A Moral Foundation: How to begin?

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It is evident by the stories in the media that ethics are missing in our society. How can we teach ethics to our engineering or technology students? This paper will explore different methods and tools that can be implemented and then assessed in trying to teach ethics to students. One of the main points is that students must be taught at lower levels or at the beginning of their university experience. Tools and methods that will be covered are: student handbooks – publicity and expectations, actions and consequences, ties to professional occupations, use of citations, and case studies.

What are ethics? Most people would agree that ethics are "making good decisions" or "having principles or integrity," following the "Golden Rule." The American Heritage Dictionary defines ethic as, "a principle of right or good conduct, or a body of such principles." Most people have a warm and fuzzy notion of ethics.

However, teaching about ethics is much more than having an idea of ethics, individuals need to realize the impact of their decisions. These decisions may not only affect them, but have may consequences affecting people socially, globally, culturally and may even affect the environment. We can see the negative examples of this in our society with Enron, the space shuttle, and the recent Martha Stewart trial. With improvements in technology connecting the world globally and the onset of the addition of computer and worldwide web use, these problems are magnified and pose new situations not encountered by earlier generations. The idea is to promote the thought process before choices are made to ensure good moral decisions.

Teaching morals must begin at a lower level. In order to guide and have the students make the proper choices and decisions, these must be started early in order to form good habits, show that having good ethics are a priority and that there are consequences and impacts to so called bad choices. One step is to publicize the consequences of making improper choices and this can be done through an institution's student handbook. An example of this can be found in Pittsburg State University's handbook, where academic dishonesty is defined and consequences discussed. Excerpts from the handbook follow:
"Academic dishonesty by a student is defined as unethical activity associated with course work or grades. It includes, but is not limited to:

a) Giving or receiving unauthorized aid on examinations.
b) Giving or receiving unauthorized aid in the preparation of notebooks, themes, reports, papers, or any other assignments.
c) Submitting the same work for more than one course without the instructor's Permission, and
d) Plagiarism."

Consequences are explained in the handbooks as:

"The committee may impose one or more of the following sanction(s):

      -The imposition of a grade of 'XF" with the addition of a permanent note on the student's transcript indicating his/her participation in a serious act of academic dishonesty (such as taking an exam for another student)
      -Disciplinary probation
      -Suspension
      -Expulsion from the university"

Professors should also follow up and point out in their syllabi, definitions of expected honesty and the consequences of dishonesty. To show priority of expected good morals, the handbook and class policies should be emphasized in a freshman course, introduction course, or a special offering through a seminar setting or library offering. The effectiveness of this process can be done by testing and then feedback from instructors about the students that were exposed to the process.

Some other information to share with student is how ethics are expected in their professional organizations after they graduate and the legal consequences if they don't follow the codes of ethics that are expected both professionally and as a citizen.

World Wide Web Resources and Textbooks for Engineering Ethics

There is an abundance of information about engineering ethics on the World Wide Web. The establishments of a number of comprehensive web sites (ethics centers) provide searchers with a gateway to a wide variety of engineering ethics information including codes of ethics, case studies, and additional resources. Some representative web sites of professional societies with engineering ethics information are also included and are intended as examples of what can be found on professional society web sites.

Comprehensive Web Sites
    __ **Center for the Study of Ethics in the Professions**
        http://www.iit.edu/departments/csep/PublicWWW/codes/index.html
        Hosted by the Illinois Institute of Technology, the center includes 850 online codes of ethics, including many engineering codes

    __ **Murdough Center for Engineering Professionalism**
        http://www.murdough.ttu.edu/index.cfm
        From the College of Engineering at Texas Tech University, this site includes codes of ethics from selected engineering societies. It also includes an ethics test for engineers and much more..

__ **ONLINEETHICS.ORG**
　　http://www.onlineethics.org/
　　The *Online Ethics Center for Engineering and Science* at Case Western
　　Reserve University is a good site for introducing first and second year
　　students to engineering ethics. Included are case studies, essays,
　　educational resources, reference materials, addressing problems, and
　　more.

__ **Web Clearinghouse for Engineering and Computing Ethics**
　　http://www4.ncsu.edu/~jherkert/ethicind.html
　　This web site is sponsored by the Division of Multidisciplinary Studies,
　　North Carolina State University. Information on ethics centers, course
　　syllabi, professional societies, code of ethics, conferences, books and reports,
　　newsletters and journals, online articles, case studies, are some of the resources
　　you will find on this web site.

Engineering Society Web Sites
__ **American Society of Mechanical Engineers - Technology and Society**
　　Division
　　http://www.asme.org/divisions/ts/
　　The Technology and Society Division of the American Society of
　　Mechanical Engineers is concerned about the limits of technology and its impact
　　upon society.

__ **National Society of Professional Engineers**
　　http://www.nspe.org/ethics/home.asp
　　This web site includes a section on ethics, which has the *Code of Ethics*
　　for Engineers, the *Engineers' Creed*, a *History of NSPE Code of Ethics for*
　　Engineers, and the *NSPE Code of Ethics Exam.* Some ethics cases can be
　　found under *The Board of Ethical Review and BER Cases.* Under Ethical
　　Resources and References, one can find *FAQs About Engineering Ethics*,
　　Related Articles on Engineering Ethics, and *Other Ethics Related Web*
　　Sites.

__ **Institute of Electrical and Electronics Engineers -Ethics Committee**
　　http://www.ieee.org/portal/index.jsp?pageID=home
　　The *IEEE Ethics and Member Conduct Committee* provides a link to
　　Ethics Resources and Organizations.

__ **IEEE Society on Social Implications of Technology**
　　http://radburn.rutgers.edu/andrews/projects/ssit/default.htm
　　"The scope of the society includes such issues as environmental, health
　　and safety implications of technology; engineering ethics and professional
　　responsibility; history of electrotechnology; technical expertise and public
　　policy; peace technology; and social issues related to energy, information
　　technology and telecommunications."

__ The **ASME Professional Practice Curriculum**
http://www.professionalpractice.asme.org/engineering/ethics/
This web site lists Cannons of the ASME code along with interpretations.
Also provided are links to other resources and an interactive ethics quiz.

Selected Engineering Ethics Textbooks

Gorman, M.E., Mehalik, M.M., & Werhane, P.H. (2000). *Ethical and Environmental Challenges to Engineering.* Saddle River, NJ: Prentice-Hall.

Harris, Charles, E. Jr., Pritchard, Michael S., & Rabins, Michael J. (2000). *Engineering Ethics: Concepts and Cases.* Belmont, CA: Wadsworth.

Herkert, Joseph R. *Social, Ethical and Policy Implications of Engineering: Selected Readings.* New York: IEEE Press, 2000.

Martin, Mike W. & Schinzinger, Roland. (1996). *Ethics in Engineering.* New York: McGraw-Hill.

Unger, Stephen H. (1994). *Controlling Technology: Ethics and the Responsible Engineer.* New York: Wiley.

Whitbeck, Caroline. (1998). *Ethics in Engineering Practice and Research.* New York: Cambridge University Press.

Citation Guides and Citation Generators

Students often find citing other peoples work to be difficult and therefore avoid. Basically, there are two types of citation guides available that can make this task easier for students. The two types are the traditional citation guides in print and electronic formats and the interactive citation generators. Citation guides such as APA, MLA, etc. give examples and guidelines on how to cite various kinds of materials, including World Wide Web resources. Citation generators actually build the citation for you. Students enter the proper information and the citation generator arranges the information into a proper citation. Some citation generators allow you to build a bibliography. Citation generators are available in APA and MLA formats.

Sample Citation Guides

__ APA Style Electronic Formats - by Dr. Mary Ellen Guffey
http://www.westwords.com/guffey/apa.html

__ Citing Sources (APA, Chicago, MLA, Turabian) - Duke University

__ Using Modern Language Association (MLA) Format - Purdue University Online Writing Lab http://owl.english.purdue.edu/handouts/research/r_mla.html

__ [Virtual Reference Desk: Citation Styles](http://www2.lib.udel.edu/ref/virtref/cite.htm) (APA, Chicago, Government Documents, MLA, Turabian) - University of Delaware Library, Newark
http://www2.lib.udel.edu/ref/virtref/cite.htm

Sample Citation Generators

__ [Style Wizard](http://www.stylewizard.com/) - by EB Communications, provides APA & MLA citations.
http://www.stylewizard.com/

__ [EasyBib.com](http://www.easybib.com/) - creates bibliographies based on the MLA Handbook (5th ed.)
http://www.easybib.com/

One of our university's mottos is to "learn by doing." With ethics this can be accomplished by studying and practicing with case studies. Case studies are found in the ***Engineering Times***, which is published monthly by the National Society of Professional Engineers (NSPE). In these studies, a situation is described and then a question is asked on your opinion. To check your opinion, there is then a section detailing what the NSPE's Board of Ethical Review states regarding the case. For more cases, the University of Virginia has a home page for engineering ethics. Additional help in applying the case study approach, check out the website http://ethics.tamu.edu/pritchar/an-intro.htm. Assessment can be checked with written exercises and role playing.

In summary, ethics are needed. They need to be taught at an early stage of education in order to form habits and show importance. It was discussed that ethics may be taught through awareness, professional organizations, consequences, citation lessons, and case studies. Assessment of information learned may be done through testing and follow up in following classroom behaviors.