EQANIE: Implementing a System of Quality Assurance for Informatics Higher Education

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Abstract. The paper briefly explains the field-specific approach to quality assurance of higher education programmes, thereby drawing on existing examples in the European Higher Education Area. It then presents the European Quality Assurance Network for Informatics Education, EQANIE, founded in 2009, and highlights why there is a need for a field-specific approach to quality assessment of degree programmes in informatics. It shortly presents history and challenges at the outset of the initiative before outlining the two main challenges for field-specific external review activities: 1) the challenge of avoiding that the quality labels become an end in themselves rather than the (interim-)result of a continuous process of quality enhancement of a degree programme, and 2) the difficulties of actively involving stakeholders from industry in external quality assurance.

Quality Assurance Approach

One key assumption of the Bologna Process is that quality of education is an essential precondition for the realisation of a competitive European Higher Education Area. Quality of education is ultimately measured by the graduates' success when entering the labour market (be it as researchers or employees in industry).

A growing number of stakeholders in education believe that competitiveness of graduates cannot be achieved via mere compliance of education with institutional or generic benchmarks.[1] There is a growing demand for improved ways of demonstrating the relevance of the output to the stakeholders of education.

Mutual recognition of degrees and programs is a crucial factor for student mobility. Recognition can be based on quality assurance performed by trustworthy organizations. Since accreditation has to consider the peculiarities of different fields of science, field-specific accreditation has clear advantages. But even within a field, accreditation is difficult due the wide range of degree programs that differ in specialization, degree of scientific orientation, duration, admission selectivity etc.. On the one hand, an essential body of knowledge and skills has to be covered; on the other hand one must not be too restrictive allowing a diversity of different profiles and also different national and cultural peculiarities.

The European Commission supports a number of field-specific networks which have developed Qualification Frameworks at the European level for each their discipline.[2] Combining the latter with generic criteria oriented at the European Standards and Guidelines, external quality review of degree programmes is offered. Higher education institutions in Europe increasingly seek to combine general approaches of quality assurance with field-specific ones, as observed in particular in the field of technical and science studies.

The mentioned quality assurance networks function according to the principle of peer review, while varying between direct and indirect accreditation. Examples are:

The European Network for Accreditation of Engineering Education, ENAEE, does not itself conduct assessment. It awards the EUR-ACE Quality Label to first and second cycle degree programmes via

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[1] Augusti, G., Freeston, I., Heitmann, G. and Martin, R.-P., Accreditation and QA of engineering education in Europe: Setting up a pan-European system, in: Implementing and Using Quality Assurance, Strategy and Practice, A Selection of Papers from the 2nd European Quality Assurance Forum, European University Association 2008, pp. 42-47.
[2] "Good Practice field-specific networks. The EU Contribution to the EHEA"
(http://ec.europa.eu/education/pub/pdf/higher/ehea_en.pdf), ISBN 978-92-7915103-3, p. 24.

indirect accreditation, through authorised accreditation agencies at national or regional level. An important feature of this method is, according to ENAEE-President Giuliano Augusti, that the national and regional differences can be taken appropriately into account. The success of this field-specific approach is undeniable: The total number of Quality Labels awarded since March 2006 exceeds 600.

The European Chemistry Thematic Network Association, ECTNA, conducts direct accreditation, but also works with four partner agencies at national level which are authorised to award the so-called "Eurobachelor" and "Euromaster" to degree programmes assessed against the framework for a first cycle qualification and a second cycle qualification in chemistry, respectively. Since 2005, about 80 labels have been awarded.

Following the example of the other two field-specific quality assurance networks, a group of accreditation agencies, national and European academic associations and professional societies in the area of informatics founded the European Quality Assurance Network for Informatics Education, EQANIE in early 2009.

The need for a field-specific approach for Informatics Higher Education

In contrast to the other branches of Engineering, Informatics is not a regulated profession in most European countries. Also, unless a specific accreditation culture for degree programmes is in place at national or regional level, higher education institutions are often free to label their programmes "informatics", thereby sometimes abstracting away from the actual qualification students attain, and sometimes even deceptive with view to their compliance with the needs of the labour market. Also, the higher education landscape in informatics shows a trend to so-called hybrid programmes, which are positioned somewhere between informatics and other fields where IT is increasingly used (health care, life science, media).

While pursuing a Europe-wide approach, the Euro-Inf Framework is not intended to compete with or replace national guidelines for informatics courses. It offers an overarching reference point, which is intended to be widely applicable and inclusive, enabling a broad range of possible approaches to informatics higher education.

The core of the Euro-Inf Framework is a set of learning outcomes descriptors, which are ranged in the following four categories:

- Underlying Conceptual Basis for Informatics

- Analysis, Design and Implementation

- Technological, Methodological and Transferable Skills

- Other Professional Competences.

To list the learning outcomes descriptors in detail would go beyond the scope of this paper. As an example the category of the Technological, Methodological and Transferable Skills is quoted in the following:

At Bachelor's level:

"Graduates having completed a First Cycle degree should have demonstrated the following capabilities:

- combine theory and practice to complete informatics tasks

- the ability to undertake literature searches, and to use data bases and other sources of information

- the ability to design and conduct appropriate experiments, to interpret data and draw conclusions

- awareness of relevant state-of-the-art technologies and their application

- recognition of the need for, and engagement in life-long learning.

At Master's level:

Graduates having completed a Second Cycle degree should have demonstrated the following capabilities:

- integration of knowledge from different disciplines, and handling complexity

- comprehensive understanding of applicable techniques and methods for a particular specialisation, and of their limits

- awareness of the limits of today's knowledge and the practical application of the state-of-the art technology

- knowledge and understanding of informatics to create information models, complex systems and processes

- ability to contribute to the further development of informatics

While compliance with the set of Euro-Inf learning outcomes statements are in the focus of EQANIE's assessment activities, the field-specific criteria are combined with generic criteria oriented at the European Standards and Guidelines. Since the beginning of 2010, the network awards the Euro-Inf Bachelor and the Euro-Inf Master to successfully reviewed Informatics programmes.

Going strong: From Euro-Inf to EQANIE

The Euro-Inf Framework was developed in the context of the "Euro-Inf Project" (2006-2008), co-financed under the Socrates Programmes of the European Union, and the predecessor project "Euro-Inf Spread" under the Lifelong Learning Programme is currently aiming to disseminate the framework and exploit its benefits. A strong informal network formed from the partners and interested stakeholders around the project. After the successful termination of the Euro-Inf Project, it became quickly clear that a permanent network was needed to carry on the not so small efforts made hitherto.

Even though the first regular accreditation visits by EQANIE were only starting in 2010, the network brings about some relevant experience at European level: During the project duration over 10 *trial*-accreditation visits were conducted, most of them exclusively organised by the Euro-Inf team, some of them in the context of national visits. The analysis of the feedback given by the visited HEI revealed that the initiative was particularly helpful to those institutions in the Eastern European countries.[3] It is with a particular attention to the needs of the academic community in the newly evolving infrastructures of Eastern Europe that EQANIE directs its activities.

Define or not define "Informatics"? Challenges when getting started

As one of the first key questions at the kick-off of the Euro-Inf Project it was discussed if the Project should attempt to define the term informatics, in order to be clear about scope and target group of the Project. Not only because this question has occupied several generations of informatics-practitioners and academics[4] the then-present partners decided to leave the term undefined. To agree on a definition would have meant to inevitably preclude significant numbers of degree programmes offered in Europe from the chance to demonstrate their educational quality.

The advantage of this decision is that EQANIE is able to take account of current and future developments regarding the state of the art in informatics discipline via research, and with a little

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[3] Muth, F. and Mujacic, S., "Results of the first Trial-Accreditations Lessons Learned for the Euro-Inf Project, in: Informatics Education Europe II, Developments in South-East and East Europe", 2007, http://www.seerc.org/ieeii2007/PDFs/p226-236.pdf, retrieved July 25th, 2010.

[4] As an example cf. the article by Malcolm, C., "What Does Informatics Mean?", U of Edinburgh, 2002 http://www.dai.ed.ac.uk/homes/cam/informatics.shtml, retrieved July 25th, 2010.

lead time, also regarding the state of the art in teaching. In practice, the EQANIE Accreditation Committee decides case by case if an accreditation request is accepted or not – hybrid programmes as well as international and double degree programmes are explicitly encouraged to apply for the quality label.

While the learning outcomes descriptors as such constitute the main reference point for assessing informatics degree programmes, they might reach their limits when certain hybrid programmes become the subject of assessment. But to insist on a one-to-one correspondence of the Euro-Inf outcomes descriptors with the actual learning outcomes of the degree programme being assessed has never been the main idea behind the development of the Framework.

A rather important tool for doing justice to the concepts of hybrid programmes in the particular case is, in fact, a highly qualified team of auditors which, with their combined knowledge and expertise, reflect as precisely as possible the educational profile of the degree programme and are thus sufficiently informed to make reasonable judgements. In some cases, finding the right composition of auditors may be a real challenge, especially when topics are taught on which there are only few experts to be found in the world. Still it is one of EQANIE's assets as an international network that it is able to draw upon a vast pool of experts from all over Europe

Status to date / Successes achieved

One key achievement of the first half of 2010 is that the EQANIE Accreditation Committee has started its work and cleared the way for the first accreditation visits. On May 19, 2010 at the constituent session of the Accreditation Committee the Chair was elected for the coming three years.

The Committee furthermore adopted the document "Procedural Principles for the Accreditation of Degree Programmes" which is, besides the Euro-Inf Framework, the main source of information for the applicant HEI.

With a freshly composed Accreditation Committee and the key documents adopted, EQANIE accreditation activities are in full swing. The first auditing visit by an EQANIE team will take place this autumn at Reykjavik University, Iceland. Visits at further institutions such as the Technical University in Riga and the University degli Studi di Milan are scheduled for the beginning of 2011. The EQANIE Expert Pool currently includes about 60 auditors who have directly been approved by the Executive Board, about two hundred additional experts can be activated upon request to EQANIE's member institutions.

Numerous higher education institutions (HEI) in Germany have expressed their interest in obtaining the Euro-Inf Quality Label via indirect accreditations. The German Accreditation Agency ASIIN has requested to be authorised to award the Euro-Inf Bachelor and the Euro-Inf Master in the context of its national programme accreditation processes. It is furthermore expected that the British Computer Society and the Latvian Higher Education Evaluation Council will apply for authorisation.

EQANIE has been a full member of the International Network of Quality Assurance Agencies in Higher Education (INQAAHE) since June 2010. Membership applications are being prepared to bodies such as the European Network of Quality Assurance Agencies, ENQA, and the European Quality Assurance Register, EQAR.

The Euro-Inf Spread Project has now been running since November 1st, 2009. The project activities concentrate on disseminating the Euro-Inf Framework. Hitherto, the Project Board has nominated two higher education institutions where pilot auditing visits will take place, co-financed from the Euro-Inf Spread budget. The aim is to award some first Euro-Inf Quality Labels to positively assessed programmes at a project Final Conference in September 2011. The labels are deemed to serve as triggers for further applications from the respective country.

Contacts have been established with the relevant stakeholders of informatics higher education in Spain, Italy, Czech Republic and Latvia in order to explore the possibilities for a transfer of the Euro-Inf Framework Standards and Accreditation Criteria to the respective national level.

The Higher Education Quality Evaluation Center of Latvia, HEQEC, has already transferred considerable parts of the Euro-Inf Assessment Criteria into its own assessment criteria. Negotiations are ongoing with stakeholders in Italy and Spain. In the Czech Republic, possibilities for a transfer are limited by a strict national accreditation law, however, there is a prospect that the Euro-Inf Framework will be mentioned as good practice example in the national assessment criteria for informatics degree programmes.

Challenges ahead

EQANIE currently faces two main challenges:

1) The first challenge for the sectoral quality labels is to avoid causing institutions to shift their focus away from the idea of quality enhancement towards a sole award of the "Label". The self-assessment done by the HEI in the run-up to an external peer-review is often seen as a one-time bureaucratic exercise managed by one person only. This practice stands in contrast to the idea of a process of enhancing quality, borne by a team of equally engaged and involved stakeholders. The concept of quality and continuous improvement can work only if quality itself becomes the goal of all stakeholders, and not just the exasperating but necessary effort to obtain the "Label".

2) The involvement of practitioners – a key feature of the field-specific accreditation – reveals very difficult. Industry often complains that the qualification of graduates does not correspond to the needs of the labour market. This fact suggests that employers should have an interest in opening channels of contribution to assessing programmes and further developing outcome statements for in informatics higher education. However, both at institutional level and at the level of assessment visits the engagement of industry is "hard to get".

Some questions for discussion

What is the role of sector-specific labels for enhancing the comparability and compatibility of informatics degree programmes?

What is the future role of sectoral labels in te EHEA?

What provisions should be taken to convey the message to all stakeholders in education that quality management is a rewarding effort?

How to overcome the industry's lack of interest of getting involved in quality assurance of academic programmes?