

FACULTY READINESS FOR DEFINING AND FACILITATING CEE

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In this paper we discuss the new demands put on university faculty for involvement in delivery of Continuing Engineering Education. CEE programmes are often composed in the same way as on-campus programmes – which means straight forward for teachers to conduct. However, the needs for new knowledge and new competencies in small and medium sized enterprises and for teams in larger enterprises are very often not covered by such academic defined courses. The need for tailor-made programmes is increasing. This is a new situation for university faculty, and we conclude in this paper, that faculty training needs to be prepared for the future involvement in research based knowledge transfer.

Introduction

We talk about “program development” and “CEE learning programs” followed by individual learners. The outcome obtained by the learners will be new knowledge; they learn new theories and methodologies – and they will earn some credits or perhaps another Degree. This is the traditional straight forward way for university faculty to share their knowledge with industrial learners.

However, to meet the needs of small and medium sized enterprises – or to meet the needs of teams in larger companies, we must focus more and more on developing learning programmes based on company needs and not just individual needs, and we must focus more on the company need for new **competencies/skills** – based on new **knowledge**.

This means that we have to operate on a more ad hoc basis, and it means that faculty must be able to listen to and understand what they need out there. This is a very difficult task, as faculty and industry normally do not share the same language. We communicate in terms of theories and methodologies – they ask for tools and solutions. Experienced engineers as learners are quite different from on-campus full-time students. Also, faculty has to learn to act more as a facilitator for the learning process and less as a lecturer.

Therefore, a question may arise: Do we need a “Faculty training program” – to train faculty in understanding the target group, understand the industrial context, understand that it is another teaching and learning situation, understand the importance of flexibility.

How can we support faculty in developing CEE with content defined from company needs and how does this differ from CEE with academic defined content?

How do we understand the difference between CEE programmes with the purpose of earning academic credits and programmes aiming at improving the company based competencies?

What is Continuing Professional Development

“CPD (Continuing Professional Development) is quite simply a means of supporting people in the workplace to understand more about the environment in which they work, the job they do and how to perform it better. It is an ongoing process throughout our working lives. ----- we encourage individuals to consider CPD as an essential part of modern working life – a means of managing and developing their careers over the course of a lifetime.” [1]. Continuing Pro-

Professional Development (CPD) is about continuously updating professional knowledge, personal skills and competencies [2].

How does this continuously updating take place – is it “Back to School again” or will it be built on more work-place based learning activities?

Most course providers, private as well as university based, are offering a number of short courses. The courses will often be offered for individual enrolment. “Each year we offer 4,500 courses and programs, linking 65,000 adults of diverse backgrounds to enhanced career, academic, and personal growth opportunities through lifelong learning” [3]. This is the straight forward way for university faculty to offer lifelong learning. The courses may even be the same courses, as full-time students are following on-campus. Course content will be planned by the professor, based on his research, his experience with courses within this field and with his feeling of what is needed in industry. Courses will often be valued with credits to give the learners the opportunity to collect credits.

Such courses will be offered to individuals, engineers who either want to earn credits, want to be better at their job, or who want to improve their career and perhaps prepare for another job. However, courses will also be prepared and offered for company based lecturing, which gives opportunities for the professor to go deeper into application details with relevance for the specific company. Such courses will be customized to some extent, but normally with take-off in a predefined academic course.

One more viewing point to CPD is the individual one. Is it possible for a person to develop his’ or her whole career despite the priorities outlined by an employer? Even in those situations where the individual is not actively in the working life, such as on maternity leave or in unemployment.

Individual or organisational focus

Experience with customized and especially tailor-made courses has clearly indicated that very often it is difficult to specify an enterprise’s competencies needs. The difficulties lie partly in the lack of strategic focus on competence development, and partly, in the lack of methodologies for collaboration on how competencies are made explicit in order to be described and further developed into courses. We can distinguish between customized and tailor-made courses.

To customize a course is a relative simple process for both the course provider and the enterprise. The course will often be put together from already existing course elements and the enterprises only have to make some choices or add a few wishes. But if the course has to be tailor-made and match a strategic goal as well as preferences of the individual learners, a thorough dialogue is required among the enterprise, learner and the course provider. In tailor-made courses the collaboration process is indispensable, as this is the seeds for the success of the course [4].

Open courses with individual enrolment are relative straight forward for professors to plan. They define the learning objective, the learning content and the learning method, and they define the time schedule. Such courses with an academic defined content will often be followed to improve the personal CV.

Tailor-made courses will normally not be taken for CV improvement but to improve the skills needed in the work-place. The learning objectives will be specified based on identified needs at the work-place. The identification of new competence needs can be a very difficult process. For big companies with a clear strategy for the company development this will include a plan for how to develop the company based competencies. But for small and medium sized enterprises (SME’s) it can be very difficult to define what they do not know! SME’s will often at management level express their needs in terms of products. Engineers will express the needs in terms of tools and solutions, but the university professors will talk in terms of theories and methodologies. This “language problem” must be solved as one of the first steps in the process identifying

the needs for new competencies and transforming these needs into a specification of learning objectives, the basic elements for the course description.

Barriers against CPD

Different barriers against the process of running CPD programmes exist on both sides. First of all time is a problem. Open courses with individual enrolment might be running at a “bad time” from a potential participants point of view. In a busy engineers working life it will often be very difficult to find the time for following such courses – including giving enough priority to prepare for the course and go through the reflection phase after the course to be able to apply the newly acquired knowledge in the working tasks.

Courses defined by university professors will seen from a SME, often be too academic and too general. SME’s and their engineering staff are looking for courses that fit very tight to their situation. If only a minor percentage of the course content is direct useful for the engineer, the course will be considered too expensive by comparing the benefit with spend time, course cost, travel cost and perhaps accommodation cost. For such engineers tailor-made courses integrated into their engineering tasks will be a relevant alternative.

In general university teachers are reluctant to get involved in conducting CPD courses of any kind. University teachers are supposed to conduct research and teach on-campus students – CPD is considered as extra work. Big enterprises (potential research cooperation) might be attractive for professors to get involved with, but SME’s will for most professors by definition not be interesting. This barrier is also very important to deal with. On the contrary, in the area of SME’s, the Universities of Applied Sciences might easier play a more natural role when it comes to conducting research on the SME field. This comes from the distinction between the two university types that Universities of Applied Sciences are not supposed to conduct scientific research rather than to applied R&D.

Faculty readiness

Short courses are more or less straight forward to define, plan and implement for individual industrial participants. In this situation the professor lecturing the course will be in the situation that it is his course, and the participants might even have chosen the course because of the professor. This supports the teacher’s good reputation. The only problem might be whether the professor is able to go into specific dialog with the participants and discussing the topic with take off in the engineers work tasks and daily engineering challenges?

In defining and planning tailor-made courses we can add quite a number of new problems for the academic teacher:

- ◇ How do we solve the “language problem” and come to a common understanding?
- ◇ Can the teacher conduct the process from identified needs to specification of learning objectives?
- ◇ Can the teacher assess the learner’s prior knowledge to define the right professional level of the course?
- ◇ How do we handle the problem of professional diversity in the learning teams?
- ◇ Does the teacher understand the world that the enterprise is operating in, i.e. external conditions, the competition, subcontracting issues, stakeholders’ interests etc?
- ◇ What does academic pride mean for the professor; can he accept to plan and facilitate a learning process which is more focussed on application than on academic issues?
- ◇ Will the professor be ready for dynamic change of the content and time schedule in the learning process according to the changing conditions for the learner?
- ◇ Will he be ready to go into an open dialog on professional issues including application of theories, or will he need to “prepare before the lecturing”?

- ◇ Is the teacher open for continuous personal improvement? Readiness for development according to the customer and peer feedback.
- ◇ Are the teaching staffs ready to adopt new learning methods?

These are some of the important questions that must be answered to ensure that university teachers are prepared for dynamic involvement with CPD for SME's.

Facilitated Work Based Learning

At Aalborg University we will prepare a "Teacher Training Programme" in the coming year to assist the teachers who are going to be involved in CPD with focus on tailor-made learning processes. Since 2001 we have been working on a new methodology to facilitate research based knowledge transfer to engineers in industry and also facilitate the process of applying this new knowledge in their engineering tasks. This methodology is named Facilitated Work Based Learning (FWBL), based on experiences from Work Based Learning and from on-campus Problem Based Learning [5]. Experiences from delivering tailor-made CEE based on FWBL to almost 100 small and medium sized enterprises tells us, that this is a very difficult task for many university faculty.

Change Laboratory as a Tool for Rising Faculty Readiness

Need for rising faculty readiness for new ways of CPD have turned out to be evident in EVTEK University of Applied Sciences. As EVTEK will be merged with Stadia Polytechnic in order to create Helsinki Metropolia University of Applied Sciences August the 1st this year, the atmosphere for renewing even the CPD strategy is excellent. The willingness for finding different ways of planning and conducting courses for CPD has risen in the light of the feedback collected from the learners and other stakeholders. The need for change concerns contents, learning/teaching styles, and timing/organising of the education. In the whole, the deeper understanding of the needs of customer and direct usability of the gained learning leads to renew the process of running CPD. The tool for developing the process and the personnel is called Change Laboratory.

In EVTEK case several steps have been carried out for responding to the real needs, developing project based CPD. Firstly, the program leaders have advisory boards to collect information from the industry. Secondly, the program leaders have close contacts and pay several visits to the main customer organisations. In many cases several EVTEK's graduates are working in those organisations. Thirdly, many visiting teachers run the courses. And fourthly, the teachers can participate in their own Teacher Training CPD program.

Moreover, it has been planned that in the teachers CPD program the methods of "change laboratory" will be used. That is a way of adapting the dialogical approach to learning, which is an emerging new paradigm widening the focus from individual work ("monological", within mind) via participation ("dialogical", interactive) to approaches by emphasizing the importance of processes where learners focus on collaborative, long-term efforts for developing authentic shared objects [6]. The shared objects can either be concrete or conceptual artefacts, such as concepts, plans, products, or social practices. Within the dialogical approach, also individually performed activities and social interaction serve the sustained processes of developing some concrete, shared objects collaboratively for subsequent use.

Change Laboratory is a method for exploring and initiating developing work practices by the practitioners together with the interventionist-researchers [7]. The central tool of traditional Change Laboratory is the 3x3 set of surfaces representing the work activity (see Figure 1). The dimensions of the surface are: vision/model, ideas and the mirror materials, all of them reflected to the past, present and future.

	vision/model	ideas	mirror materials
past			
present			
future			

Figure 1: The Change Laboratory work surface

Several technology based tools are under development for supporting the process, although this process can also be conducted with traditional methods.

The flow of the method is a continuous move from a box to another, by collecting existing materials, facts, documents, videos and so on to the mirror area. The new ideas are allowed to come, and added to the “living area” of ideas. Accordingly, new visions and build models for testing are created. Also, the evaluation of the experiences for the future work is essential.

In EVTEK’s teachers development program the participants are creating a new vision of the project based learning concept, and practical tools to conduct it. In this changing lab “every day” challenges are combined with the strategy level planning to create a new entity. Especially in this merge situation the method has run successfully in combining the adult education staff in both of the universities, analyzing the best practices and worse challenges from the past. Also, it has developed a strategy for adult education and working-life relationships for the new organization in a shared learning process.

Further on, the same method will be used in teaching the main teachers to be able to make the developed strategy work in practice by designing and running adult education. This will be achieved by using projects and R&D work as teaching methods.

In the Change Lab, the participants are the core experts, researchers and developers of their own work. This method supports the participants to see the teaching in a fresh context. In practice they study the formerly used teaching practices and tools for clearer identification of the contradictions, and structure them for finding innovative solutions.

What comes to the Change Lab work, the participants form a natural team sharing an interest for the result. In our example 10 persons were chosen from different aspects and relationship of adult education. The work is divided into three phases: analysis, planning and experiment/testing. The whole cycle of the teachers’ learning process takes around 10 weeks with its weekly half a day long session.

The core of the work is the material collected to the mirror. In the very beginning everyone brings the easily reached material, but between the meetings the participants are expected to collect more material. The material will be collected from different carefully chosen sources and persons, as it should cover all the relevant knowledge yet not expanding too much.

The first outcome of the method was a realistic and shared description of the existing status situation in both of the Universities. The new ideas created simultaneously, as a spin-off, were collected in the table’s idea section. The ideas of the idea section were further developed and placed to the section of visions and models. Finally, after the models were built, they were tested and analyzed which work is still going on.

From the key persons Change Laboratory process came out for the future guidelines such as: First of all, the whole setup is heavily depended on the expected learning outcome, were it needed, wanted or expected. The outcome should consist of capabilities to solve problems

jointly with colleagues, although some technical issues may as well be listed as learning objectives. Changing the information of the technical issues to engineering knowledge is a question of finding the practical adaptation, and furthermore, learning to pay an eye to the whole context of the application. In many cases, even a change in behaviour is required.

Secondly, teaching in the context of real working life projects and workplaces seems to be an effective way of developing the right type of learning. Though, this requires new pedagogical skills from the teacher, whose role evolves towards one of a coach or a mentor.

Finally, timing of the courses is valued as important in CPD – the learning has to correspond with the work situations. Sometimes learners can use much time for CPD, as the new issues are fundamental; sometimes they have to concentrate on other things. In some cases an intensive week is needed; in some other half a year with a lesson every week. This results as a tremendous need for flexibility from the part of CPD.

The aim of this teachers' CPD program, or should we call it a CPD process, is to combine the existing expertise of pedagogic and professional knowledge to the new forms of conducting courses. This is, in the same way than the CDIO, PBL (problem based learning) and WBL (work based learning) are used to create the EVTEK's own way of forming and realization of learning. The results are planned to be spread by starting to expand the learning amongst the teachers even in "grass root level" with the same Change Laboratory method.

Conclusions

After graduation most engineers will feel that they do not need to consult their professors for more research based learning in near future – now they need to confront their academic knowledge from university studies with reality – how can this knowledge be applied to real-life engineering problem solving? In many cases they however soon realise that their knowledge does not cover everything – they might move into another professional specialisation, they might need some knowledge about a neighbouring professional area – or they simply realise that new developments has occurred without they really noticed. The strategic plans for the product development in their company may also change according to changes in the market and pushed by the global competition.

The question for these engineers however is: can I just go back to school and take another course given by the well reputed professor? Will he understand my world as an engineering practitioner, or will he just continue to tell more academic stories?

We conclude that the situation with lifelong learning is putting a huge demand on knowledge providers like university and university professors. The demand is however very different from traditional university activity, and to make success the professors must be prepared for the situation, and we believe that teacher training programmes should be considered.

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Curriculum Vitae

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