

## From earth to heaven: formats to allow adult learners to combine working, living and learning

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### 1. Introduction

In a world of increasing complexity and rapid technological development, the interplay between Europe's goals of economic growth and social well-being, and academic expertise is essential. It is an area where continuing education, innovation and research should come together to address the global challenges of our time. Adult learners, such as engineers working at companies or governmental agencies, have already gained a wealth of practical experience that can be built on and aspire to learn more to contribute to the innovation capacity of the organisation at which they work. A relevant educational program at a university is an opportunity for further development and a way to gain important new insights. For the university, the flow of academic expertise gained from research is accelerated into practical application. With these continuing educational programs they are satisfying their knowledge valorisation efforts and are ensuring access to resources and real-life cases. The main benefits for companies are a head start on fellow companies, motivated and sustainable deployable employees [1] and a structural link with a research community.

Has this compelling proposition been realized in some of Europe's continuing educational programs? Or is it easier said than done? What role can the European University Continuing Education network (EUCEN) play? In this paper we look into three case studies from different universities from different countries in Europe that took up the challenge to develop innovative formats that allow adult learners to combine working, living and learning for the benefit of themselves, the company and the university.

In Finland the Universities of Applied Sciences have implemented Master's of Engineering programmes that require at least 3 years work experience after the B.Eng. graduation and tight cooperation with the workplace of the participant. As the Master's degree is based on B.Eng. of 240 ECTS it is only 60 ECTS, which equivalent to one-year full time studies. However the studies usually take from 1½ years to 2 years as the students typically work full time in the company. The thesis work, from the subject of the company, covers the half of the studies - and thus is ties the studies closely to the needs of the company.

Additionally to the thesis work, the courses cover deeper and wider knowledge from the area of the discipline of engineering. That gives updated information of the subjects and understanding of the research of the area. However that is a great way of technology transfer.

In Denmark, Aalborg University offers a wide range of Part-time Master's programs for employed adults within a broad spectrum of academic fields. In 2016 a total of 2.225 fee-paying students were enrolled in Part-time programmes among which more than 60% were social science students and only 10% were engineering students [2]. The Part-time Master

is no to be mistaken for the traditional Master of Science (MSc.) programmes, which according to Bologna is a 2 years study following a bachelor degree, The Part-time Master programs are specially prepared to meet the need of employees who lack competence development within a specific identified area. Admission to and extend of a Part-time Master programs is the same as mentioned above in the Finish context – a bachelor degree and at least two years of relevant professional experiences and the extend is 60 ECTS. The Part-time Masters are aligned with Aalborg Universities' pedagogical approach problem-based learning (PBL) [3] which means that more than half of the study-time (30 ECTS) is dedicated to solving real-life problems. These problems are often identified within the adult learners' workplace, which bring synergy to the learning environment.

In the Netherlands, TU Delft offer professionals already working in industry or governmental organisations ('contract PhD's') the opportunity to defend their PhD. These professionals who want to make a difference in their daily practice on the basis of scientific research, remain stationed elsewhere. Their companies granted them part-time leave to follow a PhD program. The graduate school of TU Delft has an extended doctoral education (DE) programme. The DE Skills Training Programme offers a range of courses and activities for acquiring transferable skills, to increase disciplinary competences, understanding ethics and integrity and obtain research skills: activities to reach full proficiency in conducting research. Each category within the programme requires a minimum of 15 GS credits which amount to a total of 45 GS credits. (1 GS credit is equal to 8 hours). PhD candidates who have completed doctoral level course work prior to starting their PhD at TU Delft, are eligible for requesting an exemption. [4] This case is about setting up a PhD track as a multi-year collaboration between the PhD candidate, the employer of the PhD candidate and the university. A PhD project in this context therefore entails not only the training of an individual to become a scientific researcher, but also a collaborative project in which new knowledge is developed that should lead to innovation.

The overall question is: Which characteristics in the design of the program ensure that adult learners' needs are addressed and that they are able to combine work, life and education at the service of their own, the company and the university?

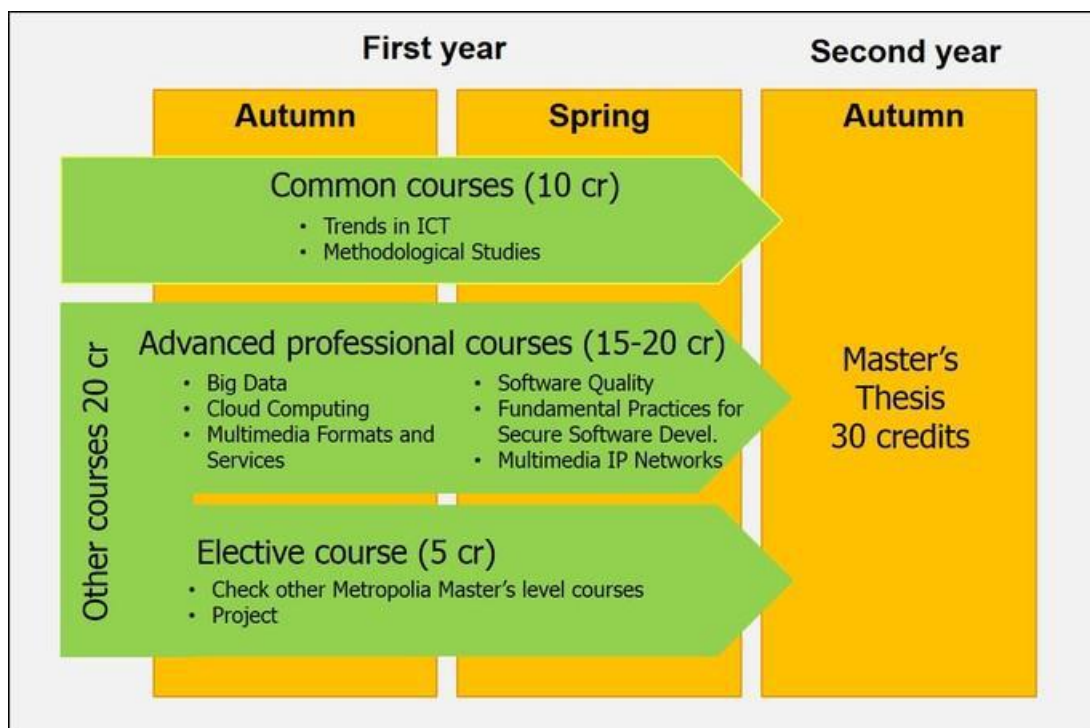
Case studies are considered to be useful in research as they enable researchers to examine data of real life situations and they allow the exploration and understanding of complex issues. It is used here to describe several innovative designs and to examine the difference between the realized and the designed curriculum. Within its context, better insights are provided what will contribute to the needs of adult learners. Further, through the three cases we will show that a one size fits all approach will not come true because of the (contextual) differences. If we want to consider the role of EUCEN and the topics that are of importance, the (categories of) promoting and impeding factors of this research can serve as input to start the discussion at the conference.

## 2. Cast study: Finland

The Masters' courses in Engineering at Universities of Applied Sciences in Finland are planned to directly meet the needs of the working life. That means the content of the studies is applied and thus directly useful for the daily work. However additionally the methodological

studies are included to give the students competences to execute research and what is in these cases even more important, validate the work done elsewhere.

In the structure of the studies the daily work in a company is appreciated - lectures are mostly in two evenings of the week or intensive periods partly during the weekends. Distance education is adapted and individual assignments are used. All this makes the learning tailored for the needs of the student and his/her employer. As an example of these courses in the picture 1 is the structure of an IT MEng course from Metropolia University of Applied Sciences which purpose is to deepen the technical knowledge additionally to give some research and management skills.



Picture 1. An example from the professional MEng course in IT [5]

In the Master's programmes in Metropolia very much emphasis is paid on the tight contact with the employer. Each of the students has four coaches from the university side additionally to the coach from the company. The programme leader and coordinator are regularly following up the advancement of the students. The 1<sup>st</sup> thesis coach visits the company and makes sure the tasks are understood in both ends in the same way. The role of the company coach is to define the needs of the company, however the needs are turned to research questions jointly with the company, student and thesis coach. Furthermore the 2<sup>nd</sup> thesis coach validates the evaluation and supports the 1<sup>st</sup> coach.

This close contact between the company and university creates many additional benefits to all the parties. Teachers learn to know the companies, their products, processes and strategies meanwhile effective technology transfer from the university reaches the company. Furthermore these activities strengthen the base for future cooperation - the colleagues of

the student might apply for the next programme or some innovation projects for the students in Bachelor's programmes might be established. Even larger development project have been initiated through these connections.

The students of the master's programme create a close group while they are studying. They are cross-sparring each other's works and thus supporting each other. This is an effective way to build professional networks, which will then continue after the graduation as alumni activities.

The studies are adopting the CDIO-approach (Conceive - Design - Implement - Operate) [6], this means that the students are supposed to first conceive the challenges by analysing their situation until the root causes are defined. After that they need to design different options for solutions. Implementation of the chosen solution will be followed by study of the added value of the change or new product. Furthermore in operation phase the solution should be analysed and evaluated until the recycling or next steps of the change. In this way the whole lifecycle of the executed work is included.

### 3. Case study Denmark

#### Part-time Master In Information and Communication Technologies (mICT)

The mICT is an international Part-time Master's programme at Aalborg University designed for employed learners who work in the ICT industry and want to keep their job while they are participating in a Master's programme [7]. The curriculum is carefully put together to be attractive and exciting for both the ICT engineer and the ICT business professionals. The aim of mICT is to integrate students' knowledge of technology, users and markets to educate ICT professionals with both deep and broad competencies. The courses/seminars are mainly given in the evening and during weekends.

The cross-disciplinary profile addresses the growing need for ICT professionals who can combine knowledge from different areas:

- Internet, Communication and Broadcast Technologies and Converging Media
- Services and Platforms
- Development of User-friendly Applications, Solutions And Services
- Business Development and Business Models
- Security, Trust, Privacy; Legal and Ethical Aspects
- Organisational aspects of ICT

The programme is provided in three trimesters, where a trimester in the full-time (one year) version of the education is equivalent to four months, in the part time (two years) version is equivalent to eight months and in the part time (three years) version is equivalent to one year. The programme covers 3 main areas [8]:

- Networks and services
- Design and users
- Market and regulation

	1ST TRIMESTER THEME: ISP: SERVICES AND PLATFORMS CIS: ENTERPRISES CYBER SECURITY MII: ORGANISATIONS AND INNOVATIONS	2ND TRIMESTER THEME: ISP: APPLICATION DEVELOPMENT CIS: PRIVACY & SECURITY FRAMEWORKS IN ORGANISATIONS MII: SERVICE DESIGN	3RD TRIMESTER THEME: MASTER'S PROJECT
<b>Courses</b>	10 ECTS	10 ECTS	5 ECTS
<b>Project</b>	10 ECTS	10 ECTS	15 ECTS
<b>Total</b>	<b>20 ECTS</b>	<b>20 ECTS</b>	<b>20 ECTS</b>

Picture 2. The Part-time Master mICT [8]

The mICT programme is taught via extensive use of IT-supported distance education tools such as interactive courses with web-based support, platforms for group collaboration, Moodle and other support. However, at the seminars courses are taught face-to-face and teachers are facilitating learners' project-work as well as learners are encouraged to engage in dialogues with fellow participants (peer-learning).

As the pedagogical approach is problem-based Learning (PBL), an internationally recognised method of active learning through problem solving. Key components also include

- Flexible knowledge
- Self-directed learning
- Intrinsic motivation
- Collaborative skills

More than half the programme content is project work (35 ECTS) and the other half is courses. This extensive amount of resources dedicated to project work allows the learners to in depth to identify, analyse and solve real-life problems, which might have been identified within the workplace of the learner or in collaboration with management or even problems of strategic relevance of the company. From a learning perspective the context of the problem has to be as authentic as possible and if the context is the learners' workplace – the criteria for relevance must be fulfilled.

#### 4. Case study The Netherlands

TU Delft acknowledges the doctorate as a key instrument to address the increasing complexity of society. Core of the PhD programme is the PhD candidate's research project. This is supported by a supervisory team, PhD mentor, progress meetings and the Doctoral Education programme. A full-time PhD research project usually takes 4 years. In order to stay on track each PhD candidate has several mandatory progress and evaluation meetings with his or her supervisory team. During the PhD project PhD candidates will not only focus on their research, but also on personal and professional development. This development is mainly obtained through Doctoral Education. In the Doctoral Education programme each PhD candidate is required to take part in courses which support the development of their knowledge in the field of their specific research, as well as courses in personal- and professional development. [9]

However, although the theses of contract PhDs must meet the same requirements as the fulltime employed PhD candidates at TU Delft, this format of a PhD programme is not eligible for contract PhDs. The Delta Infrastructures & Mobility Initiative (DIMI) and Delft Energy Initiative (DEI) at TU Delft have launched a pilot for a collaborative PhD track within the

graduate school for contract PhD candidates. The collaborative PhD tracks contain a preparatory phase in which the candidate discover what a PhD trajectory requires, what the differences are between the world of practice and that of science. Furthermore, a company supervisor will be added to the guidance team, next to usually two supervisors from the university, one of which is the promotor and the other usually is the daily supervisor. The company supervisor will in particular support the application of the results in practice. Furthermore, time allocation, funding and intellectual property rights should be discussed before starting a PhD track. Finally, once started, the focus of contract PhDs is much more on research related skills (such as Research Design, How to make a questionnaire, discovering statistics etc.) than on transferable skills for personal development. [10]

## 5. Conclusions

Similar to all of these programmes in three different universities is that they take the content and purpose of the learning from real working life needs combined with individual motivation. However the pedagogical angle to the studies might be different. Furthermore strong support and coaching both from the employer side and university side enables students to carry out the studies within the expected timeframe.

The 60 ECTS study programme organised in a timeframe of mostly 3 semesters are possible to complete due to the convergence with the students every-day work, the aim is that the student should be able to include tasks from their work-life into the education, which can be time-saving for the student since the task also is part of his/her work. Also this close relation to the students' work gives birth to work related benefits, which to some students are the motivations for the study.

During the studies students are encouraged to form groups to work on assignments and projects that in long term can create valuable relationships and professional networks which can be very usable e.g. in regard to the learners long-term career planning. Also the study brings along the possibility for university academic and professionals establish long-term relations shops, which can bridge the gab between universities and companies. In best case even some people from the university and some from the companies might join.

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