

PROFESSIONAL ETHICS – A LIFE-LONG PURSUIT BY AN ENGINEER

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Abstract: After an engineering student has finished the studies in a college, he (or she) is prepared to, usually with much enthusiasm and high hopes, embark into a new world to make use of what he has learnt for the betterment of the society and the engineering profession. The pursuit of the “Real”, the “Good”, and the “Beautiful” has been the highest goal. With the dawning of the e-Commerce and “Dot-Com” era, with the IT (Information Technology) heat sweeping through the world and catching everyone by surprise, and with the rapid replacement of traditional materialistic substances by their electronic and cyber counterparts, we will witness a new economic order and have to adapt ourselves to changes in the engineering discipline. An important goal of continual and life-long education for an engineer is coping with changes around us while discharging various responsibilities required by the profession. This paper discusses, from the perspective of the IT profession and with reference to IT-related scenarios, the issues about professional ethics and the various expectation and requirements made on its members by a professional body.

INTRODUCTION

The engineering discipline has served mankind for a very long time. Starting from the ancient days, engineers were busy in conquering the nature to make a better living environment for their fellow humans. They removed the hills, leveled the grounds, built houses, roads, bridges, canals, tunnels. They made tools to ease jobs, made weapons to hunt and guard against wild animals. In modern times they build high rising buildings, machineries, automobiles, airplanes, telephones, computers, the Internet. With more inventions having been made, mankind would be able to enjoy an overall improvement in living standards. The roles of engineers have become so diversified that their contribution is to be found almost everywhere. A recent phenomenon is the “high-tech” wave whereby the Internet connects up large numbers of users and supports numerous applications. Computers are becoming more and more important and their usage has become more widespread. The “high-tech” wave brings about new challenges and new threats to the society, and in particular to the engineers in the information technology (IT) area. Faced with rapid changes in technology, IT engineers may experience conflicts of interest when performing their duties. How should he or she resolve the conflicts of interest arising from performing the job duties? What codes or guidelines can an engineer follow? This paper discusses the issues of professional ethics and investigate how a professional body can uphold the professional ethics standard among its members.

ENGINEERING PROFESSIONALISM

Together with the legal and the medical professions, engineering has been regarded a profession. What are then the qualities of a profession? According to [Fleddermann 1999], one of the qualities exemplified by a profession is that it requires high-level work that cannot be done in a routine manner by a layman without proper education background and subsequent training. It calls for judgment, experience, and sophisticated skills that can only be achieved with the appropriate education background and sufficient practical experience. Judging from this context, there is nothing wrong that a certain type of job is not a profession. It may be that the job nature is routine, or can be mastered in a short time by the average people without any specific education background. Nevertheless numerous jobs of this type are crucial to the normal functioning of the society. Fig. 1 shows, in a conceptual manner, how education background and experience combine to form the basis of a profession.

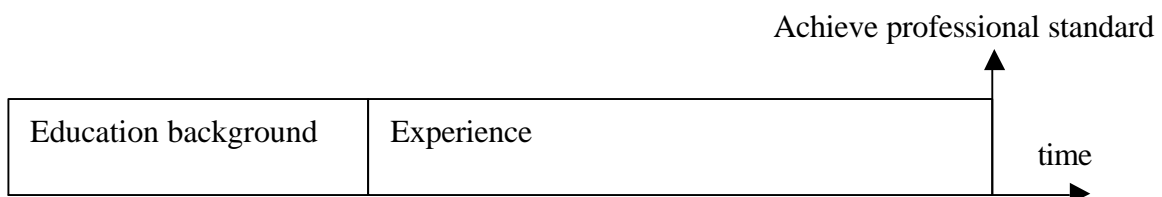


Fig.1 Profession quality

The practitioners of a profession (i.e. the professionals) never work alone. They need to join force in setting standards, and advancing the knowledge and technology, and in finding solutions to new problems. There is the need of a professional society (also called a professional body) for those who have met the education and experience requirements to join. An important function of the professional society is to uphold the professional standards required from its members. Standards are important in ensuring that the works performed are up to a certain acceptable quality. These are the yardsticks (pass or fail) against which the level of accomplishment is measured. Another function of the professional society is to spell out those things its members can do and those they cannot when practicing their profession. These are usually called the “Codes of Ethics” or the “Codes of Practice”. These codes serve the function to guide members of the professional society on the right track. In case problems occur to their members, a professional society may provide assistance back up the members on the grounds of codes of ethics adopted by the society. A famous case in the discussion of engineering ethics is the BART case in 1975 where three engineers were fired by their company for “whistle blowing” – drawing the public attention to a potentially unsafe design of an automatic train control system. Since their actions were deemed to be compliant to the codes of ethics laid down by IEEE, the three engineers got the full support of the IEEE [BART 75]. To be a member of a professional society means that one’s actions are governed by the codes of practice. In this way, professional membership is synonymous with high quality and is a label for the public to have confidence on.

The third quality of a profession is that it must do something *good*. On the surface, this requirement is obvious. But in practice it may be difficult to decide what is good and what is bad. To do so requires the application of moral standards, ethical standards, and materialistic standards. Hence this is the most ambiguous quality when it comes to actual practice and professional ethics has an important part to play here.

ETHICS AND MORAL

When we were young, we were always told by our parents to do this and that, and not to do this and that. Is there a set of rules that governs what we must do and what we must not? Some ethics theorists believe that we as human beings should have a set of basic rights. By nature we are allowed to do something. To respect others' rights, one has to refrain from doing something or one is bound to do something. This is the set of duties. Under the equality principle, rights and duties share a duality relationship. Because we have the rights of not to be disturbed, then must also have the duty of not disturbing others. Rights and duties can be defined for the engineering profession to govern what an engineer should do or should not do. When conflicts of interest occur, the engineer can apply the rights and duties principle to determine the necessary actions. The problem with the rights and duties principle is that there is not a universal set of rights and duties that everyone accepts. Sometimes it is difficult to decide whose rights should be respected more when conflicts occur. Another ethics theory is that we should do something which brings about the most benefit. This is a materialistic approach where benefit counts the most. The difficulty of applying this ethics theory is that it would be very difficult to calculate the amount of actual benefit in complicated situations involving the society, companies, individuals stretched over a large time scale. Something beneficial to a company may not be beneficial to the society, or long-term benefit may out-weigh short-term benefits.

PROFESSIONAL ETHICS IN IT

Due to the rapid penetration of our daily lives by the World-Wide-Web (WWW) technology that is fueled by the Internet, Information Technology (IT) has played a very important role in modern society. As an IT engineer, what would be the professional ethical problems that he would encounter?

A large number of professional ethical problems are related to the use of computer or the manipulation of data. A consequence of the popularity of the Internet and the WWW is the phenomenon that computers, and people as well, are "connected". It is only a matter of a simple click in the mouse to initiate data exchange between two computers. Documents residing in computers thousands of kilometers away can be downloaded in a matter of seconds. The protection of computer resources (hardware, software, data, and software) from unauthorized access becomes an eminent problem. It is not uncommon to see news reports on web sites being hacked – being accessed by unauthorized users. Sometimes no harm would have been done and only nuisance has been caused. But the other extreme is that millions of dollars in revenue is lost as a result of a distributed denial of service (DDOS) attack. The detrimental effects of computer-related crimes on the economy should not be taken lightly. As a IT professional, what are his/her responsibilities over these issues?

First of all, IP professional should have a set of codes of ethics to follow. To be qualified as IT professional, an IT engineer must join a professional society and then adhere to the codes of ethics. Secondly, IT professionals should apply their knowledge to design IT systems such that they provide services with high quality as far as costs, availability, robustness, response time, and security are concerned. They should employs techniques to ensure that information are exchanged in a secure and cost-effective manner across the Internet. Thirdly, the IT professional should provide education to the general public about the proper use of IT. There are many reported cases about youngsters playing the role of hackers. This is a consequence of poor education. Youngsters and grown-ups should be educated about the what can be done and what cannot.

As far as IT projects are concerned, IT professionals should note that IT projects change

very rapidly. In every six months there will be some advancement in technology or product features. The IT Engineers should plan IT projects such that variations are allowed for. They should also define clearly the acceptance standard of work that cannot be measured merely in physical terms and quantities. Say, software standard and quality, system response time, and level of maintenance and supporting services etc. An IT professional should follow closely industry standards development. Due to the lack of precedents and case laws in the resolution of conflicts between contractors and engineers, as compared with traditional disciplines such as building, civil, mechanical, special attention should be paid to issues such as risk sharing among clients and contractors and unforeseeable disruption. The IT professional should ensure that the risks to be shared by contractors and employers are well balanced, open, and fair.

THE HONG KONG INSTITUTION OF ENGINEERS (HKIE)

The HKIE has laid down four Rules of Conducts as the cornerstone of conduct requirements of professional engineers. The first rule is about the responsibility of its members to the engineering profession. The second rule is about the responsibility of its members to their colleagues. The third rule is about the responsibility of its members to their employers or clients. The fourth rule is about the responsibility of its members to the Public. These comprehensive rules and the corresponding codes of practice prescribe the way an HKIE member should follow in order that the ethical requirements are satisfied. There is a Disciplinary Board in HKIE to take disciplinary actions against wrong doing committed by its members. The Disciplinary Board is composed of members from all the sixteen disciplines in HKIE, among them the Information Discipline is one of them. An example of drastic actions taken on a member removal of membership status and the removal of the member's name from the registration list of registered professional engineer.

PROMOTING PROFESSIONAL ETHICS

The Hong Kong Institution of Engineers (HKIE) and the Hong Kong Ethics Development Centre (HKEDC) have organized a seminar on "Professionalism and Ethics for Engineers" on 12th December 1998. There were 110 participants and favorable response towards this seminar was noted. In this seminar, there was a case study session in which participants were presented with hypothetical scenarios depicting ethical dilemmas that an engineer might possibly encounter at work. Participants showed great interest in the case discussions and most of them rated the group discussions useful and applicable in their daily work situations. The professional codes published by the HKIE is a handy reference and principle guidelines to its members. In addition to this code, it is felt that certain practical guidance on how to deal with possible ethical problems encountered in their workplace may also be beneficial to HKIE members. This publication, "Ethics in Practices - A Practical Guide for Professional Engineers" by the HKIE and the Hong Kong Ethics Development Centre of ICAC, therefore aims at providing professional engineers with a quick reference on some common ethical issues in their areas of work as well as proposing ways to handle such ethical dilemmas.

PROFESSIONAL ETHICS TO ALL MEMBERS?

The code of practice is applicable to all classes of members, from student, graduate, associate to corporate and fellow members. Any misconduct by HKIE members would be subject to disciplinary action.

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