

A new model for continuous education in Engineering

The University of Minho approach

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Introduction

Engineering education at the start of the new millennium faces important challenges that are closely linked to the quick evolution of technologies, the development of new materials, and the growing mobility of the employment market. This new scenario imposes the need for continuous personal and professional evolution of Engineering graduates to remain competent and competitive.

The School of Engineering having a long experience of offering ‘traditional’ post graduation education and hosting ‘conventional’ short courses for Industry felt that a new approach was urgently needed to give an effective answer to the educational needs of the industrial sector. Engineering graduates get increasingly involved into professional activity and thus, their availability for traditional courses based on regular weekly timetables is smaller. Furthermore progression in their career brings about the need for education in areas not covered in basic undergraduate courses.

The Portuguese professional Institution of Engineers debated a new approach to continuous education in Engineering with the University of Minho, and a general background was laid in a paper by Barros [1].

Programme structure

The model now envisaged at the University of Minho aims at the definition of a Post graduation Continuous Education scheme that is structured as programmes scientifically supervised by the University. These programmes aim not only to the academic upgrading but also to the professional improvement that will be recognised by the work market and by the Professional Institution of Engineers.

A Post graduation Continuous Education Programme is defined as a set of actions / activities to be developed by the trainee over a period not less than 3 years, which will be chosen from a number of options including:

- a) Short courses at post graduated level with a pre-defined length.
- b) Training periods in the company.
- c) Attendance of conferences and / or workshops.

- d) Delivery of training courses in the company.
- e) Authorship of papers for conferences or journals
- f) Design activity.
- g) ...

Model advantages

It is believed that this model will enable

- a) The introduction of a innovative way for qualified professional improvement, at post-graduation level, adjusted to the concept of *long life learning* [2]
- b) A new image for the post-graduation education, more flexible and more adjusted to the changing market, different from the conventional master courses or weekend short courses.
- c) The reinforcement of the responsibility and competencies of the Professional Body (in the Portuguese case the *Ordem dos Engenheiros*). This is achieved with the monitoring and accreditation of the programme activities, and with the consequent recognition and awarding of an associated level of professional competency.
- d) The association to the Continuous Education of an added value, both in academic as in professional grounds.

Addressed issues

Launching this new concept of **Post graduation Continuous Education Programme** brings about some practical difficulties resulting from the existing legal framework for post-graduation education and a non-existing practice of post-graduation activities accreditation by the professional body.

In Portugal this approach to post-graduate continuous education raises some issues that are being currently addressed:

- The recognition by the Academic authorities of the opportunity and relevance of developing **Post graduation Continuous Education Programmes**.
- The acceptance of the concept of **creditation** associated to the skills and knowledge that will be acquired outside a regular formal post-graduation course. It is already foreseen that this creditation will be a specific competence of the School Scientific Council. This concept will enable graduates taking a Post graduation Continuous Education Programme to enrol later on in

a formal post graduation course, therefore getting access to a higher education degree. This concept will widen the opportunities for higher continuous education.

- The formal **accreditation** of the Post graduation Continuous Education Programmes by the professional body (Ordem dos Engenheiros).
- The possibility for 3-4 year engineers (bachelor degree holders) to access post graduate education. This access is not yet possible in Portugal, because legislation restrains such access to 5-year engineers (licenciante degree holders). This issue is not yet settled in the European Union, but the increasing number of bachelor degree holders that are denied direct access to post graduate education irrespectively of their professional curriculum makes it a priority.

Implementing the model

At present, the School of Engineering is developing two Post graduation Continuous Education Programmes in the fields of Computing / Informatics and Polymer Engineering.

An overall view of the model is shown in the figure.

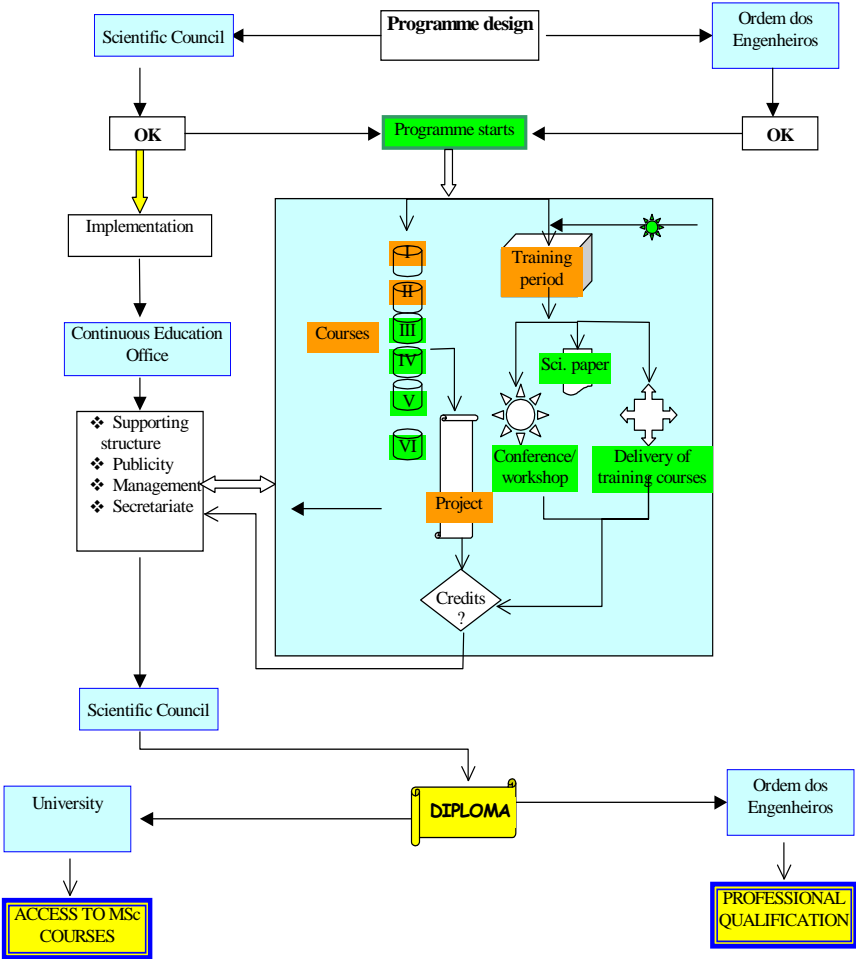
The implementation of the model requires not only the direct involvement of specialists delivering the subjects that make up a programme, but also of several bodies, namely:

- The **Scientific Council** of the School of Engineering that will validate the scientific and academic level of the programme, and will award the final diploma.
- The **Continuous Education Office** that will be in charge of the whole logistics of the course delivery. This Office is seen as independent from the normal academic structure of the University.
- The **Ordem dos Engenheiros**, the Portuguese Professional Institution of Engineers, that will state the accreditation of programmes and that will recognise the diploma issued by the University.

Concluding remarks

It is worthwhile, as a concluding note, to summarise the three major points that contribute to the consistency of the adopted model: first, the **professional** soundness of the programme which is granted by the accreditation given by the Professional Institution of Engineers; second, the **scientific** value of the

programme that is conferred by the Scientific Council of the University School that will credit the learning process towards a further standard post graduation degree; and third, the **management structure** supported by non-academics who, in principle, will have a better awareness of the culture of the trainees coming from an Industrial environment.



References

[1] Barros, A.S., A Formação Contínua no Exercício da Engenharia, Ingenium, March, p34-37, 1999
 [2] Lifelong Learning in Engineering Education: a Call to Action, SEFI Document nº 20, May 1998.