

CROSS DISCIPLINARY PROJECTS

A COOPERATION BETWEEN LINKÖPING UNIVERSITY, DEMOLA AND THE SURROUNDING SOCIETY

Eva Törnqvist, Ph. D.

Associate Professor

Centre for Human, Technology and Society

The Department of Thematic Studies

Linköping University, Sweden

ABSTRACT

Demola is both a concept and an international organization that facilitates co-creation projects between university students and companies, either locally or internationally. The network consists of various partners including universities: faculties, researcher as well as students but also of both local and international companies, and different types of agencies. The co-creative concept aims to solve real challenges where the outcome can be a new concept, a demo, or a prototype. If the partner company finds the students' outcome useful, the company can license or purchase it, and take it for further development. The framework makes it easy for partners outside the university to cooperate with student groups. Each partner has a clear role, and the work is guided by simple procedures. Contracts, intellectual property rights, licensing models, and other legal requirements are in place and meet international business standards and practices. At Linköping University the Demola concept is implemented through the course *Cross Disciplinary Projects* that also is designed to meet the demands expressed in the CDIO Syllabus. What makes this course unique and different from other project courses is that students from the Faculty of Arts and Science, The Institute of Technology and the Faculty of Health Sciences are working together in *one* course towards the same goal. The students are participating in the work order to creatively and independently contribute with expertise from their different areas and therefore the course is open only to those who are at the end of their studies. The course is conducted in the form of independent cross disciplinary projects. The briefs are externally specified from companies or other interested parties who wish to have an idea elaborated or a problem solved. In addition to the project some lectures are given, for instance in applied ethics and inter professional communication. Upon completion of the course the student is expected to have acquired knowledge and understanding concerning how to independently work on issues related to the knowledge and skills previously acquired in education. The course also aims to enforce their capabilities and competences regarding communication with representatives of other professions since they are expected to demonstrate ability to work in a team and in close collaboration with other professions. Demola is now listed by OECD and World Bank Group as a best practice for innovation policy-makers globally.

KEYWORDS

Demola, cross-disciplinary, open innovation, cooperation. Standards: 2, 3, and 5

INTRODUCTION

CDIO Syllabus 2.0 includes in addition to core engineering knowledge, the student also should be given the opportunity to take initiative and to be willing to make decisions in the face of uncertainty (2.4.1), forming effective multidisciplinary teams (3.1.1 and 3.1.5) through good communication skills (3.2). They should also experience the innovation process (4). Since 2014 there is a course at Linköping University, *Cross disciplinary projects* (8 credits), which in a new way address these demands.

Since the academic year 2012/13 the Demola concept has been used at Linköping University. The first year the course was given for only two programs, the bachelor program *Graphic Design and Communication* and the master program *Media Technology and Advanced Computer Graphics* (an engineering program). The concept was integrated into an already existing project course that was mandatory for those who was a part of the programs. During the autumn of 2013 a new course, *Cross disciplinary project*, was designed and the target groups were students from The Faculty of Arts and Science, The Institute of Technology and The Faculty of Health Sciences.

The aim with the course is that the students shall acquire knowledge and understanding concerning how to independently work with issues related to the knowledge and skills previously acquired in their education. The course also aims to enforce their capabilities and competences regarding communication with representatives of other professions since they are expected to demonstrate ability to work in teams and in close collaboration with other professions. In this course it is done in the format of projects created by companies, organizations or private persons, in this case (hereafter referred to as) the idea owner.

For students Demola East Sweden's participation in the course gives them the unique opportunity to participate in a specific project in close cooperation with the business community during the later phase of their studies. On the other hand the project course creates opportunities for companies to develop their ideas into successful market-based solutions with help of students.

"Amazing completed mission! We are very impressed with the angle, which the group found, and their personal commitment around the mission conveyed initially. We think that the outcome and the idea are innovative, timely and have the potential to have a major impact in the field of communication and integration. We were interested in buying back the idea but together with the group instead decided to move forward in a partnership, which will be the most favorable situation for all parties. We believe that this group and their commitment is at the core of this and want to see it grow along with them to the potential the concept has."

Hysesbostäder, 2014

OPEN INNOVATION AND INNOVATION INTERMEDIARIES

Innovation is a key factor for all types of organisations to be able to develop in a positive way. Engineering a process for innovation can be difficult in an organization, and it often involves hazards when few attempts at innovation successfully (Chesbrough, 2003). This enables the

launch of a new type of organization, innovation intermediaries, in order to facilitate open innovation (Chesbrough, 2006). Innovation intermediaries serve as bridge between the organization with an idea that they want to develop and those that can develop the idea, in this case students who take the course *Cross disciplinary project*. These intermediaries serve not only as a broker between the two parties but they provide services in addition to conveying contacts (Howells, 2006). It can range from helping to negotiate and draw up contracts, guarding the intellectual property rights to providing appropriate development environments. The intermediary between Linköping University (i.e. the students and the examiner) and the idea owners is in this case Demola East Sweden.

The Demola Concept

The Demola concept has its origin in Finland and the cooperation between Nokia and Tampere University. Today it is a network that consists of various partners including universities, as well as companies, local agencies and Demola Centers in Europe. In the process, which is formatted and facilitated by Demola, each partner has a clear role. Contracts, intellectual property rights, licensing models, and other legal requirements are in place and meet international business standards and practices.

The concept is based on that the students from their assigners, (the idea owners), gets real challenges to find new innovative solutions to and it may be a new concept, a demo, or a prototype but not necessarily a finished product. If the idea owner considers the result as valuable for it's organization, there are different ways to proceed. The idea owner may, according to the in advance the written contract, either license or buy the result to develop it further. If the results do not meet the expectations or has taken a turn so that it is no longer interesting for idea owner, the students keeps the rights to the result. The original idea, however, is still owned by idea owner.

Demola East Sweden (hereafter referred to as Demola) is the Demola center that serves as the intermediary between Linköping University, it's researchers and students, and both local and global organizations. Linköping University, Linköping municipality and Norrköping municipality fund the center. A total of four people, of which three are facilitators, are employed at the center that operates both in Mjärdevi Science Park (Linköping) and Norrköping Science Park. ABB, BlackBerry, Huawei, and Nokia are among the business partners.

COURSE DESIGN AND IMPLEMENTATION

The voluntary course is given for students who are at the end of their training and admission to the course requires an assigned project via Demola. The unique with this course is that it is open to students from the philosophical, medical and technical faculty. There is only one curriculum and there is one examiner regardless of the students' program affiliation. This gives students from different programs opportunities to exchange experiences and knowledge, which they would not otherwise receive during their studies.

This course is conducted in form of an independent interdisciplinary project course where students from the different schools are participating in order to creatively contribute with expertise from their field of studies. The briefs are externally specified from companies or other interested parties who wish to have an idea developed or a problem solved. In addition to the project there are course assignments such as writing a final document in which the student

should reflect over what she or he has learnt during the process. They should also address ethical and sustainability issues. To support this there are lectures and seminars given by professors from different departments at the university. To support the students during the project each group has a, from Demola, designated facilitator. Some of the assignments and checkpoints are common for both the project and the course; the project plan, the pitches and the documentation given to the idea owners, see Figure 1.

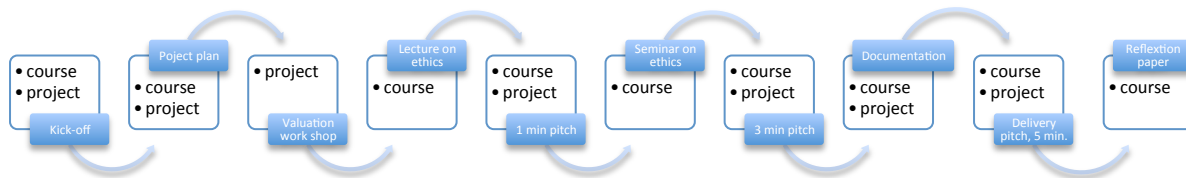


Figure 2. The process and its different parts

As intermediary Demola enrol the companies, agencies or organisations which have a more or less developed idea, see below, that they for some reason can not develop in the context of their ordinary activities. It can be that the organization itself does not have the competence and skills, which are require or that they do not want to invest resources in an unsafe or even risky project.

When the project proposals have been processed they are presented on the Demolas website. In this presentation, the competencies required in the corresponding project are shown. The competencies are not grouped as traditional academic subjects, but in: business and concept, coding, design and art, education, engineering, environment, governance, health care, media and communication and finally social science. Interested students can chose up to three projects they want to work with, and this application is sent to Demola. The facilitators put together the various teams based on the students' profiles.

Parallel with this work, the university teacher in charge of the course does the first preliminary assessment of the students' competence. When the student has been assigned a project they will be able to apply to the course. Their respective faculty, if student meets course requirements, makes the final assessment. Students who take a bachelor program must have at least 90 credits when they apply and the equivalent of a master programme is 150 credits. The course extends over an entire semester and is given twice a year. If a student is not assigned any project he or she has the opportunity to apply two more times. For a schematic picture of the preparations before the start of the project course see Figure 2.

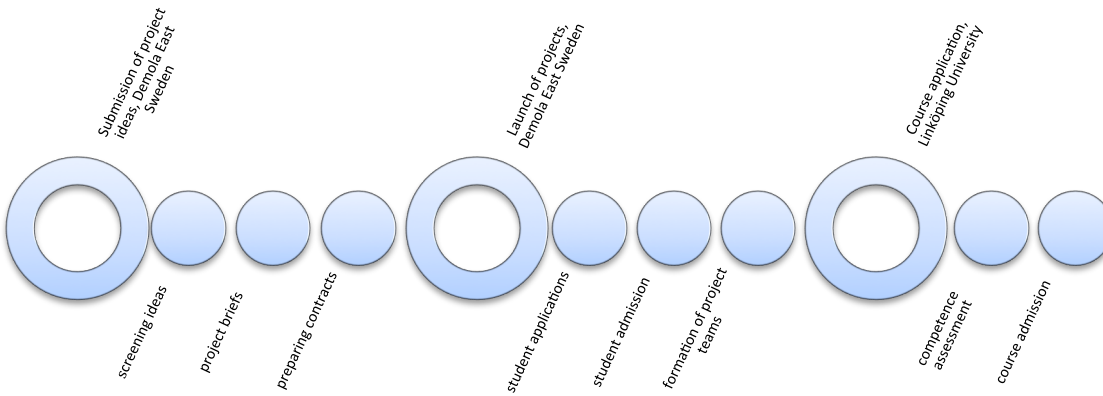


Figure 2. The pre phases to the projects and the course

This uniqueness with this course

What makes this course different from another project course? One difference is that students who are recruited to the course come from different faculties and in the projects they are representing different competences. The course does not aim to teach basic skills but gives the students opportunity to apply already acquired knowledge in a team with different professions.

The relationship with the surrounding community, that is to say the idea the owners, also differs from the usual project courses. This is especially true for the intellectual property rights that are regulated before the project starts and which after finishing the project could lead to that the students will receive a financial compensation or intellectual property rights to the product/service. That Demola acting, as an intermediate also is something that differs from way that the university normally organize project courses.

Another difference is that the various project descriptions both are very open and varying, (see below) which reinforces the possibility of innovation. In a typical project course students are working with similar, well-defined problems.

The course is also the only one to have a joint curriculum, joint admission requirements and joint examiner for all programs, with exception teacher training programs.

Project Examples

Since Demola started operating 2012 there has been 29 projects, 91 students from 14 programs and during the spring semester 2015 there another are 7 projects in progress involving 38 students. Below are two examples of descriptions from two completed projects.

The municipal housing company, Hyresbostäder in Norrköping, initiated the first project and the quote in the introduction comes from the idea owner after the project group presented its solution.

Intercultural Living

Project skills Business & concepts, coding, design & art, education, governance, healthcare, media & communications and social science

The brief Information and communication is sent via letters, notifications posted on

the entrance, signs, brochures, website, tenants newspapers, magazines and different meetings and gatherings. To better meet the demand of our customers, we have expanded our language competence. Colleagues with different language profiles with a foreign background have been recruited and are working in the districts and in the customer service. We identify good communication with the tenant to be one of the more crucial areas in order to become an attractive landlord.

The background Hyresbostäder has 9 500 tenants and closer to 45% of them are of foreign background. In Hageby, one of the districts, more than 100 languages are spoken. Some learn the Swedish language, others do not and some can't even read their native tongue. Apart from different groupings within the same language there are also different clan/tribe bonds. We communicate in general in Swedish with our tenants today, and in some cases we translate it into English or the most commonly spoken language in the district.

The problem How can we more efficiently and satisfyingly communicate and reach out to all our tenants? By communication we mean inform the tenant about the apartment, rights and obligations as well as inform about services and activities through different marketing material and channels mentioned above. How do we motivate more tenants with foreign background to attend at our information meetings and activities?

The second example, which comes from *Ericsson* is not as evolved as the first one giving students considerable freedom to explore different solutions but also challenging their creativity. Also in this example, the students received after the completion of the mission a positive answer from idea owner

Film IT!

Project skills Business & concepts, coding, design and art, engineering, media & communications

The brief What possible communication solutions can be based on thin films – transparent or opaque? Showcases that utilize connected films!

The background Surfaces can be used capture and present information. Ericsson have promoted a concept called "Window of Opportunity"

The solution Use thin film technologies for communication.

CHALLENGES

Project courses that involve organizations outside the university are not uncommon, but what is special with the course Cross disciplinary projects is as mentioned earlier that it is given for three different faculties, and has as a mediator, Demola between university and idea owners. This means that there are new challenges emerging both within in the university and with the partners outside the university.

Each faculty has its administrative procedures, such as how students apply for a voluntary course, how these are scheduled and how many credits a student gets. The first challenge is to find people within the university who are interested in pursuing this type of interdisciplinary cooperation and who are also willing to provide scope for nontraditional academic solutions in order to solve such problems as described above.

A different kind of challenge is that the Demola and university represent different organizational cultures. Demola is run in the form of a project with a culture which is closer to the business world than the academic. Examples are management and lead times. Demola network is managed from Finland and the concept means that a Demola center more or less is the same wherever in the world it is. This leads to that an adaptation to local conditions can be more difficult. Special laws and regulations govern the university. Demola's activities at short notice can be closed down while the university through its public authority has a long-term responsibility towards the students.

A third type of challenge is linked to the students. All students are not suitable for this type of project, which requires that they go outside their comfort zone and can think outside the box. This makes great demands both on the students' subject knowledge and their personal characteristics. The recruitment of students to the various projects as well as the composition of the various teams is therefore essential if the result will become rewarding for both the students and idea owners.

CONCLUSION

Through a practical activity like this course students are given the opportunity to, in close collaboration with other professions, work with issues related to the knowledge and skills previously acquired. They participate independently in real development processes by discussing information, problems and solutions in dialogue with the other team members and the idea owner. Not least, to work in close cooperation with a company and create a network of contacts with possible future employers is positive for the students.

The incentive for the participating companies is that they get access to competence through the students and thereby also the latest research from the university. Since the students are about to finish their studies it is an opportunity for the companies to recruit staff. It is also an opportunity for companies for low risk business development.

For the university it is an opportunity to further tie training and working life closer together, to cooperate with business and the surrounding society. This is a necessity to the environment for innovation and entrepreneurship, which is a prerequisite for the growth in the society.

This course is one way to meet the Swedish examination regulation for engineering students which states, among other things, that the students shall demonstrate an ability to develop and design products, processes and systems with regard to the conditions and needs of people and society's goals. This is also in line with what is written in the CDIO Syllabus v. 2.0 about personal and professional skills and attributes.

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BIOGRAPHICAL INFORMATION

Eva Törnqvist, Ph. D. is Director for Centre for Human, Technology and Society (CMTS) at Linköping University, Sweden. She has long experience in teaching communication and societal subjects at The Institute of Technology, Linköping University. Eva has during the past 20 years been involved in the development of new courses and programs for engineering students.

Corresponding author

Dr. Eva Törnqvist
Linköping University
Dep. for Thematic Studies, Technology and
Social Change SE-581 83 LINKÖPING
SWEDEN
+46 13 28 10 00 eva.tornqvist@liu.se



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