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### Monograph: ICT Certifications for Informatics Professionals (published jointly with Novática\*)

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\* This monograph will be also published in Spanish (full version printed; summary, abstracts, and some articles online) by Novática, journal of the Spanish CEPIS society ATI (*Asociación de Técnicos de Informática*) at <http://www.ati.es/novatica/>.

## Presentation

## Certification Systems for Professionalism in Information Technology

*Luis Fernández-Sanz, María-José García-García, and Peter Weiß*

Certification of persons in information technology and telecommunications has been firmly established in today's education and training landscape. Certifications offer alternative ways to approach the area of IT professionalism. Today, many institutions are offering certification programmes ranging from entry to advanced or even to specialist level. Certifications offer an alternative occupational designation in form of a "right-to-title", confirming an individual's qualifications in a specified technology field or occupational role.

The majority of certification systems promise to offer hands-on qualifications that demonstrate competence in the workplace-oriented mastery of specific IT solutions or products and/or technology required for a job role.

Recent estimates indicate the existence of more than 850 certifications and more than 200 certification programmes, turning the current certification landscape into a "jungle". It makes it difficult for individuals and employers to determine the most suitable certificate and programme. For example, Microsoft reports about almost 3 million certifications of their Microsoft Certified Professional programme which have been issued since its launch 13 years ago. A visit to the web sites of some prominent certification providers reveals more than 700,000 certifications until October 2005 from Cisco, more than 350,000 Oracle professionals until December 2006, or annually 260,000 participants by Sun. These figures are likely to be only the tip of the iceberg.

Among the most prominent and leading certification providers are ICT vendors e.g. Microsoft, Cisco, Oracle, IBM, Sun, Novell, Adobe, etc. They offer industry or product-related certifications e.g. Microsoft Certified Solution Developer (MCSD), Cisco Certified Network Associate (CCNA), or Adobe Certified Expert (ACE). Certifications have also been developed by the open source community e.g. Red Hat (Red Hat Certified Engineer and Technician) and credentials granted by the Linux Professional Institute (e.g. Senior Level Administration (LPIC-3)). Moreover, certifications are issued by professional or industry associations such as the IEEE Computer Society, CompTIA, CEPIS, etc. Nowadays certifications are granted increasingly on national level by multi-stakeholder consortia led by national governmental bodies and their agencies as e.g. AITTS by CertIT in Germany.

Altogether, this provides us with clear indication of a

### *The Guest Editors*

**Luis Fernández-Sanz** received a degree in informatics engineering from Technical University of Madrid (Spain) in 1989 and a Ph. D. degree in informatics from University of the Basque Country in 1997 (with extraordinary mention for his doctoral thesis). From 2000 to 2006 he was the head of the department of Computer Systems at *Universidad Europea de Madrid*. From 1992, he is the coordinator of the software engineering section of Novatica and editor of REICIS ([www.ati.es/reicis](http://www.ati.es/reicis)). Luis has explored the relationship between university education and employability through different research projects and he is in charge of the most detailed study of IT job offers in Spain: RENTIC (<http://esp.uem.es/rentic>). [lufesa@computer.org](mailto:lufesa@computer.org).

**María-José García-García** received a degree in Computational Mathematics by *Universidad Complutense de Madrid* (Spain). She has worked in software development companies (1994 – 1999). She is with the *Universidad Europea de Madrid* since 1998 and she has acted as coordinator of the Informatics Engineering degree from 2004 to 2006. She had participated in a number of research projects focused on university education and employability. Author or co-author of several papers in different journals and conferences, María José is completing her doctoral thesis about computing professional profiles in software development. [mariajose.garcia@uem.es](mailto:mariajose.garcia@uem.es).

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sustained credentialing system that operates globally and independent of national authorities and formal education systems which is reason enough to highlight this special issue in order to get to the bottom of certification systems.

Today, certification systems offer a recognisable system and infrastructure for learners. Evidently, there is a strong link between IT professionalism and certifications.

ICT (Information and Communication Technologies) have been always subject to a continuous cycle of advancement and change. Due to the explosion of innovations in ICT and the shortening technology life-cycles and newly emerging trends, IT professionalism underlies a constant change and necessitates regular updating of once acquired knowledge, skills and competence; although IT professionals have started to become acquainted with regular "hot topics" and technology trends that often have popped out of nowhere over the last decades.

The IT profession is a relative newcomer that cannot rely on long tradition as can other established disciplines e.g. law, mechanical engineering, medicine, etc. Perceptions about what the IT profession *is* vary, and hitherto there has been no common understanding and agreement with regard to a shared body of knowledge.

ICT certifications seem to be an answer to these constant changes by offering a flexible, learner-centred infrastructure and competence-oriented qualification system. Hence, one is not surprised that most successful certifications (if measured in increase of salary for the holders) are specialist certifications that are clearly oriented toward the actual needs of industry (as e.g. security specialists, network designers, system integrators, data base administrators, etc.). Certifications offer an interesting way to enter into the IT profession by confirming acquired and demonstrated knowledge, skills and competences regardless of a candidate's qualifications or where and how they have been obtained. So, they seem to be an attractive way for individuals to enter the IT profession and an important supplement to traditional paths.

However, as there is still great debate about different topics which determine the real influence and benefits of certifications, Upgrade wants to contribute to and promote discussion and analysis among readers with a selection of articles provided by recognised experts in the area as well as information, surveys, URLs and references. The articles are related to the industry and academic world and they are aimed at introducing into the area of ICT certification and look at different issues, applications and projects in connexion with the main topic. The section of references on ICT certifications helps the reader to get acquainted with the main sources of information existing in ICT training and education.

We hope that this issue will contribute to a better understanding of the different aspects of this real hotspot within the area of IT education and professionalism.

The first article looks at the history of ICT certifications. The paper titled "*E-Skills Competences in Europe: A Partnerships to Deliver Sustainable Value*" by **Hugo Lueders** introduces industry-based competences and certifications in ICT. The author argues the relevance of industry-based certifications for the recognition of learning and points out the necessity of multi-stakeholder partnerships

to align and improve workforce preparation systems. It discusses how industry-based certifications can play a crucial role in a credentialing system that supports skills development, innovation and life-long learning.

"*The International IT Professional Practice Programme*" is the title for the analysis of IT profession by **Charles Hughes** and **Colin Thompson**, two authors with outstanding experience in an influential professional IT association, the BCS. They offer an overview of the fundamentals of IT as profession as well as a description of different aspects of work under the IFIP and CEPIS promotion to create standards and qualifications internationally meaningful and recognized.

To enlarge upon ICT certifications necessitates an understanding of the environment and general context in which systems operate. The article "*The Context: the IT Professional Labour Market*" by **Matthew Dixon** gets to the bottom of the relevance of ICT certifications with regard to their role in demonstrating candidates' capabilities to employers. Those who invest in training and assessment assume that there will be a genuine return on that investment. The article looks at the ICT professional market and argues the prevailing difficulty of forecasting demand and supply of ICT skills and thereby determining the general relevance and "value" of certifications.

The Software Engineering Institute is a well-known institution in the area of software development as a source of models and guidelines for organizations. **Jefferson Welch** presents the programme of SEI for certifying individuals in different areas of technology. His paper, titled "*Certifications for Software Professionals Helps to Assure Safety, Reliability in Vital Systems*" can help readers to appreciate the global dimension of SEI and its Credentials Programme based on the philosophy of determining best practices for specific areas of work like computer security incident handling, software engineering process management, and software architecture design.

A subsequent article "*Survey of ICT Certification Systems for ICT Professionals in Europe*" by **Roman Povalej** and **Peter Weiß** explores what ICT certifications definitely are (and what they are not), what they actually offer, and what is their obvious "value" offered. Most interestingly, the authors discuss the relationship between ICT certifications and formal education based on the concept of performance components. Moreover, the authors present a taxonomy to categorise ICT certification programmes. Also described are some of the challenges to be faced in working towards improving comparability of ICT professional certifications systems within Europe. Professional associations seem likely to play a pivotal role in harmonising existing systems and approaches.

ATI, the Spanish body of CEPIS, exploiting the coincidence with this issue, launched an extensive survey on the image and opinion of IT professionals regarding personal accreditations and certifications during the period from March to May of 2007. The article "*Perception of personal accreditations by IT professionals in Spain*" by **Luis**

*Fernández-Sánz* and *María-José García-García* contains an analysis of the results of that survey, obtained from the response of 130 IT professionals revealing interesting data about their perceptions and opinions on ICT certifications.

Finally, it is also important to promote standardization in the areas of human resources, career development and certifications in the IT field. Due to the heterogeneity of the

different sources of information and involved domains, the need for ontology has been clearly considered as an important demand for the future. *Michael L. Brown*, *Karsten O. Lundqvist*, *Shirley Williams*, and *Keith Baker* offer an interesting analysis on this in their paper "ontoReadiness: A meta-Ontology for Readiness Certification and Career Portability".

## Useful References on ICT Certification

In addition to the references and sources mentioned in the articles of this issue, interested readers may like to take a look at the following books, articles, journals, etc.

### Books

- Peter Weiß, Dudley Dolan, Wolffried Stucky, Peter Bumann. ICT Skills Certification in Europe, authors on behalf of CEPIS, Cedefop publication 6013. <[http://www.trainingvillage.gr/etv/Information\\_resources/Bookshop/result\\_publ.asp?from=1&cedefop\\_nr=6013](http://www.trainingvillage.gr/etv/Information_resources/Bookshop/result_publ.asp?from=1&cedefop_nr=6013)>.

### Articles

- Luis Fernández-Sanz, María-José García-García. "The Human Factor in Software Engineering". Upgrade, Vol. VII, issue No.1, February 2006, pp. 59-66. <<http://www.cepis-upgrade.org/issues/2006/1/up7-1Fernandez.pdf>>.
- Luis Fernández-Sanz and María-José García-García. "Software engineering professionalism". Upgrade, Vol. IV, No. 4, 2003, pp. 42-46. <<http://www.cepis-upgrade.org/issues/2003/4/up4-4Fernandez.pdf>>.

### Journals

- Communications of the ACM. <<http://acm.org/cacm/>>.
- Journal of Computing Sciences in Colleges. <<http://portal.acm.org/>>.
- Microsoft Certified Professional Magazine. <<http://mcpmag.com/>>.

### Conferences

- European e-Skills Conference 2006. <<http://eskills.cedefop.europa.eu/conference2006/>>.

### Web Sites

- ACM Education. <<http://campus.acm.org/crc/>>.
- CA Computer Associates. <<http://www.ca.com/us/education/>>.
- CEN/ISSS Workshop ICT Skills. <<http://www.cenorm.be/cenorm/businessdomains/businessdomains/iss/activty/wsict-skills.asp>>.
- Certiport. <<http://www.certiport.com/>>.
- Cisco Academy. <<http://www.cisco.com/web/learning/>>.
- CompTIA. <<http://www.comptia.org/>>.
- e-Skills Certification Consortium (eSCC). <<http://www.e-scc.org/>>.
- Enterprise Architecture Certification. <[http://www.enterprise-architecture.info/EA\\_Certification.htm](http://www.enterprise-architecture.info/EA_Certification.htm)>.
- EUCIP (European Certification of Informatics Professionals). <<http://www.eucip.com/>>.
- European e-Skills Forum. <<http://eskills.cedefop.eu.int/>>.

- IBM Education. <<http://www-03.ibm.com/industries/education/>>.
- IEEE Certification. <[http://www.computer.org/portal/site/ieeecs/menuitem.c5efb9b8ade9096b8a9ca0108bcd45f3/index.jsp?&pName=ieeecs\\_level1&path=ieeecs/education/certification&file=index.xml&xsl=generic.xsl&](http://www.computer.org/portal/site/ieeecs/menuitem.c5efb9b8ade9096b8a9ca0108bcd45f3/index.jsp?&pName=ieeecs_level1&path=ieeecs/education/certification&file=index.xml&xsl=generic.xsl&)>.
- Information Systems Security Association. <<http://www.issa.org/Resources/Industry-Certifications.html>>.
- Institute for Certification of Computing Professionals. <<http://www.iccp.org/iccpnew/>>.
- ISACA CISA/CISM certifications. <<http://www.isaca.org/>>.
- ITIL (IT Infrastructure Library). <<http://www.itil.co.uk/>>.
- Linux Professional Institute. <<http://www.lpi.org/>>.
- Microsoft Learning. <<http://www.microsoft.com/learning/>>.
- The National Association of Communication Systems Engineers. <<http://www.nacse.com/>>.
- Oracle University. <<http://education.oracle.com/>>.
- Pearson VUE examination. <<http://www.vue.com/>>.
- Prometric examination. <<http://www.register.prometric.com/>>.
- Software Engineering Institute (Carnegie-Mellon University). <<http://www.sei.cmu.edu/activities/credentials/index.html>>.
- Sun Microsystems. <<http://www.sun.com/training/>>.
- Tech Career Compass. <<http://tcc.comptia.org/>>.

### Standards

- ACM Curricula Recommendations. <<http://www.acm.org/education/curricula.html>>.
- Conformity assessment — General requirements for bodies operating certification of persons. <<http://www.iso.org/iso/en/CombinedQueryResult.CombinedQueryResult?queryString=17024>>.
- European Qualifications Framework. <<http://europa.eu.int/comm/education/policies/educ/eqf/>>.
- IEEE Learning Technology Standards Committee. <<http://ieeeltsc.org/>>.
- IMS Reusable Definition of Competency or Educational Objective Specification. <<http://www.imsglobal.org/competencies/>>.
- Software Engineering Body of Knowledge. <<http://www.swebok.org/>>.

### Quality

- ProCert Labs, The Quality Assurance Standard For Curriculum Alignment. <<http://www.procertmag.com/>>.