Professionalism in ICT

who is accountable and to what extent?

Hans Frederik

President NIOC, Dutch Congress Foundation on ICT-education

And how is your country coping with the financial problems? In the Netherlands – just a few weeks ago - our government had to buy the second largest bank. And one of the arguments was that they had to act, to avoid a system-breakdown. How is that possible we ask ourselves? All those financial professionals, accredited and screened. Their Financial companies and accounting firms are inspected by the Governmental Financial Department and the National Bank. A lot of the 'experts' in Wall Street, City of London, Frankfurt, Budapest, Amsterdam, Dublin and else are 'certified financial analysts'. Where was their professional behavior, social responsibility, public obligation, integrity, what did or will their guild, their chamber do,…?

In this paper I will present you some of my thoughts on the professionalism issues, especially about the ICT-worker. It is a topic I am in a way, obsessed with. Ten years of my teaching career I worked as a professor at the Amsterdam University of Applied Science in ICT[i]. So my point of view is mostly oriented from the education site. As a teaching professor I worked on decreasing the gap between ICT-industry and ICT-education. Do they (the industry) know the competencies of our graduates? And in return I got the same question: Does the university know which competencies we need from the graduates? The last six years I am president of the Dutch congress foundation on ICT-education NIOC and I have been board member of the NGI, the Dutch Computer Society. In both roles I worked on my "obsession".

> The main question in this is: who is accountable?
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> |---|---|
> | – Employees? | – Education? |
> | – Industry? | – Government? |
> | – Employers? | – Labor organizations? |
> | | And if so, to what extent? |

In my opinion, professionalism is not only an educational topic. The ICT-sector, Government and Education have to work together on the strengthening of professionalism in ICT.

In the first part of this paper I will give a summary on the higher ICT education in the Netherlands (levels and volume). And I give you an overview of the Dutch system for quality assurance in higher education. In the second part I will explain and comment on the EURO-Inf project. In this European project, with the German organization ASIIN in the lead, the first steps to a systematic comparison of higher ICT education and quality assurance is made.

Finally, if the time permits me, I will show you some thoughts on accountability.

Higher education in ICT in the Netherlands

In the Netherlands, we have around 16 million inhabitants. In 2007 we had 260.000 people working in ICT-companies, from whom 125.000 are classified as ICT-professional. In that year we had almost 10.000 open positions as ICT-worker.

In the Netherlands there are 14 universities, with all some master programs on computer science or informatics[ii]. And we have 16 universities of applied science with bachelor programs on ICT, Informatics and Business Informatics. Together this gives us 4.500 new graduates every year. But there is a real shortage on the labor market for ICT-workers in the Netherlands. This shortage is filled with outsourcing software engineering and insourcing ICT-workers from Poland and India.

The Dutch system of education ICT-professionals is built on government regulations. Compared with the European Qualification Framework (EQF) we have higher professional education on level 6 (bachelor at universities of applied science) and academic education on level 7 (master) and 8 (PhD). The NVAO (Accreditation Organization of the Netherlands and Flanders) independently ensures the quality of higher education in the Netherlands and Flanders by assessing and accrediting programs. At the request of an institution, a quality assessment agency organizes an external assessment. The framework of reference that is to be used for the assessment should cover at least the themes, standards and criteria set out in this accreditation framework. The institution carries out a self-evaluation. The self-evaluation report contains a description and an assessment of the program, covering at least the themes, standards and criteria:

1. Aims and objectives of the program
2. Curriculum (consistency of the curriculum, workload, admission requirements, credits, coherence of structure and contents and learning assessment)
3. Staff (requirements for professional / academic orientation, quantity of staff and quality of staff)
4. Services (facilities and tutoring)
5. Internal quality assurance system (periodical evaluations, measures for improvement, involvement of staff, students, alumni and the professional field)
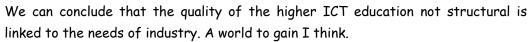6. Results (achieved learning outcomes and study progress)

In its self-evaluation, the institution should indicate the level (bachelor or master's level) and orientation (professional or academic orientation) of the program. This is to be substantiated with clear argumentation. NVAO assesses the report and its overall assessment. If the program meets the criteria listed in the accreditation framework, it is accredited for a period of six years.

Concluding remarks

Professionalism has, amongst others, to do with the trust someone has in the quality of an ICT-worker. When you want to judge the professional abilities of an ICT-worker, you start to examine his/her graduation. Is it from a recognized institute? And is it with the specialization needed?

We use the educational system to prove one side of professionalism. But is this according to the expectations of the industry? The Dutch assessment system is based on six main topics (see above). Only topic five has an element which refers to the industry (professional field) and the experience of post-graduates (alumni).

To illustrate this with my experience as auditor: In 88% of the audits I participated in, the check on industry and alumni was a meeting once or twice a year with representatives from industry,

respectively post-graduates. In only 12% of those meetings there was a real check on the learning outcome in relation with the expectations of industry.

We can conclude that the quality of the higher ICT education not structural is linked to the needs of industry. A world to gain I think.

EURO-Inf Project

First a summary of the project: The EURO-Inf Project aims at the creation of a framework for setting up a European system for accreditation of higher informatics education with the following aims:

- improving the quality of educational programs in informatics;
- providing an appropriate "European label" for accredited programs in informatics;
- facilitating mutual recognition by program validation and certification;
- facilitating recognition by the competent authorities, within the EU directives;
- increasing mobility of graduates as recommended by the Lisbon Strategy.

Consistent with the framework of the Bologna process, the accreditation will distinguish between the first and second study cycle (Bachelor and Master level); it will cover informatics programs of all types of Higher Education Institutions.

Accreditation of an informatics degree program is the primary result of a process used to ensure the suitability of that program as providing the education base for the entry route to professional practice. It involves a periodic assessment against accepted standards of informatics higher education. Independent, third-party accreditation is essentially based on a peer review process, undertaken by appropriately trained and independent teams comprising peers from both academia and informatics practice, in accordance with agreed principles. It is important that accreditation processes go beyond judgment on the achievement of a minimum standard, and effectively promote the idea of continuous improvement of the quality of higher education programs.

Program Outcomes for Accreditation from EURO-Inf

The program outcomes[iii] can be described as quality standards for competences, skills and knowledge graduates of an accredited course would be expected to have achieved as the education base for practicing their profession or for post-graduate studies. They have been ranged in the following four categories:

- Underlying Conceptual Basis for Informatics
- Analysis, Design and Implementation
- Technological, Methodological and Transferable Skills
- Other Professional Skills

For each of the mentioned category expected program learning outcomes for informatics programs have been formulated.

Each informatics program for which a Higher Education Institution seeks accreditation or re-accreditation against EURO-Inf standards must be consistent with legal and national requirements and have in place:

- program educational objectives consistent with the mission of the Higher Education Institution and the needs of all relevant stakeholders (such as students, relevant employers, informatics associations or societies, etc.) and program learning outcomes

consistent with the program educational objectives and the specified program learning outcomes for accreditation;

- a curriculum and processes which ensure achievement of the learning outcomes;
- academic staff, facilities, resources and cooperation agreements with industry, research institutions, necessary to deliver the learning outcomes;
- appropriate forms of assessment which can validly attest to the achievement by graduating students of the program learning outcomes;
- a management system able to ensure the systematic achievement of the learning outcomes and the continual improvement of the program.

CEPIS contribution

As part of the work program of the EURO-Inf project, a survey was carried out of CEPIS Member Societies to clarify the current and expected national situations concerning the Accreditation of Higher Education Informatics/Computing courses in different European countries, as well as the learning outcomes expected from graduates from such courses. Responses were obtained from 19 of the Member Societies, and the response data provides an important starting knowledge base about the situation in a number of EU Member States. It is clear from the responses that there is considerable diversity in the current and expected quality assurance arrangements for higher informatics courses around Europe.

Concluding remarks

Given the great diversity of informatics education across Europe, the attempt to create framework standards comprising all areas of the informatics discipline appears ambitious. The EURO-Inf Framework is thus intended as a broad common denominator, or reference point for the variety of informatics programs. In order to allow for possible inclusion of existing informatics specializations within European Higher Education Institutions, the framework is formulated in general terms. But besides the global approach of the EURO-Inf project, has a clear contribution to the professionalism question. Each informatics program for which an Institution seeks accreditation against Euro-Inf standards must have in place (amongst others):

1. A systematic check of the program educational objectives with the priorities and needs of all relevant stakeholders, including employers, informatics associations or societies, etc.
2. Educational and cooperation agreements with industry, research institutions and/or other Higher Education Institutions

The link between Industry and Higher Education is recognized and will give support to the strengthening of professionalism in ICT.[iv]

Some thoughts on accountability and professionalism

As a researcher I am studying the balance between management en teaching staff in higher professional education. Management has a responsibility in planning, creating frameworks, quality assurance, and accounting. Teaching staff has a responsibility in the field of facilitating and promoting the best learning outcomes. They both work as `professional` and are interdependent. But who is accountable for what and to what extent? This research will focus on the way the balance is recognizable in the visitation and accreditation process in higher education in the

Netherlands. Regular I participate in audit teams (see above) to examine the quality of higher education programs. A great number of self evaluation reports are available at the Hobéon Institute[v], an Assessing Agency recognized by the Dutch Ministry of Education[vi]. This research will check these reports on the way they report on the topic Staff (requirements for professional / academic orientation, quantity of staff and quality of staff) and on the topic of mutual adjustment between employees and institution in adjusting the ICT study programs.

Professionalism

Let us go back to the original question. Professionalism is an important topic in ICT. Because the ICT projects that went wrong, because of the shortage of ICT-workers and the habit from the industry to go for short wins. But who is accountable? In this discussion the maturity of the ICT sector is a frequently used argument. But I think, we all are accountable. We all have to contribute to the strengthening of the professional behavior in ICT.

> The main question in this is still: who is accountable?
> – Employees?   – Education?
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>   And if so, to what extent?

The employees are represented by CEPIS, counsel of computer societies with 36 computer societies in 33 countries all over Europe. Good for more than 250.000 ICT-workers (estimation). CEPIS has exerted influence in certification and education:

IFIP and IP3, with Charles Hughes as an enthusiastic and professional leader is one of the better developments in our sector. The Open Group with the Certified IT Specialist, EUCIP, the European Certification of Informatics Professionals, this programs all have the same goal: proving the professional behavior of the ICT-worker. CEPIS has started EUCIP and is active involved in IP3 Harmonise[vii] and EURO-Inf both projects funded by the EU and supported by CEPIS, contribute to the comparability of ICT grades and certificates.

The whole secret is now, I think, how we can involve industry and government. Only when they see their role, we are able to leave the adolescent phase and really become mature.

Appeal to you all

Let us use our influence and connections to industry and government. On the local level, in your state, your country and in Europe. To work on professionalism. Only when we all use our influence this growing to maturity will develop regular and smooth.

Thank You.

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[i] This institution of tertiary education in the Netherlands is called "*Hogeschool*". While the literal translation is "high school," these entities are actually equal to universities of applied sciences. They can also be compared with a college, polytechnic and fachhochschule. "*Hogescholen*" are not allowed to be called university in the Dutch language, because they do not confer doctorates.

ii Computer Science, Informatics and ICT in this paper will be used inter exchangeable.

iii The complete conclusions of the EURO-Inf project are available at the EURO-Inf website www.euro-inf.eu, especially the end report of the project.

iv There is a non-for profit association in the process of building up: "European Quality Assurance Network of Informatics Education" (abbreviated: EQANIE) shall work on these EURO-Inf outcomes. Expected founding members are ASIIN, BCS, CEPIS, GI, GRIN, Latvian Accreditation Institution, European Association of Employers; Spanish, Dansk, Dutch informatics societies, EAEEIE (European Association for Education in Electrical and Information Engineering).

v Hobéon Institute, Den Haag, the Netherlands.

vi http://www.minocw.nl/english/index.html

vii HARMONISE contributes to establish comparable data on ICT vocational training systems and various approaches to ICT qualification and ICT certification in the participating Countries. The project aims to elaborate recommendations for the stakeholders by collecting and examining available reference material concerning the potential of applying and implementing standards in order to work towards the convergence of existing approaches to e-skills certification in Europe and beyond. Harmonise closed on 30 September 2007. The Final Report has been approved by the European Commission and can be downloaded here.