

COMMUNICATIONS EDUCATION AND TRAINING: ETHICS AND PROFESSIONALISM



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Since antiquity, the difficulty of fulfilling multiple and sometimes conflicting moral obligations to different parties has been well recognized. By the 19th century, the emergence of engineering as a distinct profession was accompanied by a need to clarify the relationship between the self interest that practitioners of engineering have in advancing their careers and business interests, and their moral obligations to society, to their employers and/or clients, and to their profession.

During the late 19th and early 20th centuries, U.S. engineers formed societies to foster the development of professionalism within the major disciplines through exchange of technical information and standardization of practices. After a series of high profile bridge failures that led to significant loss of life during this period, governments began to regulate the engineering profession through formal licensing procedures and oversight conducted by independent associations and boards.

Both the societies, which promoted the interests of the profession, and the associations and boards, which represented the interests of the public, began to develop formal Codes of Ethics to guide, protect and set expectations for both their members, their employers or clients, and the public. The challenge in developing and following such codes, of course, lies in the conflicting nature of an engineer's moral obligations to each of these interested groups.

Engineering school curricula have traditionally focused on the so-called hard skills related to math, physics, computing, signal processing and other technical subjects. As the media has placed an ever brighter spotlight on the causes and consequences of errors in engineering judgment and decision making, engineering accreditation boards have mandated increases in the amount of time and effort devoted to developing learning outcomes involving the so-called soft skills related to communication, teamwork, project management skills and, importantly, responsibility to society and the public.

For engineering schools, formulating an effective

approach for developing learning outcomes that help students anticipate and prepare for the ethical and professional challenges that they will face during their career has itself been a challenge. Just as traditional lectures are increasingly seen as inadequate for helping students develop technical skills and acumen, so they are considered inadequate for helping students develop the necessary ethical and professional insights.

Development of innovative or novel approaches for exposing students to ethical issues and dilemmas is not sufficient, however. It also necessary to assess the quality of the learning outcomes that are achieved in order to permit subsequent offerings to be improved. The articles that comprise this Feature Topic on Ethics and Professionalism in Communications Education and Training provides important insights.

In "Engineering Ethics Education: Aligning Practices and Outcomes," Diana Bairaktova and Anna Woodcock suggest that it is not sufficient to impart and assess ethical awareness via students' responses to vignettes concerning ethical dilemmas. Instead, they present results that suggest that current practice be extended to include motivational variables that may influence students' ethical awareness and predict their ethical behaviour.

In "Integration of Ethical Training into Undergraduate Senior Design Projects on Wireless Communications," Wilmer Arrellano, Ismail Guvenc and Nezih Pala share the ethical training framework that they have integrated into the two-semester senior design project course at Florida International University and the success that they have achieved by encouraging students to make decisions based upon ethical theories.

In "The Effect of a Stand-Alone Ethics Course in Chilean Engineering Students' Attitudes," Ruth Murrugarra and William Wallace share their experience in asking students to model and simulate ethical issues using computer-based agent simulation techniques and, importantly, assessing the impact on the student's perspectives and atti-

tudes. The results highlight the value of diversity in the backgrounds and perspectives of participants in discussions and problem solving concerning ethical issues.

The final article in this Feature Topic focuses on Professionalism and the emergence of Telecommunications Engineering as a distinct engineering discipline. Historically, telecommunications has been classified as a sub discipline of Electrical Engineering. Tarek El-Bawab and his colleagues have recently convinced ABET that the two fields are distinct and should be treated as peers. This exciting development, which has been supported by the ComSoc Education & Training Board during the past five years, represents an historic milestone for our profession and is described in detail in the article.

Recognizing the increased interest in Engineering Ethics, IEEE recently inaugurated a biannual conference that brings together practitioners, regulators, and researchers to share recent experiences and new insights in this area. Readers are encouraged to participate in the next edition of the IEEE Ethics conference to be held in Vancouver, Canada in May 2016. Details can be found at <http://sites.ieee.org/ethics-conference/>.

BIOGRAPHIES

DAVID G. MICHELSON (davem@ece.ubc.ca) is with the Department of Electrical and Computer Engineering at the University of British Columbia. His research interests include antenna design, channel modeling, radar remote sensing and the scholarship of teaching and learning. He is a member of the Boards of Governors of the IEEE Communications and Vehicular Technology Societies, and is past Director of Education and Training for ComSoc. He serves as General Co-Chair of the 2016 IEEE Ethics conference.

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