

Using industry internships to improve the quality of engineering higher education in Europe.

The experience of French graduate_engineering schools

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An historical view

During the second half of the XVIIIth century,
« engineering schools » have been created out
of the universities to educate engineers that
the Army and the Royal management need.

The “Ecole des Ponts et Chaussées” used to
organize summer industry placements in
different regions of France

An historical view

Second half of the XXth century

- engineer : a generalist professional who is able to operate in a variety of complex environments
- systematic introduction of non-technical subjects in engineering education
- CTI –established in 1934- has formalized and enforced this feature

CTI's standards (2010)

- 50% of industry representatives in management boards of HEI
- important (15%) part of the curriculum taught by industry employees
- 20% + of the curriculum dedicated to human and economy sciences
- compulsory internship period of 28 weeks for all engineering programs during the 3 last study years

Various internship models

- Operative Internship (low level -usually manual-operative work)
- Company internship (real working assignment)
- Research internship (research lab project)
- Final engineering project (to face a real -hence complex- engineering problem)
- International internship (laboratory or company)
- Gap year in industry (status problems)

CTI Standards for internships

- At least 28 weeks of internship, with more than 14 in industry (mandatory)
- International internship is strongly recommended
- The objectives, the assessment methods, and the intended learning outcomes should be defined (ECTS credits)
- A written report and an oral presentation to a jury (academic + professional)

Objectives

- awareness and openness of the students to the professional world
- To acquire some basic professional reflexes and relational skills
- To apply knowledge, capacities and attitudes learnt to a real professional situation
- To improve the short term employability

Problems and challenges (1)

- Industry considers it must provide some return and may forgets the pedagogical aspects
- A good way for industry to prepare future recruitments
- A good way for companies to promote themselves

Problems and challenges (2)

- Internships should be intimately integrated with the academic components of curricula
- Management problems with the academic staff
- Industry internships should be carefully selected and monitored by the HEI (2 tutors)
- An opportunity to develop industry-academy relations
- Internships should not become a comfortable (and inexpensive) way to get the students educated out of the campus

Apprenticeship

- French law enforces the apprenticeship as an alternative way to academic degrees
- 10% of engineers degrees (masters) are prepared by apprenticeship
- Part time education in HEI and in company
- Regular schedule : x weeks in university , x weeks in industry
- The “student” has a work contract and is paid
- New public, new pedagogical methods for the same final learning outcomes
- Excellent employability

Conclusions

- Internship not a summer job
- Strongly imbedded in the curriculum
- Induces new pedagogical methods
- Aiming at new type of students (induction vs deduction)
- Feedback on the relevance of the curriculum
- Link between programs, learning outcomes and competence-based approaches



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Thank you

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