

Science, technology and values: promoting ethics and social responsibility

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Abstract The paper discusses the limitations of engineering ethics as implemented in practice, with a focus on the fact that engineering and other activities are carried out without any consideration of whether the activities are themselves ethical, and on the gap between legality and ethics. This leads to the following three central ideas of the paper. The first is the need for engineers to both be aware of and critique their own values and be able to widen their perspective to that of the ‘other’, i.e., marginalised and minority groups and the environment. This understanding of the ‘other’ and values is also applied to the discussion of ethical issues relating to minority world (‘developed’) country engineers working in majority world (‘developing’) countries. The second central idea is the fact that structural and contextual factors in the form of barriers and enablers affect ethical values and practices. Individuals are not necessarily unethical in themselves, but the context and organisational ethos may present barriers to ethical behaviour and encourage the development of unethical values. These barriers and enablers are investigated through a pilot survey. The third central idea is the relationship between individual and collective responsibility and the need for support to enable engineers to think and behave ethically.

Keywords Ethics · Engineers · Individual and collective responsibility · Support · Values · Barriers and enablers

1 The importance of engineering ethics

Technology development is one of the most important factors in shaping modern society, both in the richer industrialised countries, which fairly quickly experience new technologies, and in the poorer majority world countries, where access to new technologies is more restricted. Thus, engineers have the potential to both have a significant positive influence on society and cause very serious and possibly lasting damage. Being an engineer could be considered to be both a great privilege and a real responsibility. There is increasing awareness of ethical and social responsibility issues with regard to how engineers carry out their jobs, but less so with regard to the nature of these jobs. For instance, one of the case studies produced by a US National Science Foundation funded project on introducing ethics into engineering teaching considered the case of three civilian chemical engineers convicted for illegally storing, handling and disposing of hazardous waste while developing a new chemical weapon. This case study considered a range of ethical issues associated with hazardous chemicals, but not the ethics of developing or using chemical weapons.

There is still a tendency for engineering (and other professional) ethics to focus on legality and ignore the wider ethical implications of activities which may be legal, but which are not necessarily moral (Hersh 2004; Seedhouse 1988). There has also been an associated tendency, as illustrated by the case study presented above, to focus on how engineers carry out their activities, while frequently ignoring the nature of these activities. However, ethical behaviour requires the action both to be inherently ethical and to be carried out in an ethical way.

Another important factor is the precautionary principle (Dethlefsen et al. 1993; Hersh 2006; Raffensperger and

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