

How to introduce successfully Sustainable Development in Electrical Engineering Curricula for under- and post-graduate students: Some examples from overseas collaborations.

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Sustainable Development (SD), even if it has different definitions, it is and it should be present everywhere, non-sustainable, uncontrollable progress is simply useless, further, it can be seen as harmful for the existence of the humanity and damaging for our planet. Usually, sustainability can exist where Environmental, Economic, and socio-political Equity considerations overlap, this the “3E” concept shown very often in a Venn diagram. We can however complete this concept by adding a few more “E”s and more especially Ethics, Education (in Engineering among others), Energy and Ecology.

Scientists and engineers have always been concerned by the future. More especially, engineers have a critical role to play in the making of a sustainable, equitable, and peaceful world. Further engineering profession continuously evolves as it responds to environmental, energetic, social and economic needs. Energy and electric power sectors are key issues for SD. There are ensuring access to affordable, reliable, sustainable and modern energy for all and this part of their mission constitutes the 7th UN Goal for Sustainable Development. It is clear that electrical engineering is critical to development of our societies. Tertiary education institutes train millions of students every year, but only 15% of them are following engineering paths of any kind. Some key sectors like electrical and power engineering attract only 20% of the above-mentioned fraction and in many cases this number is not sufficient for covering electrical industry needs. Surprisingly, the electrical engineering profession has shown limited interest and competency in addressing human development issues for the developing world over the past 20 years. Higher Education Institutes which train worldwide the engineers of tomorrow should mitigate that problem.

Ensuring the right supply of SD skills to this new generation of electrical engineers in a rapidly changing world is more than challenging for our tertiary education Institutions. As Pam Chasek (International Institute of Sustainable Development) wrote¹ “...we have a responsibility to ensure that the students we teach and train, who will be the leaders of tomorrow, have the skills necessary to create not just the future we want, but the future we need.”

It is absolutely legitimate to ask “how should engineers be educated to address global issues and more especially SD?”. High quality appropriated training is the key to answer this question. This is perfectly in line with the 4th UN Goal for Sustainable Development which is “Quality Education” accessible to all countries regardless of their economic strength. Ensure that way appropriate pathways for professional development, so graduates and engineering practitioners meet employer needs and community expectations. The main idea is to establish internationally accepted curricula built around sustainable development for electrical engineers. This curriculum has to be achieved by building multilateral mutual recognition of qualifications and professional credentials of experienced engineers. Facilitating that way their mobility to locations where there is a demand.

Jordi Segalàs (UNESCO Chair of Sustainability in Technical University of Catalonia) wrote²: “WHY universities should integrate sustainability education as a core value in the engineering curricula. Then WHAT competences, in the domains of knowledge and understanding, skills and abilities and attitudes, should be learnt by engineering undergraduates at the universities are presented. Finally, HOW to make the acquisition of these SD competences possible is analyzed through the pedagogical improvement needed in existing higher education institutions”.

The objective of this contribution is to address the above “WHY-WHAT-HOW” questions based on some concrete examples of international curricula built in the frame of international projects with a focus on 2 Erasmus+ Capacity Building projects the first between European and South-Asia Universities (project MESfIA) and the second between European and Indian-Subcontinent Universities (project ELNAB).

¹ www.iisd.org/library/beyond-rio20-what-it-means-global-higher-education, consulted July 6th, 2020

² www.raco.cat/index.php/Sostenible/article/view/130099, consulted July 6th, 2020