

Guest Editorial

Guiding Engineering Educators: Keeping Pace with Scientific-Technological Change and Socio-Economic Development

Engineering Practice and Engineering Education are undergoing in profound metamorphoses, as a result of radical scientific-technological revolutions and of a globalized and growingly interconnected world, which reshape all aspects of society, from culture to ethics, from economy to politics. Keeping pace with such changes implies a continued renovation of Engineering programmes, not guided by fashionable trends, but progressively incorporating the relevant innovations, while protecting the proven beneficial traditions; a focus on fundamental scientific-technological knowledge and pursuit of excellence. The support of simple procedures to promote a more dynamic and personalized Engineering Education is one of the keys to success. Aspects such as the encouragement of global engineers, with a personal dedication to lifelong learning, and with human values derived from the Education for Global Citizenship principles, are among the critical issues for educating engineers capable of solving the challenges ahead. All these novelties constitute additional responsibilities for professors at technical universities and teaching institutions and generate growing uncertainties, which are complex to manage.

In consequence, engineering educators of the future, apart from providing to students the necessary in-depth theoretical and practical knowledge on basic disciplines of science and technology, must be able to educate engineers capable of addressing the current global challenges that are transforming the present, which will soon be long past. Facing the threats to come requires the best possible educated engineers, which will be: those capable of implementing and working within international and multidisciplinary teams; those having an important cultural background, as a basis for mutual understanding between countries and civilizations; and those conscious of the relevance of international mobility and of lifelong learning for keeping up with techniques, procedures and engineering systems still to be invented. Evidently, educators are also subject to such demands and their dynamism, with regards to their teaching practice, supported by a life of research and innovation, will be essential to fulfil their roles.

In fact, lifelong learning has been recently put forward by the European Union Council and Commission Report on the *Strategic Framework for Cooperation in Education and Training until 2020 (2015/C 417/04)* as one of the main drivers of change for promoting a knowledge-based economy, for increasing social cohesion and for improving equal opportunities. However, in spite of the lifelong learning and mobility programmes available for educators, the professors from technical universities are sometimes reluctant to benefit from them or, in most cases, cannot take advantage from such opportunities, mainly due to overwhelming work-related (especially bureaucratic) duties, lack of supporting funding or even familiar constraints. In other cases, the shift from industrial or research tasks into the educational world is made without specific preparation and too suddenly, which minimizes the teaching-learning results achieved in the first years of educational practice.

In any case, much has been achieved in terms of the professional training, international mobility and lifelong learning of engineering educators, but there is still a long way ahead towards a generalized worldwide cohort capable of progressively re-thinking Engineering Education and of preparing the engineers of the future. In order to search, generate, gather and provide some clues for solving the challenges mentioned, linked to Engineering educator's professional practice, we proposed this special issue on Guiding Engineering Educators: Keeping Pace with Scientific- Technological Change and Socio-Economic Development.

The special issue collects experiences connected to strategies for the professional training of engineering educators; good practices for the promotion of engineering educators' lifelong learning; good practices linked to the promotion of engineering educators' international mobility; specific mobility programmes for researchers and professors in connection with lifelong learning; collaborative teaching-learning projects and rewarding experiences among educators; synergies between research experiences and innovative teaching-learning activities; synergies between industrial experience and innovative teaching-learning activities; conferences, workshops and seminars as part of educators' professional development; teaching-learning

experiences involving students and teachers or students vs. teachers; global classrooms, summer schools, contests and other extra-curricular collaborative tasks; Engineering educators and their adaptation to novel technologies and related methodologies; bridging the gap between Engineering educators and the “digital generation”; assessment of educators’ performance from the perspective of the challenges ahead, among other aspects of educational practice. The final papers have been selected, after a comprehensive peer-review process among 23 received extended abstracts and several additional proposals discussed via email with potential contributors.

Personally, we are profoundly thankful to the authors for their support to this Special Issue and for their patience during the review and editing processes, which were slightly extended due to the number of submissions received. This Special Issue is the result of their joint efforts. We have also counted on the help of an international team of reviewers covering several Engineering disciplines and we are grateful indeed for their assistance. We truly hope that the final results will be according to authors’ expectations and of interest for colleagues and readers of the International Journal of Engineering Education. Finally, we would also like to acknowledge the support and continued confidence of Chief Editor Ahmad Ibrahim, whose advice and improvement proposals have been, once again, inspiring. We are keen to have future collaborations.

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