ENTREPREUNERSHIP AND ICT-EDUCATION AS MEANS RATHER THAN ENDS – CASE BUSINESSACADEMY FINLAND

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ABSTRACT

The aim of this article is to present a novel new innovative learning environment: Salo BusinessAcademy (BA) is based on student-owned cooperatives where from the 2nd year most learning takes place. BA is an extension of the innovation pedagogy approach visible in Turku University of Applied Sciences, where active learning standards in the form of problem-based learning, real-life projects and the changing role of the teacher meet in an inspiring learning environment without time and space limitations. In this article we also present the key challenges and possibilities of this environment for students and teachers and illustrate key activities related to this kind of learning. From the CDIO perspective, the article and the BA concept are strongly related to standards 3, 7 and 8; Integrated Curriculum, Integrated Learning Experiences and Active Learning, respectively. The idea how to learn has drastically changed in recent years, especially in the field of entrepreneurship. Central idea of this is that learning happens through entrepreneurship - meaning as acting as an entrepreneur during studies. After the first year studies SBA gives a path to become an entrepreneur and act in a real co-operative company the last 2.5 years of studies. SBA combines studying and working in its best sense; student entrepreneurs' and local SMES open´ learn to know each other in a very early stage and can cooperate in real working life projects. Graduation time is less than three years while in the traditional degree programs in Finland it is 4.1 years. The number of local companies that have acted as project partners is more than 400. Employment rate after PE and SBA is nearly 95 % - compared to traditional degree programs of 60 %.One recent addition to the curricula portfolio is educating adults who have a) lower level degree or b) have started but not finished their bachelor degrees. Nokia was by far the biggest employer in Salo-region but has gradually downsized its operations, resulting in mass unemployment.

KEYWORDS

Innovation pedagogy, active learning, project-based learning, curricula development, CDIO, entrepreneurship

INTRODUCTION

The social environment and general view of relationship between education and working life has changed almost completely during past twenty years from total isolation to close co-operation. New skills and competencies are needed in the traditional fields of business and engineering and substance information is taken for granted.

The first purpose of this article is to illustrate the role University of Applied Sciences (UAS`) have in Finnish educational landscape and what is the holistic understanding of learning behind the UAS'.

Secondly, a concept of innovation pedagogy is introduced via the case of Business Academy (BA) of Turku University of Applied Sciences (TUAS) – a novel concept and ICT supported learning environment combining multidisciplinary student groups – engineering, business and young & adults students – in learning. Hence, the learning is happening without time and space limitations; it changes the structures of everyday life in learning [1]. real feedback from surrounding business ecosystem has clear links to what is learned. University cannot naturally offer all elements, thus learning outside university perimeter must be included into curricula. Also ideas and thoughts from students are taken into consideration and learning goals are formulated together.

Third aim in this paper is to present that new engineering generation is facing different kind of world with constantly changing demands for their skillset and mindset. Moreover in general, words research, development and innovation (RDI) as well as entrepreneurship and real life projects are something which every student and teacher faces in the field of education.

According to Finnish Labour Statistics (2011) about a half from graduated in the field of engineering are working in a position of the expert or specialist. As a clerical worker worked every fifth and the management status had every fourth. In these positions both soft and hard skills are equally important to master which are fourthly handled in this paper. It is also noteworthy that in Finland the recent problems with Nokia reflect upon educational needs; today's graduating engineer/ICT-specialist can find him/herself with insufficient skillset if the education has been very narrow.

The paper is structured as follows: first we illustrate Finnish higher education landscape and the role of applied sciences universities in it. Then we introduce two key issues in our university, namely pedagogical approach called Innovation Pedagogy and multidisciplinary learning environments. After that we illustrate how we see our changing role in business ecosystem and one application of innovation pedagogy: BusinessAcademy [2] learning environment. Finally we conclude what can be learned from our practices in the changing business and ICT-education and put this in CDIO-perspective.

INNOVATION PEDAGOGY

The TUAS is a multi-disciplinary higher education institution founded in 1992 and located in Southwest Finland. The institution has 850 full-time employees and nearly 10 000 students in seven fields of education. Technology, communication and transport, business and administration, health care and social services and culture are the largest fields of education. The institution has 35 degree programmes for the Bachelor's Degree, from which 9 are engineering programs, and altogether 13 programs for the Master's degree. The institution offers tuition mainly in Finnish, but five degree programmes are taught in English.

Universities of applied sciences are new institutions, which were established in Finland at the beginning of the 1990s to support the regional development, economic growth and welfare, in contrast to the traditional research universities that create new universal knowledge in basic research and serve the whole of society and humankind. It turned out that the pedagogical approaches of traditional research universities are not suitable for the universities of applied

sciences. In addition, the Finnish Ministry of Education and Culture required that each higher education institution should define its profile. Based on these facts, the TUAS developed innovation pedagogy as its profile to promote innovation and increase its external impact on the region [3,4,5].

The purpose of the innovation pedagogy is to respond to the regional development needs and the demand for skilled labour. The institution establishes interdisciplinary projects of research and development and integrates them with education. This kind of integration provides opportunities for students to participate in research and development with teachers and partners from many real organisations. In this way, the institution creates capabilities for students to participate in development work and create innovations. [6].On Finnish scale, TUAS has a large patent base so innovation-activities are visible. However, true innovations are somewhat lacking because patents leading to commercialization are few. Obviously, the next step should be to concentrate more on tech transfer and other activities to capitalize on these innovations.

Individual-centred learning is found in traditional research universities, where students listen to lectures, read literature and memorise both for examinations. This kind of mechanical learning [7] is relevant in cases where the purpose is to disseminate facts, concepts and information. It is necessary but not sufficient at the universities of applied sciences, which want to have a strong external impact on companies and other organisations in their environment.

Collaborative learning is necessary in research and development which is integrated with education. It is a relevant option when an interdisciplinary approach is needed to carry out a project [8,9]. According to the cognitive load theory it is superior to individual learning for relatively complex problem-solving tasks [10, 11]. Collaborative group-based learning may take place at the first stage within the institution when the students learn to know each other, but it is necessary to extend the learning outside the institution.

Typically, externally funded research and development projects are more demanding than intramural learning tasks because they combine the objectives of teachers, students and working life [12]. Networked learning takes place in internships, various projects and theses written for companies and other organisations. In this way, the universities of applied sciences are part of a wider community in their socio-cultural setting. Therefore, the constructivist view of learning and the socio-cultural theory [13, 14] have become popular at these institutions.

BUSINESS ECOSYSTEMS AND THE ROLE OF AN INNOVATIVE LEARNING ENVIRONMENT

Business ecosystems

Moore [15] introduced the concept business ecosystem and described it as an organization group crossing many industries working cooperatively and competitively in production, customer service and innovation. Peltoniemi et al. [16] define business ecosystem as "a dynamic structure which consists of an interconnected population of organizations. -- Business ecosystem develops through self-organization, emergence and co-evolution, which help it to acquire adaptability. In a business ecosystem there is both competition and cooperation present simultaneously"
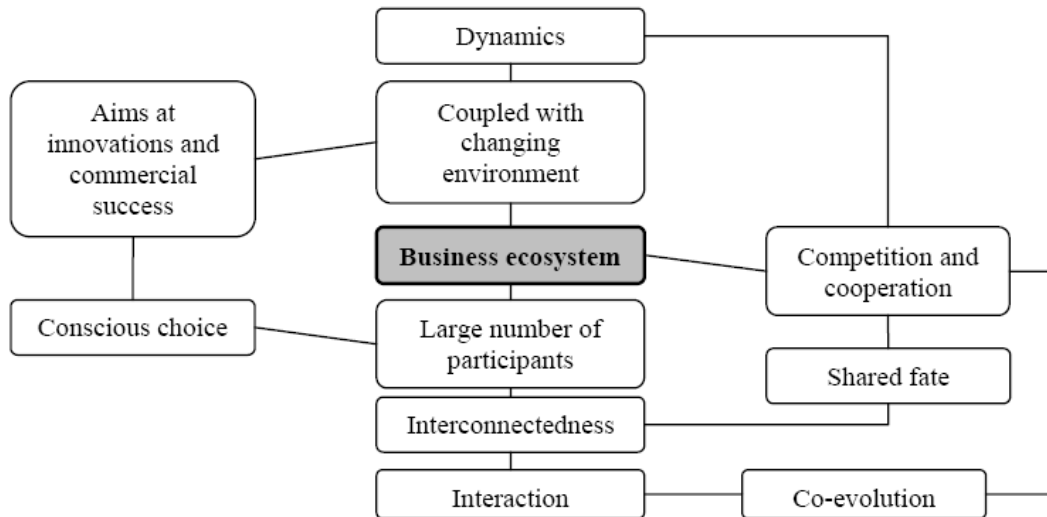
Figure 1: the central concepts of a business ecosystem and their linkages [16].

Peltoniemi et al. [16] illustrate the elements of a business ecosystem (see figure 1): A business ecosystem is coupled to a changing environment. This describes its nature as a connection between market economy and an individual organization. In a business ecosystem the organizations make conscious decisions in order to create innovations and gain commercial success. The large number of participants that are interconnected have many kinds of interactions, which leads to co-evolution. These interactions may be competitive, co-operative or co-opetitive.

The interconnectedness of the organizations also leads to a future that the organizations share at least partially. For example, the success of one organization may bring success to the other organizations as well. The business ecosystem is located in some environment that consists of many different aspects, such as political, cultural, social and legal. This environment has an impact on the business ecosystem but the business ecosystem may also have an impact on the environment. It is noteworthy that a business ecosystem may include both commercial and non-commercial organizations, also universities. The actual reasons for participating to a business ecosystem vary between organizations. While the most obvious is commercial success, other reasons such as shared beliefs, common development goals and even creating business opportunities for other actors play also a role. In our case, there are at least two obvious reasons to participate: 1) students are better prepared to enter the actual business ecosystem if they have been part of it during studies and 2) the role of TUAS is seen by the government to be a regional actor. We might add a third reason: when designing curricula, participating into business ecosystem gives actual feed-back on the issues corporates and other organizations see desirable to be learned.

Case: Freedom of Learning in innovative learning environment BusinessAcademy

In this point, cooperative form of studying is nowadays essential part of HEI`s. In the faculty of Telecommunications and eBusiness all students have the possibility to join or establish a co-operative during their third semester of studying. These co-operatives are student-owned - with 12-16 equal student partners - and conducted companies in which real-life projects are done with the local SMEs, bigger companies and other organizations. Especially local SMEs are

favored partners for student-owned cooperatives for multiple reasons. For example their needs are typically smaller and thus manageable.

The students organize their own workday in various ways: selected reading materials are handled, discussion and evaluation groups are held, projects provided by local companies are implemented and project meetings with other stakeholders are arranged, seminars, workshops and lecturers are visited etc. Each student builds his/her own personal and tailored study plan with his/her personal coach concerning the goals and skills which students wants to study and learn.

The study plan consist mainly reading materials, discussion groups, and real-life projects targeted to curriculum competencies of the certain level as well as personal objectives of the student. Traditional lecturing can be taken as a part of study plan but is not in the main role. Identifying, recognizing the learning in various situations, also outside the school, is a crucial part of co-operative work and studying. Reflection and evaluation is done by the coach but also students themselves, clients in projects as well as fellow students. When comparing this study form to CDIO principles and instead of rising the irrelevant question of what works is appropriate for the students to do, to reach the learning outcomes, transfers smoothly to the relevant question what should students do to demonstrate that they fulfill the learning outcomes. One possibility for demonstration is the personal portfolio. Students gather "evidence" from all projects and actions and thus create their own portfolios. The evidence may include written material, videos, newspapers, www-pages and so on.

This form of studying sets a number of challenges – and also opportunities - for teaching staff and students. The challenge number one is the element of surprise. If what-is-to-be-learned is defined by actual projects from actual companies, one cannot really fully plan when and where learning is taking place. The teacher cannot plan for a length of time what is to be learned and must be adaptive. This goes naturally for the students as well. Student also learns not to fear the unexpected. This we see as a major issue.

Other major issue is the role of innovations and how they are "made". Modern innovation literature starting from Chesbrough [17] and moving on to other notable authors such as Christensen [18], ; Hippel, E. [19] and Ramaswamy., et al [20] focuses on openness and co-creation as viable solutions to facilitate innovations. Environments as BA are open both internally and externally. Thus students learn modern innovation skills while tackling the problems of real-life projects.

The role of the teacher is interesting in this environment. It changes quite radically from traditional lecturer to facilitator, inspirer and coach. In BA there are three kinds of teachers: coaches (each cooperative has a coach), specialty-area teachers (who give specialized knowledge, for example coding skills, when needed) and students-as-teachers (also known as sub-coaches, older students who act as student mentors). This kind of transformation of teacher's profession is not for everybody – it is quite demanding initially and includes many other roles than lecturing. These roles are coach, mentor, facilitator, tutor, thesis supervisor just to name the most important.

Also, technology has its role in this environment. According to Keen et al. [21] in mobile commerce consumers (users) define value of services, and when, where, and how they want it. Mobile services offer consumers freedom. Freedom itself is not value but *freedom becomes value when it changes the limits of the possible in the structures of everyday life*. That is called *Braudel Rule. Braudel Rule* means that mobile services become valuable in case they change

the daily routines of people and moreover people shall rely on that specific mobile service. If the mobile service would disappear people feel that their daily routines are disturbed. This is one base when evaluating the effectiveness and simplicity of mobile value services to the consumers [21]. The question here is how the consumers do their choices in the field of everyday life and the same applies to information technology; how the IT is made part of consumers' everyday life (Lie et al., 1996) in this case in education. MIT's Open Courseware is naturally a classical example of this, but such issues as ICT-assisted co-creation etc. are still very open to education sector.

CONCLUDING REMARKS: CDIO LEVELS 3, 7 AND 8; INTEGRATED CURRICULUM, INTEGRATED LEARNING EXPERIENCES AND ACTIVE LEARNING, RESPECTIVELY.

The integrated curriculum: mixture of theory and real customer projects

The Student's Enterprise Model is a tripartite programme consisting of the practice enterprise (BS), a cooperative (BA) and a business incubator. The first of these, the practice enterprise is generally run for a full academic year and consists of three phases: orientation and establishing the simulated enterprise, running the business, and preparing financial statements and evaluating the results of the project.

The practice enterprise is followed by the second phase of the Student Entrepreneurship Model: the cooperative BusinessAcademy. The BA provides both the business and the ICT- students with insight into the everyday business operations. It is a real company with real business and is taken into consideration in the curriculum fully as a part of studying. Real life projects to customers are integrated into each study unit and can be enlarged within credits if needed.

Figure 2 illustrates a new modular curricula for both the business and ICT-students, which is updated yearly. This is currently in use with two co-operatives which are formed from former Nokia-employees (ranging from factory workers to middle-level management). The key issues here are large study elements which can be adapted even during the semester and the possibility to become ICT-savvy business student or ICT-specialist with strong business skills. Naturally it is also possible to graduate also with narrower, more specialized skills in either field.

The Nokia-groups need to re-focus their capabilities for better possibilities at job markets or gain capabilities in entrepreneurship. It is interesting to note that they actually give a lot of feed-back to curricula and help to develop it with us. Sometimes the border between the teacher and (Nokia)-student gets blurred. Also, it is noteworthy Nokia`s problems reflect upon the whole Finnish engineering education landscape. Our approach could be one option to transform also future engineering education. Instead of fixed narrow skillset we aim for broaden learning capabilities. See for example Olin College of Technology approach.

Figure 2: Modular Curricula For Business And ICT-Students

Underlined philosophy of the new curricula (figure 2.) is to put together ICT, business and other students. Concepts such as business models, new technology, user adaptation, everyday mobile systems etc. become naturally interlinked whether the student is business or ICT - student.

The third phase is going to the incubator. There have been earlier incubators in the Salo campus but this time we intend to make it an integral continuum of studies. If the students have been given both the skillset and mindset for entrepreneurship, we see it as our duty to offer a sanctuary to start business. Also, we must admit that these young entrepreneurs are quite attractive as a calling cards for our university.

Integrated learning experiences: Cooperation with local enterprises and multidisciplinary student groups

BA learning environment was organized in close cooperation with local small and medium-sized companies in North-West Finland area. One of the main tasks of the students both business and IT, working and studying in BA was to initiate business and institutions network. Moreover, the networking events in the area were held to provide a forum for the trainers, students and local companies. In this way the connection of learning to working life and RDI is clearer.
This reflects upon our positions in our local business ecosystem.

For example, students prove their skills and knowledge in **24 h innovation sessions**. This means that companies give a real business or technological challenge to student team and team produces a solution to the challenge in 24 hours. After that team presents their solution to a company and company representatives evaluate the solution and give feedback and grade from 1 to 5. In addition the company pays for the student team in case grading is 3 or more.

Active learning: Learning through entrepreneurship

Considering the classical learning culture in the universities and the demands coming from companies and students, and in general from outside world, it is clear that different solutions concerning entrepreneurial implementations in curricula in higher educational institutions must be develop further. Traditional entrepreneurship courses are not the solution.

We suggest that it is concentrated especially on implementations which support learning through entrepreneurship during studies both basic and professional levels no matter in which field or department student study. That means that students act as entrepreneurs while studying. Other two ways of learning are learning about entrepreneurship which refers lecturing and artifacts provided by students as a result of learning like a well-organized business plan, and learning for entrepreneurship which stands for competencies development to prepare the students to start and manage a business.

A key issue in assembling the suitability of entrepreneurship components in university level is to beat the barriers in human attitudes inside the universities as both personnel and students tend to act in a safe way.

Preliminary findings and way forward

Preliminary findings indicate that BA students graduate 6 to 9 months before their more traditional peers. Personal team tutor seems to be one explaining factor and also a factor of working as a part of multidisciplinary team (student-owned coop) which implements real working life assignments with several companies in different business fields. In many cases practice can come first to student and from needs of the student to learn theory can happen very fast which is not always possible according to traditional fragmented curricula.

What is even more interesting is that project based studying with its contacts to companies gets the students surer and better (manager, expert, and specialist) entry level positions when starting their working life.

We are currently collecting data on these subjects from three classes 2010-2012.

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