Europe wide Industry Certification Using Standard Procedures based on ISO 17024

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***Abstract*— ECQA (European Certification and Qualification Association) is the result of a series of EU funded projects from 2005 – 2012. This included European projects such as EQN (European Quality Network, 2005 – 2007), EU Certificates Campus (2008 – 2009) and DEUCERT (Dissemination of EU Certification), the ECQA nowadays acts as an organization that is independent from funding. The members of ECQA are widely spread all over Europe and vary from universities to companies as well as individuals.**

ECQA is aimed at a demographic problem of education and training in the European Union. For people at 40 – 50 it is many years ago that they attended the university and required skills nowadays are changing every 2-3 years. This means that their skills get outdated and we experience in Europe a growing unemployment from the age of 45 upwards. Universities in Europe are currently not addressing this problem.

EQN developed a so called role based qualification concept where e.g. an existing software engineer (who studied informatics some 15 years ago) can identify job roles to upgrade so that he remains a value for the organization. He might receive additional industry qualification for e.g. a safety architect (additionally learning how to enrich existing software architecture with functional safety aspects). This way the person, would for instance, grow into a safety architect position and a younger person who knows more about new programming techniques gets his old position. EQN then developed certification mechanisms for this role based approach for university and industry educational partnerships.

EU Cert Campus collected about 15 job roles, structured the corresponding skills sets and established online services. The online services comprise skills browsing, skills assessment, and online training. So people from industry can attend job role based qualification training from the work place.

DEUCERT established ambassadors for this new job role based qualification concept Europe and worldwide. DEUCERT also helped to create a critical mass of partners. At the moment we do have 26 job professions (ready and in progress) that are certified all over Europe and already outside of the European Union. The concept is meanwhile supported by approx. 60 universities and training bodies in Europe.

Human resource managers from leading multinational companies called ECQA "a success story" because so far the universities in Europe do not address the mentioned demographic problem and ECQA has already achieved more than 11000 online trainings and more than 6600 certificates in European industry and at university PhD programs.

The processes of the ECQA are mapped onto the ISO 17024 international standard for the certification of persons.

The PAC project will integrate further skills sets and certification options into the ECQA platform.

Keywords-component; European qualification standards, European certification strategy, European exam systems, European leraning portals

I. INTRODUCTION

While university programs address people in the age of 19 – 26 they do not address the demographic problem of increasing unemployment for people older than 45 at all. We already experience in nearly all countries in the European Union the growing age of people and in parallel that the number of unemployed people older than 50 is increasing as well. This can lead to a high demographic risk because most economies also plan to increase the age of pension and this will not work if people do not stay employed with the growing age.

The project EQN [3],[4],[5] was a strategic network project in education in which industry and educational institutions from 13 countries did networking to propose a solution to this demographic problem. Also the project should deliver an initiative of innovation in education as well [6],[8].

This resulted in:

Job Role Based Qualification Strategies [5],[7]. While the universities teach for a domain (e.g. informatics engineer) the job role based qualifications are short courses which in 2-3 weeks re-qualify people in industry (access from the workplace) to sustain their value for the company and remain employed. Job roles are described in form of skills sets (similar to the skill cards in the Department of Trade and Industry in the UK), and skill sets are mapped onto training, exercises and tests.

If someone studies informatics engineer this takes approx. 5 years at a university. Assuming this as a basis a job role qualification is for instance to upgrade to a safety architect, software process improvement manager, etc.

Modular Certification. It was also assumed that people in industry at the work place are under time pressure and cannot do the whole training at once. They might do a part in year 1 and the rest in the next year. They (assuming the European mobility strategy) could do the first part from Spain the rest from a German work place.

Thus the skills sets were structured into skill elements and each skill element has so called performance criteria. Each certificate lists elements and a full certificate is achieved if all elements are passed.

European Mobility Strategy. If, for instance, in the current economic situation Spanish workers would move to Germany for employment and later would move to UK and then back to Spain, all certifications should be added up and accepted across all countries.

This led to the concept of so called lifelong learning accounts for people. Each person in Europe can register at the system and in one lifelong learning account (like an international bank account but for education) can do self assessment, achieve skills profiles, and receive training. The account sustains and is a central service across EU countries.

This infrastructure was later established in the EU Cert campus project.

Europe Wide Standardized Approach. To be able to roil out this strategy in all countries the design of standard guidelines was important. They were translated in all major European languages.

As a result of this the ECQA [3],[4],[5],[9],[10] has established a set of standard quality guidelines for

- Certification of a new job role
- Certification of training bodies
- Certification of trainers
- Certification of people

See www.ecqa.org and cooperation with ECQA under guidelines.

A job role committee is an international working group who signed the standard ECQA JRC agreement and annually maintain the skills card and test questions pool

ECQA certifies training bodies who train assessors in this new assessment model.

Attendees of courses do an ECQA based exam and receive an ECQA Certificate.

In the guidelines of ECQA the fulfillment of the ISO 17024 standard for certifications of persons has been considered. A mapping to this international standard can be found in the ECQA guidelines.

This standard process requires that training organisations and examiners are separated. ECQA supports that by

1. Establishing a Europe wide exam system which generates tests randomly per person (each person gets a different test and cannot be controlled by the training body). The exam questions are assigned to skills elements of job roles.

2. Using certified exam bodies who provide examiners to organise the exams.

3. Automatic corrections through the ECQA test system so that none can interfere the tests and the results personally.

4. Job Role Committees elaborate and annually update this pool of multiple choice test questions.

The work in PAC [1] will be reviewed against the ECQA quality criteria and the coverage of all quality criteria is checked by reviews.

II. EUROPEAN WIDE INFRASTRUCTURE

To support the concept of lifelong learning accounts (a strategy developed in the EQN project) the EU Cert Campus project (above 20 partners from 18 countries) developed an infrastructure which supports standard procedures for lifelong account management, self ass4essment of skills, exams and administration of certificates [2],[4],[5],[9].

Once this infrastructure was developed and in place (now used by above 11000 professionals and managers in European industry) it was important to find a body maintaining these services. This resulted in the legal foundation of the ECQA (European Certification and Qualification Association, 2008).

ECQA is not for profit and the income model is based on the certification business. ECQA follows the processes of independent exams as outlined in ISO 17024 and earns a share of each certificate sold. The income is used to further maintain the lifelong learning accounts and exams infrastructure.

The members of ECQA (and owners) are more than 60 universities and training bodies from Europe.

The Notion of Skills Profiles. The future vision of EQN was that each person in Europe might have an educational card like a bank card. On the chip we store the skills profiles of the person. This strategy was called “skills-card” strategy for Europe. The original strategy stems from the EU funded FP project CREDIT, 1998 – 2011, where ISCN was the partner for the technical architecture.

In EQN and EU Cert this strategy was adapted to a skills profile online which a person can maintain in a private lifelong learning account. Instead of a physical skill card with a chip on the cards, there are now lifelong learning online accounts.

A skills profile (= skills card as designed by the EU project CREDIT) is a representation of the coverage of competencies of a person in different skills elements. Each job role contains skills elements, the coverage of skills is shown in form of a percent mark.

Exam results Illustrating the Coverage of Skills Profiles. Exam results are displayed in the form of a skills profile, demonstrating the coverage per skills element. See Figure 1. To be certified you must reach 66% in each skills area.

Figure 1: Typical Profile as Result of an Exam

The exam system portals are continuously updated and new functions to guarantee stability of the system during exams is extended since more than 6 years now.

III. EUROPEAN LIFELONG LEARNING PLATFORM STRATEGY

Once the ECQA [2] was founded and the exam procedures were in place the next problem to solve was to allow a smooth integration of a critical mass of LLP projects into the platform. The EU LLP program finances a few hundred VET projects per year. The strategy was to empower a selected set of these projects to structure the skills and learning results into ECQA standards and integrate them into the platform.

Knowledge and Learning Cluster for IT and Services. The partnership of ECQWA decided that we cannot accept every LLP project or new job role. Firstly, they must satisfy the ECQA standards and quality criteria and secondly they should relate to a specific cluster. So it was decided that in the first years of rollout (2008 – 2014) we especially support the sector of IT and services.

To integrate LLP results ECQA demands that skills are described using European standards for skills descriptions. This means that each profession to be accepted needs to create a standard skills set. ECQA reviews the compliance of these quality rules.

With the growing number of collaborating industry training initiatives and LLP projects it was necessary to automate the import of new job roles into the system. Thus a further new functionally added in 2011 was the import and export functions allowing to enter new skills sets and exam questions automatically. This requires that Job Role Committees use a standard Excel template for describing the exam questions.

The Excel includes a macro which allows you to check that syntax and semantics of your test questions are correct.

Job Role Committees reworking the test questions annually can also export the test questions pool into this Excel format, rework the content, check the syntax and semantics with the macro and import again.

		She/he understands that if conflict is not controlled in an innovative environment it can lead to long-term inefficiencies			
QuestionId	Correct?	Question	Possible answers		
592	B,C,D	Which of the following situations would a manager utilise in h	1565	A	Status or power differences
			1566	B	Ensure innovations are within the mas
			1567	C	Do not change team members without
			1568	D	Never place staff on opposity sides of
593	A,B,C	Accepting that conflict can be very distructive what practices w	1569	A	Expand resource base quickly
			1570	B	Set challenging but attainable goals
			1571	C	Never exceed the groups conflict resol
			1572	D	High conflict resolution situations are l
		She/he has gained a thorough understanding of the unterlying factos that help diffuse conflict situations			
QuestionId	Correct?	Question	Possible answers		
594	A,B	In normal circumstances which of the following would be effe	1573	A	Seek out natural leaders
			1574	B	Delegate as much as possible
			1575	C	Become more autocratic
			1576	D	Ignore non-verbal cues
595	B,C	The way forward out of conflict resolution situations would be	1577	A	Set impossible deadlines
			1578	B	Obtain everyones point of view
			1579	C	Situations of serious conflict are best c
			1580	D	Take no action

Figure 2: Import / Export of Test Questions Pool

Some of the universities who are ECQA members decided to not use the multiple choice tests but to extend the system to support the APL (Accreditation of Prior Learning) procedures in the industry-university partnerships for education.

Thus a further new developed software function is the assessment of prior learning function. Here a panel of advisers (assessor of skills) can review existing knowledge of a person and assess a specific skills element to be fulfilled. In this case the exam is only to be done for skills elements where the assessment did not show coverage of the skills.

IV. FUNCTIONS OF THE ECQA PLATFORM

The ECQA platform allows people from the work place to attend online skills portals, receive training, do exams, and receive a certification [3],[4],[5],[9].

With one login people can register for one or more job roles. When they register for the job role they can browse the skills and do a self assessment.

Figure 3: Skills Browsing and Self Assessment

The self assessment highlights in which areas the student needs to fill some skills gaps. In these areas the system allows to connect to an e-learning system.

Figure 4: Integrated E-Learning Courses

The courses include multimedia lectures, students notes, exercises and online discussions of the exercises.

The skills card structure defines units (competence areas), learning elements (learning objectives), and performance criteria (what the student must be able to demonstrate). The learning approach is therefore "learning by doing" based and thus task based leaning is a method which ECQA supports.

Once the training has been performed the student can register for an exam. The exam is computer generated, and will be corrected automatically. Exams are random generated and different per student. Questions are generated from a Europe wide shared test questions pool.

The implemented learning approach is described in Figure 5.

Figure 5: ECQA based integrated learning cycle

Figure 6: ECQA – Multiple Choice Based Exams

V. ECQA AND PAC

The PAC Project [1] is an innovative approach that answers the demands of the European Higher Education Area (EHE) by promoting the integration of industrial real world requirements and labor market into the engineering educational curriculum. This is in order to prepare qualified professional engineering profiles based on technical skills that are relevant to current and future labor market needs.

Recently ECQA started collaboration with universities from 10 countries to discuss and agree an ECQA for ECTS strategy.

The interplay and cross-fertilization of Higher Education (HE) and focused training in the work context has for long been a key objective in the development of a coherent and effective lifelong learning approach at the European level. In the context of HE, the Bologna process has transformed the landscape of trans-national mobility and cooperation. In the context of lifelong learning, different programmes have developed innovation and frameworks as the EQF have fostered trans-national recognition of qualifications. The European Credit system for Vocational Education and Training (ECVET) enables a better compatibility between the different

vocational education and training (VET) systems in place across Europe and their qualifications. In HEI, the European Credit Transfer and Accumulation System (ECTS) plays an analogous role, and both ECVET and ECTS are based on the same foundations. These achievements have resulted in a framework enabling the interplay of lifelong learning and HE.

However, the governance and strategic directions in Higher Education Institutions (HEI) institutions are in most cases not effectively partnering with the relevant sectors of industry or doing so only for consulting in the design and evaluation of the curricula. This often results in a mismatch of the needs of enterprises and industry and the programs offered by HEI. Further, the systems for assessment in HEI are often very different from approaches to certification in industry. This points out to a need of devising and experimenting with new models for HEI and enterprise collaboration in aligning and even intertwining their educational and training offerings that consider the standards and practices used in both contexts and allow transferring credits and qualifications between the two realms. This needs to be done also respecting the business models and quality approaches used in training for industry needs together with the attainment of the competencies required in HE degrees.

In the ECQA for ECTS strategy we extended ECQA based industry certificates to become mapped into university lecturing programs and thus offer both to attendees, an industry certificates and ECTS points at the same time.

This will empower also university graduates to have (like with Microsoft diploma) European industry certificates covered in their study as well.

VI. Outlook

The current economic situation in Europe clearly illustrates that the demographic problem outlined in the abstract of the paper is a realistic scenario. The awareness that universities have a social responsibility to also think about solutions about how to upgrade skills of people older than 45 is increasing but still nearly non existing Europe wide. They still just focus on young people aged 19 – 26.

The concepts developed in EQN (2005 – 2007) and implemented with ECQA (as a not for profit initiative) represent a possible solution to this problem. This growing awareness leads to a growth and more and more universities and training bodies are expected to join.

The growth of the ECQA initiative is shown in Figure 7 where we see the growth trend of managers in Europe that have been ECQA certified after attending an ECQA test.

Training Bodies comprise universities, commercial training companies, chambers of commerce who became active providers of ECQA certified courses.

The described demographic situation is the major driver for growth in ECQA. Also by the number of many thousand certified people and their connections with other people in Europe we expect a wave of growing interest.

Also the number of LLP funded projects applying ECQA guidelines is currently doubling per year.

If you also plan to join this initiative please contact the ECQA president, Prof. Michael Reiner, University of Applied Sciences, Krems, Austria, Email: michael.reiner@fh-krems.ac.at.

Figure 7: ECQA –Growth Trend of Exams in Europe

Figure 8: ECQA –Growth Trend of Training Bodies in Europe

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