the engineer act as a professional?”
Respect for persons is important. How can those who did the radiation testing be
respected? What way of handling this new information best respects the public? Justice
is relevant. What is fair to the company, to the competitor, to the engineers who did the
study, and to the public? Compassion is at issue. How can the potential suffering of the
public be minimized? How will the revealing of this information potentially cause
suffering to the engineers who worked on the project or designed the tests or to the
company? Beneficence and nonmaleficence are certainly important. How will the company ensure safety? How can it avoid harm both to itself and others? Responsibility must be considered. To whom is the engineer responsible? To his or her employer, to the colleagues who worked on the previous project, to the public? For what is the engineer responsible? For doing his assigned job or for handling in a professional way any information that comes up that is relevant to his role as an engineer?

Second, although values can compete, they don’t conflict. In this case, the engineer wants both to report the discovered information (this furthers beneficence and nonmaleficence, integrity, and compassion) and to do nothing (this because of concerns for justice, compassion, and responsibility). There is no inherent disagreement between integrity and justice, for example, even though in specific circumstances they may compete.

Third, no value necessarily overrides any other. It is true that some frameworks or codes may privilege one value over all others. The Pinkus et al list identifies the value of beneficence and nonmaleficence as holding above all. This historical emphasis of the profession on safety and protection is important but it is also crucial not to overlook any other value commitments. Rather than assuming that there is an easy answer or a standard hierarchy of concerns, look at the plurality of concerns. This strategy is an advantage of the value approach. Answers don’t come easily but they do reflect the complexity, the comprehensiveness, and the plurality of the engineer’s value commitments.

Fourth and finally, aim to realize all values, but where that is impossible, enact the most important values and/or the greatest number of values. Perhaps the engineer in this case will have to prioritize values, namely, decide whether integrity is more important than justice. But perhaps he can find a way to respect all values by handling this discovered information in a way that is both honest and fair. It may even be that a supervisor or colleague will know something relevant to the radiation study. There may have been follow-up tests the engineer is unaware of, it may be that the engineers who worked on this project already passed on information about the cheaper models, or it may be that testing standards differ on various models of microwaves and so no appliance company directly tests the low end model. A creative professional will find that on reflection some actions do a better job than others of acknowledging integrity, dignity, fairness, compassion, benefit, and responsibility. For instance, telephoning an investigative reporter would at present be a bad way of enacting integrity and beneficence.

In conclusion, what is needed in the ethical education of engineers is a way to overcome the “fear of responsibility” and the “hope for easy answers.” A values-based ethics program can do this well. It provides a framework within which engineering students can reflect on what is of value to the engineering profession and to themselves as practicing professionals. Because of the plurality of value commitments, students will come to see that ethical answers will not be easy and that interpretation and dialogue are necessary. A values-based approach also stresses responsibility in two ways. On the one hand, responsibility is a value the profession is committed to, and, on the other hand, by using a
values-based approach, students discover that in deciding to act for the sake of integrity or beneficence and nonmaleficence or justice, for example, they also must take responsibility for the decision they have made. In a values-based ethic, engineering students will develop tools which enable them to give up their fear of responsibility and their hope for easy answers and in doing so they will become more ethical professionals.

Bibliography

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