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Engineering Apprenticeships: an industry-based training benefitting companies

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Abstract

Engineering Apprenticeships are, without doubt, an ideal project for companies which want to train their future team members, and anticipate their needs for skills and competences (succession planning, creation of new positions, for example). It is also a unique opportunity to benefit, at a very low cost as the scheme is partly funded by the French state and the Regional Councils, from a high-skilled young engineer whose knowledge is constantly updated by the partner academic institution and transferred to the company.

Introduction

Today, when the cohorts of Generation Y are leaving behind the familiar confines of university, and among them even freshly qualified engineers are taking longer and longer to secure that first, all important first step on the career ladder, the apprenticeship/sandwich course is once more showing its worth amongst the panoply of degree courses on offer in Higher Education.

Who would have believed it 20 years ago, that prestigious Engineering Schools, would be investing so much in a training formula which, for a long time, had been perceived as out-moded; fit only for workers and the trades? Was it really necessary to let that happen, so that only now, we can see this proven, time - honoured learning method reclaim its rightful place at the top table of training systems? And yet, for more than 20 years now, the CESI School of engineering has continued to keep the flame alive.

The Cesi was established fifty years ago by a group of companies, with the remit to provide training adapted specifically to their needs. The objective was to prepare and accompany industry based production technicians to attain the rank of engineer. It was in 1989, in the light of legislative changes, that the school conceived an engineering apprenticeship programme, articulating the complementary elements of classroom and (on the job) industry-based training. “Since then, more than 2000 company-partners have entrusted us with the recruitment and training of apprentice-engineers”.

1. A Qualification which matches companies ever-changing needs.

What does the qualification offer?

“The School produces engineers who are able to perform in a wide variety of work. The graduates are prepared for a future in production, research, project

management in industry or the tertiary sector, in varying contexts in combination with an international outlook. Our engineering qualification is recognized as a Master degree by the European Union.

2. The candidates are motivated by the prospects of working in a company.

For whom is the training designed?

It is aimed towards those who have already a qualification equivalent to your A Levels (advanced levels) plus two years, that's the same as a Higher National Diplomas) in a science and/or a technical subject who wish to continue their studies. There is an upper age limit of 26. The vast majority of our applicants want to link academic work with practical experience and thus gain a foothold in the workplace at an early stage of their studies. Whether they have found life at university unsuitable, or their teachers have encouraged them to aim for a qualification higher than that of a technician, our applicants are attracted by the opportunity of a work placement in which they will be able to put into practice their theoretical knowledge.

All our applicants must pass an entrance examination and sign an apprenticeship agreement with the partner company offering the work placement. The renumeration paid during the contract finances the training and enables the trainee to obtain a qualification, otherwise often beyond the means of his/her parents. That such a possibility like this exists, namely to provide access to Higher Education to those who couldn't otherwise do so, is something the Cesi holds dear.

3. A robust and professionalizing teaching programme.

From the beginning, the Cesi has integrated two fundamental principles into this type of training.

1. Academic teaching which is based on interactive, practical, methods and projects. Such teaching guarantees the acquisition of knowledge and of strategic thinking required in the following subjects:

- The fundamentals of science (648h/1800)
- Engineering techniques (487h/1800)
- Modern languages, humanities and social science (665h/1800)

Such a training framework allows the trainee to acquire all the general engineering dimensions.

2. Practical, real-time, on-the-job training delivered by virtue of work placement periods phased with time at school, split into exactly 101 weeks in company and 55 weeks in the classroom. This calendar is designed to provide an accompanied progression from the role of a technician to that of an engineer. This vocational block-release training is adjusted over the time of the training period, being short at the beginning (from 3 to 5 months in the first year), extending gradually in length in

proportion to the assumption of responsibility for projects, with the aim of establishing the requisite level of professionalism in the third year. A work-placement abroad of a minimum of 3 months is included to gain experience of international culture.

Thus, the trainee engineers follow a programme which allows them simultaneously to obtain a qualification and to gain invaluable experience. However, the real strength of this programme is not limited to the twin demands of the academic and professional training. The school has built its training framework around the continuous contact between the company and the school all along the 3-year training period.

The key pedagogical strength lies in the articulation of training between the school and the companies which allows the trainee to link the theory with the practice throughout the whole of the training course. The student is expected, not just to rely on the times in company to benefit from this interaction, but also to link the formal teaching with the practical aspects at every opportunity which presents itself during the course. We can think of five occasions in which the trainee encounters this dual approach; for certain of them this will happen regularly, for others less so.

The fact of having two tutors is, of course, a major junction for cross-fertilisation of training methods and content, since the trainee is at once accompanied by the personal tutor at school and the workplace tutor. At school, the trainer follows up the instruction of each student (there is an individual appointment once every term, the supervision of the training course's projects and of course, help and advice given whenever it is required). In company, the workplace trainer is there to oversee the transmission of technical expertise, on-the-job practical know-how and to impart the professional behaviour and standing of the future engineer. The tri-partite approach is not only stipulated in the Apprenticeship Contract, but also in a pre-training period project signed prior to the start of the course. This document lays down the commitments of each party to the apprenticeship of the student; namely, the job targeted by the student and the missions to be undertaken by him/her in company during the 3 years to come.

These obligatory missions chart the planned progress of the training course, and allow the student to develop from the status of technician to that of engineer, and at the same time be of practical value to the company by assuming responsibility for missions of increasing importance as time goes by. These missions take the form of a technical report written in the first year, through real-time projects based on problem resolution in the second year, to managing and leading 'junior engineer status' projects in the final year.

The company visits constitute a special interaction zone in order to follow-up the apprentices training. The trainees Personal Academic Tutor visits the company once a year to check up on the student's progress and that of his/her projects. The tutor takes account of the conditions of the working environment; the pedagogical relationship between the workplace tutor and the student; he/she answers their

questions, and tours the company in order to get a deeper understanding of the reality of daily life in industry. Finally, he/she gathers the qualitative comments of the workplace tutor appertaining to the work of the apprentice. These comments are a summary of the three-monthly evaluation conducted by the workplace tutor recorded in the Student's Logbook which the apprentice engineer must keep up to date throughout the duration of the training.

Feedback sessions about the work placement are organised in groups of 12/15 students, accompanied by a training tutor, each trainee gives an account of their 'in-company' training period. The object being to share experience, give vent to difficulties and how they coped with them, and to listen and learn from each other.

Finally, we turn to the Individual Training Project, the common thread running through the training project over the three years period which guides the student in creating his professional project. This begins, in the first year, with the identification of a job as the professional goal, (eg maintenance engineer), and culminates in the final year with the student giving a presentation of his/her own skills assessment in comparison with this identified target. This assessment formally sets out all the skills and competences required to successfully fulfill the demands of the job: whether these be technical, organizational, people management, or economic/financial. This self-skills assessment will shed light on the coherence of the students training path, charting all the missions accomplished, and the training courses taken. It presents an opportunity for each student to highlight and enhance all the positive elements of his apprenticeship prior to entering the jobs market.

4. A training programme which serves company needs.

This apprenticeship is particularly relevant here, if one considers that the Engineering School's objective is to train and prepare engineers in 3 years to be operationally effective on obtaining their qualification, to be competent in project and team management, and to be proactive and innovative in face of change.

To conclude, this programme, is without doubt, the ideal project for the company which wants to train its future team members, and anticipates its needs for skills and competences (succession planning, and the creation of new positions, for example). It is also a unique opportunity to benefit, at a very low cost, from a high-skilled young engineer whose knowledge is constantly updated by the partner academic institution: from the start of the contract, the trainee already has the same skills as a technician and can assume the responsibility for projects, or even restart those that have been shelved due to lack of time. The company is not under any obligation to sign a contract of employment with the newly qualified engineer at the end of the course, if even it is a good bet for the medium term.

Even without envisaging the eventual creation of new jobs, the apprenticeship offers the company the opportunity to call upon and use young, dynamic, enthusiastic trainees immediately whilst benefitting from the exoneration of national insurance contributions.

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