Engineering Ethics Begins in University Education

Introduction

The times we are living now features innovation and originality. Engineering is a profession that links various inventions to common people. Needless to say, with its vital role in the society this profession demands its practitioners to be technically, and even scientifically, competent, as engineers are developing new products, producing them and/or serving their clients with their expertise. However, technical expertise alone does not make a good engineer, and the professional morality and responsibility of engineers, which has long been neglected in university education, is also an indispensable component. Didier (1999) approaches to the issue of engineering ethics from a historical perspective, comparing the ethical professional engineering practices in the United States, Germany and France, and mentions the absence of ethical education in engineering curricula. Johnston et al (2000), on the other hand, touch upon “the social impact and international and global nature of engineering practice and outline the necessary educational changes to meet the social and ethical challenges of this profession. This paper briefly ticks off some fundamental knowledge of engineering ethics, and tries to discuss some academic practices in university engineering education that are conducive to or hindering the development of engineering ethics.

Engineering Ethics

According to Davison and Kock (2004), “professional Ethics concerns one's conduct of behavior and practice when carrying out professional work.” There are a great many professional bodies throughout the world that put forward important institutionalized “codes of conduct and codes of practice” for their members to follow. In many counties, medical ethics, legal ethics and business ethics are repeatedly discussed by the public and even regarded compulsory to the practitioners. Engineering ethics has also been becoming an increasing concern over the past

decades, during which the world witnessed some momentous events like stratospheric ozone depletion, cloning technology, the Challenger disaster and so on, which are closely related to the issue of engineering ethics. Professional bodies of engineering like the US professional engineering associations, the German Association of Engineers and the Institution of Engineers, Australia, are getting more active.

Engineering codes of ethics vary by different cultures and might still remain controversial. Nevertheless some codes are believed to be universal. For the sake of their professional integrity, honor and dignity, an engineer is expected to use their knowledge and skills to enhance human welfare; be honest, loyal and impartial serving the public, their employers and clients; improve their professional competence and prestige; and work under the guidance of their professional societies. An example could be where an engineer, who knows the performance and using precautions of certain products perfectly well, does his best to overvalue the performance of some goods but hesitates to provide the precautions before potential customers so as to get them into buying the products. What they bear in mind is only their corporate interest and their personal benefits, as is against their professional integrity and impartiality. Examples like this one that concerns knowledge sharing are numerous. In a journal editorial, Elliot (2004) addresses the issue of knowledge and information sharing and enumerates a great many cases in corporate setting that make “the difference between a healthy company and a company that will have to lay off people or closes its door altogether - which could end up being decidedly grave for individuals, families and the community.”

Ethics in University Education

The challenges of engineering ethics in the professional work these days that engineering ethics is becoming a new discipline that holds its place in university education. There is growing expectation by specialists (Chubin et al 2005, Davison and Kock 2004) and the public at large to enhance professional ethics education in universities by incorporate it into improved academic curriculum. Symposia,

workshops and seminars could be arranged to promote professional engineering ethics. They believe professional morality and responsibility should be introduced early to engineering majors. It is also a professional must for engineering graduates to familiarize themselves with engineering code of ethics prior to being practitioners.

However, knowledge of right and wrong is at most half of the battle. A good engineering professional also needs other qualities like self-discipline, conscientiousness, integrity and professional dignity, which can hardly be acquired by simple indoctrinization or sheer brainwashing. Johnston et al (2000) advocates practice-focused ethics in engineering education for that the professional ethics being accepted well, it could be made an indispensable part of their academic practice. In universities, engineering majors, undergraduates or postgraduates, are doing experiments, conducting researches, handling projects and writing papers to conclude their practical work. By handling these practical tasks, they learn to establish their professionalism by applying their knowledge to practice and developing some practical skills. Meanwhile they are also learning to adopt their way of thinking, their mindset and their attitude as a real professional. In other words, they are also establishing their professionalism by developing those indispensable professional qualities like self-discipline, conscientiousness, integrity and professional dignity in practices they are most likely to continue after their graduation. With these qualities being part of their professional habit and value, they are bound to be upheld and advanced by those engineering graduates in their professional career.

Among the above mentioned academic virtues, there is one point that is most often than not time and again repeated here and there, and could never be overvalued. That is academic honesty. Academic honesty is relevant to professional code of ethics in that it practices integrity which is valued by employers and a professional must demonstrate while working.

Academic honesty and integrity is important also in that practicing academic

dishonesty means overcoming academic dishonesty. Academic misconducts such as plagiarism, collaboration and multiple-submission are rather common and induced by many factors: lagging behind in coursework, working too many hours, meeting emotional and healthy issues and so on. Thus, a university student is always tempted to misconduct academically. Their success in adhering to their honesty and integrity by dealing with pressure, balancing work and study, putting emotional matter reasonably will help them adopt correct attitude and develop useful skills that are also needed in their future work. Plagiarism, using other people's words or ideas or research findings with proper citation, is among the most common academic misconducts. Proper citation and referencing mean acknowledging other people for their innovation and originality, which are particularly valued in this knowledge-based era.

Conclusion

Universities are places where the students are trained to be real professionals like engineers. The future engineers are expected to be made ethically qualified and technically. Thus professional morality and responsibility should be introduced to engineering students, and engineering code of ethics needs to be infused to these future professionals. What is even more vital to establish professional ethics is for the engineering students to develop their professional integrity, honesty, dignity, self-discipline, conscientiousness and so on through appropriate academic practice. Whenever doing research, writing paper or handling other academic tasks, they should stay off academic misconducts like plagiarism. Adhering to academic honesty means overcoming some temptations and adopting right attitude and useful skills that are essential to establishing their professionalism. Therefore, it is justifiable to say that "the development of ethic professional engineering practice begins with the development of appropriate academic practice in university engineering education."

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