

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.

DOI: 10.4018/978-1-5225-2212-6.ch010

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

33 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/diversifying-engineering-education/175506

Related Content

Generic Engineering Competencies Required by Engineers Graduating in Australia: The Competencies of Engineering Graduates (CEG) Project

Sally A. Male (2012). *Developments in Engineering Education Standards: Advanced Curriculum Innovations* (pp. 41-63).

www.irma-international.org/chapter/generic-engineering-competencies-required-engineers/65228

Designing of E-learning for Engineering Education in Developing Countries : Key Issues and Success Factors

B. Noroozi, M. Valizadehand G. A. Sorial (2010). *Web-Based Engineering Education: Critical Design and Effective Tools* (pp. 1-19).

www.irma-international.org/chapter/designing-learning-engineering-education-developing/44723

Teaching and Learning Requirements Engineering Based on Mobile Devices and Cloud: A Case Study

Fernando Moreiraand Maria João Ferreira (2016). *Handbook of Research on Applied E-Learning in Engineering and Architecture Education* (pp. 237-262).

www.irma-international.org/chapter/teaching-and-learning-requirements-engineering-based-on-mobile-devices-and-cloud/142753

Mobility of Engineering and Technology Professionals and its Impact on the Quality of Engineering and Technology Education: The Case of Chinhoyi University of Technology, Zimbabwe

Fredreck Chinyemba (2011). *International Journal of Quality Assurance in Engineering and Technology Education* (pp. 35-49).

www.irma-international.org/article/mobility-engineering-technology-professionals-its/55876

Building Sustainability Through Environmental Education: Education for Sustainable Development

Ediola Pashollari (2019). *Building Sustainability Through Environmental Education* (pp. 72-88).

www.irma-international.org/chapter/building-sustainability-through-environmental-education/219052