Professional Ethics and Values in Engineering HS(317)

UNIT – IV:

Engineering ethics-global issues and laws, sources - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights – Plagiarism - Intellectual Property Rights (IPR) – discrimination- Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors - moral leadership-sample code of Ethics like ASME, ASCE, IEEE, IEI, IIMM, IETE etc.

Global Issues

'We want freedom and privacy, but also the benefits of technologies that threaten freedom and privacy'.

'A well intentioned engineer may still be a "bad" engineer if his work does not serve the public well'.

"All products of technology present some potential dangers and thus engineering is an potential dangers, and thus engineering is an inherently risky activity...Engineering should be viewed as an experimental process. It is not, of course, an experiment conducted solely in a laboratory under controlled conditions. Rather, it is an experiment on a social scale involving human subjects"

"Good people do not need laws to tell them to act responsibly while bad people will find a around the laws" –Plato

"Always do the right thing this will gratify some and astonish the rest"- Mark Twain

"A long habit of not thinking a thing wrong gives it a superficial appearance of being right"-Thomas Paine

"Sweat saves blood. Blood saves lives and brains save both"-Gen George Patton

"In so many aspects of life, you need to be a long-time optimist, but a short time realist. You need to know what you know and what you do not know…, We need to try to do the right thing every time because we never know what time in our life we will be judged on.." Capt. Chesley Sullenburger

International Operation & Global Issues

An engineer's life is being influenced more and more by the global marketplace in which we practice. As more and more companies expand their operations to include international work, the engineer's professional life is bombarded with new considerations regarding the physical, cultural and political environments with which they must deal. International trade agreements and the move towards international laws governing human rights and environmental issues complicate many of the decisions one must make in both personal and professional life. Such considerations raise new moral and ethical questions that are relevant to engineers and thus deserve examination.

The interest in international pursuits seems well justified. For the company, the move into less developed parts of the world provides access to inexpensive labour, new sources of natural resources and new markets for product. This usually benefits both the company involved and the home economy by becoming more globally competitive and balancing trade. (Martin and Schinzinger, 291) There are also significant benefits for the developing countries as a result of such foreign investment: new employment opportunities for citizens with better pay and skill development, transfer of new advanced technology and the array of other social benefits that follow from an improved economic capability (e.g. education, health care.). (291)Martin and Schinzinger raise several moral issues relating to foreign activities including business and social complications. (Who loses jobs at home versus who gains? What are the local tax implications? What is the long term effect on the host country of selling off resources or accepting the influence of a foreign culture?) (292) "Culture" differences often cause the most debate

-a different value system, different religious beliefs and different business practices. This discussion focuses on the resulting moral and ethical considerations for corporations or individuals doing business with a foreign culture.

Cultural Concerns

The difference in values is a primary source of ethical concerns. As a starting premise we acknowledge that one's value system is related to the culture in which it was "acquired". Since values and ethics are intimately related, we first review three perspectives on "relative values / ethics" as described by Martin and Schinzinger (292)."

Ethical Relativism: Actions are morally right within a particular society when (and only because) they are approved by law, custom or other convention of that society." This is best summarized as "When in Rome, do as the Romans do." If liberally followed, this philosophy could lead to participation in some extreme, and generally unacceptablebehaviour (e.g. genocide, slavery). (292) If we accept that morally correct behaviour is based on fundamental human rights, then to ignore them simply becauseof a local convention would be to deny our own moral beliefs. While there are some arguments that would support acceptance of this philosophy, at least for some circumstances, its shortcomings are more evident if we apply this same philosophy to certain "sub-cultures" that exist in our own society (e.g. gangs, cults). If we consider that some of their behaviour may be unacceptable (or even illegal) in our "larger" society, then it would seem unreasonable that one could effectively change one's value system by joining such a group. (It is more likely that one would join such a group if one's value system already approximately matched that of the group!) To try to rationalize behaviour that did not fit with one's own value system would certainly create a moral dilemma. If we consider the entire planet as the "global society", then a country or area may be considered analogous to the sub-culture described above –i.e. a significantly different value system than the "global" one. Again, to try to rationalize a change in ethic because of a change in venue would certainly be just as ineffective. Of course one significant difference is the legal and political jurisdiction, where a "gang" is likely subject to the same laws as the rest of its enveloping society, this is not as yet true for different countries. However,an increasingly global economy is fuelling the pressure and support for more international law.

(Consider for a moment how one might define what the "global" value system actually is. As with any culture or sub -culture, it might be considered a statistical compilation of the values of allits members. This implies of course that one consider the frequency with which certain values are held and their weighting effect on the "global" result. This model also implies that there would be sub-sets in any larger group that might have a value system different enough from the global "norm" to be considered outcasts or splinter groups (recall gangs, cults).) In conclusion, "ethical relativism" as a view offers little to help guide our behaviour or resolve our moral dilemmas.

"Descriptive Relativism: As a matter of fact, value beliefs and attitudes differ from culture to culture." This philosophy simply acknowledges that there are differences in beliefs and values between different cultures. (292) It does not imply ethical relativism, nor does it offer any guidance to resolve moral dilemmas which arise because of these differences. It is however a partial step in that recognizing differences is at least the first step in dealing effectively with them.

"Moral Relationalism (or Contextualism): Moral judgments should be made in relation to factors that vary from case to case, usually making it impossible to formulate rules that are both simple and absolute. In particular, customs and laws are usually morally relevant factors that should be taken into account." (292) This is an extension of "Descriptive Relativism" that says one should not only acknowledge that there are differences in values and beliefs, but that one should consider these in the context of each situation when making moral and ethical decisions. It does not imply that these alternate views are either right or wrong; but it does imply that there may be more than one morally acceptable view in any situation (i.e. "ethical pluralism"). (293) Because the "context" of each situation is different, it is near impossible to establish any consistently applicable "rules". (Recall: This is reminiscent of Gilligan's view of "post conventional" moral development in which moral decisions are arrived at by considering the context of each situation.) It recognizes that moral rules almost always have exception (e.g. lying is generally considered morally unacceptable, but there are circumstances under which, at least in this philosophy, it would be considered morally correct). In summary, it recognizes that reasonable people can have different opinions about a moral issue and still be reasonable; and that different acts can be considered morally correct when taken in the context of the situation. While pragmatic or contextual considerations in a foreign environment may justify some digression from what is considered morally acceptable practice at home, it does not automatically justify participation in a foreign culture's practices without serious "examination of conscience" and at least some assessment of the long term effects. As a general guideline to assist in such decisions, consider the following suggestions:

• Identify the source of moral / ethical conflict

–what specific practice or act is in question and how does this differ from normal (at home) practice.

• Identify any local or foreign legal implications

–for example, while bribery per se is illegal in most places, there are some locales where it is tacitly condoned (at least in some circumstances) as evidenced by the complete lack of any enforcement of the applicable law. Occasionally there are local laws governing a companies behaviour even in when outside the country. Make sure you are not leaving yourself or your company open to litigation on either side.

• Make sure the practice is really accepted and understood to be part of the normal process. Example: while misleading advertising is not morally acceptable, deliberate exaggeration or obviously false claims are sometimes used to make a point. The key is that it is clearly understood, and expected to be understood by most people, that a certain statement is false and is not intended to mislead. This "understanding" is also culturally dependent.

• Consider the negative effects or the reason(s) why the practice or custom is not accepted locally; assess whether or not the practice would have the same effect in the other culture. Example: falsifying accounting records is generally considered unacceptable here because it would lead to illegal avoidance of taxes (for one) and others paying more to "take up the slack". If, however, it is considered common practice as the start of a negotiating process, then the same negative effect would likely not accrue.

• If the alternative is to not do business in the foreign location, then one may also try to balance the possible positive consequences of one's presence in the foreign location (e.g. jobs, improved local economy) against the negative effects of the practice. This can be a very difficult assessment and decision. Even the suggestion to "do more good than harm" is of limited help as even this assessment (especially if done in-house) is, at best,

subjective and possibly (probably?) biased! Another condition that may help put a bound on participation in foreign practices is to not violate any fundamental human rights. (Look to International bodies for declarations of human rights that are proposed for global acceptance.)

Culture-Transcending Norms

Harris et al consider the concept of behavioural norms that they feel represent values that are common to many cultures and should therefore be internationally applicable. While they acknowledge the difficulties in identifying and applying universally acceptable behaviours, they do offer another potential tool for the engineer to use when searching for a morally acceptable solution to intercultural issues. They draw these "CT norms" from the major ethical theories, international guidelines and documents, engineering codes of ethics and a basic respect for persons. From these sources, they identify nine behaviours which they suggest should be used to guide international operations:

1. Avoid unfair exploitation. Whenever there is an imbalance of power, economic or otherwise, there is opportunity to take unfair advantage. A foreign company, for example, may be in a controlling position with respect to local workers who desperately need the jobs and will accept an unfair wake or unsafe conditions because they feel they have no other choice. It is morally unacceptable to take such unfair advantage just because you can "call the shots".

2. Avoiding paternalism. The opposite of unfair exploitation is being too protective or paternalistic to the point that you are making all the decisions for someone else an the assumption you "know better". While it is appropriate to carefully consider whether someone has the stability, rationale and experience to make a sound decision on their

own behalf, one must also judge when it would be beneficial and developmental to inform them of the choices and solicit at least their input if not allow then to decide for themselves.

3.Avoiding bribery and gifts. This is a very common and very difficult situation for many companies. In general, the use of monetary or other gifts to acquire an unfair advantage or for extortion is definitely unacceptable. However, their use as part of customary business dealings or "grease payments" has come to be accepted as a normal part of

business in some cultures and could be morally justified. Bribery is universally illegal, be sure to carefully check relevant laws in bothyour country and the host country and make sure the practice is acceptable before finding yourself in serious difficulty.

4. Avoid violation of human rights. There is, as yet, no universally accepted list of basic human rights that can be applied in all locales. The United Nation's International Bill of Human Rights and related documents provide a "wish list" and excellent goal for all international operators. These should be observed as a minimum whenever possible. If this minimum doesn't meet your personal or corporate standards, choose the "higher road" while respecting local customs and laws as much as possible.

5. Promoting the welfare of the host country. An ethically sound foreign operation should be beneficial for both parties. Ensure that your presence provides a net benefit for the host. Here again, consideration of economic circumstances and safety issues must be considered contextually, bearing in mind the limits discussed elsewhere.

6. Respect local cultural norms and laws. This guide is clearly limited by the other CT norms. It may also create apparent conflicts. Harris et al suggest that in these cases, the local norms receive priority consideration unless they seriously violate one of the other norms. Here again, a reasoned judgment is likely to be more successful than arbitrarily imposing an unfamiliar and unwelcome change to a local culture.7.Protect the health and safety of workers and residents. This is another tenet of engineering codes of ethics that must be carried over to international operations (public safety). One must consider the "appropriateness" of any technology being transferred giving due consideration to the local skill level and required training etc. and ensure that it is not creating a dangerous situation. While it is generally acceptable that working and living standards may not be equivalent to your home country, there are reasonable limits to how far one can ethically stray from sound engineering standards of practice.

8.Protect the environment. This again follows from many engineering codes of ethics. Since many developing nations have minimal environmental protection legislation in place, one must look to home standards or international bodies for guidelines to consider. Often protection of the environment is a lower priority for developing nations than economic development, and certainly some operational latitude is justifiable is the alternative is no developmental benefit for the host country at all. One cannot, obviously, ignore environmental issues to the point where it becomes a health or safety hazard for the residents or workers. When acceptable compromised are initially justified, one should at least planfor ultimately meeting internationally acceptable standard in the future.

9. Promote legitimate background institutions. This follows almost directly from CT norms 4,5 and possible 7. One cannot adequately honour human rights and bring a benefit to the residents (including safety and health) if your company is directly or indirectly supporting governments or institutions that do not apply these norms themselves. Donaldson insists that if one cannot operate without violating certain human rights, one must leave and find another place to operate. (296) Of course some practices generally considered violations of human rights may be locally accepted as customary rather than repression or harm; gender roles are one example. If one accepts that they must follow this local practice in order for the country to realize any benefits, include a plan to work respectfully with locals to improve standards in the long run. Many times there will be conflicts between these "norms", and they clearly can not all be met fully at the same time. When this occurs, the practitioner should consider reasonable trade-offs and strike a morally acceptable balance. Harris et al also give some additional suggestions that are intended to assist in their application:

1. Consider proportional responsibilities. Remember that although engineers may play a significant role in decisions regarding international operations, they are not professionally responsible for everything. They can legitimately limit their responsibilities to those matters over which they have some control.

2. Avoid laxness and rigorism. Strive for reasonable compromises where necessary. Ignoring all rules of behaviour or insisting on enforcing strict adherence to your version of what it right will more often than not lead to unnecessary complications.

3.How to choose between competing local and host practices. Providing they don't obviously violate other standardsor norms, the host country practices should be favoured whenever possible. This will show respect for the local people and their culture, and improve your company's relationship with your host.

4. How to choose between competing CT norms. Conflicts can also arise between CT norms. For example: "Eliminating the pollution [of a fertilizer plant] may result in an increase in the price of fertilizer and put it beyond the reach of most farmers in the country." (263) creates a conflict between CT norms 7 and 8 above. Although Harris et al don't offer any advice for these situations, we would suggest adopting the utilitarian approach and favouring the option that provides the most overall good. Remember that evaluating "goodness" has its own set of challenges.

In an overview of the state of engineering in the new millennium, Wm. A. Wulf (2000), president of the NAE, introduced the concept of "macro ethical" behavior, that is , behavior that increases the intellectual pressure "to do the right thing" for the long-term improvement of society. Examples abound: the development of maintainable energy resources, the preservation of a healthy environment, the avoidance of ecological disasters, and universal education.

During the years I had the privilege of teaching in the engineering school at Princeton, I began the first class session of every semester by announcing that a gentleman had invented a new product that virtually everyone in the world would want to have—a product that would create millions of new jobs and would greatly improve the quality of most people's lives. Furthermore, as luck would have it, he was seeking investors. When asked, most students expressed significant interest in investing in his endeavor (at least hypothetically—after all, they were students!). But when I added, "Oh yes, there is one other thing—his invention will kill a quarter of a million people each year" and asked if they would still be interested in investing, no one showed any interest in such a reprehensible product. Furthermore, most said that any such product should be banned outright. I then told them that the inventor's name was Nicholas Joseph Cugnot—and his invention was the automobile. Imagine that you were responsible for the structural design of a building in Manhattan, the world's seventh tallest building, and that after the edifice was completed and fully occupied by its owners you, *and you alone,* discovered that there was an error in the design that could result in the structure's collapse in a type of storm that might be expected to occur every 16 years. What should you do? In this case, the "you" is Bill LeMessurier, a highly regarded structural engineer. He immediately informed the owner of the building and the authorities of the danger.

Or suppose you are a young, up-and-coming manager in a large corporation and that one day the chairman of the firm indicates to you that he is impressed with your work and is going to propose that you be elected to the board of directors. He goes on to say that there will be one condition: "You will always vote," he says, "exactly as I tell you." What should you do? In this case, the "you" is Herb Krannert—and his answer was simple. "I quit," he said. The following day six of his colleagues showed up at his front door saying they heard what happened and they too had quit—and they wanted to go to work for *him*! Together, they formed the Inland Container Corporation.

Or suppose you are an engineer responsible for overseeing the research and development work of an aerospace corporation by which you are employed; the company is doing some very early research on stealth technology, in which it is investing significant sums of money. Independently, you are asked by the government to serve, in a personal capacity, as chairman of an outside advisory board. In carrying out your duties for the government, you become aware that the government is funding research on stealth technology at another company based on an altogether different technical approach that is far more advanced than the work being done by your own company. How do you carry out your responsibilities to your company—and yet honor your duty of privacy to your client, the U.S. government , and, indirectly, to its contractor on the project? In this case, I was "the engineer".

These three examples span the spectrum of ethics from macro ethics to micro ethics, and all of them involve engineering. Macro ethics involves ethical issues that affect large segments of society, whereas micro ethics involves issues that affect a smaller, more immediate group, such as one's boss or one's client.

Collective bargaining

Collective bargaining consists of negotiations between an employer and a group of employees so as to determine the conditions of employment. The result of collective bargaining procedures is a collective agreement. Employees are often represented in bargaining by a union or other labor organization. Collective bargaining is governed by federal and state statutory laws, administrative agency regulations, and judicial decisions. In areas where federal and state law overlap, state laws are preempted. The main body of law governing collective bargaining is the National Labor

Relations Act (NLRA). It explicitly grants employees the right to collectively bargain and join trade unions. The NLRA was originally enacted by Congress in 1935 under its power to regulate interstate commerce. It applies to most private non-agricultural employees and employers engaged in some aspect of interstate commerce. Decisions and regulations of the National Labor Relations Board, which was established by the NLRA, greatly supplement and define the provisions of the act.

The NLRA establishes procedures for the selection of a labor organization to represent a unit of employees in collective bargaining. The act prohibits employers from interfering with this selection. The NLRA requires the employer to bargain with the appointed representative of its employees. It does not require either side to agree to a proposal or make concessions but does establish procedural guidelines on good faith bargaining. Proposals which would violate the NLRA or other laws may not be subject to collective bargaining. The NLRA also establishes regulations on what tactics (e.g. strikes, lock-outs, picketing) each side may employ to further their bargaining objectives.

State laws further regulate collective bargaining and make collective agreements enforceable under state law. They may also provide guidelines for those employers and employees not covered by the NLRA, such as agricultural laborers.

Arbitration is a method of dispute resolution used as an alternative to litigation. It is commonly designated in collective agreements between employers and employees as the way to resolve disputes. The parties select a neutral third party (an arbiter) to hold a formal or informal hearing on the disagreement. The arbiter then issues a decision binding on the parties. Both federal and state law governs the practice of arbitration. While the Federal Arbitration Act, by its own terms, is not applicable to employment contracts, federal courts are increasingly applying the law in labor disputes. Fourty-nine states have adopted the Uniform Arbitration Act (1956) as state law. Thus, the arbitration agreement and decision of the arbiter may be enforceable under state and federal law.

Freedom of association ensures that workers and employers can associate to efficiently negotiate work relations. Combined with strong freedom of association, sound collective bargaining practices ensure that employers and workers have an equal voice in negotiations and that the outcome will be fair and equitable. Collective bargaining allows both sides to negotiate a fair employment relationship and prevents costly labour disputes. Indeed, some research has indicated that countries with highly coordinated collective bargaining tend to have less inequality in wages, lower and less persistent unemployment, and fewer and shorter strikes than countries where collective bargaining is less established. Established collective bargaining practices were an element that allowed the Republic of Korea to weather the Asian financial crisis and enabled South Africa to make a relatively peaceful transition into the post-apartheid era. ILO standards promote collective bargaining and help to ensure that good labour relations benefit everyone.

Respect Authority

According to a traditional image, “true professionals” are independent agents who, unlike businesspersons, serve clients without having to submit to the authority of managers. With the advent of managed health care and large legal offices, most physicians and attorneys now work within authority-structured corporations. Indeed, all issues in professional ethics, not only those surrounding personal commitments, increasingly concern interactions between professionals and their organizations, and also among members of different professions. This chapter discusses three aspects of shared responsibility: the interplay between professionals' authority as experts and managers' authority within organizations, the possibility of corporations and professionals serving shared or widely overlapping goals, and how respect for authority is compatible in principle with professional autonomy. It also explores professionals' right of conscience that leaves room for personal ideals within authority relationships. Although the focus is on the profession of engineering, the main points apply to all professions.

Senior team members, coming from a traditional project setting to an Agile project might face a situation, where they feel that they are not adequately respected for their seniority. In certain circumstances they find it hard to adjust in Agile teams.

In an interesting thread running in parallel on Scrum Development group and Agile India group Vikram Dhiman brought an interesting situation for discussion. He shared an incident of a company in which 4 senior technical people refused to join the Agile team because they anticipated inadequate respect and authority. The senior members felt that their experience would be dishonored if they had to work in a team in which the only metric relevant was “team success”. As per Vikram one of the senior member said

I have slogged hard for over 06 years to reach where I have. I don't have an issue working with people much less in experience - I would learn something from them too. But, I find it degrading to discredit all my 06 years of experience. How do I know I have grown if all the time its just "team's success" that is the metric. Again, I am not against the team - I just want respect and slight authority.

Vikram further added

In older hierarchy - you had two paths of growth : technical [tech architect, enterprise designer etc] and managerial. How do we show this to the people in an Agile set up so that you do not end up losing good and experienced people?

Giving some support to the argument, Pankaj Chawla suggested that authority and power, in any sphere of life, do decide who will survive and who will perish. He quoted an example from animal kingdom where the animals with less power always perish in the battle of supremacy. He added that, though businesses work on the notion on increasing value of differentiation however, Agile tends to put all the team members in the same bucket.

Most of the other members on both the groups were unanimous in stating that authority and respect do not necessarily come from the years of experience a person has. Respect and authority are earned with the actions that one performs. Ajay Danait added that true leaders would not quit if they are not given authority, they would rather enable authority through consensus building.

So is there a way in which the senior members from a traditional setup ease their way into an Agile team?

Guido Schoonheim suggested that the team principle of “everyone is the same” indeed does not go well with the senior members. In his view to take care of the situation the teams should start with a norming session where the roles and standards are decided on. Then the senior members of the team, on account of their experience, should be made responsible for the project quality and mentorship. This would make the senior member make use of his experience.

Peter Goldey provided his thoughts on the aspect of recognition and growth. He suggested that even though the most important metric is team success it does not mean that metrics to measure an individual's performance do not exist. According to him, if one of a pair of individuals is performing better than the rest, then they would automatically get noticed. Now it is upto the Scrum master to reward the individuals accordingly.

So how does a team measure success of an individual so that he does not feel that his efforts are going unnoticed? How does an Agile team define the career progression for senior members?

Richard Banks suggested an MVP award where each member of the team votes for the most valuable player. He also suggests that senior people on the team should be valued for their experience and their progress should depend on their contributions and how their peers value their work.

David A Barrett added that with time the definition of great programmer has undergone a change. Initially great programmers were the ones who were technically sound, the next generation required them to have skills to relate to the community and the business, now the definition of great programmers has changed further. According to him

Now, I'd say that a "great" programmer needs to be able to work in a team environment. There's a whole new set of skills to be learned - things like influencing without authority - and personality traits that lead to success. To me, the effectiveness of Scrum (and Agile in general) is what makes this latest paradigm shift inevitable.

In conclusion David and Pankaj made somewhat tangent remarks. This is what they had to say

Dave Nicolette concluded that he would consider people who feel disregarded in Agile teams more as a personality issue. He suggests that Agile is a very different way of working and not everyone enjoys working in Agile teams. The key is to get people with the right frame of mind who can contribute with the team for the success of the project.

Pankaj made a very interesting comment. He suggested

The basic problem is that Agile is a very engineering solution created by engineers for a problem that is engineering in nature but is vastly a human problem (productivity, motivation, teaming etc) and like most engineering solutions to human problems this one will also show its weaknesses as more and more humans embrace it. The good thing is that Agile is based on the foundation of iterative improvement and embracing change and I hope that Agile will use its own founding principles to do course correction and find a better solution to a changing requirement of showing a 25 year career path to guys in the technical ladder.

Members on the Scrum Development and Agile India groups were unanimous that respect and authority need to be earned. They cannot be assumed on the basis of seniority. However, there was a small undercurrent in the threads which suggested that Agile might still have to provide some answers to senior members in terms of career path and growth.

How can people be influenced to make commitments to the goals of the organization? In part, this question can be answered by how managers define and use power, influence, and authority. Deciding what type of authority system to create is part of the managerial responsibility of organizing. Compare, for example, two managers. One accepts or rejects all ideas generated at lower levels. The other gives the authority for making some decisions to employees at the level where these decisions will most likely affect those employees. How managers use their power, influence, and authority can determine their effectiveness in meeting the goals of the organization.

RESPONSIBILITY

Responsibility is the obligation to accomplish the goals related to the position and the organization. Managers, at no matter what level of the organization, typically have the same basic responsibilities when it comes to managing the work force: Direct employees toward objectives, oversee the work effort of employees, deal with immediate problems, and report on the progress of work to their superiors. Managers' primary responsibilities are to examine tasks, problems, or opportunities in relationship to the company's short-and long-range goals. They must be quick to identify areas of potential problems, continually search for solutions, and be alert to new opportunities and ways to take advantage of the best ones. How effectively goals and objectives are accomplished depends on how well the company goals are broken down into jobs and assignments and how well these are identified and communicated throughout the organization.

INFLUENCE AND POWER

Formal job definitions and coordinating strategies are not enough to get the work done. Managers must somehow use influence to encourage workers to action. If they are to succeed, managers must possess the ability to influence organization members. Influence is the ability to bring about change and produce results; people derive influence from interpersonal power and authority. Interpersonal power allows organization members to exert influence over others.

Power stems from a variety of sources: reward power, coercive power, information power, resource power, expert power, referent power, and legitimate power. *Reward power* exists if managers provide or withhold rewards, such as money or recognition, from those they wish to influence. *Coercive power* depends on the manager's ability to punish others who do not engage in the desired behavior. A few examples of coercion include reprimands, criticisms, and negative performance appraisals. Power can also result from controlling access to important *information* about daily operations and future plans. Also, having access to and deciding to limit or share the

resources and materials that are critical to accomplishing objectives can provide a manager with a source of power. Managers usually have access to such information and resources and must use discretion over how much or how little is disseminated to employees. *Expert power* is based on the amount of expertise a person possesses that is valued by others. For example, some people may be considered experts with computers if they are able to use several software programs proficiently and can navigate the Internet with ease. Those who do not have the expert knowledge or experience need the expert's help and, therefore, are willing to be influenced by the expert's power. When people are admired or liked by others, *referent power* may result because others feel friendly toward them and are more likely to follow their directions and demonstrate loyalty toward them. People are drawn to others for a variety of reasons, including physical or social attractiveness, charisma, or prestige. Such politicians as John F. Kennedy were able to use their referent power to effectively influence others. *Legitimate power* stems from the belief that a person has the right to influence others by virtue of holding a position of authority, such as the authority of a manager over a subordinate or of a teacher over a student.

In some respects, everyone has power to either push forward or obstruct the goals of the organization by making decisions, delegating decisions, delaying decisions, rejecting decisions, or supporting decisions. However, the effective use of power does not mean control. Power can be detrimental to the goals of the organization if held by those who use it to enhance their own positions and thereby prevent the advancement of the goals of the organization.

Truly successful managers are able to use power ethically, efficiently, and effectively by sharing it. Power can be used to influence people to do things they might not otherwise do. When that influence encourages people to do things that have no or little relationship to the organization's goals, that power is abused. Abuses of power raise ethical questions. For example, asking a subordinate to submit supposed business-trip expenses for reimbursement for what was actually a family vacation or asking a subordinate to run personal errands is an abuse of power. People who acquire power are ethically obligated to consider the impact their actions will have on others and on the organization.

Employees may desire a greater balance of power or a redistribution of authority within the existing formal authority structure. People can share power in a variety of ways: by providing information, by sharing responsibility, by giving authority, by providing resources, by granting access, by giving reasons, and by extending emotional support. The act of sharing information is powerful. When people don't share information, the need to know still exists; therefore, the blanks are filled in with gossip and innuendo. When people are asked to take on more responsibility, they should be provided with tasks that provide a challenge, not just with more things to increase their workload that don't really matter. People need the legitimate power to make decisions without having to clear everything first with someone higher up in the organization. People who have power must also have the necessary range of resources and tools to succeed. Access to people outside as well as inside the organization should be provided and encouraged. People should be told why an assignment is important and why they were chosen to do it. Emotional support can come in the form of mentoring, appreciation, listening, and possibly helping out.

Sharing power or redistributing authority does not necessarily mean moving people into positions of power; instead, it can mean letting people have power over the work they do, which means that people can exercise personal power without moving into a formal leadership role. The ability to influence organization members is an important resource for effective managers. Relying on the title "boss" is seldom powerful enough to achieve adequate influence.

AUTHORITY

Authority is seen as the legitimate right of a person to exercise influence or the legitimate right to make decisions, to carry out actions, and to direct others. For example, managers expect to have the authority to assign work, hire employees, or order merchandise and supplies.

As part of their structure, organizations have a formal authority system that depicts the authority relationships between people and their work. Different types of authority are found in this structure: line, staff, and functional authority. Line authority is represented by the chain of command; an individual positioned above another in the

hierarchy has the right to make decisions, issue directives, and expect compliance from lower-level employees. Staff authority is advisory authority; it takes the form of counsel, advice, and recommendation. People with staff authority derive their power from their expert knowledge and the legitimacy established in their relationships with line managers. Functional authority allows managers to direct specific processes, practices, or policies affecting people in other departments; functional authority cuts across the hierarchical structure. For example, the human resources department may create policies and procedures related to promoting and hiring employees throughout the entire organization.

Authority can also be viewed as arising from interpersonal relationships rather than a formal hierarchy. Authority is sometimes equated with legitimate power. Authority and power and how these elements are interrelated can explain the elements of managing and their effectiveness. What is critical is how subordinates perceive a manager's legitimacy. Legitimate authority occurs when people use power for good and have acquired power by proper and honest means. When people perceive an attempt at influence as legitimate, they recognize it and willingly comply. Power acquired through improper means, such as lying, withholding information, gossip, or manipulation, is seen as illegitimate. When people perceive the authority of others as illegitimate, they are less likely to willingly comply.

DELEGATION

In order for managers to achieve goals in an efficient manner, part of their work may be assigned to others. When work is delegated, tasks and authority are transferred from one position to another within an organization. The key to effective delegation of tasks is the transference of decision-making authority and responsibility from one level of the organization to the level to which the tasks have been delegated. In order to effectively delegate work, some guidelines should be followed: Determine what each worker can most effectively accomplish; decide whether the worker should just identify a problem or also propose a solution; consider whether the person can handle the challenge of the task; be clear in the objectives of the task; encourage questions; explain why the task is important; determine if the person has the appropriate resourcesime, budget, data, or equipmento get the job done on a deadline; create progress reviews as part of the project planning; and be prepared to live with less than perfect results. Authority should be delegated in terms of expected results. Generally, the more specific the goal, the easier it is to determine how much authority someone needs.

Some employees resist delegation for a variety of reasons. Initiative and responsibility involve risk that some people try to avoid. People tend to play it safe if risk results in criticism. Those who feel they already have more work than they can do avoid new assignments. Some people doubt their own abilities and lack the self-confidence to tackle new assignments. Delegation is an excellent professional development tool so long as it expands a worker's expertise and growth. Delegation can also compensate for a manager's weakness. A successful team is developed by building on the strengths of its members.

People develop most when stimulated to broaden themselveshen challenged. More authority can add challenge; too much challenge, however, can frustrate people and cause them to avoid new responsibilities. Delegation should involve acceptable challengenough to motivate but not so much as to frustrate.

In today's workplace, managers are compelled to rely more on persuasion, which is based on expert and referent power rather than reward, coercive, or inappropriate use of power. A manager who shares power and authority will be the one with the greatest ability to influence others to work toward the goals of the organization.

Conflict of Interest

Conflict of interest arises in the workplace when an employee has competing interests or loyalties that either are, or potentially can be, at odds with each other. A conflict of interest causes an employee to experience a struggle between diverging interests, points of view, or allegiances. Conflicts of interest are generally forbidden in company codes of conduct and / or employee handbooks.

Addressing conflicts of interest
- Faithful Agent and Trustee

- Avoid vs. Disclosure
-'Appearances'
- Acceptance of Compensation from More Than One Party
- Serving on Public Bodies
- Accepting Contracts from Government Bodies
- Part-Time Engineering Work
- Contingent Fee Arrangements
- Representing Adversary Interests
- Consent

Professional Rights

The engineer's problem has centered on a conflict between professional independence and bureaucratic loyalty, rather than between workmanlike and predatory instincts.

Edwin T. Layton, Jr.

Professional Rights

Engineers as professionals also have special rights arise from their professional role. Those include:

- Basic right of professional conscience (right to exercise professional judgement in pursuing professional obligations)
- Right to refuse to engage in unethical activity
- Right to express one's professional judgement, including right to dissent
- Right to warn the public of dangers
- Right to fair recognition and remuneration for professional services

Employee Rights

An employee rights are any rights that apply or refer to the status of employees. It can be categorised as contractual and non-contractual rights.

a) Contractual right arise solely out of an employee contract created by organisational policies or contracts. For example, right to receive a salary of certain amount.

b) Non-contractual rights exist even if not formally recognised in a contract or company policy, such as

- Right to choose outside activities
- Right to privacy and employer confidentiality
- Right to due process from employer
- Right to non-discrimination and absence of sexual harassment at the workplace

Engineers have several types of moral rights, which fall into sometimes overlapping categories of human, employee, contractual, and professional rights.

As human beings, engineers have fundamental right to live and freely pursue their legitimate personal interests.

In particular, they have a human right to pursue their work and not to be unfairly discriminated against in employment on the basis of sex, race, or age.

Professional and employee rights can be justified by reference to ethical theories.

1. A rights theory would derive the right of professional conscience from a fundamental human right to pursue legitimate interests, where such interests include moral obligations.

2. A duty theory might appeal to the fundamental human duty employers have not to harm others (e.g., the public) by handicapping engineers seeking to meet their professional obligations.

3. A utilitarian theory would argue that the greatest good is promoted by allowing engineers to pursue their obligations.

In general, the importance of professional duties means that the importance of the right to meet those duties must be recognised.

Laws, Codes and Behaviour

Behavior Continuum (Relationship of Laws and Codes to standards of ethical behavior) Consider the representation below where behavior has been shown as a continuum. The extremes may be "Selfish" and Altruistic" as shown, or perhaps as 100% unacceptable and 100% acceptable

(e.g. everyone agrees that a certain act or behavior is unacceptable at one extreme, and everyone agrees that a certain behavior is acceptable at the other extreme.)

Engineers as Responsible Experimenters:

To fulfill their obligations as responsible experimenters, engineers must:

-protect the safety of human subjects, providing a safe exit whenever possible, and respect their right of informed consent

- use imaginative forecasting of possible side effects, and reasonable efforts to monitor them

- have autonomous, personal involvement in all aspects of a project

- accept accountability for the results

-display technical competence and other attributes of responsible professionals

(Martin & Schinzinger, 89)

Remember, informing for consent requires excellent communications skills in order to

provide appropriate information in an understandable way. Also, cooperation with other disciplines is often essential to assess potential side effects and monitor effects of "social experiments" through engineering.. (Recall Alasdair MacIntyre's virtue of professional responsibility which includes: i) self direction, ii) public spirited, iii)

team work, iv) proficiency. (Martin & Schinzinger, 42))

Confidentiality

Confidentiality is one of the most central and widely acknowledged duties of most professionals. Indeed, information gained in confidence can be considered part of engineers' "specialized" knowledge which is required to

do their job properly and professionally. To discuss the related issues, we first refer to a few definitions (Martin and Schinzinger, 208 –210):

-confidential information is any information deemed desirable to keep secret

-privileged information is often used as a synonym for “confidential, but literally means

available only onthe basis of special privilege.

-proprietary information is information that a company owns or is the proprietor of, often considered as an asset which can be protected by law from use by others.

-trade secrets are another form of proprietary information which is any type of information that has not become public and which an employer has taken steps to keep secret.

-patents are a method of legal protection of ideas for a specified period (currently 20 years in Canada). Patents and trade secrets have the same objectives but each has its advantages and disadvantages. While patents offer some legal protection, they necessarily reveal some aspects of the idea in the public forum which can lead to improvement and use by others (which is indeed one of the reasons for the patent process). Trade secrets can keep all aspects of an idea from the public, but should it leak out (through a former employee or espionage), there is no legal way to prevent its use.

Normal reason would dictate that an engineer has a firm obligation to their employer or client to keep information confidential. In most cases, the professional requires all relevant information in order to do the best job for their client. Trusting that this information will be kept confidential helps facilitate this relationship and a quality result. In the case of corporate secrets, it can be argued that it is also in the public’s interest to allow innovative companies the opportunity to recoup their development costs by exploiting their inventions, and engineers should do their part to support this process.

One set of issues has to do with determining what information is confidential, for how long, and under what circumstances. Certainly the circumstances where public safety is at stake may warrant exceptions to otherwise strict rules (Martin and Schinzinger, 212), but again each situation should be studied carefully. Generally, information that someone outside a company or client relationship could obtain legal access to by some other means would not be considered confidential. For example, this could include some information included in patent applications or public annual reports. Remember however that interpretation of that information may not be easily accessible, and engineers are often asked to interpret technical information. (Remember one’s obligation to one’s client or employer to protect their interests. If in doubt -speak not!) As for timeframe, until it’s public, it’s confidential!

One of the trickiest situation that may be encountered is when an engineer changes employers. Usually there is an implied confidentiality agreement if not an explicit one. This is especially an issue when an engineer goes to work for another company in the same line of business. It should be clear that an engineer cannot directly use any trade secrets or proprietary information in order to give their new employer a competitive advantage (even though in some industries this is a common practice to acquire new knowledge or technology!). The issue is much more subtle when it comes to expertise the engineer has developed that is more general in nature. Generally, it is becoming recognized that much of the knowledge developed on the job is owned as much by the engineer as the company, and it is their right to look after their own self interests and better their situation (Martin and Schinzinger, 213). Of course, each situation is unique, and should be examined carefully with respect to possible confidentiality infringements. In recent times, explicit confidentiality agreements have attempted to strike a reasonable middle ground by either offering incentives to departing employees to keep secrets, or by specifying conditions or timeframes thus making the decisions clearer. (214) However, an explicit agreement is not an excuse to ignore one’s moral obligations (recall the potential effect of following just the letter of the law!).

Plagiarism

Plagiarism is defined in multiple ways in higher education institutions and universities. For example:

- Stanford sees plagiarism as the "use, without giving reasonable and appropriate credit to or acknowledging the author or source, of another person's original work, whether such work is made up of code, formulas, ideas, language, research, strategies, writing or other form."
- Yale views plagiarism as the "use of another's work, words, or ideas without attribution" which includes "using a source's language without quoting, using information from a source without attribution, and paraphrasing a source in a form that stays too close to the original."
- Princeton perceives plagiarism as the "deliberate" use of "someone else's language, ideas, or other original (not common-knowledge) material without acknowledging its source."
- Oxford characterizes plagiarism as the use of "a writer's ideas or phraseology without giving due credit.";
- Brown defines plagiarism to be "appropriating another person's ideas or words (spoken or written) without attributing those word or ideas to their true source".

Sanctions for student plagiarism

In the academic world, plagiarism by students is usually considered a very serious offense that can result in punishments such as a failing grade on the particular assignment, the entire course, or even being expelled from the institution. Generally, the punishment increases as a person enters higher institutions of learning. For cases of repeated plagiarism, or for cases in which a student commits severe plagiarism (e.g., submitting a copied piece of writing as original work), suspension or expulsion is likely. A plagiarism tariff has been devised for UK higher education institutions in an attempt to encourage some standardization of this academic problem.

Eight Cardinal Rules of Academic Integrity

1. **Know your rights.** Do not let other students in your class diminish the value of your achievement by taking unfair advantage. Report any academic dishonesty you see.

2. **Acknowledge your sources.** Whenever you use words or ideas that are not your own when writing a paper, use quotation marks where appropriate and cite your source in a footnote, and back it up at the end with a list of sources consulted.

3. **Protect your work.** In examinations, do not allow your neighbors to see what you have written; you are the only one who should receive credit for what you know.

4. **Avoid suspicion.** Do not put yourself in a position where you can be suspected of having copied another person's work, or of having used unauthorized notes in an examination. Even the appearance of dishonesty may undermine your instructor's confidence in your work.

5. **Do your own work.** The purpose of assignments is to develop your skills and measure your progress. Letting someone else do your work defeats the purpose of your education, and may lead to serious charges against you.

6. **Never falsify a record or permit another person to do so.** Academic records are regularly audited and students whose grades have been altered put their entire transcript at risk.

7. **Never fabricate data, citations, or experimental results.** Many professional careers have ended in disgrace, even years after the fabrication first took place.

8. **Always tell the truth when discussing your work with your instructor.** Any attempt to deceive may destroy the relation of teacher and student.

How to Avoid Plagiarism

Northwestern's "Principles Regarding Academic Integrity" defines plagiarism as "submitting material that in part or whole is not entirely one's own work without attributing those same portions to their correct source." Plagiarism can occur in many forms besides writing: art, music, computer code, mathematics, and scientific work can also be plagiarized. This document pays special attention to plagiarism in writing, but it is important to understand that unauthorized collaboration in a math or science assignment is also plagiarism.

In all academic work, and especially when writing papers, we are building upon the insights and words of others. A conscientious writer always distinguishes clearly between what has been learned from others and what he or she is personally contributing to the reader's understanding. To avoid plagiarism, it is important to understand how to attribute words and ideas you use to their proper source.

Guidelines for Proper Attribution

Everyone in the university needs to pay attention to the issue of proper attribution. All of us--faculty and students together--draw from a vast pool of texts, ideas, and findings that humans have accumulated over thousands of years; we could not think to any productive end without it. Even the sudden insights that appear at first glance to arrive out of nowhere come enmeshed in other people's thinking. What we call originality is actually the innovative combining, amending, or extending of material from that pool.

Hence each of us must learn how to declare intellectual debts. Proper attribution acknowledges those debts responsibly, usefully, and respectfully. An attribution is responsible when it comes at a location and in a fashion that leaves readers in no doubt about whom you are thanking for what. It is useful when it enables readers to find your source readily for themselves. You help them along the way, just as that same source helped you along yours. To make sure that our attributions are useful, we double-check them whenever we can. Quite literally, it is a habit that pays. Colleagues in every field appreciate the extra care. Nothing stalls a career faster than sloppy, unreliable work.

Finally, an attribution is respectful when it expresses our appreciation for something done well enough to warrant our borrowing it. We should take pride in the intellectual company we keep. It speaks well of us that we have chosen to use the work of intelligent, interesting people, and we can take genuine pleasure in joining our name with theirs.

Intellectual property (**IP**)

Intellectual property (**IP**) is a legal concept which refers to creations of the mind for which exclusive rights are recognized. Under intellectual property law, owners are granted certain exclusive rights to a variety of intangible assets, such as musical, literary, and artistic works; discoveries and inventions; and words, phrases, symbols, and designs. Common types of intellectual property rights include copyright, trademarks, patents, industrial design rights, trade dress, and in some jurisdictions trade secrets.

Although many of the legal principles governing intellectual property rights have evolved over centuries, it was not until the 19th century that the term *intellectual property* began to be used, and not until the late 20th century that it became commonplace in the majority of the world.[2]

Objectives

The stated objective of most intellectual property law (with the exception of trademarks) is to "Promote progress."[21] By exchanging limited exclusive rights for disclosure of inventions and creative works, society and the patentee/copyright owner mutually benefit, and an incentive is created for inventors and authors to create and disclose their work. Some commentators have noted that the objective of intellectual property legislators and those who support its implementation appears to be "absolute protection." "If some intellectual property is desirable because it encourages innovation, they reason, more is better. The thinking is that creators will not have sufficient

incentive to invent unless they are legally entitled to capture the full social value of their inventions." [22] This absolute protection or full value view treats intellectual property as another type of 'real' property, typically adopting its law and rhetoric. Other recent developments in intellectual property law, such as the America Invents Act, stress international harmonization.

Criticisms of IPR

"Copying is not theft!" badge with a character resembling Mickey Mouse in reference to the in popular culture rationale behind the Sonny Bono Copyright Term Extension Act of 1998

Some critics of intellectual property, such as those in the free culture movement, characterize it as intellectual protectionism, intellectual monopoly or government-granted monopoly, and argue the public interest is harmed by protectionist legislation such as copyright extension, software patents and business method patents. A critique against the idea of *intellectual property* has been formulated by Eben Moglen in his *dotCommunist Manifesto*:

Society confronts the simple fact that when everyone can possess every intellectual work of beauty and utility—reaping all the human value of every increase of knowledge—at the same cost that any one person can possess them, it is no longer moral to exclude. If Rome possessed the power to feed everyone amply at no greater cost than that of Caesar's own table, the people would sweep Caesar violently away if anyone were left to starve. But the bourgeois system of ownership demands that knowledge and culture be rationed by the ability to pay.

Objections to overbroad intellectual property laws

Some critics of intellectual property, such as those in the free culture movement, point at intellectual monopolies as harming health (in the case of pharmaceutical patents), preventing progress, and benefiting concentrated interests to the detriment of the masses,[53][54][55][56] and argue that the public interest is harmed by ever expansive monopolies in the form of copyright extensions, software patents, and business method patents. More recently scientists and engineers are expressing concern that patent thickets are undermining technological development even in high-tech fields such as nanotechnology.[57]

Peter Drahos notes that "Property rights confer authority over resources. When authority is granted to the few over resources on which many depend, the few gain power over the goals of the many. This has consequences for both political and economic freedoms with in a society."[58]:13

The World Intellectual Property Organization (WIPO) recognizes that conflicts may exist between the respect for and implementation of current intellectual property systems and other human rights.[59] In 2001 the UN Committee on Economic, Social and Cultural Rights issued a document called "Human rights and intellectual property" that argued that intellectual property tends to be governed by economic goals when it should be viewed primarily as a social product; in order to serve human well-being, intellectual property systems must respect and conform to human rights laws. According to the Committee, when systems fail to do so they risk infringing upon the human right to food and health, and to cultural participation and scientific benefits.[60][61] In 2004 the General Assembly of WIPO adopted *The Geneva Declaration on the Future of the World Intellectual Property Organization* which argues that WIPO should "focus more on the needs of developing countries, and to view IP as one of many tools for development—not as an end in itself".[62]

Further along these lines, The ethical problems brought up by IP rights are most pertinent when it is socially valuable goods like life-saving medicines are given IP protection. While the application of IP rights can allow companies to charge higher than the marginal cost of production in order to recoup the costs of research and development, the price may exclude from the market anyone who cannot afford the cost of the product, in this case a life-saving drug. "An IPR driven regime is therefore not a regime that is conductive to the investment of R&D of products that are socially valuable to predominately poor populations...."[

Some libertarian critics of intellectual property have argued that allowing property rights in ideas and information creates artificial scarcity and infringes on the right to own tangible property. Stephan Kinsella uses the following scenario to argue this point:

[I]magine the time when men lived in caves. One bright guy—let's call him Galt-Magnon—decides to build a log cabin on an open field, near his crops. To be sure, this is a good idea, and others notice it. They naturally imitate Galt-Magnon, and they start building their own cabins. But the first man to invent a house, according to IP advocates, would have a right to prevent others from building houses on their own land, with their own logs, or to charge them a fee if they do build houses. It is plain that the innovator in these examples becomes a partial owner of the tangible property (e.g., land and logs) of others, due not to first occupation and use of that property (for it is already owned), but due to his coming up with an idea. Clearly, this rule flies in the face of the first-user homesteading rule, arbitrarily and groundlessly overriding the very homesteading rule that is at the foundation of all property rights.

Thomas Jefferson once said in a letter to Isaac McPherson on August 13, 1813:

"If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me."

In 2005 the RSA launched the Adelphi Charter, aimed at creating an international policy statement to frame how governments should make balanced intellectual property law.

Another limitation of current U.S. Intellectual Property legislation is its focus on individual and joint works; thus, copyright protection can only be obtained in 'original' works of authorship. This definition excludes any works that are the result of community creativity, for example Native American songs and stories; current legislation does not recognize the uniqueness of indigenous cultural 'property' and its ever-changing nature. Simply asking native cultures to 'write down' their cultural artifacts on tangible mediums ignores their necessary orality and enforces a Western bias of the written form as more authoritative

Computer Ethics is a branch of practical philosophy which deals with how computing professionals should make decisions regarding professional and social conduct.[1] Margaret Anne Pierce, a professor in the Department of Mathematics and Computers at Georgia Southern University has categorized the ethical decisions related to computer technology and usage into 3 primary influences:

- 1. The individual's own personal code.
- 2. Any informal code of ethical conduct that exists in the work place.
- 3. Exposure to formal codes of ethics.

Foundation

To understand the foundation of computer ethics, it is important to look into the different schools of ethical theory. Each school of ethics influences a situation in a certain direction and pushes the final outcome of ethical theory.

Relativism is the belief that there are no universal moral norms of right and wrong. In the school of relativistic ethical belief, ethicists divide it into two connected but different structures, subject (Moral) and culture (Anthropological). Moral relativism is the idea that each person decides what is right and wrong for them. Anthropological relativism is the concept of right and wrong is decided by a society's actual moral belief structure.

Deontology is the belief that people's actions are to be guided by moral laws, and that these moral laws are universal. The origins of Deontological Ethics are generally attributed to the German philosopher Immanuel Kant and his ideas concerning the Categorical Imperative. Kant believed that in order for any ethical school of thought to apply to all rational beings, they must have a foundation in reason. Kant split this school into two categorical imperatives. The first categorical imperative states to act only from moral rules that you can at the same time will to be universal moral laws. The second categorical imperative states to act so that you always treat both yourself and other people as ends in themselves, and never only as a means to an end.

Utilitarianism is the belief that if an action is good it benefits someone and an action is bad if it harms someone. This ethical belief can be broken down into two different schools, Act Utilitarianism and Rule Utilitarianism. Act Utilitarianism is the belief that an action is good if its overall effect is to produce more happiness than unhappiness. Rule Utilitarianism is the belief that we should adopt a moral rule and if followed by everybody, would lead to a greater level of overall happiness.

Social contract is the concept that for a society to arise and maintain order, a morality based set of rules must be agreed upon. Social contract theory has influenced modern government and is heavily involved with societal law. Philosophers like John Rawls, Thomas Hobbes, John Locke, and Jean-Jacques Rousseau helped created the foundation of social contract.

Virtue Ethics is the belief that ethics should be more concerned with the character of the moral agent (virtue), rather than focusing on a set of rules dictating right and wrong actions, as in the cases of deontology and utilitarianism, or a focus on social context, such as is seen with Social Contract ethics. Although concern for virtue appears in several philosophical traditions, in the West the roots of the tradition lie in the work of Plato and Aristotle, and even today the tradition's key concepts derive from ancient Greek philosophy.

The conceptual foundations of computer ethics are investigated by information ethics, a branch of philosophical ethics established by Luciano Floridi. The term computer ethics was first coined by Dr. Walter Maner, a professor at Boston University. Since the 1990s the field has started being integrated into professional development programs in academic settings.

History

The concept of computer ethics originated in 1950 when Norbert Wiener, an MIT professor and inventor of an information feedback system called "cybernetics", published a book called "The Human Use of Human Beings" which laid out the basic foundations of computer ethics and made Norbert Wiener the father of computer ethics.

Later on, in 1966 another MIT professor by the name of Joseph Weizenbaum published a simple program called ELIZA which performed natural language processing. In essence, the program functioned like a psychotherapist where the program only used open ended questions to encourage patients to respond. The program would apply pattern matching pattern rules to human statements to figure out its reply.

A bit later during the same year the world's first computer crime was committed. A programmer was able to use a bit of computer code to stop his banking account from being flagged as overdrawn.[*citation needed*] However, there were no laws in place at that time to stop him, and as a result he was not charged. To make sure another person did not follow suit, an ethics code for computers was needed.

Sometime further into the 1960s Donn Parker, who was an author on computer crimes, led to the development of the first code of ethics in the field of computer technology.[*citation needed*]

In 1970, a medical teacher and researcher, by the name of Walter Manner noticed that ethical decisions are much harder to make when computers are added. He noticed a need for a different branch of ethics for when it came to dealing with computers. The term "Computer ethics" was thus invented.

During the same year, the ACM (Association of Computing Machinery) decided to adopt a professional code of ethics due to which, by the middle of the 1970s new privacy and computer crime laws had been put in place in United States as well as Europe.

In the year 1976 Joseph Weizenbaum made his second significant addition to the field of computer ethics. He published a book titled "Computer power and Human reason" which talked about how artificial intelligence is good for the world; however it should never be allowed to make the most important decisions as it does not have human qualities such as wisdom. By far the most important point he makes in the book is the distinction between choosing and deciding. He argued that deciding is a computational activity while making choices is not and thus the ability to make choices is what makes us humans.

At a later time during the same year Abbe Mowshowitz, a professor of Computer Science at the City College of New York, published an article titled "On approaches to the study of social issues in computing". This article identified and analyzed technical and non-technical biases in research on social issues present in computing.

During 1978, the Right to Federal Privacy Act was adopted and this drastically limited the government's ability to search bank records.

During the same year Terrell Ward Bynum, the professor of Philosophy at Southern Connecticut State University as well as Director of the Research Center on Computing and Society there, developed the first ever curriculum for a university course on computer ethics. To make sure he kept the interests of students alive in computer ethics, he launched an essay contest where the subject students had to write about computer ethics. In 1985, he published a journal titled “Entitled Computers and Ethics”, which turned out to be his most famous publication to date.

In 1984, the Small Business Computer Security and Education act was adopted and this act basically informed the congress on matters that were related to computer crimes against small businesses.

In 1985, James Moor, Professor of Philosophy at DartMouth College in New Hampshire, published an essay called "What is Computer Ethics". In this essay Moor states the computer ethics includes the following: "(1) identification of computer-generated policy vacuums, (2) clarification of conceptual muddles, (3) formulation of policies for the use of computer technology, and (4) ethical justification of such policies."

During the same year, Deborah Johnson, Professor of Applied Ethics and Chair of the Department of Science, Technology, and Society in the School of Engineering and Applied Sciences of the University of Virginia, got the first major computer ethics textbook published. It didn't just become the standard setting textbook for computer ethics, but also set up the research agenda for the next 10 years.

In 1988, a librarian at St. Cloud University by the name of Robert Hauptman, came up with "information ethics", a term that was used to describe the storage, production, access and dissemination of information. Near the same time, the Computer Matching and Privacy Act was adopted and this act restricted the government to programs and identifying debtors.

The 1990s was the time when computers were reaching their pinnacle and the combination of computers with telecommunication, the internet, and other media meant that many new ethical issues were raised.

In the year 1992, ACM adopted a new set of ethical rules called "ACM code of Ethics and Professional Conduct" which consisted of 24 statements of personal responsibility.

3 years later in 1995, Gorniak Kocikowska, a Professor of Philosophy at Southern Connecticut State University, Coordinator of the Religious Studies Program, as well as a Senior Research Associate in the Research Center on Computing and Society, came up with the idea that computer ethics will eventually become a global ethical system and soon after, computer ethics would replace ethics altogether as it would become the standard ethics of the information age.

In 1999, Deborah Johnson revealed her view, which was quite contrary to Kocikowska's belief, and stated that computer ethics will not evolve but rather be our old ethics with a slight twist.

Computer Ethics

Ethics deals with placing a "**value**" on acts according to whether they are "**good**" or "**bad**". Every society has its rules about whether certain acts are ethical or not. These rules have been established as a result of consensus in society and are often written into laws.

When computers first began to be used in society at large, the absence of ethical standards about their use and related issues caused some problems. However, as their use became widespread in every facet of our lives, discussions in **computer ethics** resulted in some kind of a consensus. Today, many of these rules have been formulated as laws, either national or international. **Computer crimes** and **computer fraud** are now common terms. There are laws against them, and everyone is responsible for knowing what constitutes computer crime and computer fraud.

The **Ten Commandments of computer ethics** have been defined by the **Computer Ethics Institute**. Here is our interpretation of them:

1) Thou shalt not use a computer to harm other people: If it is unethical to harm people by making a bomb, for example, it is equally bad to write a program that handles the timing of the bomb. Or, to put it more simply, if it is bad to steal and destroy other people's books and notebooks, it is equally bad to access and destroy their files.

2) Thou shalt not interfere with other people's computer work: Computer **viruses** are small programs that disrupt other people's computer work by destroying their files, taking huge amounts of computer time or memory, or by simply displaying annoying messages. Generating and consciously spreading computer viruses is unethical.

3) Thou shalt not snoop around in other people's files: Reading other people's e-mail messages is as bad as opening and reading their letters: This is invading their privacy. Obtaining other people's non-public files should be judged the same way as breaking into their rooms and stealing their documents. Text documents on the Internet may be protected by **encryption**.

4) Thou shalt not use a computer to steal: Using a computer to break into the accounts of a company or a bank and transferring money should be judged the same way as robbery. It is illegal and there are strict laws against it.

5) Thou shalt not use a computer to bear false witness: The Internet can spread untruth as fast as it can spread truth. Putting out false "information" to the world is bad. For instance, spreading false rumors about a person or false propaganda about historical events is wrong.

6) Thou shalt not use or copy software for which you have not paid: Software is an intellectual product. In that way, it is like a book: Obtaining illegal copies of copyrighted software is as bad as photocopying a copyrighted book. There are laws against both. Information about the copyright owner can be embedded by a process called **watermarking** into pictures in the digital format.

7) Thou shalt not use other people's computer resources without authorization: Multiuser systems use **user id's** and **passwords** to enforce their memory and time allocations, and to safeguard information. You should not try to bypass this authorization system. **Hacking** a system to break and bypass the authorization is unethical.

8) Thou shalt not appropriate other people's intellectual output: For example, the programs you write for the projects assigned in this course are your own intellectual output. Copying somebody else's program without proper authorization is **software piracy** and is unethical. **Intellectual property** is a form of ownership, and may be protected by copyright laws.

9) Thou shalt think about the social consequences of the program you write: You have to think about computer issues in a more general social framework: Can the program you write be used in a way that is harmful to society? For example, if you are working for an animation house, and are producing animated films for children, you are responsible for their contents. Do the animations include scenes that can be harmful to children? In the United States, the **Communications Decency Act** was an attempt by lawmakers to ban certain types of content from Internet websites to protect young children from harmful material. That law was struck down because it violated the free speech principles in that country's constitution. The discussion, of course, is going on.

10) Thou shalt use a computer in ways that show consideration and respect: Just like public buses or banks, people using computer communications systems may find themselves in situations where there is some form of queuing and you have to wait for your turn and generally be nice to other people in the environment. The fact that you cannot see the people you are interacting with does not mean that you can be rude to them.

Defining Computer Ethics

In 1976, nearly three decades after the publication of Wiener's book *Cybernetics*, Walter Maner noticed that the ethical questions and problems considered in his Medical Ethics course at Old Dominion University often became more complicated or significantly altered when computers got involved. Sometimes the addition of computers, it seemed to Maner, actually generated *wholly new ethics problems that would not have existed if computers had not been invented*. He concluded that there should be a new branch of applied ethics similar to already existing fields like medical ethics and business ethics; and he decided to name the proposed new field "computer ethics". (At that time, Maner did not know about the computer ethics works of Norbert Wiener.) He defined the proposed new field as one that studies ethical problems "aggravated, transformed or created by computer technology". He developed an experimental computer ethics course designed primarily for students in university-level computer science programs. His course was a success, and students at his university wanted him to teach it regularly. He complied with their wishes and also created, in 1978, a "starter kit" on teaching computer ethics, which he prepared for dissemination to attendees of workshops that he ran and speeches that he gave at philosophy conferences and computing science conferences in America. In 1980, Helvetia Press and the National Information and Resource Center on Teaching Philosophy published Maner's computer ethics "starter kit" as a monograph (Maner 1980). It contained curriculum materials and pedagogical advice for university teachers. It also included a rationale for offering such a course in a university, suggested course descriptions for university catalogs, a list of course objectives, teaching tips, and discussions of topics like privacy and confidentiality, computer crime, computer decisions, technological dependence and professional codes of ethics. During the early 1980s, Maner's *Starter Kit* was widely disseminated by Helvetia Press to colleges and universities in America and elsewhere. Meanwhile Maner continued to conduct workshops and teach courses in computer ethics. As a result, a number of scholars, especially philosophers and computer scientists, were introduced to computer ethics because of Maner's trailblazing efforts.

The "uniqueness debate"

While Maner was developing his new computer ethics course in the mid-to-late 1970s, a colleague of his in the Philosophy Department at Old Dominion University, Deborah Johnson, became interested in his proposed new field. She was especially interested in Maner's view that computers generate *wholly new* ethical problems, for she did not believe that this was true. As a result, Maner and Johnson began discussing ethics cases that allegedly involved *new* problems brought about by computers. In these discussions, Johnson granted that computers did indeed transform old ethics problems in interesting and important ways — that is, "give them a new twist" — but she did *not* agree that computers generated *ethically unique* problems that had never been seen before. The resulting Maner-Johnson discussion initiated a fruitful series of comments and publications on the nature and uniqueness of computer ethics — a series of scholarly exchanges that started with Maner and Johnson and later spread to other scholars. The following passage, from Maner's ETHICOMP95 keynote address, drew a number of other people into the discussion:

I have tried to show that there are issues and problems that are unique to computer ethics. For all of these issues, there was an essential involvement of computing technology. Except for this technology, these issues would not have arisen, or would not have arisen in their highly altered form. The failure to find satisfactory non-computer analogies testifies to the uniqueness of these issues. The lack of an adequate analogy, in turn, has interesting moral

consequences. Normally, when we confront unfamiliar ethical problems, we use analogies to build conceptual bridges to similar situations we have encountered in the past. Then we try to transfer moral intuitions across the bridge, from the analog case to our current situation. Lack of an effective analogy forces us to discover new moral values, formulate new moral principles, develop new policies, and find new ways to think about the issues presented to us. (Maner 1996, p. 152)

Over the decade that followed this provocative passage, the extended “uniqueness debate” led to a number of useful contributions to computer and information ethics. (For some example publications, see Johnson 1985, 1994, 1999, 2001; Maner 1980, 1996, 1999; Gorniak-Kocikowska 1996; Tavani 2002, 2005; Himma 2003; Floridi and Sanders 2004; Mather 2005; and Bynum 2006, 2007.)

DEVELOPMENT OF THE CASE STUDY

The challenge in presenting any 'non-technical' course content to engineering students is to make it relevant and engaging. This is especially true of a topic such as ethics, which can potentially viewed from a students' perspective as a highly theoretical exercise with limited relevance to the real world, or at the other extreme, challenging and confronting to the students' personal beliefs and ideals. It is within the context of wishing to ensure a macro-ethical approach as well as improving the engagement of undergraduate students in the learning process that the case study described in this paper was developed.

There exists no shortage of published resources and documented case studies dealing with professional ethics in the context of applying and interpreting relevant codes of ethics [4] [21], but the aim here was a macro- rather than micro-ethical approach. At the time I was searching for an actual occurrence that involved engineering, technology and moral decisions, there was a very public remembrance of the 50th anniversary of the use of the first atomic bomb. The development and use of the first atomic weapons is well documented and remains one of the greatest achievements of science and engineering in the technological sense. It is also one of the most controversial projects in terms of the moral justification of both the development phase and actual use of the weapons. Here then was the case study I was looking for.

THE CASE STUDY

Based on published accounts from a large number of sources, the case study documents, in the form of a time line, and objectively as possible, the scientific, social, political and military events spanning the discovery of the nuclear structure of atoms through to the use of atomic weapons against the Japanese in 1945. The time line format allows students to study the events leading up to the use of nuclear weapons in the correct temporal and causal sequence. Commencing the case study with the scientific discoveries that underpin nuclear power allows students to grasp the relationship between scientific research and the final application of technology. The following are selected segments of the case study time line.

****

1911 - Ernest Rutherford publishes a paper describing the nuclear structure of atoms.

1917-1920 - Rutherford refines the nuclear model, and identifies the proton.

1932 - James Chadwick discovers the neutron and its ability to be absorbed by some atoms.

December, 1938 - Otto Hahn and Fritz Strassman solve the mystery of neutron absorption, a uranium nucleus can absorb a neutron and split into two smaller nuclei, and in the process release energy. This phenomenon is called nuclear fission. In fact the fission also produces more neutrons, which can split further uranium atoms, which produces more neutrons in an ever increasing release of energy called a chain reaction.

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December 7, 1941 - The Japanese attack Pearl Harbour, severely crippling the US Pacific fleet and killing more than 2300 people.

December 8, 1941 - The Americans declare war against Japan. Germany, Japan's ally, declares ware on America shortly thereafter. The US was now directly in the race to develop atomic weapons and devotes enormous resources to the project. Within six months they have outstripped the British effort and are motivated by the fear that the Germans are also working on atomic weapons. The US atomic weapons program is code-named the Manhattan Project.

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Summer, 1944 - The two basic bomb models are developed and partially tested on a small scale.

Late 1944 - The allied forces enter Germany, and a special US military scientific unit locate the chief German nuclear scientists and establish that the Germans have not developed a nuclear bomb. Several Manhattan scientists feel uneasy about continuing the project now that there is no German nuclear threat. But only one, Dr. Joseph Rotblat is known to have left. Oppenheimer described the project as now having a momentum of its own.

December 1944 - The allied offensive in Europe slows and the possibility of using an atomic bomb against Germany is discussed. The idea is dropped as the allied effort moved forward. The atomic bomb is now seen as a weapon to be used against the Japanese in the Pacific.

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8.15am, August 6, 1945 - The US B-29 bomber named the 'Enola Gay' drops a uranium little boy bomb on Hiroshima, killing approximately 130,000 people, of which only 20,000 are military personnel.

August 8, 1945 - The USSR declares war on Japan.

11.02am, August 9, 1945 - The US B-29 bomber names 'Bock's Car' drops a plutonium fat man bomb on Nagasaki, killing approximately 70,000 people, of which only 150 are military personnel.

August 10, 1945 - The Americans agree to allow the Japanese to retain their Emperor in surrender.

August 14, 1945 - The Japanese Emperor insists that Japan accept the Potsdam Declaration and the war in the Pacific comes to a close.

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Following the time line of events under consideration, a series of macro-ethical questions relating to the pursuit of knowledge, the application of technology, the roles and responsibilities of engineers in general, and particular questions arising from the case study are posed for consideration by students. Finally, an initial set of further references are offered to students who wish to read more widely. The following are selected ethical questions from the case study.

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Should the Manhattan project have been stopped after the defeat of the Germans?

Was it inevitable that the bombs would be used once they were successfully tested? Did those involved have to justify the money and effort expended in the development?

Would it have been better to demonstrate the destructive power of the bomb to the Japanese by allowing them to view a test explosion or dropping a bomb in an uninhabited area of Japan? Or was the 'shock value' of tens of thousands of deaths required to convince the Japanese?

Was it right to target Hiroshima and Nagasaki, which were primarily non-military cities?

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Some people have suggested that the devastation at Hiroshima and Nagasaki played an important part in stopping the use of nuclear weapons in wars since that time. Does this help to justify the use of atomic bombs on Japan?

What about the benefits of nuclear energy the world has derived from the work done on the Manhattan project?

Why wasn't work on atomic weapons development stopped after the defeat of the Japanese?

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The case study is presented to students in print form as an integral part of the normal course material they receive. The full text of the case study can be found on the World Wide Web at:

'http://www.deakin.edu.au/~spalm/ethics'.

APPLICATIONS AND LIMITATIONS OF THE CASE STUDY

The case study presents a context in which to introduce and discuss macro-ethical considerations for engineering students. This can be used to complement and balance a study program that examines micro-ethical issues, such as hypothetical situations involving moral choices for individual engineers, particularly those referring to the IEAust code of ethics. The case study is intended as a student resource that forms part of a complete ethics syllabus as outlined in Figure 1 above.

The case study was developed for use in engineering and technology undergraduate education, but the nature of the material lends itself to the teaching of science students as well, particularly those studying chemistry or physics. Used in the context of discussing the impacts of technology and ethical considerations in the link between research and development and the consequences of technology, the case study has wide applicability.

Even though the case study is based on events that occurred long before the birth of most of today's undergraduates, the history of the Manhattan project is still fascinating to anyone involved in science and technology, and the consequences of the development and use of nuclear power will continue to be relevant for the foreseeable future. The 50th anniversary of the use of nuclear weapons was quickly followed by French nuclear testing in the south pacific, the resumption of Chinese nuclear testing, the complications of the nuclear test ban treaty, and most recently renewed discussion about Australia's three uranium mine policy.

As a tool for provoking thought and moral debate, the case study achieved success even in the development phase, with different colleagues respectfully and variously suggesting that it presented in a bad light the Allies, the Japanese, the military, scientists and engineers.

The case study was developed to be used at first year undergraduate level, but the nature of the issues addressed in the case could be presented and discussed at any level. While no formal evaluation of the case study has yet been undertaken, students were given the opportunity to select the topic 'The ethics of the development and use of the atomic bomb in World War II', from a list of four topics relating to the course material, as the basis for their major semester essay. Of the students who elected to consider this topic, their concluding remarks ranged from unequivocal support for the use of atomic weapons by the Americans, to quoting the accounts of survivors from Hiroshima.

Even though every effort has been made to present the circumstances surrounding the development and use of nuclear weapons objectively, success in this area is necessarily limited by the availability and accuracy of the information sources used and the editing of those sources into a case study.

CONCLUSION

The members of the professions, including engineering, find themselves in a world of ever increasing ethical complexity, brought about by increasing social and commercial pressures, and by changes in the nature of the professions themselves. To enable engineering graduates to deal effectively with these challenges we must ensure that, as students, they develop moral autonomy. To achieve this they must be exposed to a wide range of ethical issues including, the nature of ethics and moral decision making, and the relationship between science, engineering, technology and society, as well as the concept of professional ethics and the application of the code of ethics. The case study presented provides a context in which to introduce and discuss macro-ethical considerations for engineering students.

Discrimination

The aim of the Anti-Discrimination Act (the Act), and therefore the Anti-Discrimination Commission (ADC), is to promote recognition and acceptance of the right to equality of opportunity of persons regardless of an attribute to eliminate discrimination on the basis of an attribute and to eliminate sexual harassment.

These are pretty big aims and we work to achieve them through mechanisms such as our complaint handling, conciliation, public education and training services. http://www.nt.gov.au/justice/adc/aboutus.htm

When **handling a complaint of discrimination or other prohibited** conduct, the ADC will conduct an investigation and work with parties (ie the person making the complaint and the person/organisation about which the complaint is made) as they attempt to resolve the complaint through conciliation (link to definition of conciliation). When a complaint is not able to be resolved through conciliation, it may be determined through a public hearing. This hearing determines whether the actions alleged by the person making the complaint took place and if so, whether they amounted to unlawful conduct under the Act. As a general rule most of the complaints that we receive at the ADC are resolved without the need to go to hearing.

The ADC also provides public education and training, with a range of programs available to businesses, government, individuals and other organisations in the NT. These programs are designed to educate participants about what constitutes prohibited conduct under the Act and how it can be avoided. We also hold a number of public events during the year to promote the aims of the ADC.

Our other functions at the ADC include examining legislation to determine whether that legislation is consistent with the purposes of the Act; consulting with other organisations to work to improve services and conditions of those groups who may be subjected to prohibited conduct; advising the Minister on the operation of the Act; and providing other advice and assistance in relation to the Act.

The ADC has a key role in promoting equality of opportunity and eliminating discrimination in the Northern Territory, but we cannot do it alone. To have any success in achieving our aims, every Territorian will need to play a part. We all need to reflect on our own thoughts, and actions, and challenge discrimination where we see it.

One of the ways we can all do this is by considering our own prejudices. Treating others fairly means treating each person on their merits - not making assumptions about what a person can or cannot do, what that person thinks or how they will act just because they are female, or aboriginal, have a disability, are pregnant, or a parent. It means not hurting or making fun of others because of their race, their religion, their age, their sexuality or some other characteristic.

We also need to be clear about what we mean when we use the term "equality of opportunity". We are often asked whether this just means eliminating discrimination. Eliminating formal discrimination is a great aim, but it will not in itself ensure that we have equality of opportunity in the NT. Equality of opportunity is about ensuring that all members of our society have the opportunity to achieve to their full potential. For this to occur we all need to firstly recognise that there are groups in our community that are starting from a position of disadvantage, often as a result of a history of discrimination or other barriers to equality. To ensure that all members of society have equal access to opportunities such as education and work, some members will need some additional assistance to even get to the starting blocks.

This fact is recognised through the provisions in the Act that deal with "special measures" or positive discrimination designed to achieve equality; and those that provide for positive obligations such as accommodation of special need (link).

If you experience discrimination, or even just observe it, get in touch with us at the ADC. If you have a good story, or think an organisation or an individual deserves a pat on the back for their work to eliminate discrimination and promote equality of opportunity we would like to hear about that too.

Engineer as Expert Witness

An **expert witness**, **professional witness** or **judicial expert** is a witness, who by virtue of education, training, skill, or experience, is believed to have expertise and specialised knowledge in a particular subject beyond that of the average person, sufficient that others may officially and legally rely upon the witness's specialized (scientific, technical or other) opinion about an evidence or fact issue within the scope of his expertise, referred to as the expert opinion, as an assistance to the fact-finder.[1] Expert witnesses may also deliver **expert evidence** about facts from the domain of their expertise.[2] At times, their testimony may be rebutted with a learned treatise, sometimes to the detriment of their reputations.

Experts in the real world

Typically, experts are relied on for opinions on severity of injury, degree of insanity, cause of failure in a machine or other device, loss of earnings, care costs, and the like. In an intellectual property case, an expert may be shown two music scores, book texts, or circuit boards and asked to ascertain their degree of similarity. In the majority of cases the expert's personal relation to the defendant is considered irrelevant.

The tribunal itself, or the judge, can in some systems call upon experts to technically evaluate a certain fact or action, in order to provide the court with a complete knowledge on the fact/action it is judging. The expertise has the legal value of an acquisition of data. The results of these experts are then compared to those by the experts of the parties.

The expert has a heavy responsibility, especially in penal trials, and perjury by an expert is a severely punished crime in most countries. The use of expert witnesses is sometimes criticized in the United States because in civil trials, they are often used by both sides to advocate differing positions, and it is left up to a jury to decide which expert witness to believe. Although experts are legally prohibited from expressing their opinion of submitted evidence until after they are hired, sometimes a party can surmise beforehand, because of reputation or prior cases, that the testimony will be favorable regardless of any basis in the submitted data; such experts are commonly disparaged as "hired guns.

Duties of experts

In England and Wales, under the Civil Procedure Rules 1998 (CPR), an expert witness is required to be independent and address his or her expert report to the court. A witness may be jointly instructed by both sides if the parties agree to this, especially in cases where the liability is relatively small.

Under the CPR, expert witnesses are usually instructed to produce a joint statement detailing points of agreement and disagreement to assist the court or tribunal. The meeting is held quite independently of instructing lawyers, and often assists in resolution of a case, especially if the experts review and modify their opinions. When this happens, substantial trial costs can be saved when the parties to a dispute agree to a settlement. In most systems, the trial (or the procedure) can be suspended in order to allow the experts to study the case and produce their results. More frequently, meetings of experts occur before trial.

Experts charge a professional fee which is paid by the party commissioning the report (both parties for joint instructions) although the report is addressed to the court. The fee must not be contingent on the outcome of the case. Expert witnesses may be subpoenaed (issued with a witness summons), although this is normally a formality to avoid court date clashes.

In the United States, under the Federal Rule of Evidence 702 (FRE), an expert witness must be qualified on the topic of testimony. In determining the qualifications of the expert, the FRE requires the expert have specialized education, training, or practical experience in the subject matter relating to the case.[6] The expert's testimony must be based on facts in evidence, and should offer opinion about the causation or correlation to the evidence in drawing a conclusion.

History

The earliest known use of an expert witness in English law came in 1782, when a court that was hearing litigation relating to the silting-up of Wells harbour in Norfolk accepted evidence from a leading civil engineer, John Smeaton. This decision by the court to accept Smeaton's evidence is widely cited as the root of modern rules on expert evidence. However, it was still such an unusual feature in court that in 1957 in the Old Bailey, Lord Justice Patrick Devlin could describe the case of suspected serial killer Dr John Bodkin Adams thus: "It is a most curious situation, perhaps unique in these courts, that the act of murder has to be proved by expert evidence."[7]

On the other hand, expert evidence is often the most important component of many civil and criminal cases today. Fingerprint examination, blood analysis and DNA fingerprinting are common kinds of expert evidence heard in serious criminal cases. In civil cases, the work of accident analysis, forensic engineers, and forensic accountants is usually important, the latter to assess damages and costs in long and complex cases. Intellectual property and medical negligence cases are typical examples.

Electronic evidence has also entered the courtroom as critical forensic evidence. Audio and video evidence must be authenticated by both parties in any litigation by a forensic expert who is also an expert witness who assists the court in understanding details about that electronic evidence.

Voice-mail recordings and closed-circuit television systems produce electronic evidence often used in litigation, more so today than in the past. Video recordings of bank robberies and audio recordings of life threats are presented in court rooms by electronic expert witnesses.

What is Moral Leadership?

Leadership is a complex concept, yet too often is it understood in narrow ways. Leaders are frequently considered to be those that have authority over others, those who control, those that somehow walk ahead, are better than the rest. This kind of leadership is often self-serving, short-term oriented and disempowers others. It has often proven disastrous on a personal and organizational level.

Moral Leadership is a very different kind of leadership. Rather than aspiring to being followed, Moral Leaders aim to serve. Instead of showcasing their own skills, Moral Leaders tend to develop the capacities of others. Moral Leadership is not about rank – any person holding any position can be a Moral Leader, but such individuals are always characterized by a deep sense of ethics, are driven by core ideals (such as justice) and are motivated by the pursuit of a higher purpose.

Moral Leadership is also about particular capacities and skills. First of all, Moral Leaders know how to manage themselves, how to temper their egos and how to act with nobility and rectitude. They are visionary and affect personal change. Moral Leaders also have a highly developed sense of emotional intelligence and master key social skills. They work to overcome obstacles and are skilled at the art of consultation. They build consensus navigate diversity and establish unity. Moral Leaders are the conscience (i.e. moral compass) of an enterprise or organization and the glue that holds it together.

Moral Leadership originates in, builds and reinforces Spiritual Capital.

For leaders to facilitate solutions to ethical dilemmas in the workplace, written guidelines in the form of a code of conduct are useful. According to Driscoll and Hoffman (2000), a code of conduct is intended to be a guide and reference for users in support of day-to-day decision making. It is meant to clarify an organization's mission, values and principles and to link them with standards of professional conduct. It can also serve as a reference used to locate resources related to ethics within the organization. While many organizations have noteworthy codes of ethics, the "Credo" of Johnson and

Johnson is often cited as a model example of a well written and highly effective one.

It is important that a code of ethics provide standards of behaviors, as opposed to a list of rules. The code of ethics should be based on organizational values, a philosophy of ethics, and the mission statement of the organization. Codes require the commitment of the company's leaders and other higher levels of management, and should address the needs of the various constituencies and stakeholders in the organization. For example, in a college athletic department, the Athletic Director and Associate/Assistant Athletic Directors would be considered, as would the coaches, student-athletes, boosters and fans, trainers, and staff. Similarly, for a school system such as that of Miami-Dade County, the fourth largest in the country, a code was developed and implemented for school employees (the superintendent, his assistants, school principals, and teachers), the students, and the outside vendors who do business with the schools. Though

certain ethical considerations might apply to all, there are those that are specific to

different constituencies.

CODE OF ETHICS

A code is an open disclosure for the way an organization operates. It provides visible guidelines for behavior. A well-written and thoughtful code also serves as an important communication vehicle that reflects the covenant that an organization has made to uphold its most important values, dealing with such matters as its commitment to employees, its standards for doing business and its relationship with the community (Driscoll & Hoffman). A code is also a tool to encourage discussions of ethics and to improve how employees/members deal with the ethical dilemmas, prejudices, and "gray areas" that are encountered in everyday work. A code is meant to complement relevant standards, policies, and rules, not to substitute for them. Codes of conduct offer an excellent opportunity for organizations to create a positive public identity for themselves which can lead to a more supportive political and regulatory environment and an increased level of public confidence and trust among important constituencies and stakeholders. Wherever possible, having employees participate in development of the organization's code of conduct is useful to create by-in and commitment. It is critical to include the top management and leadership in the code's development and implementation. It is also useful to define the enforcement capacity of a code of conduct, as frustration can be created when the code of conduct has no real "teeth" in terms of its punitive capabilities. Many times, however, when one is considering unethical behavior, having a set of published guidelines will serve as the necessary deterrent to prevent unethical acts.

Ultimately, the ideal solution for promoting ethical behavior is not a punitive one, but a positive approach by the leaders of organizations. Ethical behavior must be practiced by the leaders and modeled by those they lead. Ethical decision making should be acknowledged and rewarded. Ethics and leadership go hand in hand, and as Cuilla (1998), noted, ethics is the heart of leadership. We must return to that philosophy and make ethics a way of life.

ABET CODE OF ETHICS OF ENGINEERS

THE FUNDAMENTAL PRINCIPLES

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

I. using their knowledge and skill for the enhancement of human welfare;

II. being honest and impartial, and servicing with fidelity the public, their employers and clients;

III. striving to increase the competence and prestige of the engineering profession; and

IV. supporting the professional and technical societies of their disciplines.

THE FUNDAMENTAL CANONS

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.

2. Engineers shall perform services only in the areas of their competence.

3. Engineers shall issue public statements only in an objective and truthful manner.

4. Engineers shall act in professional maters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.

5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.

6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession.

7. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional development of those engineers under their supervision.

IEEE CODE OF ETHICS FOR ENGINEERS

PREAMBLE

Engineers affect the quality of life for all people in our complex technological society. In the pursuit of their profession, therefore, it is vital that engineers conduct their work in an ethical manner so that they merit the confidence of colleagues, employers, clients and the public. This IEEE Code of Ethics is a standard of professional conduct for engineers.

ARTICLE I

Engineers shall maintain high standards of diligence, creativity and productivity, and shall:

1. Accept responsibility for their actions;

2. Be honest and realistic in stating claims or estimates from available data;

3. Undertake engineering tasks and accept responsibility only if qualified by training or experience, or after full disclosure to their employers or clients of pertinent qualifications;

4. Maintain their professional skills at the level of the state of the art, and recognize the importance of current events in their work;

5. Advance the integrity and prestige of the engineering profession by practicing in a dignified manner and for adequate compensation.

ARTICLE II

Engineers shall, in their work:

1. Treat fairly all colleagues and coworkers, regardless of race, religion, sex, age or national origin;

2. Report, publish and disseminate freely information to others, subject to legal and proprietary restraints;

3. Encourage colleagues and co-workers to act in accord with this Code and support them when they do so;

4. Seek, accept and offer honest criticism of work, and properly credit the contributions of others;

5. Support and participate in the activities of their professional societies;

6. Assist colleagues and co-workers in their professional development.

ARTICLE III

Engineers shall, in their relations with employers and clients:

1. Act as faithful agents or trustees for their employers or clients in professional and business matters, provided such actions conform with other parts of this

Code;

2. Keep information on the business affairs or technical process of an employer or client in confidence while employed, and later, until such information is properly released, provided such actions conform with other parts of this Code;

3. Inform their employers, clients, professional societies or public agencies or private agencies of which they are members or to which they may make presentations, of any circumstance that could lead to a conflict of interest;

4. Neither give nor accept, directly or indirectly, any gift, payment or service of more than nominal value to or from those having business relationships with their employers or clients;

5. Assist and advise their employers or clients in anticipating the possible consequences, direct and indirect, immediate or remote, of the projects, work or plans of which they have knowledge.

ARTICLE IV

Engineers shall, in fulfilling their responsibilities to the community:

1. Protect the safety, health and welfare of the public and speak out against abuses in these areas affecting the public interest;

2. Contribute professional advice, as appropriate, to civic, charitable or other non-profit organizations;

3. Seek to extend public knowledge and appreciation of the engineering profession and its achievements

NSPE CODE OF ETHICS FOR ENGINEERS

Preamble

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

I. Fundamental Canons

Engineers, in the fulfillment of their professional duties, shall:

1. Hold paramount the safety, health, and welfare of the public.

2. Perform services only in areas of their competence.

3. Issue public statements only in an objective and truthful manner.

4. Act for each employer or client as faithful agents or trustees.

5. Avoid deceptive acts.

6. Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness

II. Rules of Practice

1. Engineers shall hold paramount the safety, health, and welfare of the public.

a. If engineers' judgment is overruled under circumstances that endanger life or property, they shall notify their employer or client and such other authority as may be appropriate.

b. Engineers shall approve only those engineering documents that are in conformity with applicable standards.

c. Engineers shall not reveal facts, data, or information without the prior consent of the client or employer except as authorized or required by law or this Code.

d. Engineers shall not permit the use of their name or associate in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise.

e. Engineers shall not aid or abet the unlawful practice of engineering by a person or firm.

f. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required.

2. Engineers shall perform services only in the areas of their competence.

a. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.

b. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.

c. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.

3. Engineers shall issue public statements only in an objective and truthful manner.

a. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current.

b. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter.

c. Engineers shall issue no statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are matters.

4. Engineers shall act for each employer or client as faithful agents or trustees.

a. Engineers shall disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services.

b. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.

c. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible.

d. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice.

e. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member.

5. Engineers shall avoid deceptive acts.

a. Engineers shall not falsify their qualifications or permit misrepresentation of their or their associates' qualifications. They shall not misrepresent or exaggerate their responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers, or past accomplishments.

b. Engineers shall not offer, give, solicit, or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect or intent of influencing the awarding of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them.

III. Professional Obligations

1. Engineers shall be guided in all their relations by the highest standards of honesty and integrity.

a. Engineers shall acknowledge their errors and shall not distort or alter the facts.

b. Engineers shall advise their clients or employers when they believe a project will not be successful.

c. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment, they will notify their employers.

d. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses.

e. Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession.

2. Engineers shall at all times strive to serve the public interest.

a. Engineers are encouraged to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community.

b. Engineers shall not complete, sign, or seal plans and/or specifications that are not in standards. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project.

c. Engineers are encouraged to extend public knowledge and appreciation of engineering and its achievements.

d. Engineers are encouraged to adhere to the principles of sustainable development1 in order to protect the environment for future generations.

3. Engineers shall avoid all conduct or practice that deceives the public.

a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact.

b. Consistent with the foregoing, engineers may advertise for recruitment of personnel.

c. Consistent with the foregoing, engineers may prepare articles for the lay or technical press, but such articles shall not imply credit tothe author for work performed by others.

4. Engineers shall not disclose, without consent, confidential informationconcerning the business affairs or technical processes of any present orformer client or employer, or public body on which they serve.

a. Engineers shall not, without the consent of all interested parties, promote or arrange for new employment or practice in connection with a specific project for which the engineer has gained particular and specialized knowledge.

b. Engineers shall not, without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the engineer has gained particular specialized knowledge on behalf of a former client oremployer.

5. Engineers shall not be influenced in their professional duties by conflicting interests.

a. Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.

b. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the engineer in connection with work for which the engineer is responsible.

6. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods.

a. Engineers shall not request, propose, or accept a commission on a contingent basis under circumstances in which their judgment may be compromised.

b. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations.

c. Engineers shall not, without consent, use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice.

7. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action.

a. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated.

b. Engineers in governmental, industrial, or educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties.

c. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers.

8. Engineers shall accept personal responsibility for their professional activities, provided, however, that engineers may seek indemnification for services arising out of their practice for other than gross negligence, where the engineer’s interests cannot otherwise be protected.

a. Engineers shall conform with state registration laws in the practice of engineering.

b. Engineers shall not use association with a non engineer, a corporation, or partnership as a “cloak” for unethical acts.

9. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others.

a. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments.

b. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the engineer for others without express permission.

c. Engineers, before undertaking work for others in connection with which the engineer may make improvements, plans, designs, inventions, or other records that may justify copyrights or patents, should enter into a positive agreement regarding ownership.

d. Engineers' designs, data, records, and notes referring exclusively to an employer's work are the employer's property. The employer should indemnify the engineer for use of the information for any purpose other than the original purpose.

e. Engineers shall continue their professional development throughout their careers and should keep current in their specialty fields by engaging in professional practice, participating in continuing education courses, reading in the technical literature, and attending professional meetings and seminars.

ASCE CODE OF ETHICS

Fundamental Principles

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

1. using their knowledge and skill for the enhancement of human welfare and the environment;

2. being honest and impartial and serving with fidelity the public, their employers and clients;

3. striving to increase the competence and prestige of the engineering profession; and

4. supporting the professional and technical societies of their disciplines.

Fundamental Canons

1. Engineers shall hold paramount the safety, health and welfare of the public and shall strive to comply with the principles of sustainable development3 in the performance of their professional duties.

2. Engineers shall perform services only in areas of their competence.

3. Engineers shall issue public statements only in an objective and truthful manner.

4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.

5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.

6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession and shall act with zero-tolerance for bribery, fraud, and corruption.

7. Engineers shall continue their professional development throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision.

IEI CODE OF ETHICS

1.0 Preamble

1.1 The Corporate Members of The Institution of Engineers (India) are committed to promote and practice the profession of engineering for the common good of the community bearing in mind the following concerns:

1.1.1 Concern for ethical standard;

1.1.2 Concern for social justice, social order and human rights;

1.1.3 Concern for protection of the environment;

1.1.4 Concern for sustainable development;

1.1.5 Public safety and tranquility.

2.0 The Tenets of the Code of Ethics

2.1 A Corporate Member shall utilise his knowledge and expertise for the welfare, health and safety of the community without any discrimination for sectional or private interests.

2.2 A Corporate Member shall maintain the honour, integrity and dignity in all his professional actions to be worthy of the trust of the community and the profession.

2.3 A Corporate Member shall act only in the domains of his competence and with diligence, care, sincerity and honesty.

2.4 A Corporate Member shall apply his knowledge and expertise in the interest of his employer or the clients for whom he shall work without compromising with other obligations to these Tenets.

2.5 A Corporate Member shall not falsify or misrepresent his own or his associates' qualifications, experience, etc.

2.6 A Corporate Member, wherever necessary and relevant, shall take all reasonable steps to inform himself, his employer or clients, of the environmental, economic, social and other possible consequences, which may arise out of his actions.

2.7 A Corporate Member shall maintain utmost honesty and fairness in making statements or giving witness and shall do so on the basis of adequate knowledge.

2.8 A Corporate Member shall not directly or indirectly injure the professional reputation of another member.

2.9 A Corporate Member shall reject any kind of offer that may involve unfair practice or may cause avoidable damage to the ecosystem.

2.10 A Corporate Member shall be concerned about and shall act in the best of his abilities for maintenance of sustainability of the process of development.

2.11 A Corporate Member shall not act in any manner which may injure the reputation of the Institution.