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FRENCH DUAL AND PRACTICAL TRAINING APPROACHES*

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Abstract

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, High Education Institution (HEI), companies, learners, as well as the financial and educational rules that govern the construction, the implementation and the exploitation of a dual program. This paper describes main French regulations; how they have been managed by an engineering school to implement bachelor and master programs, and how dual partners are integrated into lectures and evaluation processes through some examples.

1 Introduction

Dual Higher Education has been for years an important challenge. In France, universities have represented for centuries the place where knowledge was acquired by students. During the 19th century, with the tremendous development of technology and industry, new types of institutions have been created, more focused on the acquisition of methods and techniques to be applied. Schools of engineering (postgraduate), and more recently universities of applied sciences (e.g. Technological Universities of Compiègne/Troyes/etc.), represent nowadays this approach where Dual Education is more important than traditional Knowledge acquisition. Actually, Dual Education is integrated at university for applied and technological Masters.

In this paper we will first describe the regulations that frame Dual Higher Education (section 2), then we will explain in section 3 how this framework can be applied in a school of engineering for postgraduate training, such as ESTIA, focusing on a skill-based repository. Finally, section 4 illustrates how this applied framework impacts active pedagogical approaches [13] and dual evaluation.

2 Dual Higher Education in France

2.1 Policies and regulations of Dual Higher Education

Dual Vocational Education and Training (VET) is integrated in French's education system. All universities, and institute of engineering (graduate and postgraduate) can be habilitated to propose VET: a first major condition is to have a training program displayed in a repository defined by the French Ministry of Labour and Employment, recognizing the program as being a professional certification. For 6 years, this repository has been controlled by 'France competences' (ie. Skill France).

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At least, for existing a VET program must be accredited -by the French Ministry of Labour- for its technical relevance: this leads the auditors to analyze the program skill referential. Most -but not all- of VET programs are all or part of a traditional academic program (Master, Bachelor, etc.); the academic program usually benefits an accreditation from the French ministry of Education. The accreditation is based both on the completeness of the management processes, the content of the program and its link with other academic specifications such as the research.

Finally, most of VET programs are leading to 2 kinds of degrees: (1) a professional certification recognized by the French ministry of Labor, and (2) an academic degree recognized by the French Ministry of Education. When the program is recognized by the French ministry of labor, it is integrated in specific lists: (1) for a large program leading to a family of jobs, it is registered in the RNCP list (RNCP = National Professional Certification Network), or (2) for a short program focusing on a specific professional ability, it is registered in the RS list (RS= specific repertory).

Mainly, a VET program can be supported and leading to grants only if it is accredited by the French Ministry of Labor. When this situation is, an agreement is done by France Competence to allow professional sectors, and mainly their skill development operator departments (named OPCO), to financially support the training institute and the learner during his/her training period. Usually, this training period are organized upon an alternance format: 70% of the time is lived in an enterprise on a workplace, and 30% of the time in the training institutes. We consider that the skills and professional abilities are acquired both on the workplace and on the university/institute.

Due to this professional certification, Dual training offers the opportunity to a person to acquire specific skills or professional abilities with the aim of exercising a professional development. Law regulates work placements within study programs.

When the VET is organized in alternance and the program is accredited by the French ministry of labor, the financial support can lead to a specific contract signed by the learner and an enterprise: this specific working contract is named an apprenticeship contract. It is financially supported by France Competence: it is registered and controlled by the French ministry of labor. It only can be implemented in a training institute (university or school) having a specific accreditation named Qualiopi. Qualiopi is not regarding the training program but rather the technical and organizational mechanisms of the institute.

In Higher Education institutions, Dual training or Apprenticeship (as it is called in France) is work-study training: it combines training with an employer and lectures given in a HEI. Dual study programs are generally an option either for universities for applied sciences, institutes/schools of engineering or academic universities, and most degrees in technological domains may be available for a traditional ‘students’ or a dual ‘apprentice’: mechatronics, IT, agriculture, natural sciences, economic sciences, health sciences, social sciences, law and teacher training.

The apprenticeship leads an ‘apprentice’ to spend at least 50% of the program period in the company he has contracted with. The ‘apprentice’ benefits from an employment contract in the company and must respect the rules applied to all employees (holidays, professional objectives, financial charges, etc.). The ‘apprentice’ is considered as an employee both on the HEI campus and in the company.

French Government develops for years now Dual Higher Education policies and aims at strongly continuing to develop Dual HE by regulating an economic framework focused on professional skills. Each company has a specific tax dedicated to professional training. Companies are considered belonging to predefined domain of activities. Part of it is used for Dual Education, higher or not. An HEI developing a Dual study gets money for each ‘apprentice’ from the OPCO to which its company belongs and receives no fees from the ‘apprentice’, of course.

In France, life-long learning is also regulated. An HEI has the possibility to deliver a degree to employees from a company through a dedicated process, that aims at verifying the level of acquisition of the skills defined in the professional repository, and that is based on evidence: each skill must be justified by specific professional activities otherwise a specific training program may be proposed to obtain lacking skills.

2.2 Cooperative partnership with the world of work

National supervisory and/or advisory organizations manage Dual HE. If law defines a global framework to be applied, different accreditation agencies manage the way Dual HE is applied depending on the degree and the type of HEI: universities diplomas have an habilitation for a specific scientific area (next they are free to accredited upon an internal process any program – National Diploma of Master- linked to this area); schools of engineering are mainly accredited (engineer diploma, recognized as Masters) by the CTI (Commission des Titres et de l'Ingénieur/Titles and Engineer Committee), and sometimes by the CGE (Conference of Great Schools for grand ecole master degree). If law regulates the professional certification, these institutions control the way Dual HE is implemented throughout the training programs, by auditing the policies and regulations, quality processes and dual partnerships, content of the program, calendar of training and periods in the company, professional objectives of the program, etc. Here are some topics of implementation:

- A student can enter Dual HE through an admission procedure led by the HEI, and/or the Dual partner (the company).
- The student is selected either by the Dual Partner or the HEI.
- Becoming an 'apprentice' requires a contract between the student and the Dual partner, but also a specific cooperation agreement between the HEI and the Dual Partner.
- The cooperation agreement should define the training program but most of all a skill-based repository to be acquired during the training program, being achieved in the HEI and into the company.

As a consequence, classical students and 'apprentices' may prepare the same diploma, following nearly the same program with some differences. Apprentices have less hours passed inside the educational site, so teachers may use dedicated pedagogical approaches, due to the fact they spend more time in the company. Moreover, in some academic institutions, admission criteria may be different for 'apprentices' depending on their academic level before entering the Dual program; and there is a limited number of admissions for them.

Partnerships between HEI and Dual Partners are defined based on formal contract that defines the policies and regulations to develop a Dual Study program on both HEI (theoretical and applied work) and company (professional work) places. A contract is signed for each 'apprentice'.

HEI and Dual Partners also build joint Study Committees, inviting companies with a strong interest for developing Dual studies to participate to the evolution of the training programs and to the improvement of the Dual policies and regulations of the HEI.

HEI plan and supervise workplace learning at Dual Partners, in order to integrate such evaluations into the evaluation framework that leads a student to obtain the corresponding degree. The Dual partners may participate to the evaluation of the workplace learning. Such evaluations are generally linked to the professional abilities listed into the RNCP repository for being certified.

3 Dual Higher Education at ESTIA

3.1 Main characteristics of DHE implementation

ESTIA is a school of engineering, delivering both Bachelor and Engineer (Master level) degrees. Both degrees correspond to Dual programs that are accessible to students AND 'apprentices', which is not the case for all schools of engineering. Therefore, our Dual study program differs from traditional program. This is due to our history: we were created by the Chamber of Commerce and Industry of the bask country. Our strategy has always been focused on the world of work and the aim of training engineers that will improve the competitiveness of the companies from our geographical territory.

Institutional policies and strategies are defined in collaboration with the world of work: we not only structure joint Study Committees; but also a board of directors where some members are companies' shareholders and validate our strategy; and a companies' foundation that participate to the funding of international activities.

At ESTIA the implementation of the RNCP professional directory is implemented for different degrees. We now focus on Bachelor and Engineer degrees, for which we define a directory of 17 key skills (competencies). The training program is decomposed into a set of courses, each of them allowing a student / 'apprentice' to earn credits. The Dual Learning Environment clearly defines and refers to the surroundings and conditions in which learning takes place: the periods at ESTIA and in the workplace; the skills to be verified at the end of the learning period; the conditions to obtain the degree; and of course, the learning path throughout traditional lecture's courses and workplace activities. In this context, a student/'apprentice' earns credits from both courses and workplace activities.

Courses curricula are based on the definition of Learning Outcomes that are linked to the 17 key skills, and workplace activities are associated to a subset of these 17 key skills. By this way, we have built a progressive process of acquisition/evaluation/verification of the 17 key skills that structures the training program all along. As an example, workplace activities correspond to approximately 40% of the total amount of credits that an 'apprentice' can earn, and to 30% for a student, due to the fact that a student spends less time (~30%) in a company than an 'apprentice' (~50%). A standard semester is 3 months at ESTIA and 3 months in the company for an 'apprentice' (with a 6-month period at the end of final year). 'Apprentices' have same duration as students for achieving the whole program but having more condensed courses to compensate longer periods in their company.

This skill-based framework guarantees students to be involved in a nearby-Dual study program, and strongly influences the pedagogical approaches from our teachers/professors. One third of our learners are 'apprentices'. For traditional courses they have same exams as students, and for workplace activities, students have same type of evaluations based on professional skill acquisition.

3.2 Organization of DHE partnership and Quality Assurance

ESTIA has formal contracts with Dual Partners, but they are not involved in the curriculum development. Contracts may identify additional skills to the initial 17 key skills.

When considering pedagogical aspects, ESTIA involves companies in teaching by several ways:

- Optional courses may be entirely managed by professionals.
- Courses managed by ESTIA integrate professionals to teach at teachers/professors' side.
- Professionals participate to the elaboration of applied activities that are then supervised by teachers/professors.

Actually, half teaching activities are made by external people, from whom half are professionals working in a company. Part of teachers had a professional activity before joining ESTIA. As ESTIA manages R&D technological platforms, engineers from the platforms also teach to the students and 'apprentices'.

ESTIA is certified ISO 9001 and QUALIOPI (French quality label dedicated to education institutions). It complies a quality management system to regulate Dual Higher Education processes, such as training program design and implementation, academic vs workplace learning, etc.

Every 5 years, audits made by the CTI accreditation agency validates our Dual Higher Education Bachelor and Engineer degrees: curricula, implementation processes, partnerships, results (evaluations of the courses, of the students/'apprentices', of their recruitment after getting their degree, etc. In parallel, every 3/5 years, our professional accreditation through the RNCP is also audited.

3.3 Dual Teaching and Learning

Dual Teaching and Learning cover different realities in ESTIA, but all aim at fostering active pedagogical approaches to put the student or the 'apprentice' in situations near real life in the world of work. Considering the courses at ESTIA place, specific pedagogical approaches are delivered, involving professionals or not. Traditional lectures are limited to some courses, generally at the beginning of the training program, to give fundamental knowledge. Most courses are scheduled within integrated sessions combining some theoretical elements, then application, then problems to be solved in a context of tutored autonomy, such as in [15]. Some courses, especially in the final year, are entirely based on inductive pedagogy, using case studies to develop both technical and soft skills in order to build 'a posteriori' theoretical knowledge. Responsibility of the evaluation is purely an academic one, even if professionals participate to the teaching and the examination, or to the construction of the course contents.

Considering practical learning during periods in the company, the mentoring and the evaluation is shared between university and company. The contract between ESTIA, the Dual partner and the ‘apprentice’ identifies an academic tutor and an industrial tutor. ESTIA provides an introductory training for industrial tutors. Then a meeting is scheduled each semester between them to analyze ‘apprentice’s professional activities and his/her progress concerning its integration into the company, his/her behavior and his/her skills’ acquisition. Finally, at the end of each semester, a self-evaluation is made by the ‘apprentice’, then evaluations are made by ESTIA and the industrial tutor. These evaluations allow the ‘apprentice’ to earn credits for the workplace periods.

4 Examples of Teaching, Learning and Evaluation

We now illustrate some aspects of Dual Teaching and Learning at ESTIA, focusing on pedagogical concerns and dual evaluation.

4.1 Active Teaching/Learning approaches

In recent years, pedagogy in higher education has been transformed to enable learners not only to acquire knowledge, but also to develop skills. To this end, in the field of pedagogical innovation, we have observed various levers on which to act: pedagogical alignment, active pedagogy for the learner, giving meaning to learning, the feeling of mastery of a skill, learning autonomy and information and communication technologies [12]. Different pedagogical approaches can be used to work on these levers. At ESTIA, for example, we use inductive teaching, problem-based learning, project-based learning, hackathon and industrial experts (industrial conferences, certifications, and projects), whether for improving the development of skills of learners, either students or ‘apprentices’, and for teaching in dual programs.

Problem-based learning (PBL) is a learning approach born in 1960 in a medical context. It is defined as an approach centered on the reactivation of prior knowledge and the active processing of knowledge by the student. PBL is based on the value of starting from meaningful, interdisciplinary problems inspired by real-life contexts to identify and build relevant cognitive and behavioral resources, which will be mobilized when required, rather than "simply" accumulating resources [17, 10]. It consists of a structured alternation of group work and individual learning. At least 3 stages are required [14]:

- Stage 1: *Defining the problem*. The group discovers the problem situation. During this stage, the group takes ownership of the problem, identifying and calling up the necessary prerequisites and prerequisites. At the end of this stage, a shared but individual action plan is defined to best prepare for stage 2.
- Stage 2: *Individual learning*. Each member of the group works independently according to what was defined in step 1. The emphasis here is on autonomous information-seeking. This stage is at the heart of the PBL system. The learner must be able to control his or her learning, by working on essential concepts, and not focusing on secondary or even irrelevant concepts. This is where the clarification of objectives in Step 1 comes into its own.
- Stage 3: *Feedback*. This last step is based on three stages. A pooling of individual responses to the problem situation. A look back at the organization of work to improve future efficiency. Finally, an individual self-assessment, enabling each student to see how much he or she has learned and what gaps need to be filled.

A number of studies have shown that the advantage of this method does not rely on the acquisition of knowledge, as for lectures, but rather in the acquisition of skills [8]. It is interesting to note that these skills can extend beyond the scope of the teaching module. Let's take the example of a computer science module delivered using this approach at ESTIA. Learners following this module should be able to:

- Know different programming languages.
- Know the Bastien and Scapin ergonomics criteria.
- Design an ergonomic website.

To achieve this, learners must have already completed an apprenticeship in software design, giving them the prerequisites for this module. By the end of this module, learners have acquired technical skills in computer languages and website design. However, we noticed that learners also developed other cross-disciplinary skills: they were able to develop skills linked to design engineering, by implementing methods and processes for creating the website mock-up. They also developed business skills in project management, by setting up roles, action plans and milestones, and managing and organizing group work. The development of individual competencies such as soft skills, increasingly sought after by industry [16], should also be emphasized. Among the diversity of soft skills defined [1, 3, 18], learners were able to develop autonomy, flexibility, perspective-taking, critical thinking, collaboration and communication skills in this context.

The development of these skills is all the more enhanced when the trainers are direct representatives of the industry, because of their expectations regarding these soft skills. We observed this sepcifically during a course using PBL approach applied to a socio-ecological transition problem where communication, perspective-taking and critical thinking are in high demand.

4.2 Industry-based Teaching/Learning

Involving professionals in teaching actions is one of the possible actions when implementing a dual program. The design of a course, from its curricula to its contents is then co-constructed involving a teacher, bringing its pedagogical approaches and skills, and a professional, bringing its knowledge of world of work required skills and experience. In the following example, this type of collaboration has succeeded in constructing a course dedicated to Industry 4.0.

Three Learning Outcomes have been defined:

- Understand what the 4th industrial revolution is.
- Master the technologies that can be implemented by industrial companies.
- Apply a human-centered approach for organizational transformation towards Industry 4.0.

To fulfill such learning outcomes, the course has been structured as follows. First an initial lecture of 3 hours introducing Industry 4.0 concepts, the supporting technologies and the opportunities that they represent for companies upon their business models by fostering innovation on products and services through digital transition. Then a 21-hour period starts: case studies are presented, the methodology for managing the case studies is exposed then learners work on the case studies before collective feedback.

The case studies have been defined with professionals with the aim of putting learners in a complex project management situation [5] for developing multi-disciplinary, technical and management, skills [11] specific to digital transition. For example, here are some case studies:

- CETIA: this technological center issued from ESTIA develops technological solutions for the dismantlement of clothes with a set of companies from textile industry with the aim of implementing circularity in textile industry.
- The case study consists of analyzing a second-hand clothing sorting center, employing people in social reintegration. The aim is to develop a 4.0 technological center that manages second-hand but also dismantlement and the production of new products such as spools of sewing threads, and to evaluate how people in social reintegration may be still employed.
- Tektooth: this company provides dental aligners using additive manufacturing technologies and we collaborate with it to study a new and bigger plant. The case study exploits data from this collaboration to describe a traditional company, making dental aligners with manual technologies. The aim is to integrate additive manufacturing and digital solutions to propose new types of services.
- Petit Bateau: in this French textile company a PhD student is implementing industry 4.0 projects. She proposed 2 case studies based on the projects she had to lead: one to improve energy consumption of a workshop, and one to improve human work in a sewing workshop.

Students and ‘apprentices’ are mixed into teams with the role of consultants. They work in autonomy but have to follow a very detailed methodology:

- First defining their project canvas and analyze the risk their project fails.

- Second analyzing the business model of their company, proposing opportunities that some I4.0 technologies may bring to this company, and then defining new business models.
- Third concluding their work by characterizing the whole transformation plan: financial aspects, technological costs, organizational improvements and human change management actions.

The teachers and professionals involved in the case study definition help students depending on their needs [7]. Two formal interviews are made during the course to analyze their progress, make them formal feedback to improve their work, and trace elements for final evaluation. The final evaluation is based on the documents they produce for each step and action of the methodology. The criteria of evaluation rely on the skills they have developed to answer to the objectives of their case study, i.e. how they have applied the methodology, how they have find relevant information at each of the methodology, how do they have managed the complexity of entangled point of views such as technological, organizational, human, financial, economics, etc.

To conclude, this type of pedagogical approach presents a lot of benefits, for learners as a very motivating way of learning [4, 6], due to real situations and professionals relationship; for professionals that can get new ideas from a large pool of 'brains'; and the teachers that can immediately verify the acquisition of a large variety of skills [2]. Professionals have some training before getting in front of the students depending on the type of course and activity they will have to manage with: in this situation there where 3 meetings of 2 hours to build the case study and learn how to manage the students all along the course, and iterations between them to generate the different documents used by students. In most cases professionals training is managed by the teacher in charge of the course.

4.3 Evaluating Skills from Periods in Companies

In this final example, we consider the training periods in the company. The contract between ESTIA, the company and the 'apprentice' defines the job that will take place during the 3 years of the program and specifies the skills to be acquired at the end of the program. The problem is to evaluate the acquisition of these skills, not only at the end, but also the acquisition progress all along the program. ESTIA decided to evaluate this progress at each semester. This intermediate evaluation allows the 'apprentice' to earn credits: from 8 credits in the 1st one to 30 credits in the last one (which is a full workplace semester).

The evaluation of a skill is based on the definition of [9] which implies that the acquisition is directly linked to the working situation of the learner. We have built a directory of 17 generic skills, structured in 3 categories, and integrating hard and soft skills, that most engineers will face into the world of work:

- '*Individual' skills*: they address the organizational, personal and cultural dimension of the ESTIA engineer, in his/her ability to integrate 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, but also of human society. The ESTIA engineer 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 engineer. Covering a broad scientific field, they determine its capacities for analysis, synthesis, characterization or implementation of modeling and problem-solving methods for developing products or improving complex systems.

We propose to graduate the acquisition of a skill by distinguishing 4 steps: *novice*, when the 'apprentice' apply the skill under the strict supervision of his/her industrial tutor; *functional*, when he/she can apply it alone in repetitive situations; *autonomous* when he/she apply it in non-prepared situations; and *non relevant* if he/she did not have the opportunity to use or develop this skill. Moreover, the directory defines final skills, and it is irrelevant to evaluate final skills since the beginning of the dual program. Consequently, some final skills have been redefined to propose more simple skills to be evaluated.

To illustrate this important work of definitions, we present here a skill to be verified during the final semester, from the 'individual' skills category:

- *Individual skill 5*: being able of analysis, synthesis, intellectual curiosity, creativity, and innovation to address problems in their entirety, while taking into account a more global or research context.

During the 1st semester of his/her dual program, an 'apprentice' may often discover the company and will have limited responsibility and activities. So, we formulate a simpler skill:

- *Individual skill 5*: being able of analysis, synthesis, and intellectual curiosity.

During the 2nd semester, he/she may address some problems to solve, so we define:

- *Individual skill 5*: being able of analysis, synthesis and intellectual curiosity, and force of proposal.

From the 3rd and 5th semester, he/she may address larger problems or projects, and after getting lectures on technologies and methods, we define:

- *Individual skill 5*: being able of analysis, synthesis, intellectual curiosity, creativity, and innovation to address problems in their entirety.

For company skills, and scientific and technical skills categories, we propose for example:

Company skill 1:

- 5th and final semester: being able to integrate the strategy of the company and to make it apply by his/her colleagues, even by building related objectives.
- 3rd and 4th semester: being able to understand the strategy of the company and to apply it in his/her activities.
- 1st and 2nd semester: being able to analyze the business processes of the company.

Scientific and technical skill 4:

- Final semester: being able to model and simulate a system, and to capitalize information and knowledge that have been produced for modelling and/or simulating.
- 5th semester: being able to model and simulate a system. For example, developing a dynamic model of a system and simulating its behavior in specific scenarios.
- 3rd and 4th semester: being able to model and simulate an element of a system. For example, achieving a CAD model of a part and making a finite element analysis.
- 1st and 2nd semester: this skill is not verified, due to the lack of knowledge of the 'apprentice', and the lack of lectures that bring the basic and required knowledge.

Through these examples, our intent is that we must verify that an 'apprentice' will develop skills on more and more complex task, but that will also develop skills that allow him/her to analyze his/her own skill acquisition process to be able to self-apprenticeship.

Finally based on these principles, we have built a complete framework of 6 different directories of 17 skills, 1 for each semester. The evaluation of the 17 adequate skills is made of:

- An academic evaluation with an oral presentation and a written report. The report contains a self-evaluation by the 'apprentice' of the skills he/she develops, with proofs relying on activities he/she achieved during his/her period in the company.
- An industrial evaluation with a questionnaire listing some global criteria and the 17 skills. Of course, tutors have been trained to evaluate skills.

To conclude on this skill-based evaluation, several findings can be formulated:

- The 17 skills definitions are enough generic to allow their implementation in very different situations depending on the type of company (aerospace, informatics, insurance…), of project (product development, ERP implementation, maintenance…) or of activities (developing, simulating, prototyping, managing a lean meeting…).
- The implementation of 6 progressive directories facilitates the confrontation between a desired skill and the situation that may occur in the company, at the moment when it is evaluated: the knowledge level of the 'apprentice' is taken into account, so as the level of responsibility and autonomy that an industrial tutor may give to him/her.
- Proofs of skills acquisition may be discussed between ESTIA, the 'apprentice' and the dual company to finally validate credits or not. Such proofs are also necessary to demonstrate the efficiency of ESTIA's internal processes during audits achieved by accreditation or quality institutions.

5 Conclusions and perspectives

In France Dual Education, and more precisely dual higher education is completely integrated in the education system, with strong regulations that define the ‘rules’ for HEI as well for companies, considered as dual partners from the world of work. All HEI degrees, Bachelor or Master, have the possibility to be implemented in a traditional way and/or in a dual education context. Regulations define the possible roles of a dual partner in front of an HEI, how the dual program may be structured and implemented. Consequently, these regulations are a strong tool for the companies which have a lot of benefits when training an ‘apprentice’, notably considering funding aspects. On the contrary, these regulations represent huge work for the HEI, and limitations exist for foreign students or foreign companies, that cannot beneficiate from this system. International mobility is then limited for ‘apprentices’ because they have to spend a lot of time in their company, which has difficulty to send them in foreign countries.

ESTIA chooses to implement its engineer degree (validated as a Master by the CTI) as a dual program, flexible for classical students as well as for ‘apprentices’. The curriculum of this program is based on professional skills’ directory: this directory determines the construction of all the courses, the way of managing the periods in the company, and the evaluation methods, involving industrial tutors. To be compliant with dual teaching/learning philosophy, active pedagogical approaches are implemented by teachers, fostering inductive learning and integration of professionals into academic lectures. Actual strategy focuses on going further on such approaches, and reinforcing workplace learning. Our strategy is also to encourage the mobility of learners, students and ‘apprentices’, to learn and to work in an international context, and EU4DUAL alliance represents a strong opportunity to facilitate it for ‘apprentices’.

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