Renewable and Sustainable Energy Reviews 68 (2017) 1106–1111

Contents lists available at ScienceDirect

Renewable and Sustainable Energy Reviews

journal homepage: www.elsevier.com/locate/rser

Strategic competences for concrete action towards sustainability: An oxymoron? Engineering education for a sustainable future

Karel F. Mulder [a,b,*]

[a] TU Delft Faculty of Architecture and the Built Environment, Julianalaan 134, 2628 BL Delft, The Netherlands
[b] The Hague University of Applied Sciences, Faculty Technology, Innovation & Society, Rotterdamseweg 137, 2628 AL Delft, The Netherlands

ARTICLE INFO

Available online 25 March 2016

Keywords:
Engineering education
Engineering culture
Paradigm
Transitions
Interdisciplinarity
Strategic competences

ABSTRACT

In the current discourses on sustainable development, one can discern two main intellectual cultures: an analytic one focusing on measuring problems and prioritizing measures, (Life Cycle Analysis (LCA), Mass Flow Analysis (MFA), etc.) and; a policy/management one, focusing on long term change, change incentives, and stakeholder management (Transitions/niches, Environmental economy, Cleaner production).

These cultures do not often interact and interactions are often negative. However, both cultures are required to work towards sustainability solutions: problems should be thoroughly identified and quantified, options for large change should be guideposts for action, and incentives should be created, stakeholders should be enabled to participate and their values and interests should be included in the change process. The paper deals especially with engineering education. Successful technological change processes should be supported by engineers who have acquired strategic competences. An important barrier towards training academics with these competences is the strong disciplinarism of higher education. Raising engineering students in strong disciplinary paradigms is probably responsible for their diminishing public engagement over the course of their studies. Strategic competences are crucial to keep students engaged and train them to implement long term sustainable solutions.

Contents

1. Introduction

In 1959, C.P. Snow lamented the great divide between 'science' and 'the arts': *'intellectuals often proudly proclaim that science isn't their thing, almost as a badge of honour to indicate their cultural bent'* while *'scientists being blind to the fact that live is not just about optimisation but also about the values behind that: we have to develop compromises between various, partly contradictory and overlapping, partly qualitative and emotional, demands'*. Snow argued that practitioners in both areas should build bridges, to further the progress of human knowledge and to benefit society [1,2].

Although Snow's analysis triggered lots of reactions, especially regarding its message to create more understanding for science

* Correspondence address: TU Delft Faculty of Architecture and the Built Environment, Julianalaan 134, 2628 BL Delft, The Netherlands.
E-mail addresses: k.f.mulder@tudelft.nl, k.f.mulder@hhs.nl

http://dx.doi.org/10.1016/j.rser.2016.03.038