

## CONTINUING EDUCATION FOR UPDATING TEACHERS OF ENVIRONMENTAL SCIENCE

**N. Roorda**

*Dutch National Foundation for Sustainable Higher Education (DHO), Tilburg, The Netherlands.*

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### Summary

It will be argued that staff education with respect to sustainable development is much more than the ordinary process of keeping by members of the teaching staff with new developments in their own discipline. So, an integrated approach will be necessary, originated by the management of the university or a faculty.

In order to start the process of continuing education, a special project will be needed. In the first phase, a group of teachers will be trained in all aspects of sustainable development in general and of the fields in which the faculty or university is operating in particular.

In the second phase, all of the staff – including the management – will have to receive a basic training in the concepts of sustainability. This will be followed by a deep extra training for all teachers who work in disciplines that have something to do with sustainable development; that is: almost all disciplines.

After the start project has been finished, a *permanent sustainability expert group* will be installed, that sees to it that permanent education will remain a part of the university policy. In the last part of the chapter, an example is given of an exercise that can be done with members of the teaching staff in order to internalize the principles of sustainable development.

## 1. Starting the Education Process

Article 3 of the Copernicus Charter (1993) states, that universities shall provide training to the teaching staff and the rest of the personnel. So, all universities that have signed the Charter have obliged themselves to do that, and that's great. But in what way should this be done? In this chapter, a few things will be said about this.

Continuing education of the teaching staff consists of two main parts:

- A starting project;
- Just going on after the starting project is completed.

Now, going on after the starting project has been done is easy: you just follow the lines you used in the starting project, and see to it that the knowledge and experience of the staff remains up to date.

The main problem is therefore: how do you get started?

In a university, usually most of the staff members don't know very much about sustainable development in general and about sustainable aspects of their own specialism (sustainable economics, technology, etc.). So, in many cases there is a mountain to be climbed. This is not something you start on a Monday and finish on the Wednesday following; it requires a strategy. This strategy should, of course, start with the question: why do you need staff education in sustainable development (besides having signed the Copernicus Charter)?

## 2. Reasons for Staff Education

Educating the teaching staff with respect to sustainable development is vital for the introduction of sustainability in university courses, because of two reasons:

1. There is a lot of theoretical information and practical skills to be learned about aspects of sustainable development. Of course it belongs to the natural duties of a teacher to keep his/her specialism updated; but the enlargement of the knowledge about sustainable subjects goes far beyond this normal task, and cannot be done by individual teachers without help.
2. Perhaps even more important than enlarging knowledge and skills, of teachers as well as of students, is the need to internalize sustainability. Sustainable development is primarily a matter of *thinking* in other patterns, of getting a new kind of intuition. If you want the teachers to be able to realize this in the minds of the students, then it is necessary first to realize the same in the minds of the teachers themselves; otherwise they will just not be convincing.

### ***Example: an exercise for teachers to internalize sustainability***

As an illustration of the tools that can be used to achieve this second goal (internalizing sustainability), an example of an exercise is given at the end of this chapter. The exercise has been tried out; it appeared to have a rather strong impact on the

participants. (Probably it would not be a good idea to do it with students.)

One of the reactions on the so called “negative scenario” (see the exercise) was: “Oh come on ... this can’t be realistic! It can’t be *that* bad.” In reaction, a graph was shown for which the data are derived from Meadows (1991). This graph of course is based on a number of assumptions and theoretical models, so it doesn’t absolutely prove anything. But at least it makes clear that a very negative scenario is not completely unthinkable, if global policies are not altered rather drastically.

### 3. The Strategy of Staff Education

Imagine, for instance, a typical university faculty consisting of, say, 350 people: a large group to educate.

Probably, not every member of the staff will have to become an expert in sustainable subjects. But still there are many people who have to learn something. To achieve this, a snowball strategy can be effective.

#### *Step 1: Project team*

In the first phase, a project team is formed in which perhaps 10 or 20 teachers participate. These *key teachers*, each representing one of the Faculty courses, receive a very thorough training program, which takes them one to two days a week during a couple of years. In the end, they will be experts in sustainable development in general, and in some specialist sustainable subjects.

Their training program should consist of three elements:

- a **general track**, which they follow together. Many subjects are to be treated. For instance:
  - sustainable development as an ideal;
  - sustainable economics and policies;
  - basic environmental knowledge;
  - legal aspects;
  - technological subjects, like Life Cycle Assessment (LCA) and Design for Environment (DFE).
- a **specialist track**, which is an individual program for each. The contents depend on the course that is represented by the teacher, in order to enable him/her optimally to introduce the subject in the staff of their courses and function as a teacher for their colleagues.
- **practical experience**. For this, all teachers are seconded to some company (for instance, an industrial company or a local government) in which they participate in sustainability projects for some time; this can be compared with the traineeship of the students.

In order to make this program effective, one or more experts in relevant sustainability subjects are needed: they should coordinate the project and design the curriculum the teachers are to follow. Besides, many of the theoretical subjects can be presented by a lot of experts coming from industry etcetera, in order to ensure that the information

given is relevant and up to date.

Probably, some learning books can be useful. A good example is “Factor Four” (Von Weiszäcker, 1998).

### ***Step 2: All personnel***

In the second phase, each and every teacher (and the other personnel, including the management) will go through an education program aiming at developing a general knowledge and understanding about sustainable development. This is important, because it will enable them to place their lessons in a sustainable framework.

It doesn't have to take much time: perhaps every staff member will be working on it for two or three days. (Of course, if you add all the hours of all the staff, you come to a large amount of time, and if you capitalize this, it is a rather large investment.)

The contents of this education program could perhaps resemble the general track of the project team; so, subjects are to be treated like an introduction on environmental effects, scarcity of materials and energy; an overview of possible solutions for these problems; the concept of sustainable development; some insight in sustainable policies; and something about the role of technology, cultural and structural elements, and economics.

Besides, something could be done about the links between sustainable development and other major global problems.

It would be best if the subjects are not only treated in a theoretical way, along the lines of traditional education: not a one way process in which the staff members are the listeners, the consumers of knowledge. It is important that they do something with, in order to achieve the goal of internalizing a sustainable way of thinking.

### ***Step 3: Specialists***

And third, all members of the staff who are specialized in subjects that have something to do with sustainable technology are given a training in sustainable technology.

Of course, this has a much smaller scope than that of the key teachers (the project team), as it is only aiming at their individual specialties. On the other hand, the group to be trained is much larger, since almost every teacher will need *some* kind of specialist training.

Although external experts also have a part in this education program, it is coordinated and partially given by the key teachers.

## **4. After the Starting Process**

After the starting project is completed, the situation will have to be maintained. A good way of doing this is, to keep the members of the project team together, and let them form a permanent nucleus of knowledge and experience about sustainable development,

a “**permanent sustainability expert group**”.

Together, the members of this group can see to it that the knowledge of themselves and of their colleagues remains up to date. They will keep in close contact with leading industrial companies and with research centers. If necessary, they will start a new (probably smaller) project for staff education.

This will guarantee that the continuing process of staff development towards sustainability will not become an *ad hoc* process. Instead, the development plan will always be integrated in the overall policy of the university.

What this means, can be considered in terms originating from the so called “EFQM method” for quality management.

This method, originally designed for industrial companies by the European Foundation for Quality Management (EFQM), has been adapted by a group of Dutch universities in order to be used for the quality management of university organizations (or parts thereof) (see: Expert group HBO, 1999).

Following this method, a university organization can be described with respect to staff development and sustainability as being in one of five possible stages, varying from "activity oriented" (where things happen mostly ad hoc) to “total quality”.

Applying these five stages to the above mentioned demand in the Copernicus Charter gives the following five descriptions as in Table 1:

Stage	Characteristic	Description
1	Activity oriented	Staff development in sustainability is dependant on individual initiatives.
2	Process oriented	There is a budget for staff development in sustainability. Plans for staff development in sust. are short term related.
3	System oriented	Plans are related to a long term vision in sustainability. Wishes of staff members are looked for, systematically.
4	Chain oriented	The university policy is based upon formulated goals towards sustainability; staff development is deduced from it.
5	Total Quality	The policy is based upon societal and technical trends. Feedback towards society takes place systematically.

Table 1: Application of the five possible stages of EFQM method to Copernicus Charter Demand

It will be the duty of the permanent sustainability expert group, to see to it that the aspects of sustainable development continuing staff development will always be somewhere in the higher stages, preferably in stage 5.

Besides, the permanent sustainability expert group can be useful in the university organization in another way. Since the members are used to thinking in a sustainable way; they are naturally used to think strategically: by looking ahead for more than the usual three to five years, they are able to support the university management in the development and maintenance of the strategic policy of the university.

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### **Biographical Sketch**

**Mr. Niko Roorda** received his Bachelor's degree in Astronomy from the University of Leiden in the Netherlands, and his Masters degree in Theoretical Physics and Philosophy from the University of Utrecht, also in the Netherlands. He worked as a teacher in secondary and academic education until 1998, and managed the department of Sustainable Technology at the Brabant University for Professional Education in the Netherlands. During 1999 and 2002 he was the project manager of the *Cirrus Project*, which pioneered the integration of sustainable development into the education and organization of the Polytechnic Faculty of the Dutch Avans University. For this he was awarded the Dutch National Award for Innovation and Sustainable Development in 2002.

Since 2000 he has also been working for the Dutch National Foundation for Sustainable Higher Education (DHO). For the DHO he developed the "AISHE", which is a tool for assessing the rate of integration of sustainable development into the education and organization of educational programs of universities. This tool has been used in the Netherlands, Belgium and Sweden. He has published widely, including two textbooks, on sustainable development in higher education. As a DHO consultant, Mr. Roorda has been assisting and advising universities in their efforts to introduce and integrate sustainable development into their programs. He also trains AISHE auditors and teachers.