

Programme accreditation and institutional review: both necessary for assuring quality of technical higher education

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Abstract: Everybody would agree that Quality Assurance and accreditation have become widespread practices in higher education throughout the world, but in “accrediting” engineering education several approaches are possible, that may involve the very definition and significance of the word. This lecture will discuss “programme” and “institutional” accreditation, and maintain that the two are not in contrast, but on the contrary can usefully complement each other. In particular, “programme accreditation” is essential for all “professional” disciplines that - like engineering - involve public safety and in several countries require a “licence” to practice. A brief review of the EUR-ACE accreditation system of engineering programmes at the Bachelor and Master levels, run by ENAE, concludes the lecture.

Introduction

One of the main and most positive achievements of the “Bologna process” has been the development of specific Quality Assurance (QA)¹ procedures for Higher Education (HE) and their rapid and widespread diffusion. The “Standards and Guidelines for Quality Assurance in the European Higher Education Area”, briefly known as “ESG” (ENQA, 2009), were officially endorsed by the HE Ministers meeting in Bergen in 2005 and have completely replaced the ISO Standards in the QA of HE programmes (although these are still occasionally used in the evaluation of HE managerial structures). The implementation of QA practices throughout the EHEA² has been strongly encouraged, and in almost every country a QA Agency has by now been established; the “European Register of Quality Assurance Agencies” (EQAR, 2010) has also been created.

This has led also to reconsider the role and practice of “accreditation”.

1. Accreditation: background and definitions

Nowadays, “accreditation” is a much used word that however has several similar but not identical meanings, and therefore needs to be appropriately defined.

Most of the QA Agencies operating in Europe (including the 24 listed in the EQAR) are “general Agencies”, i.e. deal with all disciplines (and some even with all levels of education, from primary to tertiary). In these cases, “accreditation” is either practically

¹ The acronyms used in the text (QA, HE, etc.) are defined the first time they appear.

² “European Higher Education Area”, comprising all EU countries plus 20 more (in total 47).

coincident with QA of the course provider Institution (“institutional accreditation”) or is an “official” or “para-official” certification authorizing the Institution to deliver courses and award degrees: indeed in many countries the word “accreditation” (or a similar-sounding one) has a “legal” value and is reserved to the use of governmental (or para-governmental) authorities. In either cases, this type of “accreditation” concerns much more the quality of the teaching/learning process, including the adequacy of staff and available facilities, than the “content” of the educational programmes.

On the other hand, “programme accreditation” (under different names) is a rather old practice in European HE, at least in engineering: as a matter of fact, the UK engineering Institutions started their activity, that included promotion of learning and evaluation of professional qualifications (a sort of “accreditation”), in the 1800s.

It is true that the word “*accreditation*” was accepted in the European usage only in the late 1990s, when it came from the USA where the “Accreditation Board for Engineering and Technology” (ABET) had been established in 1932 as “Engineers’ Council for Professional Development” (ECPD). However, in France, the CTI (“Commission des Titres d’Ingénieur”) was established by law already in 1934, with among its main missions to award the “habilitation” (indeed, the “accreditation”) to engineering programmes and HE Institutions.

At this point, let me recall the definition given in the EUR-ACE Framework Standards (ENAAE, 2008): “*Accreditation of an engineering educational programme is the primary result of a process used to ensure the suitability of that programme as the entry route to the engineering profession.*” In this definition, written for engineering but extendable to other professions by replacing the word “engineering”, “*accreditation*” is strictly related to a field-specific QA approach, in which the aims and contents of the educational programmes are specified, and combines assurance of “academic quality” with professional relevance. Therefore, it can neither be simply qualified as “academic accreditation” nor, on the other hand, as “professional accreditation”, because “academic education” may be not sufficient to be “licensed” for a profession (e.g., in several countries to be qualified as “engineer” a graduate of an accredited programme must fulfil further, more or less formalized “professional training” requirements, fixed by professional, not academic, organizations). In order to avoid confusions, “accreditation”, defined in this way, can be referred to as “pre-professional accreditation”.

2. “Meta-” and “sectoral” Qualification Frameworks.

The ESG refer to the “Qualification Framework for the European Higher Education Area” (QF-EHEA, 2005) developed within the Bologna Process: this, and the parallel “European Qualifications Framework for Lifelong Learning” (EQF-LLL, 2008) identify levels of qualifications, employing general Learning Outcomes (LO) descriptors without specifying nor referring or quoting specific subject areas: they can be defined “Qualifications Meta-Frameworks”.

Although the ESG and in general QA practices have done and are doing a great deal to improve the European HE systems (and the same is true on the global scale) the risk is unavoidable that the use of Meta-Frameworks only may lead to paying more attention to the “educational process” than to the “content” and “job relevance” of the education. That’s why “field-specific” approaches to QA, based on Learning Outcomes (LO) defined for more or less broad subject areas, are becoming recognized as relevant and essential, as confirmed by two documents pertaining to the 2009 Leuven Ministerial Conference, namely:

- i) In the “Background Paper” (Background, 2009), we can read: “...the relationship between qualifications frameworks and quality assurance is crucial. Work needs to be continued over the next few years, at national and institutional as well as at European and regional level, to improve the links and interaction between the work done on qualifications frameworks and on quality assurance, involving a broad range of relevant stakeholders... While learning outcomes have been generically defined for the degree structure [through] the ‘Dublin descriptors’, the key point is to further develop descriptors for subject specific knowledge, skills and competences. Since the start of the Bologna Process, higher education institutions and their academics have taken up the challenge to develop international descriptors and reference points for a growing number of subject areas. Initiatives in this direction ... are welcomed and need further encouragement; ... [it is true that] the establishment of too detailed subject specific descriptors could hinder the development of interdisciplinarity... however, shared subject descriptors are only to be seen as indicative for a kind of core curriculum, leaving still plenty of freedom for programme diversity. Common reference points could also be developed for an entire sector, which might lead to the definition of sectoral descriptors and the establishment of sectoral qualifications frameworks”.

ii) Also the final Communiqué (Leuven, 2009) promotes field-specific definitions of Learning Outcomes: "We reassert the importance of the teaching mission of higher education institutions and the necessity for ongoing curricular reform geared toward the development of learning outcomes... Academics, in close cooperation with student and employer representatives, will continue to develop learning outcomes and international reference points for a growing number of subject areas..."

In this context, several European organizations are developing competence profiles at disciplinary level and sets of Learning Outcomes defined for more or less broad subject areas (engineering, chemistry, informatics, geology,...), that have a number of characteristics and objectives in common: they intend to

- be widely applicable and inclusive, enabling eligibility of a wide range of possible approaches to higher education;
- handle the diversity of content of degree programmes;
- be relevant for academic study programmes leading to a First- (Bachelor) and/or to a Second-Cycle (Master) Degree;
- define appropriate qualifications as entry routes to the relevant profession;
- facilitate also accreditation of trans-national joint- and double-degree programmes.


Indeed, "field-specific" and "general" QA approaches lead naturally to "institutional" and "programme" accreditation respectively, but otherwise share most of their "technical" instruments and procedures: self evaluation reports, peer reviews, benchmarks vs. reference points, etc. The choice should never be "either - or", but how best to combine the two approaches in order to optimize the results while limiting the burden placed on the HE Institutions and their members.

3. "Institutional" vs. "programme" Accreditation.

A fair comparison of the two approaches is contained in the following slide, presented by the ENQA Vice-President Helka Kekäläinen at the Final Conference of the EUR-ACE SPREAD project (Brussels, 25/10/2010). I share most of the considerations contained in this slide, except that programme approaches imply "extra bureaucracy": indeed, the "licensing" procedures for professional practice do require anyway a sort of "professional accreditation" (that can be called differently) and the trick is to avoid duplications.

Also Prof. Howard Davies, speaking as representative of the "European University

Association” (EUA) at the same Conference, recognized that in QA procedures there is “no discontinuity between institutional and programmes levels, where both are consistent with ESG”, and programme approaches are “particularly relevant for disciplines relevant to public health and safety”.

|  EUROPEAN ASSOCIATION FOR QUALITY ASSURANCE IN HIGHER EDUCATION | |
|---|---|
| Institutional vs. Programme oriented approaches to QA* | |
| Institutional Approach <ul style="list-style-type: none"> • assesses the internal monitoring and quality assurance arrangements • Content of programmes are not thoroughly examined • allows for more flexibility in terms of structure, content and implementation of study programmes • emphasises the autonomy and the primary responsibility of the Institutions for their quality | Programme Approach <ul style="list-style-type: none"> • transversal comparison between subjects possible • better information about programmes offered, recognition of joint degrees • more resources needed (time and money), extra bureaucracy • limited effect in improving the institution’s management of teaching and learning quality |
| <small>*ENQA workshop report <i>Programme-oriented and institutional-oriented approaches to quality assurance: new developments and mixed approaches</i></small> | |

Summing up, I would say that “Institutional accreditation” is essential to guarantee the “quality” of the educational process, since only well-structured HE Institutions can provide reliable education; while “programme accreditation” is essential to assure “relevance for the job” besides “academic quality” of educational programmes.

Both approaches being relevant, it is however clear that field-specific QA approaches accentuate the need for aligning the goals of educational programmes with the expectations of the stakeholders, and underline that Higher Education institutions, while in principle autonomous, are nevertheless accountable to their constituents, which includes an obligation to demonstrate the “relevance” of their output. Thus, field-specific QA systems give credibility and concreteness to the whole “Bologna”/EHEA system. For the EU countries, this link to the relevant social and economical issue of employability is further stressed and strengthened by the “Directive for Recognition of Professional Qualifications” (EU, 2005).

4. The EUR-ACE exercise

EUR-ACE is a decentralized Europe-based accreditation system of educational programmes as entry route to the engineering profession (“pre-professional accreditation”): a common quality label (EUR-ACE® label) is awarded to programmes that satisfy a common basic set of standards (“EUR-ACE Framework Standards for the Accreditation of Engineering Programmes”: ENAEE, 2008) and are accredited by an Agency fulfilling appropriate Quality Assurance prescriptions, in particular the already quoted “European Standards and Guidelines for Quality Assurance in Higher Education” (ESG).

EUR-ACE is run by ENAEE, the European Network for Accreditation of Engineering Education, and obviously follows the “programme approach”. In fact, the ENAEE “General Policy” (ENAEE, 2009) clearly states:

“ENAEE strongly supports a field-specific approach and programme accreditation, considering it essential to fulfil the need of aligning the goals of educational programmes with the expectations of the relevant stakeholders and ensuring their relevance for the labour market.

Programme accreditation does not exclude institutional accreditation: on the contrary, it may become easier if an overall system of QA authorizes only quality HE Institutions to deliver academic degrees.”

The EUR-ACE Framework Standards provide a common reference framework serving as the basis for the award of the common European EUR-ACE quality label, and do not intend to substitute for national standards. Consequently, the EUR-ACE accreditation system is essentially a bottom-up system aiming at a “European Recognition of National Accreditations”: national (or possibly regional) agencies accredit the educational programmes, and ENAEE authorizes (“meta-accredits”) them to add the EUR-ACE label to their accreditation, after checking that their procedures and requirements satisfy the EUR-ACE Framework Standards (hence the ESG). Thus, the authority for accrediting remains with national bodies but by agreeing a pan-European meta-framework there is the opportunity to build up cross-border recognition.

In accord with the EUR-ACE Framework Standards and the European Qualification Frameworks, the EUR-ACE label distinguishes between First-Cycle (FC) and Second-Cycle (SC) degrees (sometimes referred to as “Bachelor” and “Master” degrees in engineering); the SC label is awarded also to degrees obtained via “Integrated

Programmes” (i.e. “long-cycle” programmes leading directly to a Second-Cycle degree). Consequently, the authorization (“*meta-accreditation*”) specifies if the Agency is authorized to deliver FC and/or SC labels. Each EUR-ACE label is awarded to a specific programme by means of a certificate signed by the ENAEE President and by an official of the Accrediting Agency. The graduates of an EUR-ACE-accredited programme can define themselves as either “EUR-ACE[®] Bachelor” or “EUR-ACE[®] Master”, respectively if they have obtained a First-Cycle or Second-Cycle degree.

EUR-ACE is currently implemented by seven Agencies throughout the European Higher Education Area, namely:

- CTI (Commission des Titres d’ Ingénieur), France;
- ASIIN (Accreditation Agency for Study Programs in Engineering, Informatics, Natural Sciences and Mathematics), Germany;
- Engineers Ireland;
- Ordem dos Engenheiros, Portugal.
- RAEE (Russian Association for Engineering Education);
- Engineering Council, United Kingdom;

More than 700 EUR-ACE labels have so far been awarded. EUR-ACE has been quoted by the European Commission as an example of good practice in a 2009 Report (EC, 2009) and in a publication issued in the occasion of the “Bologna Anniversary Conference” (EU, 2010).

By the closure of the EC-supported project EUR-ACE SPREAD project (November 2008/October 2010), ENAEE has received applications to be authorized to award the EUR-ACE label by several other accreditation Agencies, based in Belgium, Italy, Lithuania, Netherlands, Poland, Romania and Switzerland. It is hoped that within a few months these Agencies will be able to join the EUR-ACE system and others will follow.

At present, the EUR-ACE system is limited to the accreditation of First-Cycle and Second-Cycle engineering degrees, but ENAEE is monitoring the possibility and opportunity of accrediting other engineering programmes, including Third-Cycle (Doctoral) and Continuing Education programmes.

5. An open question: accreditation at “branch” level ?

Two levels of Qualification Frameworks have already been identified: Meta-

Frameworks and Sectoral Frameworks. The EUR-ACE Framework Standards can be assimilated to a Sectoral Framework: they are valid for all “branches” of engineering and for all educational “profiles” (either more theoretically or more vocationally oriented).

Sectoral frameworks may be further subdivided in sub-sectors characterized by specific descriptors, including, if applicable, the identification of professional activities for which the candidates are to be prepared. Engineering is a good example of a sector whose domain descriptors can be differentiated according to the different specialties or “branches” (e.g. civil engineering, chemical engineering, etc.), including possibly main or core curricula contents and methods, which aim at giving substance to the higher level descriptors.

Significant work is taking place at branch level in European engineering education, through the activity of “Education Working Parties” of the relevant scientific-technical Associations, or through the initiative of HE Institutions. Generally, these initiatives include the ‘translation’ of sectoral descriptors into specific branch-level descriptors, the identification of core contents and the identification of scope, depth and breadth of the programmes, a major issue in the engineering area when comparing programmes. Five initiatives may serve as illustration:

- 1) EUCEET II (European Civil Engineering Education and Training II), a Thematic Network directly related to the TUNING project and developed under the umbrella of the European Council of Civil Engineers (ECCE, 2006), which led to the identification of both generic and specific competences for civil engineering programmes.
- 2) The work of the Working Party on Education of the European Federation of Chemical Engineering, which led to “Recommendations for Chemical Engineering Education in a Bologna Two Cycle Degree System” (EFCE, 2005). The proposed core curricula cover about two thirds of the total credits, leaving space for significant modifications and innovations.
- 3) CHEMPASS, an European project involving 13 HEIs, which aimed at promoting mobility and attractiveness of European Chemical Engineering Higher Education through a thorough analysis of contents and methods, and through the development of tools for competence evaluation (Gagneur, 2009)

- 4) The “Recommendation for the development of consecutive Bachelor’s and Master’s courses”, proposed by the Associations of German Engineers (Verein Deutscher Ingenieure, VDI) and the Society for Chemical and Process Engineering (GVC) both for ‘more applications oriented’ and for ‘more research oriented’ profiles (VDI-GVC, 2008). The VDI-GVC recommendation defines: (i) professional profiles and aims for the courses, adopting the EUR-ACE Framework Standards; (ii) qualifications for admissions; (iii) structure of the degree course, including core curricula; (iv) fields of studies; and (v) industrial placements. This proposal is a major recognition of the relevance of the EUR-ACE outcomes and respective descriptors and represents a remarkable example on changes that promote recognition of qualifications.
- 5) The first results of the very ambitious AHELO project, i.e. the “Framework of Expected/Desired Learning Outcomes” for First Cycle programmes in the branches of electrical, mechanical and civil engineering (Tuning, 2009; Wagenaar, 2010). At present, the AHELO project is developing a “Feasibility Study” for assessing the actually achieved graduate competencies in civil engineering.

The “Archipelago of Thematic Networks in the fields of Sciences and Technology” is another example of positive collaborations and exchanges of experience within and between subject- and branch-specific networks and associations (TechnoTN, 2009). Subject-specific approaches in QA of HE have also been the theme of a 2009 Conference, organized by ASIIN with the collaboration of a number of networks (ASIIN Consult, 2009).

Although the relevance of branch qualifications is beyond doubt, a question is now open: should/could they be recognized at European trans-national level by a EUR-ACE-like system? or should this be left at the national level, noting that in some countries engineering programmes are accredited with reference to the branch and in others without (e.g. respectively in the UK and in France)?

6. Some Concluding Remarks

The “Bologna Process” aims at creating in Europe “a system of easily readable and comparable degrees” in order to facilitate mobility of students and graduates and to promote attractive conditions for third countries to cooperate with European Universities. One of the great assets of Europe is the diversity of its cultures: the

“Bologna Process” does not pursue the “uniformity” of the diverse educational systems that derive from such European cultural diversity and can only be slowly harmonized by a gradual spontaneous convergence, and not by “top-down” means.

Mutual trust is key for achieving the essential goals of the Bologna Process. To create such trust it is necessary to build transparent and readable academic curricula and professional qualifications. This can be facilitated by transparent Qualifications Frameworks (QF) and Quality Assurance procedures (QA), recognised and accepted by all partners and stakeholders. While “general” QA procedures are essential to guarantee the quality of HE Institutions, only “subject-specific” QF and QA approaches can give concrete application and put on solid and practical grounds the “Bologna” objectives.

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REFERENCES

- ASIIN Consult: Conference "*Defining Quality - The Relevance of Field-specific Approaches to Quality Assurance in Higher Education*", Bonn, 2-3 November 2009, <http://www.asiin-consult.de/pages/de/asiin-consult-gmbh/defining-quality.php>, 2009
- AUGUSTI, G. & FEYO DE AZEVEDO, S., *Field-specific Quality Assurance: some initiatives in Technical and Engineering Education*, International Journal of Quality Assurance in Engineering and Technical Education, IGI Global Publishers, Vol.1 (1), 2011 (in print)
- Background paper, Leuven/Louvain-la-Neuve Ministerial Conference, *Bologna beyond 2010: Report on the development of the European Higher Education Area*, http://www.ond.vlaanderen.be/hogeronderwijs/bologna/conference/documents/Beyond_2010_report_FINAL.pdf, 2009.
- The Bologna Process 2020 - The European Higher Education Area in the new decade**, Communiqué of the Conference of European Ministers Responsible for Higher Education, Leuven/Louvain-la-Neuve, http://www.ond.vlaanderen.be/hogeronderwijs/bologna/conference/documents/Leuven_Louvain-la-Neuve_Communiqé_April_2009.pdf
- European Commission, **Report on progress in quality assurance in higher education**, Report from the European Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, Brussels, 21.9.2009, COM(2009) 487 final, http://ec.europa.eu/education/higher-education/doc/report09_en.pdf
- European Union: **Directive 2005/36/EC of the European Parliament and of the Council on the recognition of professional qualifications**, Official Journal of the EU, 30/09/2005, L255/21-142, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:255:0022:0142:EN:pdf>, 2005.
- European Union, **The EU contribution to the European Higher Education Area**, Luxembourg, Publication Office of the European Union, 2010, ISBN 978-92-79-15103-3; doi: 102766/63140, http://ec.europa.eu/education/pub/pdf/higher/chea_en.pdf

- ECCE (European Council of Civil Engineers), **EUCEET II - European Civil Engineering Education and Training II**, <http://www.eccenet.org/Activities/Edu-Train.html>, 2006.
- EFCE (European Federation of Chemical Engineering), **EFCE Recommendations for Chemical Engineering Education in a Bologna Two-Cycle Degree System**, www.efce.info/Bologna_Recommendation.html, 2005,
- ENAAEE, **EUR-ACE Framework Standards for the Accreditation of Engineering Programmes**, 2008, www.enaee.eu [home]
- ENAAEE, **General Policy Statement**, www.enaee.eu/the-enaee-network/mission-of-the-network, 2009
- ENQA, **Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) – 3rd ed.(2009)**; www.enqa.eu [publications]
- EQAR, **European Quality Assurance Register for Higher Education**; www.eqar.eu
- EQF-LLL, **The European Qualifications Framework for Lifelong Learning**, Recommendation of the European Parliament and of the Council, 23 April 2008, http://ec.europa.eu/education/lifelong-learning-policy/doc44_en.htm
- Gagneur, S., **CHEMEPASS: Chemical Engineering Mobility Tools**, 8th World Congress of Chemical Engineering, Montreal, Canada, 2009.
- QF-EHEA: **A Framework for Qualifications of the European Higher Education Area**, Bologna Working Group on Qualifications Frameworks, <http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/QF-EHEA-May2005.pdf>, 2005.
- TechnoTN - Archipelago of Thematic networks in the fields of Sciences and Technology, <http://www.sefi.be/technotn>, 2009.
- Tuning Association, on behalf of a Group of Experts, **A Tuning-AHELO Conceptual Framework of Expected/Desired Learning Outcomes in Engineering**, May, 2009.
- VDI (Verein Deutscher Ingenieure) & GVC (Society for Chemical and Process Engineering), **Recommendation for the development of consecutive Bachelor's and Master's courses**, 2nd Ed., Dusseldorf, Germany, http://www.vdi.de/fileadmin/vdi_de/redakteur_dateien/gvc_dateien/VDI%20Curricula%20englische%20line.pdf, 2008
- Wagenaar, R., **Tuning-AHELO Learning Outcomes Statements of Engineering**, CLAIU-EU Seminar on "Engineering Master degrees in Europe", Brussels, February 2010.