The EELISA European Engineer Profile

A model to shape today's higher education and impact tomorrow's society

EELISA and Engineering

As an alliance of Higher Education Institutions encompassing many graduate engineering schools and technological universities, EELISA aims to develop a general European engineer profile. While most international standards for engineer profiles underline the importance of core scientific concepts such as understanding, practice, design, research, knowledge, methods and complexity, few point out the utility of mobility, diversity and multiculturalism during the degree to help promote learning. Furthermore, "engineer" may have different meanings among different European countries.
The ambition of EELISA is to develop a common European engineer profile rooted in society, with increased inclusiveness, cross-disciplinarity and commitment. Such a profile includes high-level technical and scientific core competencies but also encompasses environmental, social and multicultural skills taking benefits from the European context of diversity and mobility, in order to address the new challenges of a global society (namely the green and digital transition) and the expectations of companies.

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To elaborate such a profile, the work was based on:
- A deep literature review based on the Web of Science database
- A web questionnaire sent to academic staff, students and external stakeholders
- An in-depth interview of senior managers of leading European companies (subcontracted to a consultancy firm)

During a final workshop, EELISA Engineer Profile is based on four general pillars, that will be based on a new system which would be a hybrid or sui generis educational system different from existing ones.

High level of scientific, theoretical and digital skills:

This part of the profile involves core skills with theory-based understanding of the basic sciences in each field of engineering, for example mathematics, computing, etc. as well as excellent digital skills and their use to develop products, processes and systems. Students are exposed to theoretical problems and to the formulation of possible solutions based on engineering fundamentals, in a design framework. Here, training in research methodologies and relevant literature is key to help evaluate the data or processes using state of art methods. The above-mentioned high-level skills are the backbone of the European engineer profile.

- **Addressing sustainability**:
  European engineers will need to understand how the techniques they develop are compatible with the planet's boundaries and that they should not generate irreversible situations. Especially, they will need to consider the entire life cycle of products and services they design and produce. This implies a critical and thorough analysis of the socio-environmental risks that pertain to the development of new technologies.

- **Interculturalism: an engineer embracing the European project**:
  Just as practical learning may help to understand engineering fundamentals, adding mobility, both physical and virtual, in a degree program can help facilitate understanding and incorporating soft skills on a personal level. By being exposed to different professors, university environments and cultures, students will become more aware of different societal issues, ethical problems and cultural dispositions.

- **Business and communication skills and critical thinking**: **practical and applied knowledge.**
  Because engineers are at the interface between science, techniques and society, they will be exposed to economic, organisational and managerial issues, requiring training related to communication skills, decision-making and independent learning (learning on the job) to better integrate the views of multiple stakeholders into their decision and creative processes. Because they evolve in a society, where knowledge comes from a wider variety of sources, they need to develop an independent mindset and critical judgment capacities.

How will the EELISA European Engineer Profile be beneficial?

In a context of increasing global competition to innovate, this profile will take advantage of the richness and diversity of the European higher education ecosystem by stimulating mobility during studies, and interconnectedness for a rich lifelong learning experience.

The EELISA European engineer profile can be created by a combination of different life experiences, acquired knowledge, exposure to real and changing world problems, constraints and social context, mindful of the ethical consequences of the engineering solutions and trained to understand and communicate with other professionals, in diverse cultures and environments.

Finally, the ambition in EELISA is to go beyond an exposure to different cultures and different ways of thinking. The core of this Alliance is to nurture an atmosphere of cooperation and common values around cohorts of students that will stay interconnected, will embrace the European engineer vision of EELISA and develop across geographies and over time a shared vision of Europe and its values.

WP2 TEAM
Enabling Engineering Curriculum