

Teaching sustainable development: from a disciplinary to a learning outcome approach

Ecole des Ponts ParisTech, June 2022, 28th

in coordination with BME, FAU, ITU, UPM

Engineers are expected to better integrate sustainable development practices and issues in the way they design, build, operate, maintain and unbuilt products and services. Though sustainable development was defined almost 40 years ago and had a renewed impetus in 2015 with the UN Sustainable Development Goals and the Paris Agreement on Climate Change, the way it trickles down to education, and especially higher education, is not yet addressed in a systematic way.

An impediment to a wider introduction of sustainable development into curriculum as more than an introductory course is that it requires more than a disciplinary approach. Learning outcome approaches allow on the contrary to identify specific entry points within curricula to understand what already exists and what the gaps are in terms of skills and competences for future leaders. It hence helps design renewed curriculum leaning on existing disciplinary practices.

Diverse skill and learning outcome frameworks for sustainable development education have recently emerged at different scales. A few examples are the ones developed by Ecole des Ponts ParisTech, by the INSA's engineering school in France, the UNESCO learning objectives (used by WP3) or the recent European sustainability competence framework. Such a diversity poses a challenge for implementation to the actors of the higher education system.

This workshop is organized around two objectives:

- (i) Foster a common understanding, among EELISA members, of the skills needs among engineers for supporting sustainable development, as traduced in existing competence frameworks;
- (ii) Share and disseminate successful experiences which can be replicated among EELISA network members.

Practical information

The workshop will take place at Ecole des Ponts ParisTech (see access information [here](#)) on June 2022, 28th.

Registration to the event: <https://www.eventbrite.ie/e/teaching-sustainable-development-from-a-disciplinary-to-a-learning-outcome-tickets-342609804147>

Program

Morning: Competence needs and existing frameworks	
9h - 10h00	<p>Session 1: Introducing supranational sustainability competence frameworks</p> <p>> Presentation of <i>GreenComp, the European sustainability competence framework</i> by Guia Bianchi (European Commission).</p> <p>> Presentation of the UNESCO's publication "<i>Education for Sustainable Development Goals: Learning Objectives</i>" by Marco Rieckmann</p>
10h00-11h30	<p>Session 2 : dealing with sustainability competence framework for engineering training</p> <p>Gérald Majou de la Debutrie (CPU-CGE), Emeric Fortin (ENPC), Alfredo Soeiro (implementing GreenComp within CALOHEE), Manuel Romana (UPM)</p>
12h – 13h	<p>Session 3: What skills are critical to the sustainable development of Europe? Roundtable with employers and students</p> <ul style="list-style-type: none"> - Enikő Csató, Senior manager at Deloitte, - Benjamin Feldmajer, Program Manager - Green Transition and Sustainability Solutions at Schneider Electric - Gergő Wieder, Senior Manager Financial Risk and Regulatory Advisory at KPMG Hungary - Nicolas Graves, last year students at Ecole des Ponts Paristech, Member of 'Pour un réveil écologique étudiant'
Afternoon: Digging into implementation and sharing practices	
14h – 14h30	<p>Session 4: Tools for Embedding and Assessing Sustainable Development Goals in Engineering Education by Rafael Miñano (UPM)</p>
14h30-16h30	<p>Session 5: from the framework to its implementation, sharing experiences</p> <p>Presentation of a diversity of experiences among EELISA members (10mn presentation + 10mn discussion). In each presentation an explicit linkage with sustainability competence framework is proposed.</p> <p>Introduction : "<i>How education for sustainable development invites us to teach differently</i>", by Katrin Valentin [20min]</p> <ul style="list-style-type: none"> ○ Ex1: <i>Using SDGs as a transversal topic in foreign language education</i> at ITU, by Nilüfer Ülker. ○ Ex2: Barna Orsolya, BME ○ Ex3: "<i>A common track on sustainable development for 1st year students</i>", by Pierre-Jean Cottalorda (Ecole des Ponts ParisTech) ○ Ex4: "<i>Introducing Sulitest</i>" by Emeric Fortin, (Ecole des Ponts ParisTech) ○ Ex5: Seminar "<i>Raw Materials & Sustainability</i>", by Katrin Valentin ○ Ex6: "<i>Introducing sustainability at UPM</i>" by Estefanía Caamaño Martín (UPM)

17h-18h	<p><u>Session 4: co-construction of a brief record</u></p> <p>Participants participate in in-depth reflections of specific themes that emerged during the day (e.g. how to associate the teaching community, how these new skills and learning outcomes can be evaluated, especially when addressed transversally or how their implementation actually leads to measurable change of skills and competences) and discuss solutions to move forward.</p> <p>Based on the discussions of the day, an observer will propose and motivate some emerging themes to the plenary to choose. In a (short) first stage, every participant could share thoughts on each of these themes. In a second stage, participants would work out, in small groups, a series of proposals to be submitted to the whole group. Based on the outcome of this workshop, a brief record would then be circulated among participants for approval before being valued in a framework to be discussed at the time of the workshop (e.g. an article communicated to EELISA members). This input will feed into EELISA's thinking about the profile of the European engineer.</p>
---------	--

References

Examples of existing reference sustainability competence frameworks at different scales:

- **World:** Rieckmann, M. (2017). [Education for sustainable development goals: Learning objectives](#). Unesco Publishing.
- **European Union:** Bianchi, G., Pisiotis, U., Cabrera Giraldez, M. [GreenComp – The European sustainability competence framework](#). Bacigalupo, M., Punie, Y. (editors), EUR 30955 EN, Publications Office of the European Union, Luxembourg, 2022; ISBN 978-92-76-46485-3, doi:10.2760/13286, JRC128040.
- **Examples of national frameworks:** CPU et CGE (2019). [Guide Compétences Développement Durable & Responsabilité Sociétale. 5 Compétences pour un développement durable et une responsabilité sociétale \(in French\)](#).
- **Example of internal frameworks:** ENPC's Framework (*will be translated in English*)

Other resources

- Majou de la Debutrie, G., [Quatre familles de compétences pour la transformation écologique et sociale \(Four families of "competences" for the socioecological transformation\)](#). Dans : L'enseignement et la formation dans la transition écologique et sociétale. Annales des Mines - Responsabilité et environnement 2021/1 (N° 101) (*in French; summary available in English*).
- France Stratégie, 2021. [Identifier et accompagner les compétences de la transition écologique. Synthèse du cycle 2020 de webconférences](#). Juillet 2021 (*in French*) and the related [resource database of the French observatory of jobs and professions in the green economy](#).
- Sánchez-Carracedo, F.; Segalas, J.; Bueno, G.; Busquets, P.; Climent, J.; Galofré, V.G.; Lazzarini, B.; Lopez, D.; Martín, C.; Miñano, R.; et al. Tools for Embedding and Assessing Sustainable Development Goals in Engineering Education. Sustainability 2021, 13, 12154. <https://doi.org/10.3390/su132112154>

Contacts

Pierre BERTRAND (pierre.bertrand@enpc.fr)
Pierre-Jean COTTALORDA (pierre-jean.cottalorda@enpc.fr)
Emeric FORTIN (emeric.fortin@enpc.fr)
Yann KERVINIO (yann.kervinio@enpc.fr)
Laura MOLINARI (laura.molinari@enpc.fr)