1 Header

Contribution title: SoftEnterprise – Introducing Entrepreneurship in the software engineering curriculum.

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2 Summary

The goal of the SoftEnterprise program is to develop the entrepreneurial skills of computer science graduates majoring in software engineering. This is mainly achieved through a unique enhancement of the current curriculum that we combine with other disciplines. This will be explained further in this paper. The end result: students recognize the importance of operating from a business perspective in software development to a much larger extent than before. As such, they are well prepared for a career path in an business or venturing environment.

3 Strategy

Nowadays, it's no longer sufficient for an engineer to possess only good technical and scientific qualifications. Students need to become familiar with other disciplines that are required to create value from technical innovation. At least, they are expected to acquire knowledge of and experience with marketing, sales, financing, business development . In this way, they are prepared to create and to capture value from their technical innovations. Our experiences in the field and contacts with industrial partners have convinced us that the business aspect of innovation is way too often neglected in engineering curricula: students should learn that the business aspect is necessary to capture the economical benefits of technology.

Numerous educational institutions (universities, management schools) try to bridge this gap with supplementary tracks governing economics, law and finance to name only a few. As the name readily suggests however, these have to be followed in addition to the already demanding technological and scientific program. Our approach consists of a logical sequence of existing technical courses in which we embed the business perspective of technology.

The process starts with the Software Architecture course. Students get introduced in the domains of architectural design, patterns, case studies and architecture evaluation methods. They are assigned to come up with a detailed architectural specification for a given new product proposal, presented in the first week. One of the key elements of their report is the state-of-the-art research report which covers both scientific, industrial and standardization work in the domain of the project. They have to investigate potential customers, partners, competitors, existing industrial and academic research, and last but not least exisitng intellectual property such as patent and copyrighted open source projects.

During the Christmas break, the academic staff evaluates the results and decides which ones will make it to the next stage in the second semester. During the second semester they have to implement a proof of concept of their project while students from the business school prepare a value proposition for the potential applications of the technology. Both team work closely together and have joint weekly project reviews. The

software engineering students have to take to courses in the second semester to complete the project: the Software Design Project & Software management.

The Software Development poject is a tight 12-week scheduled technical project. A typical project is implemented in groups of 10 students. This is the often the first time that the students have to work in a large team on 1 project: project management and team communication become the key success factors of the project The students have to elaborate one of the architectural designs of the first semester and turn it into a software prototype of alpha version quality. This means that the majority of technical risks should have been dealt with at the moment of the exam presentation. They are trained and coached by senior entrepreneurs from existing enterprises, who work closely together with the academic staff.

In parallel, students in business and economics masters work with the team to formulate a value proposition and a business opportunity plan. This sets the stage for the technical features that have to be implemented by the technical team of engineering students. The features are prioritized based on the technical risk and complexity as well as the importance that they represent for a customer. Also here the communication between multidisciplinary teams represents a valuable learning experience.

During the 12 project weeks, the development team has to deal with different real world situations: additional requirements requested by the business team, conflicts or disagreements within the group regarding the planned activities, regular meetings with the involved stakeholders, … The outcome, in other words, is not fixed. The participants have a major influence on the end result by means of their decisions and actions, in face of both successes and troubles. The goal is to simulate a real life environment where they still have to be capable to deliver the proof-of concept on time (before the exam !), within the budget and complaint to the specifications.

Simultaneously, Software Management course, which runs in parallel with the software develepment project, provides them with insight into software quality and software processes which they apply in the project: such as process definition like reviews, measurement & metrics, project planning, configuration management and quality assurance. The focus here lies on how they do it, instead of what they are doing. The exercise in this course is an appraisal of the Software Development project using the CMMI framework.

The last step in our SoftEnterprise program is a joint master thesis performed by both an economy graduate and an engineering graduate during the second year. The prototype demonstrator from Software Development will be further elaborated into a beta version product, accompanied by a first business plan. The deliverables should be sufficient for the students to raise early stage funding for the continuation of the project. Those are typical government grants or loans (pre seed funding) or early stage venture capital (seed capital). It gives the students the possibility to start their own venture if they want to. After all, the goal of the SoftEnterprise program is to create entrepreneurial computer science students.

4 Results and conclusions

As a result of this program a number of startup companies have been launched or are in the process of being launched and are raising early stage venture capital. VodTec –online and mobile video – and Mobixx – developing internet applications and extensions for mobile devices – constitute our current flagships.

SoftEnterprise clearly proves that introducing entrepreneurial and business aspects in the engineering program will motivate and drive young entrepreneurs to take the stage and engage in new ventures. It is a key innovation in the academic curriculum that can help to maintain our economic position in a competitive landscape.