68. Beyond the fear of catastrophe!

Motivating Students and Lecturers for Education in Sustainable Development

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Abstract

This paper reflects upon using motivators for introducing SD in the lecture rooms as well as in our institutions in a more general sense. A strong motivator for SD in general is the fear for global catastrophe. We argue here that fear for global catastrophe is not enough to keep people motivated. More positive motivators are needed. Students and colleagues are supposed to be motivated by the great challenges that the world faces today. But in general, threats are not motivating if the threats have an apocalyptic character.

Also bureaucratic measures, like checking/auditing/evaluating tools might force people to include more SD in education, but are no motivator for university lecturers: In fact, disgust for bureaucratic procedures is one of the few conceptions that academics share.

How to motivate students and lecturers for SD without falling into the trap of claiming that motivation is all what counts? Learning for SD is important, not just to stimulate the motivation of students to work on SD in later phases of their careers, but especially to motivate them to study harder to be able to make a better contribution to SD

As we are often still in the process of convincing university managers to add SD to the curriculum, convincing colleagues to address SD in their lectures, and convincing students to pick SD electives and address SD in their projects, we cannot trust upon the institutionalization of SD education to do the job. A decline of motivation might destroy everything that has been built in years. We need to motivate students and colleagues for efforts that give them no direct personal reward and might even increase their workload. The only route to long term success is making the study of SD attractive.

We make the point in this paper to use the multifaceted character of SD to realize additional benefits, for the students as well as for the university. SD can help students and universities to:

- Connect disciplinary curricula to social praxis

- Integrate the dispersed elements of a curriculum
- Show the relevance of disciplinary research and education to the outside world

Positive motivators could be found at various levels. For students, it could encompass being more autonomous in studying. At the lecture level, the use of irony and humour could stimulate learning. Self learning and studying real life problems can be important motivators by providing autonomy and a sense of usefulness to the student

1 Introduction

Sustainable Development is a long term effort. But it should be accomplished by people that have essentially a more short term perspective. Living a life only having in mind the long term SD perspective does not match the normal cycles of careers. In order to motivate students, the long term issues of SD should be presented by such methods that studying these issues is also rewarding in the shorter term. How could SD lead to rewarding education for students and for lecturers?

2 Fear for catastrophe….

Sustainable Development is often motivated by a fear for global catastrophe:

- Climate change spiralling out of control
- Lack of resources and energy
- Large scale decline of ecosystems services
- Economic collapse leading to armed conflict
- Mass epidemics
- Famine and Starvation
- Large scale diseases by pollution, radiation, etc.

The fear of these global problems act as stimulus for the response that we seek among students and colleagues, i.e. action to behave/design/study more sustainably: *Information about the problematic state of the world leads to action.* However, the relationship between "information about the problematic state of the world" and "action" is far from being linear. More information and a more problematic state of the world could both lead to more action, but certainly not in all cases. More information, showing more severe problems could also lead to:

1. *Information overkill leading to despair: 'closing the shutters'*
2. *Problem overkill, i.e. the problem is portrayed to black: this creates a loss of credibility of the lecturer.*
3. *Denial if there are no, or only unattractive, options for action*

The first two phenomena should always be avoided in an academic context. The last phenomenon is explained by cognitive dissonance theory: If facts do not comply with our desires/wishes, we might just deny or ignore the facts. In practice we can observe lots of examples. For instance, despite various warnings, smokers continue smoking and Chernobyl forbidden zone squatters just deny that there is any danger in radioactivity…. And of course our societies live in *a state of denial* in regard to climate change, as the level of action is completely inadequate. How to prevent such denial responses to our teaching on Sustainable Development? Showing options for action is certainly important.

Clearly, we should not try to motivate students and colleagues by only speaking about horrific catastrophes and certainly not overstating their magnitude. Scientific fact and scientific rigor is

required. But we should especially depict attractive options: Options that do not just contribute to postponing or stopping the long term catastrophe, but that could also lead to interesting short term activities; studying new subjects, learning new approaches and perspectives, helping to realise how learning contributes to problem solving in real life. For education this implies for example to work on:

- courses that students can recognise as being related to societal challenges
- learning processes not being in a lecture form but more active
- interdisciplinary learning projects, by which various parts of a curriculum can be integrated
- Transdisciplinary projects by which students learn to work with external stakeholders too.

3 Motivation

In SD, fear is often addressed as a main motivator. But fear is only a good motivator if there is an easy fix. Even a large number of fatalities in road traffic do not keep us from driving. But persons who can afford might buy a car that has more safety precautions. Fear is also very much a temporary effect: incidents that create news lines lead to adaptations in behaviour for only a few weeks, until everything goes back to 'normal'.

Another motivator might be compassion: compassion for the underprivileged, and the generations to come that might be in some way less privileged than the average Westerner is. But this motivator might create mixed feelings: many of the SD problems are portrayed as being caused by the tremendous material growth of the BRIC economies (while of course the Western world had such high standards of material consumption already for long ….). So the feeling of compassion is often replaced by a fear for being overtaken.

Compassion for future generations, the generations to come, that might endure worsening conditions of living, is opposed to a deep strain of Western civilization: that we are on a track of 'progress'. The cyclic world view of many non-Western societies has long been left in Europe. We are 'progressing', but to what destiny? Progress thinking makes a collapsing society for many people unimaginable, as each threat can be countered by *"scientist and engineers who will work out some solution"*. Still, a societal collapse is fascinating, as it is the theme of many films and books, but it is always caused by disaster or external reasons, never by our own inaction in regard to threats. And generally, world order can be restored. So we are inclined not to believe that future generations will be better off than we were, and the world's poor (perhaps with a few exceptions) are on a track to become rich…. Hence, there is reason to belief that two main motivators for SD, compassion and fear, will not motivate sufficiently for SD.

One might argue that university does not need motivators: universities teach rationality. That is sufficient motivation on its own. But is it a sufficient motivator to keep our students on track for the challenges of the future? Highly rewarded career paths that are aiming at a quicker return of the academic investments are tempting….

In Western societies, most choices for another lifestyle involve more consumption. Lack of money might force people back into lifestyles that they want to escape from. But positive lifestyle choices are

also possible without more consumption. For example young adults generally prefer to have their own life that gives them more autonomy, instead of the often wealthier life with their parents. People often refrain from stressed jobs, as they prefer their own health and time for reflection. Hence there are other motivators than quick returns and fears. A sense of autonomy, time for reflection, connection with others, and self-fulfilment might be motivators that could be used in education. In the remaining part of the paper, we will discuss their use and give some of examples of courses that attempted to do so.

4 Motivating Students and Colleagues

As autonomy is such an important motivator, especially at the age of our students, it is remarkable that academic education provides such a low level of autonomy for students. Once the program has been chosen, the student cannot chose any relevant features of the subjects to study (until final stages of the program), and the exercises are generally completely pre-arranged. The prevailing pedagogical model is that of a student being an empty box, to be filled with whatever the lecturer decides to pour into it. Motivators in which the student's sense of autonomy is addressed, or where the connections between theory and real life practice is shown, are often limited to extra-curricular activities like excursions and study visits. New pedagogies, like problem based learning, offer the option to students to link theories to practice. Project based learning offers the option to a student to orchestrate his/her own learning process. Clearly such forms of learning are motivating, even to such extents that other parts of a curriculum might be threatened by the students putting all their efforts into this motivating education. (This might be a reason to offer such education as a block).

The flipside of the coin might be the lecturer: what the student gains in autonomy might imply less control for the lecturer, and more work. As university careers are increasingly determined by research, extra efforts for teaching will be a risk for the lecturer.

In the remainder of this paper, we will give some examples describing motivating education that did merely require extra staff efforts.

4.1 UPC- Barcelona Tech: Bachelor level – European Project Semester

The School of Engineering of Villanova i la Geltrú at UPC Barcelona Tech has designed and coordinated the European Project Semester (EPS), an innovative learning program which responds to the challenges of society and the European Higher Education Area.

EPS trains engineering students by applying Project Based Learning in intercultural and multidisciplinary groups. The working language is English and the program is designed for Bachelor students. The EPS program emphasizes the introduction of competences in sustainability and human technology (Segalàs et al., 2011).

The main objective of the EPS is to improve the learning outcomes and competences of engineering students in relation to sustainability, communication and teamwork skills, the

ability to work in intercultural settings, and the ability to work in real multidisciplinary projects with students from different degree backgrounds.

The EPS is divided into seminars (worth 10 ECTS) and a project (worth 20 ECTS). The seminars include courses in Sustainable Technologies, Business and Sustainability and Human Technology. The projects are proposed by local companies and research groups. Since 2008 the number of participants has increased from 9 in 2008 to 30 in 2011. The students, who have participated in 15 projects, have come from 16 different European and North American universities and from over 18 different academic disciplines.

4.2 UPC- Barcelona Tech: International course on Sustainable Technology Innovation

The International Seminar on Sustainable Technology Development is a course offered within the framework of the Master of Sustainability program at UPC Barcelona Tech.

The main goals of the course are: to connect experts, future researchers and policy-makers on real topics where long-term technological system renewal is needed in order to fulfil sustainability requirements; to increase the understanding of sustainable development in the long term and the role of technology and technological systems therein; to increase the capability to apply foresighting, forecasting and backcasting; to contribute to the development of scientific competences of students; to increase the ability of teachers to teach future imaging, foresighting, forecasting and backcasting; to become an experts' meeting point; and to create networking activities among different groups and institutions (Segalàs and Tejedor, 2012).

The course introduces the methodology of backcasting in real sustainability problems. The learning environment is international, transdisciplinary, intergenerational and intercultural. It includes stakeholders' dialogues and discussions. It is organized around current sustainability-relevant topics, which are analyzed in case studies based in different contexts: going from developed to developing countries and from local to global cases. Students apply backcasting to the case studies in order to set up contextualized sustainability strategies. Students and lecturers from 6 European universities and with different backgrounds are participating in the course.

The course is divided into 4 phases:

1- Local situation analysis. From March to May students analyze the topic in their own countries/regions.

2- Case study analysis. In May, students are grouped into international, multidisciplinary teams and define the current state of the case studies, as well as the questions and challenges that they pose.

3- Seminar at UPC. In June, students, lecturers and stakeholders meet in Barcelona, where the two week course takes place.

4- Evaluation of the course. Students analyze their learning experiences in terms of acquisition of new competences.

So far more than 170 students, 30 lecturers and 50 stakeholders have participated in this course.

The topics analyzed in the course vary each year and are related to relevant sustainability challenges; the topics elaborated so far have been: urban solid waste management; food & drinks packaging waste; overfishing and marine ecosystem degradation; sustainable mobility, agro-ecology and community energy systems.

4.3 UPC-BarcelonaTech: SolarDecathlon

At UPC-Barcelona Tech, the recent experience of the SolarDecathlon contest has been very valuable[1]. In the first European edition (2010), a group of 20 architecture students coordinated by a lecturer worked during 16 months in order to design and build a passive sustainable house (LOW3). The experience was unique for the students who, apart from learning sustainable architecture, learned teamwork, project management, interdisciplinarity, fund-raising,… so a wide range of interpersonal and entrepreneurial skills.

In the following edition (2012), no teacher wanted to accept the heavy task of coordinating the project. Instead of abandoning the project, the students took this responsibility themselves. They conducted successfully all project phases, acquiring not only all the competences mentioned earlier, but also the full responsibility of their project and learning activity. Fundamental in those experiences was the level of freedom and autonomy they had been conferred by the school, which triggered their responsibility and innovative solutions. For example, for the second edition, where funding was really a problem, students organized a crowd-funding project in a social innovation platform[2], which would have been unimaginable if the school had provided the funding. This is today a key skill and experience for social entrepreneurship.

4.4 Delft University of Technology: The 'boat week' course

Since 2000 Delft University of Technology provides an option to all students to specialize in SD, within the context of their normal engineering curriculum. Students have to participate in a number of optional SD courses, carry out a graduation project that is SD relevant and participate in the 'boat week' course to obtain a special SD annotation with their engineering masters' degree.

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[1] http://www.youtube.com/watch?v=-2JXsONKlUU, http://www.youtube.com/watch?v=GeHMGAha1eY

[2] http://www.verkami.com/projects/2758-lleva-e-co-a-madrid

The 'boat week' course aims at preparing students for an SD graduation project. The first week of the course is at a boat. The boat sails the inland waterways of the West part of the Netherlands. The students do not know each other before. They sleep, eat and work on the boat. During this week various sites are visited such as urban projects, landscape sites, waste or energy companies, special buildings or infrastructures that are interesting for SD. During transport, presentations and discussions take place on board. The students get a wide overview of the variety of SD challenges and solutions.

After the week on the boat, the students do a backcasting exercise in groups:

- They should analyze the sustainability of a sector/function and the demands of all stakeholders
- They should analyze trends in society that are relevant for that sector/function
- Based on that, consensus with stakeholders should be sought on an attractive future vision (long term, 10-50 years)
- The vision should be widely discussed with stakeholders and translated in pathways and milestones

Initially, the students took only long term SD challenges (50 years). Nowadays, the students work on more medium term challenges (10-20 years) as that fits better to the time frame of partners (companies, municipalities, etc.). Working with these partners is extra motivating for students.

4.5 Kyiv Polytechnic Institute: Summer School by Student Science Association

The annual Summer School was introduced at Kiev Polytechnic Institute (KPI) by its Student Science Association in 2006. The aim of this project is to facilitate internationalization at KPI and to provide students from all over the world with an opportunity to learn contemporary subjects in a friendly and motivating atmosphere during two weeks in summer. Every year the Summer School program focuses on several topics chosen by students – volunteer organizers of the project. These topics are organized into several separate streams which consist of lectures, workshops, discussions, group work and study visits to companies and research institutions.

Sustainable Development has been integrated in the Summer School's program since 2008, after a group of students from the organizing committee took part in a course on Sustainable Development conducted at KPI in the framework of the Erasmus-Mundus SDPROMO project. Teachers from KTH, TU Delft, UPC Barcelona-Tech and KPI designed the first course in Sustainable Development for students, teachers and researchers at KPI using active learning methods, including role plays, case studies, project work, films and debates during two weeks in February 2007. An active group of students from the Student Science Association became

inspired by the course. Therefore, they introduced SD as an important part of the Summer School program: from a block of lectures in 2008 and 2009, to a separate stream in 2010, a main topic of Science of Global Challenges stream in 2011 and a base line of Advanced Energy stream in 2012. As a result, SD is playing the role of interdisciplinary pillar connecting different topics of the Summer School at KPI, where students motivate their fellows and guest speakers to reflect on how subjects of their study and research shall add to the progress towards SD.

5 Reflection

What we see in the cases is a number of success factors:

- Self-organisation
- Working on real life problems
- Working with stakeholders
- Integrating various curriculum elements

All of these elements never occurred all in the same case. Student self-organisation was especially important in the UPC-Solar Decathlon case and at KPI. Real-life problems were worked at by students in the cases of UPC/EPS (problems from SMEs in Villanova), UPC/STD (backcasting on a specific topic) and TUD (backcasting problems of public companies). Programs were adapted to accommodate working these real-life problems. As such this motivating especially when the students knew that there was somebody waiting for the solution that would elaborate. This happened at the UPC EPS and at TUD cases.

A final function of these new forms of education was to integrate various curriculum elements. This happened especially in the cases of KPI, and in the UPC EPS. The UPC EPS is a bit a special case here, as it is a full semester. The project work was intended as an integrator of that semester.

6 Discussion

The cases presented here are all rather long term successful, although some are older than others. They have all proven themselves as being more than just a nice experiment. However, there success could also very well be seen as ‘the successful exception’; or in other words: Would these courses also be so successful in a curriculum that really would be built on a different pedagogical approach? In engineering, we do not know of any full curriculum that is built on problem based learning.

A second issue for further research is in the combination of success factors. Clearly we cannot apply all the success factors for the most motivating SD course. So how to combine -Self-organisation, -Working on real life problems, -Working with stakeholders, -Integrating various curriculum elements, and what combination might be appropriate for what goal?

Motivating SD education is far from being a reality. Clearly there are options for much more motivating SD education, but the question what could be the most motivating pathway to train students for SD is a challenging topic for further research.

References