ETHICS: DEALING WITH DILEMMAS

What you are speaks so loud
I cannot hear what you say.
(Ralph Waldo Emerson, minister, lecturer, writer)

6.1 Inevitable Ethical Dilemmas and Decisions

Television, the internet, radio, newspapers, and magazines often report on ethical issues or, more precisely, alleged or actual unethical behavior. A wide range of society's institutions and organizations are typically involved, including government, business, academia, and religious groups as members of those groups struggle with ethical issues.

As you study for and then begin to practice your profession, you will increasingly face a wide spectrum of ethical issues. At one extreme you will encounter ethical situations requiring decisions that you will be able to make with ease while very difficult dilemmas will confront you at the other end of the ethical spectrum. For example, during your studies or in the early years of employment, you may be tempted to:

- Plagiarize, that is, write a research paper assigned in class using ideas, data, and/or information developed by others without properly crediting them.
- Cheat on a take-home examination.
- Steal from someone else's examination during an in-class test.
- Copy another person's laboratory report.
- Embellish your resume.
- Shift blame for your errors to others.
- Fail to fulfill agreed-upon responsibilities within a team setting.
- Share sensitive information about a client, owner, or customer with a third party outside of your employer.
- Claim expertise you do not possess.
- Fail to express concern, as a member of a project team, about a team decision that you believe would have an adverse impact on the environment.
- Log more time to a project than you actually worked.

- Provide negative information about a competing consulting firm, manufacturing company, university, or other organization.
- Hide, during construction or manufacturing, life-threatening errors discovered in plans and specifications.

  Accept a gift offered by a vendor even though doing so conflicts with your employer's policy.
- Ignore unfair treatment of another employee.

Participate, as a team member, in an interview with a potential client or owner even though you know that "bait and switch" is in play. That is, if your firm is selected the interview team would not provide the promised services; a less capable group would be assigned to the project.

Regardless of your technical and non-technical expertise, unethical behavior can sink your career. Accordingly, consider developing now a sense of what you will and will not stand for and use this lecture to help refine and implement that commitment, that is, chart and follow an ethical course.

6.2 Defining Ethics

What is ethics? Is it the same as law? Do ethics and law overlap or are they different? Are unethical and illegal acts synonymous? Is ethics something you have or something you do? Is ethical behavior the same as moral behavior?

Definitions

- "Engineering ethics is the study of decisions, policies, and values that are morally desirable in engineering practice and research" (Martin and Schinzinger 2005).
- "Engineering ethics is a body of philosophy indicating ways that engineers should conduct themselves in their professional careers" (Fledderman 1999).
- "Ethics is the study of systematic methodologies which, when guided by individual moral values, can be useful in making value-laden decisions" (Vesilind 1988).
- Ethics is "the standards of conduct that indicate how one should behave and act. The standards are derived from the community's values, norms, and principles" (Valparaiso 2011).

- "Ethical conduct is often defined as that behavior desired by society which is above and beyond the minimum standards established by law" (Onsrud 1987).
- Ethics is what you do when no one is looking. Your reputation is what others think of you; your ethics is what you really are and do.
- Ethics is the process used to make value-laden decisions beyond the law in professional matters.

In summary:

- Ethics is related to, but different than and above, laws. Ethical behavior is referenced to, but more than legal behavior.
- Ethics is mostly action (what you do) not knowledge (what you know). It is the personalized way you use your values profile to make value-laden decisions.

6.3 Teaching and Learning Ethics

Ethics is difficult to teach in a university or within a place of employment in the sense that static mechanics, machine design, circuits, and project management can be taught, learned, tried, and tested. Learning ethics fundamentals and then applying them within the study and practice of engineering is strongly influenced by individual values. This teaching-learning-application challenge is heightened because of the skeptical, but fortunately not cynical, perspective of many of today's young people.

By the time you began your began college studies, you had learned much about the unethical behavior of many private and public individuals and organizations partly as a result of the news media's probing into and reporting on the personal lives of people holding, or wanting to hold, high positions in government, business, academic, and religious organizations. Even though that behavior may be atypical, it gets great attention and could influence your thinking.

As a result, when your professors and university administrators make pronouncements about ethics, you may be skeptical and give little credence to their statements. If you mistrust them, you may even, by extension, doubt what they tell you about technical matters. Similarly, as you begin your professional career, you may view your supervisors and others in your organization, including the executives, in the same skeptical manner. This is a positive perspective provided that healthy skepticism does not degrade into cynicism. The skeptic has doubts, thinks critically, hopes for the

best, and wants to be shown. In contrast, the cynic is contemptuously distrustful of human nature and the motives of others. Assuming you are skeptical and not cynical, recognize that the healthy skepticism you direct to faculty, fellow students, managers, colleagues, and others is likely to be reflected back to you—at least until you all become well acquainted and prove yourselves to them.

Table 6.1 Each person's values profile is composed of many values having relative importance peculiar to the individual.

Accountability	Being answerable for obligations
Confidentiality	Assurance that important information will not be disclosed
Diligence	Long, steady application to one's occupation or studies; persistent effort, attentive care
Efficiency	The quality or property of acting or producing effectively with a minimum of waste, expense, and unnecessary effort.
Equality	The state or instance of being equal; especially, the state of enjoying equal rights, such as political, economic, and social rights.
Equity	The state, ideal, or quality of being just, impartial, and fair.
Excellence	The condition of providing superior service.
Fairness	Selection of an action that would not unduly emphasize self-interest or show lack of objectivity in making [a] decision.
Freedom	The condition of being free of restraints; the power to act, speak, or think without the imposition of restraint.
Honesty	Telling the truth—in other words, conforming our words to reality. (Note: Honesty is retrospective, it is what you say about what you've done.)
Honor	Esteem, respect, reverence, reputation, applicable to both the feeling and the expression of these characteristics
Integrity	Informing reality to our words—in other words, keeping promises and fulfilling expectations. (Note: Integrity is prospective, it is what you do about what you said.)
Knowledge	Familiarity, awareness, or understanding gained through experience or study; cognitive or intellectual mental components acquired and retained through study and experience – empirical, material, and that derived by inference and interpretation.
Loyalty	Feelings of devoted attachment; the condition of being faithful; the unfailing fulfillment of one's duties and obligations in a close and voluntary relationship.
Persistence	The act or fact of persisting; the quality or state of being persistent, especially perseverance
Pleasure	An enjoyable sensation or emotion; satisfaction; sometimes, though not invariably, suggests superficial and transitory emotion resulting from the conscious pursuit of happiness.

Prudency	Exercising good judgment.
Reliability	Dependability in meeting duties and obligations.
Respect	An act of giving particular attention; the quality or state of being esteemed.
Safety	Freedom from danger, risk, or injury.
Security	Freedom from doubt; reliability and stability concerning knowledge of the future.
Sensitivity	Awareness of the needs and emotions of others.
Thoroughness	[Carrying] through to completion; [care] about detail.
Tolerance	Sympathy or indulgence for beliefs and practices differing from or conflicting with one's own.
Trust	Firm reliance on integrity, ability, or character of a person or thing; implies depth and assurance of such feeling, which may not always be supported by truth.

As a student and later a professional, you do not have a choice as to whether or not you will be confronted with ethical decisions and dilemmas. What will your rules of personal conduct be? Will you strengthen or detract from the ethical climate of your school or employer? What values will you hold most dearly? What will you stand for and not stand for? What will you use as your ethical framework? What decision process will you follow to make value-laden decisions? You cannot escape the domain of ethics. Your true values will be gradually revealed by many situations that arise during the normal course of your student and work days and your response to them.

6.4 Four Important Ethical Theories

Many prominent philosophers have devoted their lives to developing ethical theories, and a thorough discussion of their thought would fill a thousand textbooks.

These are the theories:

- Mill's utilitarianism,
- Kant's formalism, or duty ethics,
- Locke's rights ethics, and
- Aristotle's virtue ethics

Mill's Utilitarianism

John Stuart Mill (1806–1873) was the major proponent of utilitarianism, which states that, in any ethical problem, the best solution produces the maximum benefit for the greatest number of people.3 This theory is probably the most common justification for ethical decisions in engineering, in geoscience, and, indeed, in modern society. Democratic government itself is a form of utilitarianism, since democracy permits control over government to benefit the maximum number of people (the majority of voters).

In evaluating benefits, it is important that we apply certain criteria:

- The benefit to oneself must not have any greater value or importance than the same benefit to anyone else.
- No preference should be given to friends or favoured groups. All benefits should be awarded without regard to race, creed, colour, language, gender, sexual orientation, and so on.
- Benefits must be distributed equally. In other words, when selecting a course of action, an equal distribution of benefits is preferable to an unequal distribution.

In summary, utilitarianism states that the best course of action in an ethical problem is the solution that produces the maximum benefit for the greatest number of people, with the benefit equally divided among those people.

Kant's Formalism, or Duty Ethics

The theory of duty ethics, or "formalism," is based on the work4 of Immanuel Kant (1724–1804), who proposed that every individual has a fundamental duty to act in a correct ethical manner. This theory evolved from Kant's belief or observation that each person's conscience imposes an absolute "categorical imperative" (or unconditional command) on that person to follow those courses of action that would be acceptable as universal principles for everyone. For example, everyone has a duty not to tell lies, because if we tolerated lying, then no promises could be trusted, and our society would be unstable. This idea makes sense to most people; almost everyone has this innate sense of duty and believes that rules of conduct should be rules that everyone follows. Kant believed that the most basic good was "good will," or actively seeking to follow the categorical imperative of one's conscience. This belief is in marked contrast to Mill, who believed that

universal happiness was the ultimate good. In Kant's philosophy, happiness is the result of good will: the desire and intention to do one's duty.

Kant emphasized that it was the intention to do one's duty that was significant, not the actual results or consequences. One should always do one's duty, even if the short-term consequences are unpleasant, since this strengthens one's will. For example, even "white" lies should not be tolerated, since they weaken the resolve to follow one's conscience.

Locke's Rights Ethics

The rights-based ethical theory comes mainly from the thought and writings of John Locke (1632–1704).5 Rights-based theory states that every individual has rights, simply by virtue of existing. The right to life and the right to the maximum possible individual liberty and human dignity are fundamental; all other rights flow out of them. Each individual's rights are basic; other people have a duty not to infringe on those rights. This thinking contrasts with Kant's duty-based ethical theory, which contends that duty is fundamental; in the rights-based theory, duties are a consequence of personal rights.

Locke's writings had a powerful impact on British political thought in the 1690s; they also motivated the French and the American revolutions.

Sample human rights embedded in constitutions

- Fundamental freedom of conscience, religion, thought, belief, opinion, expression, peaceful assembly, and association;
- Democratic rights to vote in an election (or to stand for election) o
- Mobility rights to enter, remain in, and leave Kenya;
- Legal rights to life, liberty, and security of the person and the right not to be deprived of these rights except in accordance with principles of fundamental justice ; and
- Equality rights before and under the law and the right to equal benefit and protection of the law

Aristotle's Virtue Ethics

Aristotle (384–322 BCE) was one of many early Greek philosophers whose thoughts are still relevant over two millennia later. Aristotle observed that the quality or goodness of an act, object,

or person depended on the function or goal concerned. For example, a "good" chair is comfortable, and a "good" knife cuts well. Similarly, happiness or goodness will result for humans once they allow their specifically human qualities to function fully. Aristotle observed that humans have the power of thought—the one sense that animals do not have. Therefore, he postulated that humans would achieve true happiness by developing qualities of character using thought, reason, deduction, and logic. He called these qualities of character "virtues," and he visualized every virtue as a compromise between two extremes, or vices.

His guide to achieving virtue was to select the "golden mean" between the extremes of excess and deficiency. For example, modesty is the golden mean between the excess of vanity and the deficiency of humility; courage is the golden mean between foolhardiness and cowardice; and generosity is the golden mean between wastefulness and stinginess.

Table 6.2 — Summary of Four Key Ethical Theories

	Statement	**Conflict**
Mill's Utilitarianism	An action is ethically correct if it produces the greatest benefit for the greatest number of people. The duration, intensity, and equality of distribution of the benefits should be considered.	A conflict of interest may arise when evaluating the benefits, or when distributing them equally. Benefits must not favour special groups or personal gain.
Kant's Duty Based Ethics	Each person has a duty to follow those courses of action that would be acceptable as universal principles for everyone to follow. Human life should be respected, and people should not be used as a means to achieve some other goal.	Conflicts arise when following a universal principle may cause harm. For example, telling a "white" lie is not acceptable, even if telling the truth causes harm.
Locke's Rights Based Ethics	All individuals are free and equal, and each has a right to life, health, liberty, possessions, and the products of his or her labour.	It is occasionally difficult to determine when one person's rights infringe on another person's rights. Also, people occasionally claim self-serving "rights."
Aristotle's Virtue-Based Ethics	Happiness is achieved by developing virtues, or qualities of character, through deduction and reason. An act is good if it is in accordance with reason. This usually means a course of action that is the golden mean between extremes of excess and deficiency.	The definition of virtue is occasionally vague and difficult to apply in specific cases. However, the concept of seeking a golden mean between two extremes is often useful in ethics.

6.5 Legal and Ethical Domain

The connection between legal and ethical behavior was suggested in the earlier definitions of ethics. Figure 6.1 (McCuen and Wallace 1987, Onsrud 1987) is a useful model of the legal and ethical domain. In this model, the position of the vertical line, which separates legal from illegal actions, is set largely by statute and common law. Accordingly, the definitive separation between legal and illegal acts is shown by a solid vertical line. The position of the horizontal line, which separates ethical and unethical actions, is much less definitive because it is based primarily on personal values informed by various codes of ethics when professional matters are involved. As a result, the less-definitive separation between ethical and unethical lines is shown by a dashed horizontal line. Whereas most engineers agree on the legality of an act, they might not agree about whether or not some aspect of the act is ethical or unethical.

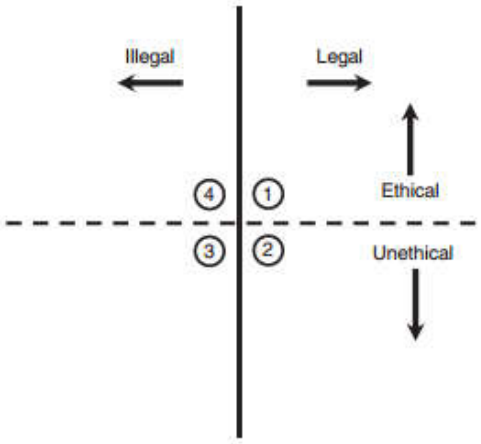

Figure 6.1 The legal-ethical domain helps understand and then resolve legal and ethical issues.

Quadrant sizes have no meaning. The rectangular axes are simply intended to define the "space" within which all possible legal-ethical transactions occur in the business, government, academic, and volunteer sectors.

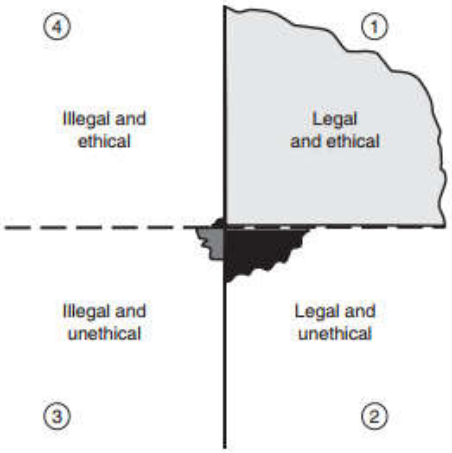

Figure 6.2 The four legal-ethical quadrants exhibit widely varying relative occurrence in engineering and similar professions.

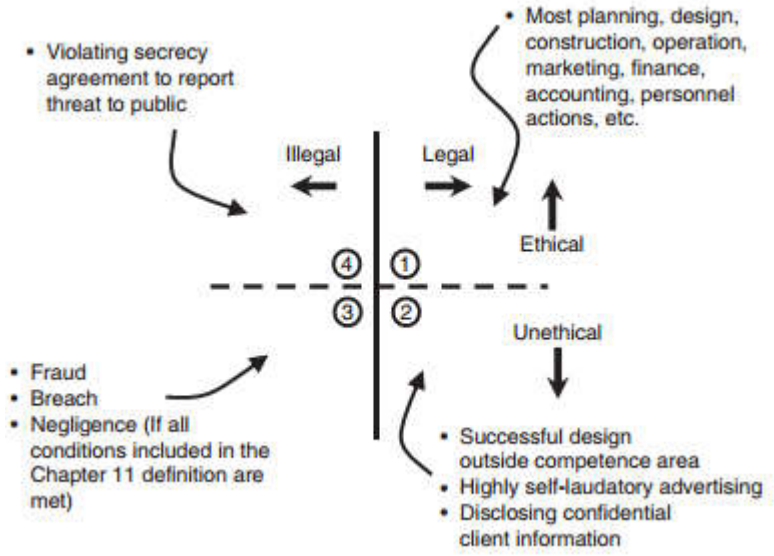

Figure 6.3 Selected professional activities can be placed in each of the four quadrants.

Quadrant 1—Legal and Ethical: Most planning, design, construction, and operation activities fall within this quadrant along with most support activities such as marketing, finance, accounting, and personnel matters.

Quadrant 2—Legal and Unethical: An engineer successfully designs a structure or facility outside his or her area of competence. A consulting firm advertises its services in a highly self-laudatory manner. An individual engineer discloses confidential information developed for or with a client or former client. As explained later in this lecture, these hypothetical actions are usually

legal, but may be considered unethical, because they conflict with accepted codes of ethics established by engineering organizations.

Quadrant 3—Illegal and Unethical: An example is an act of fraud (intentionally deceitful practice), such as bid rigging or collusion with others to secure a contract for professional services. Another example is breach (nonfulfillment of an obligation) such as missing the contractual delivery date for a set of plans and specifications. In general, illegal acts such as fraud and breach of contract, are unethical, but there can be exceptions, as indicated in the following explanation of Quadrant 4. Negligence is, in effect, illegal as explained in lecture 5 in the discussion of the definition of negligence, if certain criteria are met.

Quadrant 4—Illegal and Ethical: This somewhat problematic quadrant is best introduced by using a non-engineering or non-business example such as a concerned citizen stopping at the scene of an automobile accident, putting an injured child in his or her vehicle, and exceeding the speed limit to get the child to the emergency room of a local hospital. While the speeding was illegal, most would probably agree that the citizen's overall actions were ethical. A professional example would be an engineer violating a signed secrecy agreement with an employer to "go public" and report on a situation that he or she believes is hazardous to the public at large. ***A movie, titled Crisis (2021), illustrates some of this concepts.***

6.6 Codes of Ethics

Introduction to Codes: What They Are

Essentially all engineering societies and some business, government, university, volunteer, and other organizations have developed, adopted, and refined codes of ethics.

The overall purpose of such codes of ethics is to "express the rights, duties, and obligations" of organization members and provide "a framework for ethical judgment" (Fledderman 1999). The framework metaphor is used because a code, no matter how carefully crafted, cannot anticipate all of the ethical situations and dilemmas a student or practitioner may encounter. A code attempts to reach and document consensus, or at least the majority opinion, among members of a group and do so in a manner that recognizes the already-discussed natural variation in the values profiles or mosaics of individuals.

Code of Ethics as Guides to Conduct

Codes of Ethics usually start with a statement of general principles, followed by a list of the duties to society, employers, clients, colleagues, subordinates, the profession, and oneself. Although some codes express these duties differently, the intent and the results are very similar. The Codes of Ethics usually list the following duties:

- Duty to society: A professional engineer must consider his or her duty to the public—or to society in general—as the most important duty. In other words, professionals have a duty to protect the safety, health, and welfare of anyone affected by their work. This goal is accomplished through professional self-regulation. That is, the government delegates its authority to the Associations, which define standards of admission, discipline licensed members, and regulate the profession. This arrangement benefits society, because the Associations ensure that professionals are competent, reliable, up-to-date, and ethical.
- Duty to employers: A professional engineer must act fairly and loyally to the employer, must keep the employer's business confidential, and must disclose any conflict of interest.
- Duty to clients: A professional engineer or geoscientist in private practice has the same obligations to clients as an employee has to the employer.
- Duty to colleagues: A professional engineer must act with courtesy and good will toward colleagues. This simple statement of the Golden Rule agrees with all four ethical theories. Professionals should not permit personal conflicts to interfere with professional relationships. Most Codes of Ethics state clearly that fellow professionals must be informed whenever their work is reviewed.
- Duty to employees and subordinates: A professional engineer must recognize the rights of others, especially if they are employees or subordinates.
- Duty to the profession: A professional engineer must maintain the dignity and prestige of the profession and must avoid unprofessional, dishonorable, or disgraceful conduct.
- Duty to oneself: Finally, a professional engineer must insist on adequate payment, a satisfactory work environment, and all rights awarded under the constitution. The professional also has a duty to maintain personal competence in the rapidly changing technical world.

What Codes Aren't

A code is not a legal document in that failing to follow it is illegal, although such failure may result in expulsion of an individual from an organization. Furthermore, a code typically does not "create new moral or ethical principles" because "these principles are well established in [a] society, and foundations of our ethical and moral principles go back many centuries" (Fledderman 1999). Instead, a code provides guidance for applying those principles to professional activities. Reference to principles established in a "society" reminds us that codes of ethics are likely to vary from culture to culture.

Limitations of Codes

Fledderman (1999) and Martin and Schinzinger (2005) describe limitations of ethics codes such as:

- The already-mentioned inability of codes to anticipate all of the ethical decisions and dilemmas a student or practitioner may encounter.
- Lack of prioritization of competing demands such as maintaining client-owner customer confidentiality versus addressing environmental concerns.
- Existence of many codes within a particular sector, such as across engineering disciplines as discussed later in this chapter, may suggest to an individual engineer or other technical professional that ethical conduct is linked more to a discipline than to the overarching profession
- Limited power partly because, unfortunately, too few engineers are members of professional societies and, therefore, those engineers may not feel bound by professional society codes.

6.7 Engineering Society Codes of Ethics

Click the links shown to read or download the codes of ethics for the respective organizations. You can also download/click the links from the resource section of this course page at:

https://www.benardmakaa.com/professional-engineering-practice/

- Engineers Board of Kenya (EBK): https://ebk.or.ke/download/code-of-ethics-for-engineers/

- Institute of Electrical and Electronic Engineers (IEEE): https://www.ieee.org/about/corporate/governance/p7-8.html
- Institution of Engineers of Kenya (IEK): https://iekenya.org/forms/general/IEK%20Code%20of%20Professional%20Conduct.pdf
- National Society of Professional Engineers (NSPE) https://www.nspe.org/resources/ethics/code-ethics

Download these as well shall analyze some of them during this lecture

Some Critical Similarities

The preceding codes have many common elements, the most important of which is protection of public safety, health, and welfare. A high bar set by codes of engineering societies, consider this competency provision in the IEEE code which indicates that individuals are to "maintain and improve [their] technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations."

Codes and You

Demanding provisions, like the preceding, which are small parts of the referenced codes, can put great demands on you as you progress through your career. Recognize that adherence to the applicable code of ethics is a condition of membership in engineering and other technical organizations. Unfortunately, many professionals of all ages and levels of experience join such organizations without a detailed review of the provisions of the code. This, in turn, undoubtedly leads to some of the ethical problems that arise. You should study an engineering organization's code of ethics before joining. If you cannot embrace the code, don't become a member.

Engineers and other technical professionals who are members of professional societies with codes of ethics are not relieved of ethical responsibilities, as defined within those codes, because they happen to work for organizations in which the management or culture does not support the codes (McCuen and Wallace (1987).

The young professional seeking his or her first employment is often already a member of one or more professional societies through the student chapter structure. During the employment interview process, you should ask questions about the code or codes of ethics that apply within the

business, government, academic, volunteer, or other organization you are considering joining. As noted later, some employers have codes of ethics that supplement or complement those of professional engineering and other organizations. If you cannot accept a potential employer's code, or attitude toward codes, move on to other opportunities.

Codes Evolve

Engineering society codes, as well as codes used by other organizations, are likely to evolve in response to changing internal and external conditions.

6.8 Ethics Codes for Other Professions

Engineers and other technical professionals are likely to interact with members of other professions who, in turn, belong to professional societies such as the Law Society of Kenya, Architectural Association of Kenya, Board of Registration of Architects and Quantity Surveyors, Kenya, Medical Practitioners and Dentists Board, Institution of Surveyors of Kenya. These groups have codes of ethics tailored to their functions and responsibilities. Codes of non-engineering groups are likely to share some common elements with the engineering codes.

A comparison of codes associated with various professions also reveals some sharp differences. As you work with members of other professions, be sensitive to possible ethics differences. That awareness will help you empathize with and work more effectively with team members, clients, owners, customers, and stakeholders while at the same time holding to your ethical principles.

Detailed list of Professional Bodies and Associations in Kenya:

- https://www.knqa.go.ke/index.php/professional-bodies-and-associations-in-kenya/

Business Codes of Ethics

Businesses often adopt codes of ethics to meet their specific needs and to complement the codes of ethics of various professional societies in which their businesses, personnel, clients, owners, and customers are members. More employers in the business sector appear to be moving toward some form of ethics code.

A word of caution is in order when discussing formal codes of ethics within organizations that employ engineers and other primarily technical personnel. The apparent trend toward written codes

notwithstanding, the absence of a written code, especially in a small organization, does not necessarily mean the absence of high ethical expectations. Exemplary action by people in leadership positions is very important. Such action may be all that is needed, especially in a highly-communicative, small organization, to engender ethical behavior.

Government Codes of Ethics

Many government agencies and entities have adopted ethics codes. As with the codes used by businesses, these codes can complement the ethics codes of relevant professional societies. Consider reading at least one to further enhance your understanding of and appreciation for the value of codes.

Government ethics codes typically include some highly-restrictive requirements that could be problematic for unaware engineers and other technical professionals.

While their intent is usually worthy, ethics codes can be very complicated in practice.

University Codes of Ethics

Colleges and universities sometimes adopt ethics codes. Some are narrowly focused on academic matters, such as some honor codes, while others address a wide range of issues similar to the codes of professional societies, businesses, and government entities. Both types can serve useful functions such as helping to govern day-to-day behavior and enhancing education by sensitizing students to the need for and use of codes in various sectors of society. If you are a student in an institution with some form of ethics code, consider taking a fresh look at it in light of the ideas and information presented in this lecture.

Codes Cannot Anticipate All Circumstances

As already mentioned, an ethics code cannot anticipate all of the ethical decisions and dilemmas a student or practitioner may encounter. Accordingly, codes typically make reference to the principles on which they are based. Reference to foundation principles may help you make an ethical decision or resolve an ethical dilemma.

Encouraging the long view, clergyman H. W. Beecher said “Expedients are for the hour; principles for the ages.” Courage is often required in ethical matters, especially when dealing with friends, as suggested by author J. K. Rowling: “It takes a great deal of bravery to stand up to our enemies,

but just as much to stand up to our friends." And finally be aware of those who wear their "ethics" on their sleeves. Heed the advice of minister, lecturer, and writer Ralph Waldo Emerson who said ***"The louder he talked about his honor, the faster we counted our spoons."***

6.9 Dealing with Ethical Dilemmas: Using Codes and Other Resources

Assume you, as an individual or as a group in your organization, are trying to choose among various courses of action in a challenging ethical situation. Fortunately, you have a wide variety of resources available to help you do the right thing. Consider five types of resources on which you can draw and mix and match as needed.

Ethics Codes

Reference to one or more codes of ethics may be all the guidance you need. Consider your employer's code and the code or codes of your professional societies. If you are unable to provide a specific reference to your particular situation then, as noted earlier, refer to the foundation principles on which the code or codes were built. Ethics codes are omnipresent in that they are very likely to arise as individuals and groups apply the following four additional resources.

Advice of Experienced Personnel

Included within the staff of most organizations are seasoned professionals representing various areas of technical and other experiences. They are a gold mine of wisdom in that they have faced many ethical dilemmas and made many decisions, some good and some not so good, and they learned in the process. They represent a wealth of wisdom that you, either acting alone or as a group, can draw on for guidance. Individuals who are senior in terms of breadth and wealth of their professional experience may have already encountered the very ethical dilemma you or your group face. Even if your particular situation is new to an experienced professional, he or she is still likely to be able to offer valuable guidance.

You can also find wisdom relative to your work outside your organization. Potential advisors include professional colleagues, parents, religious leaders, and former professors and other teachers. However, in contemplating seeking external advice on internal matters, be careful to not violate ethical provisions or confidentiality requirements such as revealing confidential

information about a client to a third party in such a way as to violate client confidentiality requirements.

A Nine-Step Individual or Group Process

Determine the facts in the situation—obtain all of the unbiased facts possible.

1. Define the stakeholders—those with a vested interest in the outcome
2. Assess the motivations of the stakeholders—using effective communication techniques and personality assessment
3. Formulate alternative solutions—based on most complete information available, using basic ethical core values as guides.
4. Evaluate proposed alternatives—short-list ethical solutions only; may be a potential choice between/among two or more totally ethical solutions.
5. Seek additional assistance, as appropriate—engineering codes of ethics, previous cases, peers, reliance on personal experience, and prayer
6. Select the best course of action—that which satisfies the highest core ethical values
7. Implement the selected solution—take action as warranted
8. Monitor and assess the outcome—note how to improve the next time

A Systematic Group Process

In summary, the suggested approach is to:

- Prepare an exhaustive list of options
- Eliminate all options for which there is consensus agreement that they ought not to be done
- Screen the remaining provisional options and drop any that one or more individuals are opposed to and all others are ambivalent about
- Decide among the remaining options

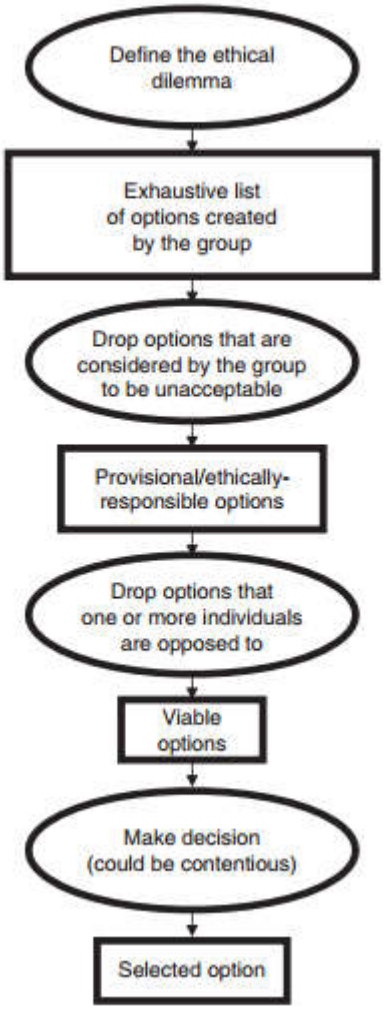

Figure 6.4 This systematic group process may help a group resolve an ethical dilemma.

Application of Moral Imagination

Telushkin (2000) suggests that one way to guide individual and corporate lives on a day-to-day basis is to develop "moral imagination." According to Telushkin, moral imagination is ". . . the ability to think through the implications of our actions, particularly as to how they will affect others." He goes on to observe that during the past century, our society ". . . has made extraordinary technological advances because of the active imaginations of our scientists and researchers." However, he concludes, ". . . we have been slower to advance morally because of a general unwillingness to practice imagination in the moral sphere."

The preceding suggests that another way to resolve an ethical dilemma is to apply moral imagination. The power of this approach is that it encourages individuals and groups to take the long view in pondering ethical questions. Given the demands and pressures of everyday living, including the crucial bottom line, the short view tends to be paramount. But individuals and groups have to live with the long-term consequences of decisions. Moral imagination can help make decisions that will pass the test of time.

6. 10 Concluding Thoughts: Seeing Sermons

The danger of talking about ethics is that it ends there—with talk. Someone said, "I would rather see a sermon than hear one." Most of us have experienced the "do as I say not as I do" hypocrisy. Berglas (1997) describes the importance of example—of action over talk in ethical matters. He says "...just look at how the company leader behaves and you will know with 100 percent certainty how the employees will act and feel..."

Few would argue that the "company leader," whether in business, government, academia, volunteer, or other organization needs to walk the talk. But the responsibility to set an ethical example goes well beyond the chief executive officer or other upper-level positions. In fact, everyone in an organization can lead in that individual actions – more specifically, your ethical actions – influence others. Be especially sensitive to the ethical messages your actions send within your organization. In addition, be careful with the ethical signals that you transmit to clients, owners, customers, government officials, business partners, vendors, and competitors. In many instances, you "are" your organization.

Good character is more to be praised than outstanding talent.

Most talents are, to some extent, a gift.

Good character, by contrast, is not given to us.

We have to build it piece by piece –by thought, choice, courage, and determination.

(John Luther, lawyer and writer)

6.11 Examples of an Ethical Dilemma

Ethical theories agree remarkably well in solving many ethical problems; however, even when they contradict each other, they may assist in resolving an ethical dilemma. For example, consider the following hypothetical case.

Case Study 1:

Background Information

Professional engineers Smith and John are both senior employees, with more than 10 years of experience. They are part of a 10-person team assigned to develop and test a massive software control system for an electrical power generating plant, which is under construction. They are good friends and occasionally party together after work. Smith drinks heavily and often takes illicit hard drugs. John suspects that Smith has an addiction or dependency on alcohol. At times, Smith has wide mood and attitude swings. The project manager cautioned Smith for absenteeism on a few occasions, but took no disciplinary action. John occasionally conceals minor errors and "covers" for Smith's absences.

As a friend, John is concerned that Smith's erratic behaviour will eventually result in discipline of some sort. John is also worried that Smith's alcohol and drug abuse is affecting Smith's work and that the software may be faulty.

John has repeatedly tried to convince Smith to seek treatment, but Smith denies that any problem exists. John hesitates to take any further action because of their close personal friendship.

Questions

Today, the control software failed a preliminary test. John has checked the data dump, and it appears that Smith's coding is the likely cause of the failure. The entire team is dismayed. John faces a dilemma: Should John continue to protect Smith as a friend or should John report Smith's drug use and suspected alcohol dependency?

Analysis

In a real situation, you would have much more information, but a few issues are obvious: Faulty software could cause safety concerns, extra costs, and delays. Even if the software will be fully

tested for safety before release, bugs might slip through, and sloppy coding might cause inefficient operation. Let us apply the ethical theories to the dilemma.

Duty theory: As a friend, John has a duty to help Smith overcome the dependency but must not act on unproven allegations. The problem statement implies that John has done this, but the abuse is entrenched and Smith has refused assistance. John also has a duty to colleagues, whose jobs may be jeopardized if the project fails. Furthermore, John has a duty to the public to ensure that the software is developed professionally, runs efficiently, and does not contain hidden bugs. In fact, every Code of Ethics states that the public interest should come first. The duty based theory overwhelmingly indicates that John must insist that Smith seek treatment, even if it means reporting the problem to management.

Rights theory: Conversely, the rights-based theory would say that Smith's health is a private matter. Smith has a right to personal privacy, and John has no right to investigate Smith's health or to discuss it with anyone.

Obviously, the duty-based and rights-based theories yield simple, clear rules, but those rules contradict each other. We must examine the other theories for further guidance. The utilitarian and virtue-based theories require a subjective judgment, so more information is usually needed before we can apply them. In this case, the degree of danger to others, the seriousness of the abuse or dependency, and Smith's willingness to seek treatment are relevant factors.

Utilitarianism: The utilitarian theory balances the risk of harm to the project and to the public (if John does not intervene) against the risk of harm to Smith's career (if John exposes the addiction). The estimated intensity of such harm is a factor. If the software fails the final validation test, the project will be delayed, the employer will suffer a loss, the whole team may suffer, and Smith's health problems may become known anyway. John's failure to act may simply have delayed the inevitable and made the outcome worse for everyone. The utilitarian theory—even based on such meagre information—would favour intervention, because the greatest good, for the greatest number, would outweigh Smith's potential loss.

Virtue: The virtue-based theory would recognize drug and alcohol dependency as extreme and undesirable. The golden mean between abstinence and addiction is moderate use. The virtue-based theory would condemn Smith's abuse and, therefore, encourage action to alleviate it.

Suggested Decision

Even with the limited information provided, three of the four theories clearly recommend intervention. However, while this may be the end of the ethical discussion, it is not the end of the problem. Knowing the right course of action, finding the courage to implement it, and doing so objectively are equal challenges.

Ideally, the process must be fair and must preserve Smith's dignity and self-respect. John might still convince Smith to take sick leave and enter a recovery program, thus salvaging Smith's career and finances. Since a large corporation typically has an Employee Assistance Program (EAP) to help employees with serious personal problems, contacting the EAP would be a good start. Other help may be available. As a last resort, John should report Smith to the department manager. The role of John as a friend is neither to conceal the problem nor to be a snitch; rather, it is to apply the decision fairly, with a minimum of personal chaos.

In summary, examining a dilemma using the four ethical theories usually gives the right solution. When theories contradict, you must follow the *most* appropriate theory. Doing this requires a value judgment, and is therefore subjective. The good news is that when a decision follows an orderly process, is consistent with a recognized ethical theory, and is fair, the decision maker has a clear conscience.

Case Study 2:

The Trolley Problem: A Well-Known Ethical Dilemma

The "trolley problem," first stated more than 50 years ago, proposes a ghastly scenario in which you observe a train (or trolley) hurtling along a track toward a group of (typically five) workers. The train is certain to kill the workers, and they are unaware of the danger. The problem then splits into two cases:

- Case A: In Case A, you are fortunately next to a railway track switch that will divert the train onto a siding if you act quickly. Sadly, however, there is another worker on the siding who will certainly be killed if you do so.
- Case B: In Case B, you are observing the train from a footbridge over the track, and there is a very heavy man beside you on the bridge. If you push the heavy man onto the tracks,

his mass will stop the train (or slow it sufficiently), and the workers on the track will easily escape. The heavy man is already leaning over the railing, and you could easily push him. Of course, he will not survive. (The question apparently presumes that your weight is too light to stop the train by jumping onto the track yourself.)

Questions:

In both of these cases, you would sacrifice the life of one person but save the lives of five others. Which action is ethically correct, according to the theories discussed in this chapter? In Case A, should you switch the train onto the siding and save the lives of five strangers, even though it will certainly kill the lone worker on the siding? In Case B, should you save the five workers by pushing the heavy man onto the tracks? (This "mind test" assumes that these people are all strangers to you and overlooks the fact that police would likely charge you with manslaughter in either case, even if you saved lives.)

Analysis

This dilemma pits Mill's utilitarianism against Kant's formalism. Mill would certainly approve of exchanging one life for five, as the greatest good for the greatest number, and would intervene in both cases. Conversely, Kant would object to taking any life and would let the train continue in both cases. (Locke's rights-based theory and Aristotle's virtue-based ethics are not directly relevant in this example.)

However, although the two cases appear to be ethically identical, if you are a typical reader, you will switch the train to the siding in Case A but refuse to push the heavy man in Case B. This result may seem curious, but researchers have replicated this ethical "mind test" many times and tabulated the responses. In every test, the results are similar. In Case A, 90 percent of the people surveyed believe it is ethically correct to switch the train onto the siding to save five lives at the cost of one; however, in Case B, 90 percent believe it is wrong to push the heavy man onto the track to achieve the same goal.

Although both cases appear to involve the same ethical trade-off, they are slightly different. In Case A, harm is unintentional (if the worker on the siding can miraculously avoid being hit by the train, everyone survives); however, in Case B, the harm is intentional, because the heavy man must collide with the train to stop it. People intuitively reject harming the heavy man intentionally.

Moreover, the cases differ in fairness. The worker on the siding accepted a job that has the inherent risk of being hit by a train and should be alert to the possibility. The heavy man is presumably a passerby, with no expectation of danger. A war analogy of the trolley problem explains this subtle difference by observing that the death of the worker on the track is unintentional "collateral damage," whereas pushing the heavy man is "deliberately killing a civilian."

In recent decades, philosophers have proposed many dilemmas similar to the trolley problem (they are easily found; simply search for "ethical dilemmas" on the Internet). The dilemmas usually describe horrifying situations in which readers must choose between two equally harrowing alternatives. However, engineers and geoscientists know that probability enters into every activity, so predictions, whether ethical or technical, are never certain. Therefore, when you face a dilemma with two equally bad alternatives, never accept their inevitability without striving to find a third option where everyone escapes injury.

A modern version of the trolley problem can be found in the development of autonomous vehicles, which are expected to become commonplace in the next decade or two. Software engineers program the computer controllers on these driverless cars so that they avoid obstacles, other cars, and pedestrians; however, the situation may arise that "the safety of one person may be protected only at the cost of the safety of another person." The U.S. National Highway Traffic Safety Administration has issued guidelines to developers of autonomous vehicles, including the requirement that "ethical judgments and decisions are made consciously and intentionally."