

EESD 2016, 4-7 September, Bruges, Belgium
8TH Conference on Engineering Education for Sustainable Development

Internet Platforms for Education on Sustainability

Andreas Pfennig

PEPs - Products, Environment, and Processes, Department of Chemical Engineering, University of Liège, Liège, Belgium.

Keywords: balances, systems view, behavior.

topics: Innovative teaching technology/organization, Lifelong learning

One challenge in teaching sustainability results from the expertise being distributed in various universities. At the same time society would not require so many experts focused on sustainability that corresponding purely sustainability-oriented curricula should be offered in a majority of universities. Thus sustainability aspects have to be integrated into existing curricula e.g. in chemical engineering studies. To offer sufficiently high-level courses or teaching content, one way is to share modules dealing with sustainability aspects. The idea to share teaching capabilities on a national or international level is not new, some examples are sustainicum.at, bioenergytrain.eu. While these approaches address the topic of sustainability with a relatively wide variety of facets, it is difficult to see, how a coherent picture can be obtained and transferred in education to students and the interested public.

While this is so, already regarding the most basic element of the versatile toolbox of chemical engineering, namely setting up and solving simple balances, leads to significant insights and especially a fundamental understanding on the basic interplay of at least some of the major drivers. These are – besides increasing world population, which is the main driver – the increasing energy consumption, the limited land area for food and bioenergy production, the finite size even of the atmosphere leading to an increase in CO₂ concentration and climate change, to name just a few. All of these aspects refer to limited resources for which balances can be set up and solved. The balances have the advantage that they are so simple that everybody can assess their validity and implications. The experience with working out a corresponding teaching module will be presented exemplarily.

To facilitate delivering the aspects to students and the interested public the teaching material including a full manuscript and power-point slides have been worked out and are supplied at sustainicum.at. To allow easy access to the content of this teaching material also corresponding lectures have been recorded and are made publicly available through YouTube. The technical boundary conditions, which were found to be quite optimal as compared to other public lectures available on the internet, will be presented. The teaching material has in the past also been used for a variety of own presentations with the aim to deliver the basic understanding to an interested public, including public conference series or school classes. From these various experiences conclusions are drawn which will be presented.

Introduction

One challenge in teaching sustainability results from the expertise being distributed in various universities. At the same time society would not require so many experts focused on sustainability that corresponding purely sustainability-oriented curricula should be offered in a majority of universities. Thus sustainability aspects have to be integrated into existing curricula e.g. in chemical engineering studies. To offer sufficiently high-level courses or teaching content, one way is to share modules dealing with sustainability aspects. The idea to share teaching capabilities on a national or international level is not new, some examples are sustainicum.at, bioenergytrain.eu. While these approaches address the topic of sustainability with a relatively wide variety of facets, it is difficult to see, how a coherent picture can be obtained and transferred in education to students and the interested public.

Exemplary Topic

While this is so, already regarding the most basic element of the versatile toolbox of chemical engineering, namely setting up and solving simple balances, leads to significant insights and especially a fundamental understanding on the basic interplay of at least some of the major drivers. These are – besides increasing world population, which is the main driver – the increasing energy consumption, the limited land area for food and bioenergy production, the finite size even of the atmosphere leading to an increase in CO₂ concentration and climate change, to name just a few. All of these aspects refer to limited resources for which balances can be set up and solved. The balances have the advantage that they are so simple that everybody can assess their validity and implications. The experience with working out a corresponding teaching module will be presented exemplarily.

Results and Conclusions

To facilitate delivering the aspects to students and the interested public the teaching material including a full manuscript and power-point slides have been worked out and are supplied at sustainicum.at. To allow easy access to the content of this teaching material also corresponding lectures have been recorded and are made publicly available through YouTube. The technical boundary conditions, which were found to be quite optimal as compared to other public lectures available on the internet, will be presented. The teaching material has in the past also been used for a variety of own presentations with the aim to deliver the basic understanding to an interested public, including public conference series or school classes. From these various experiences conclusions are drawn which will be presented.