Chapter 10

Diversifying Engineering Education:
A Transdisciplinary Approach From RWTH Aachen University

Linda Steuer
RWTH Aachen University, Germany

Sonja Gaedicke
RWTH Aachen University, Germany

Anna Bouffier
RWTH Aachen University, Germany

Carmen Leicht-Scholten
RWTH Aachen University, Germany

ABSTRACT

Engineers and therefore engineering education are challenged by the increasing complexity of questions to be answered globally. The education of future engineers therefore has to answer with curriculums that build up relevant skills. This chapter will give an example how to bring engineering and social responsibility successful together to build engineers of tomorrow. Through the integration of gender and diversity perspectives, engineering research and teaching is expanded with new perspectives and contents providing an important potential for innovation. Aiming on the enhancement of engineering education with distinctive competencies beyond technical expertise, the teaching approach introduced in the chapter represents key factors to ensure that coming generations of engineers will be able to meet the requirements and challenges a changing globalized world holds for them. The chapter will describe how this approach successfully has been implemented in the curriculum in engineering of a leading technical university in Germany.

INTRODUCTION

Global challenges, megatrends and political developments are influencing societies worldwide. Engineers create technical solutions for the resulting diverse challenges and therefore are shaping societies and trends with their work. As global developments change, so does the complexity of professional requirements set on engineers (Thursby, Fuller & Thursby, 2009). Consequently, internationally, engineering education is discussed beyond the mere imparting of technical knowledge, but also integrates skills that prepare future engineers to create socially responsible, sustainable solutions for global societies. Despite the commonality, there are variety of strategies and opinions on how to approach this challenge in order to realize this engineering education.

This chapter describes a new approach which aims at yielding socially responsible engineers, through the distinguishing means of gender and diversity integration into engineering education, research, and practice.

The aforementioned approach is based on a theoretical concept which is transferred into a practical approach in teaching and research. On the following pages, said practical concept will be elucidated by a best practice example of a course which has been very successfully applied at RWTH Aachen University, one of the leading technical universities in Germany and, one of the seven nation-wide Excellence Universities.

"MADE IN GERMANY" - ENGINEERING EDUCATION IN GERMANY

Historically German engineering had its origins in military crafts, evolving into the civic sector when a growing demand for technical applications in a broad scope of fields emerged due to the increasing use of technology during industrialization. To meet these new challenges engineering education found its way from military academies to universities. Since its commencement thru up until today engineering has always been a key factor for technological progress and economic prosperity (Knoll & Ratzer, 2010).

"Made in Germany" stands for the high reputation of German engineering worldwide. Hence, German engineering graduates are ranked among the international elite because of their profound professional expertise and leadership competencies. Thus, engineering presents the flagship discipline within the scientific profile of amongst leading German universities. The longstanding tradition of women absence within the military constitutes a strongly male-dominated and conservative disciplinary culture, shaping persistent institutional structures, stable curricula contents, and

Related Content

Encouraging Teamwork, Web 2.0, and Social Networking Elements in Distance Learning
Mirjana Ivanovi, Zoran Budimac, Zoran Putnikand Živana Komlenov (2014).
Overcoming Challenges in Software Engineering Education: Delivering Non-Technical Knowledge and Skills (pp. 71-90).
www.irma-international.org/chapter/encouraging-teamwork-web-20-and-social-networking-elements-in-distance-learning/102321

Enhancing Engineering Education Learning Outcomes Using Project-Based Learning: A Case Study
Mousumi Debnathand Mukeshwar Pandey (2011). *International Journal of Quality Assurance in Engineering and Technology Education (pp. 23-34).*
www.irma-international.org/article/enhancing-engineering-education-learning-outcomes/55875

ISO 14000 Environmental Management System for Sustainable Development and Environment in Business
Ilknur Sayan (2021). *International Journal of Quality Control and Standards in Science and Engineering (pp. 15-24).*
www.irma-international.org/article/iso-14000-environmental-management-system-for-sustainable-development-and-environment-in-business/286157

Mitigation of Communication Challenges in the Indian Software Industry
Anjanee Sethiand Shyamli Rathore (2012). *New Media Communication Skills for Engineers and IT Professionals: Trans-National and Trans-Cultural Demands (pp. 204-222).*
www.irma-international.org/chapter/mitigation-communication-challenges-indian-software/64014

A LabVIEW-based Remote Laboratory: Architecture and Implementation
Yuqiu You (2012). *Internet Accessible Remote Laboratories: Scalable E-Learning Tools for Engineering and Science Disciplines (pp. 1-17).*
www.irma-international.org/chapter/labview-based-remote-laboratory/61449