AN OVERVIEW OF DUAL EDUCATION IN A FRENCH ENGINEERING SCHOOL: COMMON FRAMEWORK AND SPECIFICITIES

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1. Introduction

Training engineers requires a deep understanding of international market and companies' needs as technologies are constantly evolving in a complex world. Companies do not necessarily have the competence to integrate new tools, processes or technologies and graduates with the appropriate knowledge are a big asset when it comes to support the company growth.
In this changing world, how can engineering schools can ensure that their graduates have competencies that match industry needs? How does an 'engineering school', as a French High Education Institutions delivering eq. Master grades, can maintain strong and multiple links with companies to offer appropriate programs?

French regulations for dual training represent a very structured and strong framework for high education institutions that implement dual programs. They define the roles of each stakeholder, HEI, companies, learners, as well as the financial and educational rules that govern the construction, the implementation and the exploitation of a dual program.

2. Case presentation

Regarding engineering schools, the CTI (Commission des titres d'ingénieurs) gives the general framework avery school has to follow e.g. number of training weeks; indicators to satisfy, number of teachers coming from industry, part of ECTS credits related to industrial training. By doing so, CTI fosters employment and competence validation by industrial companies. Within this framework, schools such as ESTIA ((Ecole Supérieure des Technologies Industrielles Avancées - Bidart) can offer a large variety of of activities to the students.

ESTIA is a perfect example of how a program can be created from companies' needs. The very first idea of creating an engineering school in the Basque Country came from the Chamber of Commerce of Bayonne Basque Country. The purpose of this organization was to support the economic development of the area as in the 1980's, industrial companies were struggling to recruit high skilled employees. The decision was made to create an engineering school, focusing on the topics where local companies were expecting to recruit.

By multiplying interactions between ESTIA and industry, it becomes easier to identify the needs. Specific events such as 24h of Innovation, job forums and company visits during internships or apprenticeships are a way to gather information. Moreover, the support of an industrial Foundation is a way to get industrial input. The challenge is then to qualify the information and decide whether it should be included in a program. Organizing a program can be seen as maintaining an equilibrium between certification constraints, academic requirements, industrial inputs and also administrative and logistical limitations. Characterizing a program by 'targeted competences/skills' was the approach chosen to guarantee the coherency between academic and industrial world.

If apprenticeship and internship is the most common and straightforward form of Dual Education, multiple forms of Dual Education have been implemented in ESTIA over the years. Several examples can be given, e.g. the creation of specific modules called expertise. The objective is to co-design a module answering a company need on a specific topic and associating an academic to provide the knowledge. This is a win-win situation where all stakeholders increase mutually their knowledge and initiate fruitful collaborations:

- Technology providers or users directly train students and may engage future relationships with some of them, for future jobs or internships.
- Academics teach associate theoretical knowledge so that students deeply understand the fundamentals.

3. Results & discussion

When working in companies, students acquire new hard and soft skills [1,2] that we measure. The evaluation of a skill is based on the definition of [3] which implies that the acquisition is directly linked to the working situation of the learner.All companies are required to measure the skills of their apprentices or interns using three axes:

- Individual skills: they address the organizational, personal and cultural dimension of the ESTIA learners, in their ability to integrate themselves into an organization (communication, know-how, search the right information…), in an international context, as well as in their personal ability to self-evaluate, to evolve and make professional choices.
- Company skills: they highlight adaptation to the specific requirements of the company. The ESTIA learner must know how to take into account the strategy and constraints of the company, such as economic, societal or human issues, and to manage projects.
- Scientific and technical skills: they directly relate to the technological disciplines necessary for the ESTIA learner. Covering broad engineering fields, they determine its capacities for analysis, synthesis, characterization or implementation of modeling and problem-solving methods for developing products or improving complex systems.

Asking the company to evaluate skills opens a valuable discussion over what is expected and enables to give the right orientation to the training.

4. Conclusions & Recommendations

In France, dual higher education is completely integrated in the education system, with strong regulations that define the ‘rules’ for HEI as well for companies. It is a tremendous opportunity for a student to immerse himself within a real industrial environment long before the end of his program. Nevertheless, it also come with considerable constraints that make it difficult for HEI to organize programs and for students to experience other activities such as academic mobility.

References

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