Recognising Work Based Lifelong Learning

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INTRODUCTION

On-the-job Learning, Workplace Learning or Work Based Learning are considered to cover a significant part of lifelong learning for an engineer. However, in many cases the learning and competences so gained are hardly recognised. Through case examples from two Finnish Universities, in this paper we will present experiences and suggestions as to how the universities could encourage continuous competence development at work by accreditation towards certificates, diplomas and degrees.

1   BAGROUND AND OBJECTIVES

Workplace Learning has been recognised and is embedded into vocational training. In higher education this is not the case and the situation sometimes is even contradictory. Universities are blamed for not providing their students with skills usable in working life and thus especially the engineering universities are trying to develop work based assignments or real-life projects into their learning methods. Yet at the same time, if students like to bring learning outcomes from their own work experience into the curriculum, they hardly get accepted.

Metropolia University of Applied Sciences is offering bachelor programs of engineering as evening studies. These studies are oriented towards adults who are working during the daytime. The curriculum is as broad as it is for the full-time students (240 ECTS), yet the time taken to execute the full programme, 4 years, is the same for both of these student groups. To make this possible, several attempts to capitalise on projects encountered in daily work have been used. This same challenge is faced in the one-year master's programs.

The professional development departments of universities, such as Aalto Pro at Aalto University, target their services mainly towards professionals working full time. Most of the continuing education and professional development programmes are designed to schedule part of the learning to take place at the student's own workplace, utilising the job as source for learning. This could form the majority of the programme, for example in so-called "academic apprenticeships" or through the Recognition of Prior Learning (RPL). If the programmes are tailored to specific organisations, it is almost mandatory that the learning is implemented on-the-job, as learning assignments or as development projects that benefit the employing organisation.

How do we define the workplace and jobs as an environment for academic or professional learning? How can this be applied for unemployed persons? How should the constant changes and developments of workplaces and jobs be taken into account? How do we measure the learning outcome instead of the learning effort? What does this require from the bodies, who are supporting and accrediting work based learning? How flexibly can universities accept the diversity of the assignments inside one programme? How should course fees be defined, if only evaluation of individual learning has taken place in the university? How can universities ensure that learners have met the promised requirements of the programme - can the programme be certified?

The objective of this paper is to open up the previous considerations through case examples and to share some answers to these questions based on our experiences.

2   WORK INVOLVEMENT IN DEGREE PROGRAMMES: CASE METROPOLIA

One way Metropolia is trying to meet the requirements of lifelong learning is to offer bachelor of electrical engineering programs (240 ECTS) for full time students during usual office hours and for part time students in the evenings. Mostly the evening class students are working full time during the days. Most of them have some professional education, typically technician, and several years of work experience already. Majority of the full time students are new graduates from secondary high school.

2.1 Pedagogical frame

In all of these degree programs the CDIO (Conceive, Design, Implement, Operate) model [1] is combined with work based learning, project based learning or problem based learning [2]. The day-time courses have more contact hours and less student involvement with working life. This leads to projects which are executed mostly as teamwork with other students during the first year introductory course [3] and during 3rd year using topics suggested by industry. In comparison the evening classes are mostly using projects where the student is part of a team in the workplace. In this case the working environment forms the platform in which the student is responsible to find a project suitable for use as an assignment.

In each of these cases it is essential to define the learning outcomes and a way to measure and evaluate them. When the contents of the project are defined by the industry, the learning outcomes vary very much from project to project. As this may apply to the technical skills, the learning outcomes for other skills and competences might be more easily defined [4].

In Metropolia all the engineering programmes include bachelor thesis work (worth 15 ECTS) during the final stages of the studies. This assignment is based mainly on the student's work in industry. The aim is to gain detailed and deep competences from

the student's specialisation area and sum up what is learned during the studies. The thesis work is usually an individually written report of the technical work done in a team with individual responsibilities. Half of the thesis work covers the practical side and half the research and reporting.

This kind of thesis work is nothing new in Finnish engineering education. On the contrary that has remained approximately in the same form for several decades. However the pathways for developing the required competences have become more flexible, but remain structured and based on evidence. The evening course includes additional workplace projects during every other term. These projects are each worth 6 ECTS. The daytime course includes an introductory project and an "innovation project" in addition to several special assignments.

2.2 Learning outcomes

These project courses have several learning outcomes which can be evaluated: creativity, innovativeness, responsibility, ethics, shared expertise, cross cultural skills, search and analysis skills, business and entrepreneurial skills and project management; just to mention some in addition to the discipline specific engineering skills.

The measurement and evaluation method and the level of learning outcomes needs to be considered and defined in each case. Guided self-evaluation is one option: When the course is starting a discussion with the workplace management and the student should be conducted to find out the requirements of the project and the existing level of the student(s). In that discussion the targets and checkpoints should be set. The evaluation may be enhanced by evaluation from both peer students and supervisor.

In our case it is the supervisor evaluation that is used mostly. Additionally to that another student or a group of students is asked to act as opponents. There are two reasons for this firstly to received peer evaluation and secondly to get the experience of evaluating others. By these different evaluations students should learn the art of questioning and expressing uncertainty - and widening their area of experience.

2.3 Findings from the learning in workplace

Analysing this year's results from these courses, students have found many advantages for them:
- the connection between real work and studies,
- interesting projects,
- alternative and different ways of learning other than lectures and examinations,
- flexibility in scheduling,
- learning of competencies that might not be learnt in other ways,
- possibility to earn money whilst studying in parallel.

But there also doubts about the method:
- questioning why there can't be clear guidance as to what to do,
- the challenge of keeping the group together and managing it,
- challenge to get the instructions from different parties,
- sometimes the aims of the project change too easily and regularly

From the side of the university:
- How to make sure the defined learning outcomes are reached, the academic responsibility?

- How to find relevant projects in time?
- How to get all the parties committed to the schedule and outcomes?
- How to keep the tutoring at right level - by letting them work independently but still making sure that the job is finalized in time and in acceptable level?

Observations from the employers of the students:
- With an employed worker, the project studies should follow the needs of the employer - university needs to be flexible for the changes of schedule and subject
- From the projects, only the time used for the applicable work should be done during paid hours - the additional work for assignments should be done within the student's own time
- It is hard to define the projects well in advance, much tutoring from the customer's side is needed, if real benefit of the projects is expected

Another challenge is when the evening course student is working in a totally different field, or if student is unemployed. In these cases a project topic will be defined by students own interest or free-time activities. Examples of successful projects have been "design and build lightening system for the garden of mother-in-law" or "plan and rebuilt one´s own kitchen". In these cases the customer will be for example the family member or friend. The role of student opponent is then more important than in industrial projects.

Literature surveys alone are not preferred, as these would not differ enough from the other learning at the university. Also the project plan including schedule, budgeting, and evaluation plan and risk analysis would be too much "an academic trial" and the final report would not be explaining the success of the project, but would be more the content of the substance.

The students are easily driven out of their "comfort zone" with the learning when it is happening in the workplace. Students are used to having materials listed and guidance given. They feel their job is to learn by following the instructions. In the work place learning happens in real jobs. In projects for real customers the learning happens in team works with other students. In these cases there is nobody who knows the "correct answers" in advance. On the other hand, each of the customers or work places has their own expectations and forms of work, which need to be followed. Thus guidance cannot take place in the same way as in traditional courses.

3   RECOGNISING EXPERTISE AT WORK, CASE AALTO UNIVERSITY

3.1 Combining university continuing education and working life at Aalto University

Continuing education activities at Aalto University serve as an important intermediary between university research and working life. Interesting career opportunities and satisfying tasks are more often available to those professionals who update their professional competence on a continuous basis. However, the hectic pace of working life set limits to the possibilities to participate in continuing education. Thus there is a call for changes in the availability, methods and financing of adult higher education programs.

Aalto among other universities started to find a solution to this situation in collaboration with all key stakeholders: industry, policymakers and education

providers. Aalto University started to develop continuing education programmes, which take into consideration work-based learning, recognise prior learning and accredit those as a part of the programme. Due to this development, we have introduced a new professional degree to the degree system in Finland, which is called Professional Diploma, a minimum 30 ECTS credit unit programme consisting of formal studies and non-formal learning. The curricula of these diplomas are based on the demand for skills and competences needed in working life. From the individual´s point of view, these programs can be used as professional or personal development in different kinds of career-situations [5].

3.2 Energy Efficiency Expert – "academic apprenticeship" programme

The Energy Efficiency Expert programme is a novel model of learning through work developed by Aalto PRO of Aalto University, Tampere University of Technology and Lappeenranta University of Technology. The Energy Efficiency Expert programme is funded by the Ministry of Education and Culture.

The aim of the programme is to enable work-based learning and to provide the participants with broad-based, highly specialised knowledge and skills in energy efficiency. It is specifically oriented in its applications to meet the needs of both industry and the consulting and planning agencies serving industry. The participant plays an active part in the programme, directing his or her own learning process by making use of the methods, experts and tools provided.

Implementation of the programme

The programme is implemented in the form of multi-modal studies, developed around the goal of improving not only the individual, but also the employer organisation, by means of a development project. The implementation is supported by information provided in class, themed assignments, peer group work, keeping contact and meeting with the advisors, and self-study of, for instance, literature, research results and other information sources related to the topic. The participant designs his/her own personal development and learning plan. This plan is carried out with the support of mentor at the work place, academic tutor from the university and a study advisor from Aalto PRO.

The extent of the programme is 30 ECTS, which is equal to approximately 800 hours of study. The student workload during the programme is divided on average as follows:

Study attainments of the programme	Extent (hours of study)
Classes, assignments	160
Independent information search and self-study	240
Development project, learning diary, contact with advisors, peer group work, preparing a portfolio	400

Certification

At start the participant, his or her employer and the university sign a contract to commit to the one-year programme. When the participant passes all the elements of the programme he or she gets a certificate from the University. (The aim is to provide a Professional Diploma in the future). The cognitive and practical competence is evaluated through a 'Portfolio'. This Portfolio contains relevant parts of the personal development plan and work-related development project plan, demonstrations of skill in the development project, thematic assignments, list and description of references used for the learning, relevant extracts from the learning diary, peer-group reports and report of analysis of the self-study.

The assessment of learning is done by the work place mentor together with the university tutor and it is based on an assessment matrix. The following areas are assessed: mastery of whole, multidisciplinary and diversity, managing change, knowledge of technological solutions, implementation, deepening the expertise taking into account the workplace needs, structuring the portfolio, analysis reports, use of references and demonstrations of skill. The participant either passes or has to improve his/her results. If the participant has not completed the development project in time, but has participated into seminars and completed the assignments he or she receives a certificate of participation [6].

The structure and process of study with different methods is seen in the figure 1 below
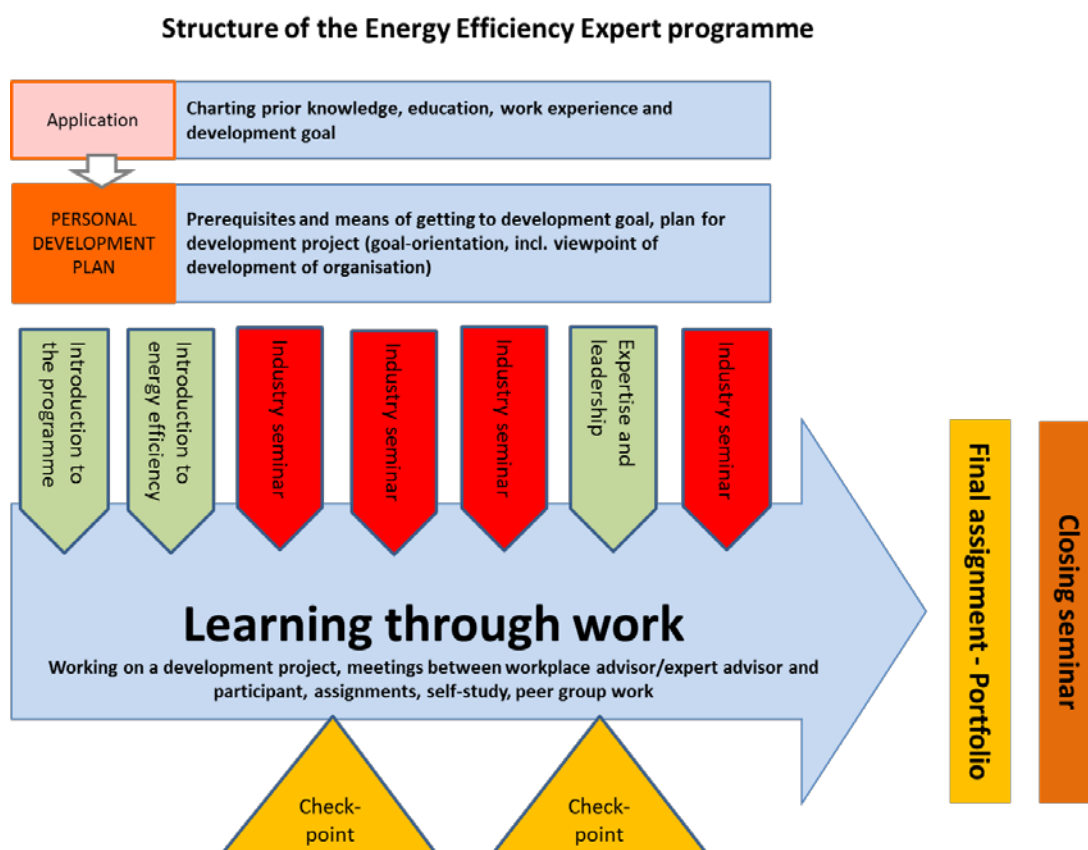

Fig 1. Structure of the Energy Efficiency Expert programme

The feedback for the programme has been positive. Even though the possibility to "Learn through work" was the key positive thing, the most valued element in studies is the peer group support. This is an interesting observation, considering that the participants have mentor, tutor and study advisor to support them. The possibility to share concrete problems and findings with peers working with same challenges seems to be important. Perhaps the working with just with one's own project and using it as the core element in learning sometimes leaves you too alone and isolated with the problems to be solved as vehicles for learning.

4   CONCLUSIONS

The latest international trends in lifelong learning seem to combine the formal, non-formal and informal education in degree programmes as well as in professional and expertise development. There are already some indications that the latter two are starting to get greater recognition in the formal education sphere [7].
Typically the modern way of competence development can be characterised by including many different features. Firstly learning is defined broadly, covering formal, non-formal and informal learning in every phase of the professional career. Secondly learning is seen as innovative and creating something new rather than a reproductive activity. Furthermore, learning and competence development are social and networked activities rather than an individual one. These different forms of learning need greater emphasis on tutoring than on teaching though the study path [8].

Cooperation between education and working life is in the key role in developing well functional educational models. Competence development is seen as a lifelong process, where movement takes place vertically as well as horizontally (deepening one's own core expertise and widening the competence to new areas)

This trend has also affected Finnish universities. As part of the renovation of adult education in Finland in 2010 the Ministry of Education started to encourage and promote cooperation in accredited learning between academia and working life also in higher education [9].

Further discussion is needed about the financing of education and the tuition fees of courses when much of the ECTS's are gain by flexible ways. To carry the responsibility of the quality of the learning outcomes by university requires expertise and resources. Clearly that task is much easier if the students receive the same package and exam than when individual learning is accredited.

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