

How Accreditation Agencies can help the Necessary Change of HEIs towards Sustainable Development Practices

<http://dx.doi.org/10.3991/ijep.v6i1.5336>

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Abstract—In our society, everybody seems concerned by Sustainable Development, however when you discuss with European students, you realise that in many institutions, there is not much done and that for the time being it is always the same European universities that behave as “good students” and answer surveys and enquiries; it is necessary to find a way to make things evolve everywhere!

Accreditation agencies are one of the solutions to improve the involvement of all the HEI.

The CTI (Commission des Titres d’Ingénieur) is in France the body in charge of authorizing engineering universities the right to deliver the title of engineer. It states its own accreditation criteria that can evolve according to CTI’s own ongoing reflexion or to the point of view of its stakeholders, as required by ENQA.

Regarding social responsibility and sustainable development, CTI consulted for 3 years organisations directly concerned by Sustainable development and defined in February 2014 the items that must appear in HEI’s self evaluation reports for their accreditation.

Index Terms—accreditation, green plan, social responsibility, sustainable development

I. INTRODUCTION

Since the concept of Sustainable Development (SD) appeared, HEIs (Higher Education Institutions) used different strategies to include it in their missions. Regarding Engineering Universities, because of their field of activities, the ecology was directly related to their teaching and/or research fields and they were among the first to react. It is both a good and a bad point for Engineering Education Institutions because in opposition with multi-disciplinary institutions, some of them remained with a restrictive view of SD.

Nowadays, the integration of SD in its three components in the global strategy of the institution is far from being of the same level everywhere, even in Europe.

It is the reason why some accreditation or evaluation agencies decided to put an emphasis on SD in their evaluation. Amongst others, the French CTI (Commission des Titres d’Ingénieur) acted those evolutions last February.

In this paper we present the requirements of the French agency in relationship with the other European and French

systems regarding SD management and the way institutions react about them.

It is a good point to incorporate SD in the accreditation criteria, if the means put in place by the institution to reach the target remains under the institution control (CTI adapted its framework from the Green Plan), because it might be the only way of turning engineering towards sustainability faster and in every engineering education institution.

II. THE PREMISES

The concept of Sustainable Development was employed first by Brundtland in 1986. Many educative activities linked with technology and energy appeared very quickly in the institutions concerned by the preoccupations underlined by SD, which induced very soon technological researches: HEIs that developed researches either in ecology, chemistry or energy were immediately concerned, and some of them even included in their programmes by the end of 90s-beginning of the 2000 some teachings for example about Eco design.

The first global teachings covering the 3 points of SD (Society, Economy, and Ecology) inside engineering universities can be considered as realised in 2002 in TU Delft [1], which is still one of the “good students”.

A. Barcelona declaration

Then, the Barcelona declaration (fig 1), in 2004, came to consolidate the points that should be important in a sustainable education and this helped some institutions to progress in a more global view and strategy towards SD.

In order to comply with this Barcelona declaration, the following aspects of the educational process must be reviewed according to the EESD (Engineering Education for Sustainable Development) Observatory 2006 [2]:

- links between all the different levels of the educational system,
- content of courses,
- teaching strategies in the classroom, teaching and learning techniques,
- research methods,
- training of trainers,
- evaluation and assessment techniques,
- participation of external bodies in the development and evaluation of the curriculum
- quality control system.



Figure 1

We can first point out that many of those items are already very often linked to those evaluated by quality assurance agencies in Europe.

B. The first surveys

Some surveys have been made in Europe concerning SD and higher education institutions for example those realised by the EESD Observatory in 2006 and 2008 [3].

In 2006, 55 European Universities answered the survey: amongst them 16 were identified as reaching their targets.

Most of these universities were from the North of Europe. For EESD, institutions reaching their target included:

- Stated policy and action plans on engineering for sustainability in research, education and campus environment
- Dedicated undergraduate courses in the area of sustainability for engineers. This includes both holistic overview of ESD and specialized courses on specific aspects of sustainability
- Identified postgraduate programmes providing the possibility for specialization or continuation for all engineering students

In 2008, the survey reached more than 400 institutions across Europe; on the 55 universities of technology ranked, 21 universities could be considered as reaching SD targets, and 17 of them were even considered as key references by their peers.

C. The great diversity in the reality of institutions

Last September, during an “open working group session” of the Working Group “Sustainability in Engineering” of SEFI, it appeared that some European Engineering Institutions were, regarding SD preoccupations, still very far from the universities answering the EESD enquiries: actually some of them were still trying to know what to do so as to initiate this process!

In 2012 and 2013, during the BEST Event on Education that was dedicated to SD, it was also clear through the reaction of students that not all the engineering universities in Europe had already started their way to SD! This discovery was far from being pleasant but it was quite pragmatic!

The preoccupation for SD really needs to be shared by all students and all universities of technology, it should be a global concern; so the real question is “what to do?”

When you take a look at labels and surveys you always see the same “good universities” and if an individual person feels concerned within an institution where the governance thinks that SD is not a strategic point, what can he do?

According to the Rio+20 [4] conference, that took place in 2012, HEIs have an increasing awareness of sustainability challenge for graduates and should therefore play an increasing role. In the HESI (Higher Education Sustainable Initiative, launched in Rio+20), Chancellors, Presidents, Rectors, Deans and leaders of HEI acknowledged the responsibility that they bear in the international pursuit of SD.

They agreed to teach SD concepts, encourage research on SD issues, green their campuses, support sustainability efforts in the communities in which they live and share results through international frameworks. But in HESI, we find another time the same “exemplary universities”.

Even if labels are an important thing, one can wonder whether an accreditation procedure making things mandatory wouldn't be good way to proceed: in several European evaluation agencies where SD is fully part of the criteria for evaluation -that is to say as well as a strategic policy of the institution as a component of the learning outcomes-, SD is described in the self-evaluation report and really visible during the audits.

III. THE CASE OF FRANCE

In France the facts about SD have been taken in account by students, as well as by organizations of deans (Conférence des Grandes Ecoles-CGE) and by Ministries, some of them trying to act as lobbies in the good sense of its meaning.

The ministries put in place surveys and questionnaires such as MEEDAT in France in 2008 [5] that identified more than 300 curricula in SD (60 general universities, 37 technical universities) and stressed on an interesting difference between the general universities concerned by a theoretical and conceptual reflexion on governance and political strategy and on the other hand the technical universities that appeared to have a more pragmatic approach based on energy, resources and Eco design; this report schematically opposes

- a top down approach in general universities and
- a bottom up approach in technical universities:

In those conditions how can we work in a multidisciplinary way necessary for the development of SD?

It was also a topic discussed with CDEFI (Conference of the French Deans of Engineering Universities).

The network of French students for SD (REFEDD) realised in 2007-2008 a survey [6] among the students (15 000 of them gave their opinion about SD and SD education) in order to make propositions resulting from these statements and expectations. The outcome was that teaching of SD was either absent or very specialised. The students hoped more active pedagogies connected to the “real world”.

One of the propositions was to make campuses exemplary and to define a minimal curriculum that should be taught to everybody. However, due to the autonomy of

universities, it was very difficult for this group to make institutions evolve quickly.

A first attempt to evolve faster has been the Green Plan, perhaps because it is based on a law but also because it includes many of the aspects considered in previous attempts in Europe. We will describe it more specifically because it is one fundament of CTI's process.

A. Green plan

According to a French law (Loi de Grenelle", 2009), the Higher Education Institutions have to elaborate a Green Plan (Plan Vert) which is a plan for sustainable development including environmental preoccupations but also social and economic ones.

In 2012, 100 institutions (among which 40% are engineering education institutions, meaning 40 over the 200 French Engineering Education Institutions) had initiated this process and with their experience, we discovered that the success of Plan Vert needed:

- the SD strategy to be elaborated
- the institution mission to dedicate a person responsible for the animation, the setting and the evaluation of the SD process; this person must have human and financial resources

A framework has been defined after promulgation of "Loi de Grenelle", it has been named Green Plan Reference system [7]: it is a toolbox helping to define a SD strategy, its steering and self-evaluation.

5 axes are considered:

- Strategy and governance
- Teaching and education
- Research
- Environmental management
- Social policy and territorial management

With a sharper view it appears to be a specific application of ISO 26000, with considerations of: accountability, transparency, ethical behaviour, respect of laws, recognition of the stakeholders interests, consideration of international norms of behaviour, respect of human rights.

Communication about such a tool is quite demanding, and is realized amongst other things by associations of deans and presidents of universities, it is difficult to imagine that institutions could have never heard of it!

Furthermore, for HEI that want to go further than this legal basis, many associations develop labels, tests or other actions that we will present further on.

B. Vision of CTI on SD

According to ENQA criteria, quality agencies must take into account their stakeholders for the evolution of their evaluation procedures and their strategy.

In CTI this criterion is fulfilled because informal meetings with stakeholders take place regularly on all topics linked to the heart of the evaluation: inside engineering education institutions, many fields are currently in great evolution regarding learning outcomes as well as teaching strategies.

Among the fields of evolution of engineering education, engineers social responsibility was an important discussion topic; CTI had already introduced some prospective

elements in a document since 2009, this document gave no mandatory criteria for the institutions.

In December 2012, a meeting took place between CTI and CGE, the benefits of Green Plan Reference on institutions were discussed, and positive outcomes for the institutions were clear. At the end of the meeting it was decided to write immediately a new prospective document based on the Green plan reference that is, in France, considered as the norm in the SD field.

This prospective document was submitted to the organizations of students and then one year later the accreditation criteria were amended since the student's organizations agreed on the proposals of the document.

The idea to start from an existing reference (Green Plan) was intended not to penalize institutions having already begun their process towards SD and because it was also a national standard for general universities.

C. Decision to go

Usually criteria [11] for French Engineering Institutions accreditation are amended only every 3 years, and consequently should have been launched in February 2015, but in February 2014, CTI, considering that teaching social responsibility to engineers was a critical aspect for society and a duty for engineering institutions, decided to include immediately SD not only in the intended learning outcomes as it was until then but also in the description of the global policy of the institution: this is an important evolution of the accreditation criteria.

The strategic guidance note of the institution being evaluated must include the orientation chosen by the institution regarding SD and particularly the Green Plan that describes the institution's strategy and its implementation and evaluation.

The strategic guidance note is an important part of the self-assessment report because the institution's administrative council votes it, and when this institution is part of a group of faculties the university council also votes it.

IV. OTHER SYSTEMS

A. Labels and tests

Labels can be the first step of an institution's strategy, because many of them are international, and a school belonging to an international network must embrace its labels practices. Many approaches can be found in the literature from the more sophisticated labels to the minimal indicators.

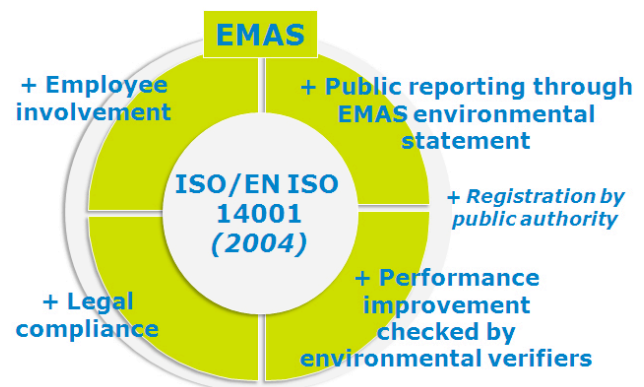


Figure 2

EMAS [8] has been created in 1995 by European Union, it is more demanding than ISO 14 001 (figure2), many German universities obtained this label and French also, but it is difficult to know the exact number of institutions labelled.

EMAS's distinctive key elements are performance, credibility and transparency. To receive EMAS registration, an organization must: conduct an environmental review, adopt an environmental policy, develop an environmental programme, establish an effective environmental management system, carry out an environmental audit, and provide an environmental statement.

This system is not specific to HEIs but HEIs are considered as a particular case of organization; it is also a global approach of SD.

During SEFI Conference 2013 in Leuven the QUESTESI label was also presented [9], it results for the QUESTESI LLP Erasmus European Project. This project was led by the European Foundation for Management Development (EFMD): several sustainability dimensions are considered during a cross evaluation audit: institution policy and strategy, social responsibility sustainable engineering education (SRSE) and curriculum, student involvement and cultural development in SRSE, research and innovation.

Apart from the score and ranking results, thanks to the evaluation, the audit preparation, reporting and process allows the evaluated institution to get involved in an enhancing thinking process.

These two labels can be considered by CTI as a policy for SD.

B. Sustainability Literacy Test

In April 2014 the Sustainability Literacy Test [10] was launched in France, and is a consequence of the HESI commitment after the Rio+ 20 conference: it is a tool to check the sustainability literacy of the HEI'S students when they graduate.

It assesses the minimum level knowledge in economic, social and environmental responsibility for higher education students, applicable worldwide in any kind of HEI. The key actors in France are the deans' conference, the universities presidents and a students' network. 2/3 of the questions are the same all over the world and 1/3 is specific to the French context regarding SD.

In opposition with labels, this test evaluates minimum knowledge level, it could, as well as for example the English language test for French Engineers, be a mandatory step to be graduated.

Even if those initiatives do not concern every students and institutions, they have a great advantage: they are transnational.

The fact that the test it is in use worldwide will allow a comparison between countries and, concerning regarding the label, the audit teams are multinational and spread all over Europe. This appears to be very important because while SD implies a notion of global vision, initiatives are very often national.

It is why CTI's strategy, that is developed hereafter, is interesting but only if the agencies like ENQA that evaluate national accreditation agencies also include SD in their criteria!

ESG are in constant evolution so, we will see soon what happens in the future years.

V. CTI REQUIREMENTS

A. General ones

CTI wishes strongly that institutions really integrate SD through curricula in the education of engineers but also apply the principles of SD in their own management, working in an exemplary way.

When an institution is accredited or reaccredited, the implementation of Green Plan has to be explained within the quality process of the institution.

CTI has quoted 8 axes of operational actions to be verified during the evaluation process:

- strategy and governance
- social management and local integration
- environmental management
- research
- curricula
- documentation
- industrial rooting
- quality management and continuous improvement

CTI stresses that a specific innovative active pedagogy has to be put in place for SD, the pedagogy of action puts the engineering student in the situation of finding and building solutions to "real world" matters.

CTI also specifies that the recruitment of students must guarantee diversity according to a policy concerning chances equity.

The way CTI make SD mandatory is a bit similar to ISO with EFQM: ISO 9000 does not mean excellence it only means that the minimum standard necessary level is reached.

We observe that even if the items do not appear in the same hierarchy, the global considerations are the same as other systems described before because all of them are somehow related to ISO criteria regarding SD.

B. Learning outcomes

However, regarding the curricula, the major point is the observation of the expected learning outcomes.

3 of them are in direct relation with SD:

- The capacity to take into account the stakes of relationships at work, of ethics, of safety and health in the work
- The capacity to take into account environmental challenges especially by application of principles of SD
- The capacity to take into account society's stakes and needs.

It is during the audit of programmes that CTI's members check this conformity but also how they are really assessed.

Very often the institution also presents its Best Practices on the subject.

VI. FIRST LESSONS AND SOME EXAMPLES

The process is well accepted by institutions (EVADDES was previously used by most of them).

However a survey made the 1st of September 2014 showed that among 211 engineering institutions with CTI accredited programmes, only 128 had a mandatory specific teaching on ethics, 140 had a specific mandatory teaching linked to safety at work and 154 had a specific mandatory teaching related with SD.

Regarding CTI itself, all members and experts don't have fully integrated this new requirement in the criteria.

This is really a difficult matter because in CTI the origin of members and experts is really very great. Half of them come from professional world and half of them come from academic world. So it is necessary to organize specific teachings on SD to reinforce the idea that this item is important.

The good point of the way CTI has acted is that it respects the initial process and strategy of the institution. We will now give some examples.

A. Polytech Orléans

In June 2013, Polytech Orleans, as a member of the Conference des Grandes Ecoles, began, with its specificities and those of its territory to start implementing its Green Plan.

All the Polytech staff was invited to a presentation of the national and local Agendas 21 and of the Green Plan Reference System.

The first step was to produce an inventory of the situation before analysing strengths and weaknesses. This allows defining the specific strategy of the institution regarding SD in coherence with the global strategy of the institution. This strategy leads to an action plan and then, as in a PDMA process, the institution has to put its plan in actions, evaluate and develop a process of continuous improvement.

Before this public meeting, the management team had shown commitments for the integration of SD in the activities of the institution:

1. Elaborate a specific Agenda 21 for the institution
2. Process to an audit of the environmental impact of the school activities
3. Organise information and awareness campaigns about SD for students and employees
4. Integrate the concepts of SD in pedagogic activities
5. Measure fluids consumed (water, electricity, heating) and then reduce them by 10%
6. Reduce by 10% the printing expanses of the school
7. Identify all the recyclable products and recycle them
8. Proceed to an audit of the transportation means between house and work for students and employees
9. Try to eliminate the use of toxic products

These points reflect some local interest (means of transport for example are part of the local Agenda 21). They are also linked with the specific activity of the school, which has teaching and research in the fields of chemistry and thermal motors.

All these items can be positioned inside Green Plan Reference is as follows:

- A) Points 2, 5, 6, 9, 7 are about sustainable consumption and production
- B) Points 3 and 4 are about education
- C) Point 1 is about governance

D) Point 8 is about sustainable transport and mobility

After defining the points to improve, it is necessary to name a responsible for each domain (A to D) and a calendar:

- Responsible are volunteers among the employees of the school, they will have to work with students, teachers, and staff
- One year is necessary to establish the inventory of premises
- One more year will be necessary to put in place priority actions

B Other schools

For Montpellier Supagro [12], the choice has been to imply as many people as possible, the five themes to improve have been chosen by all of the employees: incitement and facilitation of the use of bicycles, reduction and waste sorting, teleworking, management of the car pool, biodiversity. They decided also to stress on the actions in place before the Green Plan was launched.

In Telecom Bretagne, since 2010, a self-assessment is realised each year on the SD demarche. After the audit Queste in 2012, the employees and students have had an external vision of their SD process.

In ENSCM (Ecole de Chimie Montpellier), Green plan is led by the students instead of the staff.

These examples show that with the same framework we can observe in the same country very different ways to progress, depending on the culture, history and field of activities of the institutions.

VII. CONCLUSIONS

Since the origins of the development of SD in Engineering education, a great diversity of ways to proceed can be observed but the premises always require some basic and global expectations, most of them resulting from the application of ISO norms to education.

The decision to include the SD process as a mandatory one appears to be necessary to increase substantially sustainability in all institutions, it also satisfies the need to give examples to those that are not on the way yet; but in this remains meaningless if the management gets involved in SD policy only because of the ongoing accreditation process and are not really convinced. The governance will have to lead the whole institution in the process, which is global.

In a way we can see the accreditation process as a starting point for institutions that previously thought that they had "more important" concerns;

Criteria issued for civil society (Green Plan) or organisations (Emas) can be a good thing to prepare students for the transposition of these concepts in their future life of citizen and employees.

In addition to the real adhesion of the institution's governing staff of the institution, two points appear as cornerstones if the HEI really wishes to succeed:

- The possibility of a great diversity of processes fitted to the institution
- The importance of international confrontations.

Many reports and papers point out the necessity of a fitted pedagogy, this shows that going to sustainability really needs a global point of view as quality process does.

As an accreditation agency, we have to show the way regarding society's preoccupations and go further than the systems in place. That is why even if there is still room for improvement, we think that in two years, the 211 schools of engineers in France will have a policy regarding SD.

The fact that COP21 was in France in 2015 can be a positive point to reinforce the interest of institutions to SD, that is why next year, in some of the Self Evaluation Report of the schools we will ask for a specific focus on SD and they make a specific compilation of those focuses to be able to present 2016's synthesis on SD.

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This article is an extended and modified version of a paper presented at the International Conference on Interactive Collaborative Learning (ICL2015), held 20-24 December 2015, in Florence, Italy. Submitted 05 December 2015. Published as resubmitted by the authors 28 January 2016.