

# INSPIRING THE INNER ENTREPRENEUR IN STUDENTS – A CASE STUDY OF ENTREPRENEURSHIP STUDIES IN TUAS

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## ABSTRACT

This paper introduces a case study of the entrepreneurship studies in the Faculty of Telecommunication and e-Business at Turku University of Applied Sciences. There are three levels of entrepreneurship studies in our faculty: a) What is entrepreneurship? –to raise the awareness and motivation towards entrepreneurship, b) Student co-operatives and Support centres for training the students with the skills to manage and run business and c) Become and entrepreneur. We describe existing recommendations for higher education to organize entrepreneurship and also reflect our solutions to these recommendations.

## KEYWORDS (4-6 )

Entrepreneurship, Case study, CDIO Standard 7, CDIO Standard 8

## INTRODUCTION

Entrepreneurship is increasingly recognised as an important driver of economic growth, productivity, innovation and employment. The importance of entrepreneurship to Europe and Finland has been identified in many reports and studies published since 2000. The European Union's Lisbon Strategy stated for example that new firms and SMEs are the major sources of growth and new jobs [1]. Furthermore, the European Commission's Green Paper "Entrepreneurship in Europe" in 2003 stated that education should contribute to encouraging entrepreneurship, by fostering the right mindset, awareness of career opportunities as an entrepreneur and skills [2]. Another European Commission's report emphasized the same issue "Europe needs to stimulate the entrepreneurial mindsets of young people". This report defines entrepreneurship as something that refers to an individual's ability to turn ideas into action. Therefore it is a key competence for all, helping young people to be more creative and self-confident in whatever they undertake. [3] In addition, Eurobarometer reports that almost 75 percent of interviewed teaching professionals agree that study and training programmes should encompass more generic competences, such as communication, teamwork and entrepreneurship. [4] The education can have different objectives such as: a) developing entrepreneurial drive among students (raising awareness and motivation); b) training students in the skills they need to set up a business and manage its growth; and c) developing the entrepreneurial ability to identify and exploit opportunities. Actually, an important distinction can be made to entrepreneurial and entrepreneurship education and training. The entrepreneurial education and training can apply to all forms of education, and entrepreneurship education and training is specifically concerned with new venture creation and innovation. [5] In Finland a challenge has been low number of small companies and low interest in starting new companies. For example the national innovation strategy has recommended that teaching facilitating and encouraging business and entrepreneurship must be introduced at the core of teaching. [6]

Nowadays the role of entrepreneurship in higher education is clear. Many HEIs have recognised that entrepreneurship courses could indeed be an effective tool for them to stimulate the economy through their graduates [7]. In addition, students consider entrepreneurship education an important part of their studies [8]. The policy of the Finnish Ministry of Education declares that supporting entrepreneurship requires widening, diversifying and strengthening education in entrepreneurship. Studies of entrepreneurship are offered as alternative studies to all students and students' credits earned in R&D-projects will be doubled. [9] Students in higher education should be activated to start their own enterprises. Actually, every higher education institute should have a policy to motivate and offer support for becoming an entrepreneur, to increase innovations and to provide chances for business growth [10]. We don't ask any more whether we can teach entrepreneurship rather how we can best learn and teach it. Still, implementing innovative entrepreneurship education programs has significant challenges and the rewards are difficult to quantify [11]. Entrepreneurship education should focus upon developing understanding, and capacity for pursuit, of entrepreneurial behaviours, skills and attributes in widely different contexts. Nevertheless it demands considerable changes in pedagogy, modes of assessment and the appropriate training of staff. [12]

This paper describes a case study of adding studies of entrepreneurship in higher education in the faculty of Telecommunication and e-Business at the Turku University of Applied Sciences. First, we describe the case research this paper is all about. Second, we introduce different recommendations for higher education in entrepreneurship education. Third, we describe entrepreneurship education in engineering. Fourth, we explain the entrepreneurship education model in our case. Finally, we will discuss and reflect our efforts with the theoretical part of the paper. Hopefully, we can also provide ideas to promote entrepreneurship education in engineering programs.

## **THE RESEARCH**

This research used qualitative methods and is a descriptive case study. The study describes actions taken in the faculty of Telecommunication and e-Business at the Turku University of Applied Sciences for inspiring our students to entrepreneurship. In general, a case study aims for in depth-understanding of the context of the phenomenon [13]. Furthermore, a descriptive case study presents a complete description of a phenomenon within its context [14]. A case study is well-suited to capturing the knowledge of practitioners and to document the experiences of practice [15]. This paper follows interpretative tradition of the case research. It means that there is no objective reality, which can be discovered by researchers and replicated by others [16, 17].

Turku University of Applied Sciences is one of the biggest of its kind in Finland. Our University is organized in six faculties that promote multidisciplinary learning. The faculty of Telecommunication and e-Business represent four different fields of education: technology, business, natural sciences and culture. Our main goal is to work in close co-operation with our region and to answer to the requirements of the working life. Our education and our research and development initiatives focus on applying knowledge rather than creating new ones.

The faculty of Telecommunication and e-Business operates in two cities and has seven different degree programs (Table 1). We educate Masters of Engineering, Bachelors of Engineering and Bachelors of Business Administration. The Bachelor of Engineering is a four year degree with 240 ECTS and Bachelor of Business Administration is a three and half year degree with 210 ECTS. The Master of Engineering program is a 60 credit program for students having at least

three years of work experience after the Bachelor degree. The faculty has approximately 1500 students of which roughly 550 study in Salo campus and 950 in Turku campus.

Table 1:  
Degree programs in Telecommunication and e-Business.

Degree Program	Credits ECTS	Discipline	Students
Technological Competence Management	60	Engineering	60
Information Technology - English - Finnish	240	Engineering	600
Electronics	240	Engineering	270
Business Information Technology	210	Information Systems	170
Business and Administration	210	Business	200
Library and Information Services	210	Information Services	70

Entrepreneurship is one of the focus areas in our mission statement: The faculty of Telecommunication and e-Business operates interactively with the working life educating future international experts, activating entrepreneurship and developing our region with applied research. The main research question answered in this paper was: How do we inspire our students for entrepreneurship and entrepreneurial attitude?

## ENTREPRENEURSHIP EDUCATION RECOMMENDATIONS FOR HIGHER EDUCATION

Europe's competitiveness, innovation and economic growth depend on being able to produce future leaders with the skills and attitudes to be entrepreneurial in their professional lives, whether by creating their own companies or innovating in larger organisations. Entrepreneurship education is the first and arguably the most important step for embedding an innovative culture in Europe. [18] At the same time, the European Commission's report declares that currently the teaching of entrepreneurship is not yet sufficiently integrated in higher education institutions' curricula [3]. Clearly, for entrepreneurship to embrace the 21<sup>st</sup> century, educators must become more competent in the use of academic technology, and also expand their pedagogies to include new and innovative approaches to the teaching of entrepreneurship [19].

The Ministry of Education Finland has introduced three paths to entrepreneurship in higher education. First path stems from the intention to become an entrepreneur: the intention requires strong expertise if we hope it to really happen. Second path starts from an invention or from a product-/serviceidea. When significant market potential is identified, this might strengthen person's intention to entrepreneurship and lead to a start-up company. Third path is based on research result that has entrepreneurial potential. Growth-oriented entrepreneurship can start from this path. Figure describes how intentions, innovations and growth entrepreneurship are linked together. [10]

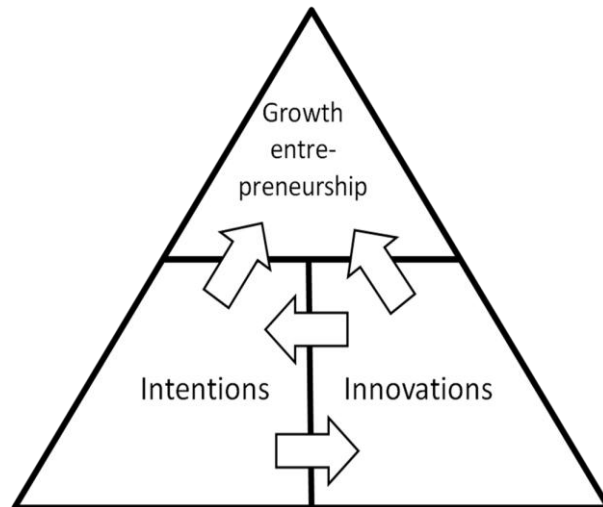


Figure 1. Entrepreneurship in higher education [10].

According to Ministry of Education Finland higher education institutions should offer a range of courses in entrepreneurship, rather than settling on a particular model of delivery. Especially in the early stages of promoting entrepreneurship education, it is better to have a diverse range of provision: options that students can take! [3]

Higher education institutions could [3]:

- set up a strategy and an action plan for teaching and research in entrepreneurship, embedding practice-based activities, and for new venture start-ups and spin-offs;
- create an entrepreneurship education department, which would serve as an entrepreneurial hub within the institution and spread the teaching of entrepreneurship across all other departments;
- offer an introduction to entrepreneurship and self-employment to all undergraduate students during their first year. In addition, give all students the opportunity to attend seminars and lectures in this subject;
- set up incentive systems to motivate and reward faculty staff in supporting students interested in entrepreneurship, and acknowledge the academic value of research and activities in the entrepreneurial field;
- develop clear institutional rules about intellectual property;
- award academic credits for practical work on enterprise projects outside the established courses.

The OECD report gives four main recommendations to higher education institutes [18, 20]:

1. Scale up

- Increase the number of courses in entrepreneurship and the number of students participating in them, particularly in lagging countries and institutions.
- Extend teaching across the HEI to address a wider range of potential entrepreneurs, moving beyond the traditional nucleus of entrepreneurship courses in university business schools. Offer courses to potential entrepreneurs in creative industries, science and technology and other fields and to both postgraduates and undergraduates.
- Integrate entrepreneurship teaching with subject-specific degree content in order to draw on the business ideas and expertise that emerge from the subject interests of students (medicine, biology, creative industries)

- etc).
  - Consider using inter-disciplinary entrepreneurship programmes to reach a wider range of students and obtain cross-fertilisation benefits from the mixing of students from different disciplines in the same courses and project teams, whilst retaining economies of scale.
  - Expand the pool of entrepreneurship teachers. Provide training, encouragement and support for staff embarking on entrepreneurship teaching activities. Facilitating teaching activities by existing and former entrepreneurs by relaxing regulations constraining their involvement and training entrepreneurs in teaching techniques.
2. Focus on growth-oriented entrepreneurship
    - Shift from traditional entrepreneurship teaching focused on business management to courses aimed at stimulating growth-oriented entrepreneurship. Focus courses on key growth challenges, including finance and internationalisation.
    - Teach the skills that will be required for enterprise growth including opportunity identification, risk-taking, strategy making, leadership, negotiation, networking, building strategic alliances and intellectual property protection.
  3. Introduce interactive and experiential teaching methods
    - Encourage learning-by-doing in contrast to more traditional forms of academic learning.
    - Increase the use of Internet and computer technologies.
    - Introduce cross-functional problem-solving approaches that replicate the bundle of activities and functions that need to be applied in entrepreneurship situations, rather than breaking up teaching into separate business functions as in traditional management courses.
    - Involve entrepreneurs in the design and teaching of entrepreneurship courses.
    - Expose students to entrepreneur role models, for example by using entrepreneurs as mentors, speakers and interview subjects.
    - Provide students with opportunities for working in existing SMEs and adding value to these firms through placements and consulting projects.
    - Expand the use of case study teaching. Provide resources to develop cases tailored to the environment that students will face. Provide training to support teachers to use this approach.
  4. Link into wider networks
    - Tap into the resources of alumni networks to help fund and support entrepreneurship programmes, for example by providing teachers and links to companies for placements, mentors and so on. Monitor and build relationships with alumni to this end.
    - Facilitate access to common materials and sharing of good practice by favouring networking among institutions and teachers and providing support for the inter-institution mobility of entrepreneurship teachers.

## **ENTREPRENEURSHIP EDUCATION IN ENGINEERING EDUCATION**

It is no surprise that majority of entrepreneurship courses are offered in business schools [18] [3]. However, it is questionable whether Business Schools are the most appropriate place to teach entrepreneurship: innovative and viable business ideas are more likely to arise from technical, scientific and creative studies [3]. Entrepreneurship needs to be expanded across the campus - especially to the technology and science departments, where many innovative ideas and companies originate. Technical and scientific universities are potential sources of start-ups and spin-offs. Increasingly, business and technical faculties are linking efforts to encourage the exchange of skills and ideas among students. [18] The real challenge is to build inter-disciplinary approaches, making entrepreneurship education accessible to all students, creating teams for

the development and exploitation of business ideas, mixing students from economic and business studies with students from other faculties and with different backgrounds.[3]

Most of the possible contents of entrepreneurship courses are relevant for students from all fields of studies. However, in order for the teaching to be tailored to the specific needs of different categories, more emphasis is placed on one aspect or another, for instance: Entrepreneurship within science and technology studies is especially concerned with exploiting intellectual property, creating spin-off companies and venturing, and offers courses on issues such as [3]:

- management techniques
- marketing, commercialising and selling of technology based ideas
- patenting and protecting technology based ideas
- financing and internationalising high-tech ventures.

A large number of Finnish engineering education professionals worked for a report defining future competences that are not in the focus of engineering education at the moment. One of the three key challenges was to increase business competences: attitude to entrepreneurship, business operations, marketing, selling, productization and usability.[21] Another Finnish report challenges Universities of Applied Sciences to provide tools for new entrepreneurship. The Universities of Applied Sciences are expected to differentiate from science universities at least in four dimensions: learning by doing, entrepreneurship education, high quality teaching and personal guidance. [22]

The CDIO initiative has many references to entrepreneurship and entrepreneurial education. Standards 7 (Integrated Learning Experiences) and 8 (Active Learning) both promote entrepreneurial competences such as creative and critical thinking. The CDIO Syllabus has section 4.2. dedicated to enterprise and business context.

## **ENTREPRENEURIAL AND ENTREPRENEURSHIP EDUCATION IN OUR FACULTY**

The strategy of Turku University of Applied Sciences defines that entrepreneurship and applied research and development will be connected to teaching. The University tries to actively inspire the inner entrepreneur and increase number of enterprises. The entrepreneurship is characterized as expert entrepreneurship. Furthermore the strategy defines that business studies will be increased in all disciplines. [23] Our faculty's model for entrepreneurship education has three phases:

1. What is entrepreneurship?: Practice Enterprise + Real life projects
2. Learn real entrepreneurship in safe environment: Student cooperatives + Education Support Center
3. Become an entrepreneur: Personal Mentors + Student competitions

The first phase in our model is called "What is entrepreneurship?". As the name defines this first phase focuses on intentions and for providing basic information about entrepreneurship. The main method in the first phase is Practise Enterprise –module [3] where the basics of business operations are studied in small multidisciplinary groups using problem-based learning. The Practise Enterprise –module is 15 credits. The module has been running since 2001 and it has yearly sharpened to the current format. Most of our students do this course as part of first year studies, but in engineering the students are typically third-year students. The established practice enterprises operate in a virtual practice enterprise network (see [www.europen.info](http://www.europen.info)) where everything else is like real life except money and goods are not moving anywhere. The

fundamental idea is that instead of just sitting on lectures students now learn basic laws and ways of business in a pragmatic way. At the same time they learn internal entrepreneurship, teamwork, project work, tolerance for uncertainty and they learn to plan their work.

There is always a true enterprise behind every practice enterprise and this practice enterprise receives all basic information like data about the cost structure from the godfather enterprise. The students work in their practice enterprise for one year taking care of marketing, accounting, selling, and taxes as well as all other things related to running business. An essential part of the project is a series of lectures that supports learning the basic business skills. The practice enterprises participate also in fairs with their own stands. Yearly chosen groups of students participate in international practice enterprise fairs as well.

Another method that familiarizes our students to entrepreneurship is do real life projects. Working with real-life assignments provides valuable information on enterprises, their culture and processes in addition with strict requirements and timetables.

In the second phase we continue training the students with the skills to manage and run business, but also continue to raise the awareness and motivation. The idea is to learn entrepreneurship in safe environment. There are several methods and alternatives for this. First possibility for students is to establish or join existing co-operatives and run business for real with normal entrepreneur obligations. Another option is to join the support centres on Microsoft server products or on Cisco network equipment and work with real customer problems and charge customers for the services.

At the moment there are two co-operatives in our faculty. The other one has been running since 2005 and the newest one is starting autumn 2010. There are two major differences compared to the first phase of learning entrepreneurship. First, now the business is for real with real money, real products and services, real customers and real employer's obligations like salaries to students, insurance and value-added taxes. Second, only students that want to study entrepreneurship this way and are ready to work for the co-operative join there. The first phase was basically mandatory for every student in a certain degree programme. A co-operative is actually meant for spontaneous, positive and daring students, who want to experience real entrepreneurship as a member of a co-operative with a little bit lower risk than operating all alone in a one-man private company.

The co-operatives have had several projects with local companies and communities. Students get credits by working in these different projects but they also have to read suitable literature, make presentations, reports and essays. For gaining a credit student has to show 27 hours of work and after every five credits student has to earn other credits through reading literature and making reports and presentations for example. Basically a student can get altogether 90 credits by working and studying in a co-operative: so far average credits for a student has been between 10 and 30.

Working in a co-operative develops many different core competences that entrepreneurship but also working life today values: ability to work in team, to tolerate uncertainty, to start behaving in an entrepreneurial way and to plan ones work. In addition to learning real business tasks like marketing, negotiating, bookkeeping students also make close co-operation with local companies and get good contacts with local business life. Students also network with students in other co-operatives in other faculties.

Another possibility to learn real entrepreneurship in safe environment is joining an Education Support Center. The ESC Finland support center was established in May 2005 together with Microsoft Finland and Faculty of Telecommunication and e-Business. The faculty offers premises and tutors to the center, but all the employees are students. The idea of the center is to provide support services to public organizations relating to any challenges with Microsoft products installation or usage. The center has access to Microsoft solutions database and it does cooperation with other support centers in Europe. In addition to services the center does real projects based on customer needs. Students working in Esc Finland have the possibility and requirement to certificate their knowledge in certificate exams.

The third level of entrepreneurship education focuses on students the ability to identify and exploit the business ideas they have. Now students start working with personal teacher mentors to develop and test their business ideas and finally start their own business. To support the initiation of business ideas we have different competitions where judges analyse the business potential of the products introduced in the competition. A good example is the ICT Showroom competition where student team participate with some ICT-product idea. The competition is to encourage students to the career of an entrepreneur.

All these phases can easily be integrated into the student's personal study plan when he decides to focus on entrepreneurship. In addition, it is possible that a student receives academic credits for practical work on enterprise projects outside the established courses as well.

Besides these special entrepreneurship education possibilities the curricula has been designed in manner that entrepreneurial competences are strengthened. Actually implementing CDIO has supported these very much. Implementing design-build project in the curriculum makes student to reflect their skills and competences. These projects are quite close to the projects in real enterprises. They train students to work in real projects and make them understand certain business rules. The increase use of active learning methods together with integrated learning experiences improve students problem solving skills, communication and negotiation skills – all important entrepreneurial competences.

## **DISCUSSION**

Higher education institutes were recommended to integrate teaching of entrepreneurship in their curricula. As we described earlier we have integrated many different ways to learn entrepreneurship in our curricula. In addition, the ways to learn entrepreneurship are not very traditional rather fresh and inspiring solutions. The paths suggested by the Ministry of Education are partly followed. The first path that focused on intentions is strongly followed: the basic idea of the Practise Enterprise –course is to strengthen the intentions towards entrepreneurship. Actually we have followed this idea long before the recent proposals of the Ministry of Education. However, paths two and three are more challenging for us. We do have some practices such as ICT Showroom that support entrepreneurship stemming from innovations. Third path is the most challenging for us because we do not exercise basic research rather applied research and development. We work with existing research results and apply them to new environments and challenges.

Our entrepreneurship education is quite well structured and it offers different alternative to the students. Still, we think that we need to create more flexible ways to connect studying and entrepreneurship. We have called up a team focusing on the development of our entrepreneurship education. This team has representatives from all our degree programs and



we try to maintain the old and create new entrepreneurship education packages that combine students from different disciplines. Again Practise Enterprise –course is a good example. Most of our students join this course during their first year studies as suggested by the Ministry of Education, but engineering students join to this project in third year. The student co-operatives answer to the inter-disciplinary requirement as well. There are students from different degree programs, different disciplines working together for common goal just like in working life.

One of the areas that we have much to do is enhancing growth-oriented entrepreneurship. In addition, we could take advantage from the large network of entrepreneurs and involve them more to planning and design of our entrepreneurship education.

The goal of all our efforts in entrepreneurship education is not that everyone starts their enterprise. We do hope that the number startups of our students will increase. Hopefully our efforts have given our student responsibility, understanding and some inspiration.

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