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New ethical challenges for today engineering and technology

Josep M. Basart [a,*], Mireia Farrús [b,1], Montse Serra [c,2]

[a] Engineering School, Universitat Autònoma de Barcelona, 08290 Cerdanyola del Vallès, Catalonia, Spain
[b] N-RAS Research Centre, Universitat Pompeu Fabra, 08018 Barcelona, Catalonia, Spain
[c] Computer Science, Telecommunication and Multimedia Dept., Universitat Oberta de Catalunya, 08018 Barcelona, Catalonia, Spain

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ABSTRACT

This paper is about the intersection of three related areas: ethics, gender and the field of engineering. It is important to focus on the attitudes and values woven through this intersection because they become essential for the complete development of the moral life of the engineering profession and of the awareness of the fact that this is a profession made up of both male and female professionals. Thus, specific behaviour coming from the feminine part is necessary in order to contribute to enriching the features of the engineering profile. An approach particularly attached to feminine values, in comparison to the masculine perspective, is a sign of commitment rather than rights, a collective social group rather than the individual and of an ethic based on caring for others rather than the traditional rationalistic arguments. Because of this, the introduction of qualitative diversity within this professional field is an important fact to highlight when women contribute to the engineering community through the enrichment, expansion and transformation of the values and attitudes that are predominant in the people who work and/or study within the area of engineering and technology.

1. Introduction

We experience, day in and day out, the ways in which concerns about the role of technologies continue to grow due to the fact that we are developing a more sensitive awareness of the huge power (Weizenbaum, 1976) we are both using and deploying through the use of new Information and Communication Technologies (ICT).

Technology influences the 'ways of doing' (Mitcham, 1994) of our society, particularly when shaping its actions. Additionally, because of the spread of this technology within different scopes, the engineering professional environment is, increasingly, an environment designed and developed on a basis of technology (ICT) and is, consequently, dependent on it. We should be able to admit the existence of the two faces of engineering activity: the technological and the social. Technology influences society, but society also influences the development of that technology. An awareness of the nature of this interaction is necessary to understand how social and value issues enter into the development of technology and the intertwined paths of technological matters, legal needs and moral social issues (Adam, 2008).

For this reason, ethics takes its place in technology, contributing, substantially, towards giving it sense in human life (Arnold and Pearce, 2008). The domain of technology is recognized as a key form of human activity, and stands alongside

* Corresponding author. Tel.: +34 935 812 395.
E-mail addresses: josepmaria.basart@uab.cat (J.M. Basart), mireia.farrus@upf.edu (M. Farrús), mserravi@uoc.edu (M. Serra).
[1] Tel.: +34 935 421 118.
[2] Tel.: +34 933 263 744.

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the arts and social sciences as fundamental to human achievement and expression. Thus, the development of technological artefacts which extend and, very often, change the perception and behavioural capabilities of human beings, make available new relationships with the world in which we are living. Ethics can help us to develop sensitivities, distinct from formal knowledge, that allow engineers to improve basic social and environmental skills into their profession, and overall to turn engineers into committed professionals, with the willingness to involve themselves, with social awareness. So, as we can see engineering is set up from the conception of an appropriate technology in the profession, which is expressed from different points of view: intellectual, technical, ethical, aesthetic and ideological, taking into account its function and its responsibility in acting as a service to the most important customer: our society (Floridi, 2010).

From this starting point, the professional praxis and the social responsibility of engineering should aspire not only to comply with the regulations currently in force, but should aim to be the guide for the professional ethos finding inspiration in excellence, pursuing the job well done, beyond the legal minimum, future contracts and goals in the short and medium term. At this point, it is important to highlight the service that engineering has to provide to society in order to come up with its recognition for the work done and the quality achieved.

When technology and daily life are juxtaposed, as engineers we should wonder if ICT can change the quality and the shape of people's lives, thus affecting their social values (Latour and Venn, 2002; Weizenbaum, 1972). In that case, as ICT professionals, we will have to be attentive with regard to what we do when exercising engineering and the consequences that our actions have, ensuring that social well being, the common good, is not at risk.

Because of this, it is advisable to incorporate non-technical practices and contents (i.e. the ethical, legal, political, and economic issues that interweave with ICT technologies) into all engineering professional profiles. So, when taking a quick look at the present social scene in which technology plays a very important role with regard to human life, a thorough knowledge of the engineer's professional role is required. This reflection demands that the global professional features of engineering are included explicitly within the codes of ethics.

In this line, ethical issues are promoted by professional codes through professional associations and institutions such as: ACM, IEEE, ABET and NSPE. All of these are focused on the defence of the professional values of engineering such as coherence, consistency, responsibility and accountability. Thus, knowledge and practice of these responsibilities is essential to ethical thought and behaviour by ICT professionals. However, traditional codes of ethics, standards and regulations, by themselves, are not enough to guarantee moral practice (Stohl et al., 2009).

At present, the development of formalized ethical standards should take into account matters such as: firstly, the new framework of the engineering profession, meaning, the context of the enormous development and global use of ICT where engineers put into practice their ethical judgments. Secondly, the current professional, as that person who has the responsibility to bear in mind the new environment brought about by the ICT society, is forced to develop new skills and abilities in order to address new social changes and needs when exercising his profession.

Taking into account these observations, then perhaps one should think about how engineering plays a central role within society and its professionals, the engineers, are one of the main actors operating as a part of a complex network of mutual relationships between many other people, organizations and groups. However, when combining all of these previous issues (i.e.: responsibility, ethics, technology, profession, etc.) and people's profiles (i.e.: stakeholders, customers, providers, managers, etc.), can we say that this model is complete? Meaning, does the engineer's image reflect a real model for this professional? Is an adjustment of the engineer's image needed in order to encompass male and female attributes and skills within this field? Is the present image credible that the ethical engineer is like a hero (man) who has all things under control and who has to solve all social troubles, sacrificing himself for the common good? (Basart and Serra, 2011). Probably, heterogeneous qualities from different points of view (male and female) should be demanded of all engineers in order for them to be a good professional and to satisfactorily exercise their profession. In that case the cultivation of set features of the engineer's character is accordingly required, with different perspectives coming from men and women.

Arrived at this point, heterogeneous qualities and qualitative diversity can be key points to incorporate into an engineer's profile. A clear example of this fact is the following declarations: The Earth Charter Initiative, The Universal Declaration of Human Rights and The United Nations Global Compact. These declarations have allowed us to discover what valuable elements are missed in comparison with the traditional codes of ethics, standards and regulations, taking into account the present social and environmental involvement.

The remainder of the paper has been divided into the following parts: next section 'A new vision' examines the relationship between engineering and its inherent ethical aspects taking into account the global duties and responsibilities of the engineering profession in relation to the current changing society. The third section 'New values and attitudes': analyses the new ethical challenges of the engineering enhancing the importance of the contribution of the ethical issues coming from the feminine part. Finally, some conclusions are described in the last section.

2. A new vision

The word engineering relates to many different things: sciences, technologies, arts and processes are some of them. It also relates to both a profession and a business. Here we are mainly interested in these two social connections, particularly in revising certain ethical aspects of these relationships when considering engineering as a service.