

Enhancing Employability: Internships and Entrepreneurship at the Faculty of Engineering Science at KU Leuven

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INTRODUCTION

The Faculty of Engineering Science at KU Leuven aims at enhancing the employability of its Master's students. concerning employability the Faculty subscribes the definition of Harvey (2003):

Employability is more than about developing attributes, techniques or experience just to enable a student to get a job, or to progress within a current career. It is about learning and the emphasis is less on 'employ' and more on 'ability'. In essence, the emphasis is on developing critical, reflective abilities, with a view to empowering and enhancing the learner. (As cited in Pegg, Waldock, Hendy-Isaac, & Lawton, 2012, p. 4)

In order to reach this goal, both internships and entrepreneurial courses are incorporated in the 23 Master's programmes of the Faculty, usually within elective courses.

Within this paper, the current internships and entrepreneurial courses offered at the Faculty of Engineering Science are described. Learning outcomes are clarified and further attention is given to supervision and mentoring in these courses. Also evaluation of the student and quality assurance are worked out. Finally, experience with the implementation of these courses in the curriculum is discussed, conclusions are drawn and plans for the future are formulated.

1 INTERNSHIPS

Students at the Faculty of Engineering Science have the possibility to do an internship during their Master's programme and work full-time for a certain period in a company. There are two types of internships possible in all the Master's degrees: a three credit version (Industrial Experience) and a six credit version (Industrial Internship). Both are elective courses and usually take place during the summer period, when there are no courses. Besides the number of credits, they differ regarding duration, prerequisites and content. Most programmes allow students to take both courses.

- Industrial Experience (3 credits):
 - Duration: minimum of 4 weeks
 - Prerequisites: holder of a Bachelor's degree
 - Content: can be very diverse, but should be linked with the technical background of the student.
- Industrial Internship (6 credits):
 - Duration: minimum of 6 weeks
 - Prerequisites: having followed at least 48 credits of the master
 - Content: prior to the internship, there is a planning phase: a detailed internship plan is set up, describing the project the student will be working on. This plan should contain the objectives of the internship, the methodology used, a time schedule and the results that need to be obtained. This plan must be approved by the three parties involved (the university, the student and the company).

These two types of internships can be carried out abroad, especially in the context of development cooperation, international internships are encouraged by the Faculty.

An internship is a possibility for students to become familiar with industry, its organisation and the way of communication and collaboration. Since the number of students in the Master's programmes (about 1600) is too high to guarantee for each individual student a high-quality internship position with adequate monitoring by

faculty staff, the internships are elective. This way, only motivated students work for a company that is willing to host the student. The decision in disfavour of a compulsory internship is supported by the Industrial Advisory Boards (IAB), which advise many of the Master's programmes, and in particular by the Faculty Senate, the IAB of the Faculty, consisting of captains of industry. Both students and participating companies are enthusiastic about the internships.

1.1 Learning outcomes

The main objective of an internship is to give the student the opportunity to experience working as a beginning engineer in an industrial environment by contributing to real-world problems. Internships provide opportunities for the students to apply a combination of knowledge, skills and attitudes acquired in their engineering programme to a real professional situation. This way, students can improve their transferable skills during an internship. Internships enhance general abilities and key qualifications, such as communication skills, report writing, organisation of work, information acquisition, and the ability to operate independently.

After an internship of type Industrial Experience (3 credit points), the student:

- is able to apply independently for an internship, and to function in a company under the supervision of a local coach;
- can place on the one hand the company division where he has been working in, in the whole of the company, and on the other hand the company both in the sector and in the general industrial context;
- can assess what the job of a beginning engineer is inside a company and how tasks and communication are streamlined in a company;
- has gained insight in the methods used and the practical organisation of the company;
- is able to report about the experience both in writing and orally;
- can reflect on his functioning during the internship;
- is able to transfer the more theoretical education he has had at the university to a professional career.

After the internship of type Industrial Internship (6 credit points), on top of the previous mentioned goals, the student:

- has delivered a substantial input for the company;
- can plan a project in discussion with others, adapt the planning and work it out.

1.2 Supervision and mentoring

The internship is supervised and mentored by the company primary, and the internship coordinator of the programme secondly. As the internships are relatively short term (four or six weeks, sometimes longer), a formal regular reporting of the student to the Faculty of Engineering Science is not perceived as necessary. When problems arise, the student and/or the company can get in touch with the internship coordinator of the Faculty of Engineering Science and a consultation will be organised.

1.3 Evaluation

The learning objectives of the internship are evaluated based on a written and oral report. The report includes 15 pages for the type Industrial Experience and 25 pages for the type Industrial Internship. The report comprises three parts:

- situating business and product; structure and operation of the company;
- assignment and results;
- self-reflection.

An oral presentation is organised before a jury consisting of at least two members of the academic staff and mostly the company supervisor.

2 ENTREPRENEURSHIP

The entrepreneurial focus can be considered as an alternative way for students to get in contact with industry and/or a professional environment. The Faculty has set up three courses concerning entrepreneurship, adopting the European definition of entrepreneurship as a key competence for lifelong learning: "Sense of initiative and entrepreneurship refers to an individual's ability to turn ideas into action. It includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives" (European Parliament and the Council, 2006, p. 8).

1. The mandatory course 'Industrial Management & Entrepreneurship' introduces the principles of enterprise management as a first step to create awareness among all the Bachelor's students about entrepreneurship (6 credits).
2. The 'Engineering & Entrepreneurship' course is organised in the Master's programmes as an elective, and also comprises 6 credits. It discusses the topics of 'Strategic management' and 'Creativity and decision making for product development', combined with two business simulation games. A last part consists of 'Technology & Entrepreneurship: case studies' where testimonies are given on the role of engineering within the start-up of technological spin-offs. A broad range of leading entrepreneurs give a seminar about their experiences so that students get a realistic image of a start-up, are inspired and gain more insight into their own discipline.
3. Since a previous study showed that the engineering students at the Faculty were not aware of the possibility to approve entrepreneurial projects in their study programme, the new course 'Entrepreneurship in practice' was launched to make this option more visible (Burman & Berbers, 2015). The course consists of three credits and is an elective. Generally, the content consists of consulting projects in which students adopt the role of business consultants by providing recommendations to a question or problem of an enterprise. These projects can last one semester to one year and can be elaborated individually or in (interdisciplinary) groups. This course started in September 2015 with 24 students. They mention among others the link with the industry and working in interdisciplinary groups as positive aspects.

2.1 The course 'entrepreneurship in practice'

In this section the course 'Entrepreneurship in practice' will be explained in more detail and will highlight the differences with a regular internship at the Faculty of Engineering Science.

2.1.1 Practical organisation

The student has to search independently for a project (for instance a student consulting project or an entrepreneurial competition). Next, he should apply for the project and fill in a standard application form to let the project be approved. This form contains several questions, such as the content and the planning of the project, the competences the student wants to enhance during the project and the relation to his programme of Engineering Science. The application is examined and possibly accepted by the coordinator of the course

2.1.2 Learning outcomes

The aim of the course 'Entrepreneurship in practice' is to provide students the opportunity to have a relevant experience in entrepreneurship. This way, students gain a better insight in the practical aspects of entrepreneurship.

The course targets the following learning objectives:

- The student is able to adopt entrepreneurship in practical situations.
- The student can act as an entrepreneur, by turning ideas into action.
- The student has developed several skills, such as creativity, innovation, taking risks, planning and managing tasks in order to achieve objectives in time, etc.
- The student is able to report on the project and the executed tasks, both written and orally.
- The student can reflect on his functioning during the project.

2.1.3 Supervision and mentoring

Three parties are involved. Firstly, the coordinator of the course examines the application of the project and has final responsibility of the course's evaluation. Secondly, an academic supervisor who is an academic staff member at the Faculty of Engineering Science, also evaluates the project. Thirdly, the project coordinator has the final responsibility in the successful accomplishment of the project by the student. If the project occurs in collaboration with an external organisation, this role is usually taken on by an external person. However, the course coordinator or the academic supervisor can still act as a project coordinator as well.

2.1.4 Evaluation

The learning objectives of the course 'Entrepreneurship in practice' are evaluated on the basis of a written and oral report. The written report consists of ten to fifteen pages and comprises four parts:

- Part A: situates the project and includes the administrative data (e.g. student's name and its study programme).
- Part B: describes the project (the assignment, the process and the obtained results). The student appoints what his specific tasks were.
- Part C: contains the reflection about the student's experience, such as:
 - critical reflection on the competences the student wanted to improve;
 - relation of the project to the study programme. Which content of which courses was relevant for the project? Was the content adjusted to the needs?
- Part D: is a conclusion of the project. Are the aims of the project reached? What is learned from the project?

Furthermore, the student gives an oral presentation about the most important aspects of the report during a debriefing, after which the supervisors can ask him questions.

3 QUALITY ASSURANCE

To assure the quality of both internships as well as the entrepreneurial pathway, several actions were taken.

Concerning internships, the frequent contacts with companies have led to a good knowledge of the industrial network. This helps the internship coordinators of the different programmes to assess the suitability of companies for internships. Furthermore, the experience of students during their internships, described in their final report, but also discussed during the oral presentation, gives the faculty members responsible for the internships a good insight in the quality of the trainee post. This information is used for the subsequent years. As a result, new companies are added to the list – companies where students applied for an internship through their own network or because of personal interest – or companies are removed from the list – companies where supervision was inadequate or insufficient, or where the content was not in line with the scientific and technical expectations of the Faculty.

Additionally, the internship coordinators of each Master's programme form a committee that meets each semester. During these meetings, they can exchange experiences and discuss common problems and inspire each other. The staff members specialised in educational issues attend these meetings as well

A survey was conducted among graduating students (called KONDOR assessment), inquiring after their opinion about the curriculum as a whole, thus including questions about internships. Also Faculty alumni received a survey questionnaire.

The result of the Kondor Questionnaire learned that 69% of the student finds that 'the expectations of the programme regarding internships are clearly communicated in advance'. Regarding the evaluation of internships, 71% of the students acknowledged clear communication in advance. The organization of the internship guidance was evaluated positive by 87% of the students. Finally, 74% of the students answered in the affirmative when asked if there was ample opportunity for completing an internship.

The alumni questionnaire on the other hand, shows that 60% of alumni was content with opportunities offered for an internship; 85% of alumni who performed an internship says they gained insight into the professional field through their internship, and the same number think this was a good opportunity to put what they learned in the programme into practice; 93% of graduates who performed an internship felt sufficiently prepared for their internship; 74% of graduates stated the internship

prepared them for professional practice; 95% think the internship provided added value to their study programme.

Overall, the faculty is not really satisfied with the outcome of the KONDOR questionnaire with regard to internships. Communication about expectations and about evaluation must be improved. Opportunities for completing an internship must also be better publicised.

In case of the entrepreneurial pathway, the quality assurance mainly focuses on the newly launched course 'Entrepreneurship in practice', since both other courses are already sufficiently monitored by the structural quality assurance systems of the Faculty. In order to assure a high quality of the projects in this course, three parties of supervisors are involved, as explained earlier in this paper. Depending on the kind of the project, the project coordinator takes on following tasks:

- he checks if all necessary facilities are available for an optimal progress of the project;
- he supervises the project members during the start and the implementation of the project;
- he assesses the performance of the student during and at the end of the project.

During the project, the student hands over an intermediate report to the course coordinator with an explanation of the progress and possible changes in comparison to the application. Depending on the project, this report can be a reflection on a conversation with the project coordinator and it can be made once or several times during the project. If the student does not follow the agreements repeatedly or severely, the project can be stopped and the evaluation will be 'not participated'.

4 DISCUSSION AND FUTURE PLANS

The Faculty of Engineering Science has a long tradition of internships in its curricula. More recently, the Faculty has set up three courses concerning entrepreneurship, including a course to approve entrepreneurial projects. Students are positive on the addition of these practical courses to their Master's programmes, effectively broadening the potential to interact with the field.

For the entrepreneurial courses, the exact learning outcomes have been defined; at the same time, the learning outcomes of the internships have been updated during the committee meetings of the internship coordinators. The clarified learning outcomes have brought a stronger coherence between the internships in the different Master's programmes at the Faculty.

Well defined learning outcomes also enable more accurate evaluation; for the entrepreneurial projects though, the evaluation criteria still needs some further fine-tuning. These criteria will be compared to other projects regarding entrepreneurship in collaboration with other faculties at KU Leuven. As to the internships, actions are taken Currently to revise the evaluation and feedback of internships and the projects of 'Entrepreneurship in practice'

In sum, internships and entrepreneurial projects have common goals, such as bringing students in contact with the industry and stimulate their employability. However, the organisation of both initiatives highly differ. Students can only take an internship during the summer within a company. An entrepreneurial project on the other hand is programmed during the academic year, and often includes students from other disciplines.

Since the Faculty of Engineering Science does not want to oblige students to participate in internships or entrepreneurial projects, only motivated students take part. This way, they can transfer their skills or improve their abilities complementary to the university education they take and reflect on the competences they learn, as Harvey (2003) mentioned in his definition regarding employability.

In the future, the administration of both internships and entrepreneurial projects will be supported by an online application form. Furthermore, a new six credit version of the 'Entrepreneurship in practice' course will be launched, since several students announced during their presentations that the three credits they received was too low for some larger projects. Communication about expectations and evaluation of the internships should be optimized. Finally, with the focus on enhancing the employability of our students, the involvement of the field of action is of great importance. In the further development of entrepreneurial courses, even more attention will be paid to the involvement of all stakeholders.

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