KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL/ELECTRONIC ENGINEERING

CENG 291: ENGINEERING IN SOCIETY

BY

DR. DANIEL OPOKU

INTRODUCTION

- Ethical dilemmas are situations in which moral reasons come into conflict , or in which the applications of moral values are unclear, and it is not immediately obvious what should be done. Ethical dilemmas arise in engineering as elsewhere because, moral are many and varied, hence moral reasoning and codes of ethics.

RESOLVING ETHICAL DILEMMAS

- Reasonable solutions to ethical dilemmas are clear, informed, and well-reasoned.
- Clear refers to moral clarity about which moral values are at stake and how they pertain to the situation.
- Informed means knowing and appreciating the implications of the available facts that morally relevant.
- Well-reasoned means that good judgement is exercised in integrating the relevant moral values and facts to arrive at a morally desirable solution.
- These criteria for reasonable solutions also enter as steps in resolving ethical dilemmas. These steps do not mean single-file movements but rather, activities that are carried out jointly and in repeating patterns.

MORAL CLARITY: IDENTIFY THE RELEVANT MORAL VALUES

- The most basic step in confronting ethical dilemmas is to become aware of them. This means identifying the moral values and reasons applicable in the situation. These values and reasons might be obligations, duties, rights, goods, ideals, or other moral considerations. This matters with the kind of considerations we are taking into account. Are we dealing with morally mandatory minimums, in the form of strict duties?
- The most useful resource in identifying ethical dilemmas in engineering are professional codes of ethics. Like most codes of ethics, the code of ethics of an American Institute of Chemical Engineers (AIChE) indicates that the engineer has at least three responsibilities in a situation.

❖ One responsibility is to be honest: “issue statements or present information only in an objective and truthful manner.”

❖ The second responsibility is to the employer: “act in professional matters for each employer or client as faithful agents or trustees, avoiding conflicts of interest and never breaching confidentiality.”

❖ The third responsibility is to the public, and also to protect the environment: “hold paramount the safety, health and welfare of the public and protect the environment in performance of their professional duties.”

CONCEPTUAL CLARITY: CLARIFY KEY CONCEPTS.

- Professionalism requires being a faithful agent of one's employer, but does that mean doing what one's supervisor directs or doing what is good for the corporation in the long run?
- These might be different things, in particular when one's supervisor is adopting a short-term view that could harm the long-term interests of the corporation.
- Again, does being "objective and truthful" simply mean never lying or does it mean revealing all pertinent facts and doing so in a way that gives no preference to the interest of one's employer over the needs of the public to be informed of hazards.

INFORMED ABOUT THE FACTS: OBTAIN RELEVANT INFORMATION.

- This means gathering information that is relevant in the wake of the applicable moral values. The primary difficulty in resolving moral dilemmas sometimes is uncertainty about the facts, rather than conflicting values.
- We as engineers need to know more about the possible harm caused by the minute quantities of constituents of chemicals on our environment. How serious is it, and how likely to cause harm.

INFORMED ABOUT THE OPTIONS: CONSIDER ALL OPTIONS

- Ethical dilemmas seam to force us into a two-way choice: do this or do that. Either bow to one's supervisor's orders or blow the whistle to the town authorities. A closer look often reveals additional options.
- As treated in myriad moral reasons generate ethical dilemmas, the chemical engineer might be able to suggest a new course of research that will improve the removal of lead and arsenic or she might discover that the city's laws are needlessly restrictive and should be slightly revised.

WELL REASONED: MAKE A REASONABLE DECISION

- Ethical dilemmas are not mechanical processes that a computer or simple algorithm might do for us. Instead, it is a deliberation aimed at taking into account all the relevant reasons, facts and values and in so doing, a morally reasonable manner is achieved.
- Often, a code of ethics provides a straightforward solution to dilemmas, but not always. Codes are not recipe books that contain a comprehensive list of absolute rules together with precise hierarchies of relative stringency among the rules. Nevertheless, the code does assert one very important hierarchy: hold paramount the public safety, health, and welfare.

RIGHT-WRONG OR BETTER-WORSE

- Most ethical dilemmas solutions are divided into two broad categories; either right or wrong. Right means that one course of action is obligatory, and failing to do that action is unethical or immoral.
- A code of ethics specifies what is clearly required: obey the law and heed to engineering standards, do not offer or accept bribes, speak and write truthfully, maintain confidentiality, among others.
- On the other hand, some dilemmas have two or more solutions, no one of which is mandatory but one of which should be chosen. These solutions might be better or worse than others in some aspects.

MAKING MORAL CHOICES

- Moral dilemmas comprise the most difficult occasions for moral reasoning. Nevertheless, they constitute a relatively small percentage of moral choices constituting decisions involving moral values. Moral choices are routine and straightforward.
- Engineering design has been considered as a domain where moral choices are made. Some thinkers suggest that, engineering design provides an illuminating model for thinking about all moral decision making, not just decisions within engineering.
- Whitbeck, a design analogist identified several aspects of engineering decisions that highlight important aspects of moral decisions in general.

CONT'D MAKING MORAL CHOICES

- First of all, there are alternative solutions to design problems, more than one of which is satisfactory.
- Secondly, multiple moral factors are involved, and among the satisfactory solutions for design problems, one solution is typically better in some respects and less satisfactory in other respects when compared with alternative solutions.
- Thirdly, some design solutions are clearly unacceptable.
- Fourth of all, engineering design often involves uncertainties and ambiguities.
- Finally, design problems are dynamic

Whitbeck finally argues that the analogies between engineering design and ethical decision making apply to moral dilemmas as well as to routine decision making.

CODE OF ETHICS

- Codes of ethics state the moral responsibilities of engineers as seen by the profession, and as represented by a professional society. Codes of ethics play at least eight essential roles: serving and protecting the public, providing guidance, offering inspiration, establishing shared standards, supporting responsible professionals, contributing to education, deterring wrongdoing, and strengthening a profession’s image.

SERVING AND PROTECTING THE PUBLIC

- Engineering involves both advanced expertise that professionals, but not the general public have and considerable dangers to a vulnerable public. A code of ethics functions as a commitment by the profession as a whole that engineers will serve the public health, safety, and welfare.

GUIDANCE

- Codes provide helpful guidance concerning the main obligations of engineers. Nonetheless, codes when well written, identify the primary responsibilities. More specific directions may be given in supplementary statements or guidelines which tell how to apply the code.

INSPIRATION

- Because codes express a profession’s collective commitment to ethics, they provide a positive motivation for ethical conduct. This motivation together with more focused guidelines constitutes a collective commitment to the public good that inspires individuals to have similar aspirations.

SHARED STANDARDS

- The diversity of moral viewpoints among individual engineers makes it essential that professions establish explicit standards. In this way, the public is assured of a minimum standard of excellence on which it can depend, and professionals are provided a fair playing field in competing for clients.

SUPPORT FOR RESPONSIBLE PROFESSIONALS

- Codes give positive support to professionals seeking to act ethically. A publicly proclaimed code allows an engineer under pressure to act unethically to say “ I am bound by the code of ethics of my profession which states that …….” this by itself gives engineers some group backing intaking stands on moral issues. They also serve as legal support for engineers criticized for living up to work-related professional obligations.

DETERRENCE AND DISCIPLINE

- Codes can also serve as the formal basis for investigating unethical conduct. Where such investigation is possible, a deterrent for immoral behaviour is thereby provided. Also, some professional societies do suspend or expel members whose professional conduct has been proven unethical.

ABUSE OF CODES

- When codes are not taken seriously within a profession, they amount to a kind of window dressing that ultimately increases public cynicism about the profession. Worse, the codes occasionally stifle dissent within the profession and are abused in other ways.
- The worst abuse of engineering codes is to restrict honest moral effort on the part of individual engineers in an attempt to preserve the profession’s public image and protect the status quo.
- Excessive interest in protecting the status quo may lead to a distrust of the engineering profession on the part of both government and the public.

CONT'D ABUSE OF CODES

- On rare occasions, abuses have discouraged moral conduct and caused serious harm to those seeking to serve the public. In 1932, two engineers were expelled from ASCE for violating a section of its code forbidding public remarks critical of other engineers. Yet, the actions of those engineers were essential in uncovering a major bribery scandal related to the construction of a dam for Los Angeles county.
- Codes sometimes place unwarranted restraints of commerce on business dealings to benefit those within the profession.

LIMITATIONS OF CODES

- Codes are no substitute for individual responsibility in grappling with concrete dilemmas. In some instances, most codes are restricted to general wording, and hence inevitably contain substantial areas of vagueness. Hence, making them unable to straightforwardly address all situations.
- Other uncertainties can arise when different entries in codes come into conflict with each other. Usually, codes provide little guidance as to which entry should have priority in those cases. Duties to speak honestly, not just to avoid deception, but also to reveal morally relevant truths are sometimes in tension with duties to maintain confidentiality.

CONT'D LIMITATIONS OF CODES

- Proliferation further limits the codes of ethics of engineers. Oldenquist (philosopher) and Slowter (engineer) pointed out that, the existence of separate codes for different professional engineering societies can give members the feeling that ethical conduct is more relative and variable than it actually is.
- Despite their authority in guiding professional conduct, akin to the authority of law in structuring societies, codes are not always the complete and final word. Codes can be flawed, both by omission and commission.
- Limitation of codes connects with a wider issue about whether professional groups or entire societies can create sets of standards for themselves that are both morally authoritative and not open to criticism or whether group standards are always open to moral scrutiny, hence ethical relativism.

ETHICAL RELATIVISM

- Does a profession's code of ethics create the obligations that are incumbent on members of the profession, so that engineers' obligations are relative to their code of ethics?
- One view is that, codes try to put into words, obligations that already exist, whether or not the code is written.
- A code of professional ethics may be thought of as a collective recognition of the responsibilities of the individual practitioners. Stephen Unger, an activist of the IEEE code of ethics, said that, codes cannot be used in cookbook fashion to resolve complex problems, but instead they are valuable in outlining the factors to be considered.

CONT'D ETHICAL RELATIVISM

- A good code provides valuable focus and direction in thinking about engineers' responsibilities but does not in itself generate obligations so much as articulate the obligations that already exist.
- Michael Davis also gives a different emphasis regarding professional codes of ethics. He said that, codes are conventions established within professions in order to promote the public good. As such, they are morally authoritative. The code itself generates obligations: "a code of ethics is as such, not merely good advice or a statement of aspiration". It is a standard of conduct which if generally realized in the practice of a profession, imposes a moral obligation on each member of the profession to act accordingly.
- Ethical relativism draws into the play the conventions of a profession like engineering or the conventions of a society in its entirety. By viewing customs as self-certifying, ethical relativism rules out the possibility of critiquing the customs from a wider moral framework.

CONT'D ETHICAL RELATIVISM

- Regarding professional ethics, ethical relativism implies that, we cannot morally critique a given code of ethics giving reasons for why it is justified in certain ways and perhaps open to improvements in other ways.
- Ethical relativism also seems to allow any group of individuals to form its own society with its own conventions, perhaps ones that common sense tells us are immoral.
- Although ethical relativism is a dubious moral outlook, it remains true that moral judgements are made in relation to particular circumstances, such as those of engineering.
- Also, some moral requirements are indeed established by mutual agreements
- Just as laws establish the legal and moral permissibility of driving on the right side of the road (United States) or the left side (England), some requirements in engineering codes of ethics create the obligations.

JUSTIFICATION OF CODES

- If codes of ethics do not merely state conventions as ethical relativists hold, what justifies those responsibilities that are not mere creations of conventions? A code specifies the customs of the professional society that writes and promulgates it as incumbent on all members of a profession. When these values are specified as responsibilities, they constitute role responsibilities; obligations connected with a particular social role as a professional.
- A sound professional code will stand up to three tests:

❖It should be clear and coherent.

❖It should organize basic moral values applicable to the profession in a systematic and comprehensive way

❖It should provide helpful guidance that is compatible with our most carefully considered moral convictions about concrete situations.

CONT'D JUSTIFICATION OF CODES

- A codified professional ethics develops certain parts of ordinary ethics in order to promote the professions public good within particular social settings.
- A profession's public goods needs to be understood within social contexts, and hence so do the codified professional norms. A profession will require an advanced expertise and use it to serve a public that must trust professionals in matters where they are vulnerable and where their well-being is at risk.
- Any set of conventions, whether codes of ethics or actual conduct, should be open to scrutiny in light of wider values. Also, professional codes should be taken very seriously since they express the good judgement of many morally concerned individuals, the collective wisdom of a profession at a given time.
- Codes establish a framework for dialogue about moral issues since they are a proper starting place for an inquiry into professional ethics.