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**WG20 Software Engineering Body of Knowledge
Meeting Minutes
October 21, 2004**

This was the fifth official meeting of the WG20 group. The meeting was held in Stockholm on October 21, 2004.

Attendees to the meeting:

Name	Country/organisation	e-mail
Juan Garbajosa	Spain	jgs@eui.upm.es
Motoei Azuma	Japan	azumam@waseda.jp
Hiroshi Mukaiyama	Japan	mukaiyama@jitec.jp
Kiyoshi Ogawa	Japan	ogawa.kiyoshi@nmiri.city.nagoya.jp
Stephen Seidman	USA	stephen.seidman@njit.edu
Risto Nevalainen	Finland	riston@sttf.fi
Bernd Hindel	Germany	Bernd.Hindel@isqi.org
Jonathan Earthy	UK	jonathan.earthy@lr.org
Stuart Arnold	UK	sarnold@qinetiq.com

Agenda

1. Initiation

- A. Welcome and introductions
- B. Approval of 2004 Interim Meeting agenda

2. Approval of Meeting Minutes on 2004 Plenary Meeting

3. Interim Report of JTC1/SC7 Study group on software engineering certification

- A. Presentation of the Interim Report of JTC1/SC7 Study group on software engineering certification
- B. Discussion. Some issues considered as critical are the following:
 - Role of examinations
 - Harmonization with national approaches
 - Treatment of professional engineers
- C. Approval is consensus is reached
- D. Plan for the final report of the Study group on software engineering certification

4. Status of TR 19759

5. Discussion of cooperation with other Bodies and future initiatives of the WG

6. Action items for the project progress

7. Discussion of future meetings locations

8. A.O.B.

Approval of Meeting Minutes on 2004 Plenary Meeting

The minutes of the 2004 Plenary meeting were published on the SC7 Web site and comments have been received until now.

Interim Report of JTC1/SC7 Study group on software engineering certification

The interim report of the study group was presented by Prof. Seidman. The slides used in his presentation are attached to these minutes. In addition, a number of countries presented currently on-going initiatives and their positions with respect to the general topic.

The content of the other presentations is outlined below:

Prof. Bernd Hindel (Germany) presented the approach represented by iSQI, a non-profit institution with links to EOQ-SG, and ASQ (www.isqi.org). One of the objectives is to represent Germany in standards organizations. This effort is sponsored by the government and a number of companies.

Their certification scheme is based on a syllabus maintained by members of industry, science and education, who maintain the syllabus and exams. The iSQI organization checks that training companies provide an adequate level of training. Certification is focused on specific jobs such as requirements engineer or software tester, and for each job several levels can be attained. Certified persons need not renew the lowest level (foundation) but must do so for the expert and advanced levels. At present, agreements are being signed with other countries such as Russia. There is a degree of compliance with SWEBOK. A link to the academic world is provided by modules that are also used for teaching at a number of universities.

In Germany the Informatics Association has another certification initiative that is project-oriented rather than topic-oriented.

Prof. Juan Garbajosa presented a perspective from Spain. New regulations will hopefully be ready at the beginning of the year in line with the European Education Space, Bologna Declaration. Input from Spain will be provided as soon as it is available. Information on the European Education Space can be found at

http://europa.eu.int/comm/education/policies/2010/et_2010_en.html

and on Recognition and transparency of qualifications at

http://europa.eu.int/comm/education/policies/rec_qual/rec_qual_en.html

The UK position was presented by Dr. Jonathan Earthy and Dr. Stuart Arnold. In the UK, there are two relevant professional societies: the British Computer Society (BCS) and the Institute of Electrical Engineers (IEE).

BCS offers several approaches to professionalism. One approach is based on society membership, together with professional career monitoring (www.bcs.org/BCS/Join/). Another approach involves becoming a chartered engineer or scientist. This is analogous to professional engineering licensure in the US.

The BCS also supports the PDS professional development scheme as a service to its members; it can be operated by other organizations in other countries. Members of the BCS may seek recognition of their qualifications; their information is submitted to the BCS by a company affiliated with this program; this includes all major companies in the UK.

The ISEB scheme is another highly detailed and complex approach that introduces jobs, levels, and qualifications. BCS also supports EUCIP qualifications.

The presentation from the IEE emphasized the following critical aspects of systems engineering professionalism: knowledge, skills, experience and aptitude.

Finally, the UK-based SFIA and SFIPlus (<https://sfiplus.bcs.org>) models constitute an Industry Standard Model framework for professional development. This framework uses 40 roles, 79 skills, and up to 7 levels to classify individual positions in software-related industries. The level of each individual is evaluated by a mentor, and the entire programme is regularly reviewed by senior management, consultants, etc. To be at a professional level (and therefore eligible to evaluate those at lower levels) you have to demonstrate participation in conferences, courses, etc.. You need not be a member of BCS for this. This is an “unfunded mandate” supported by professionals and their employers.

Mr. Hiroshi Mukaiyama described the government examinations used in Japan. The tests are prepared by a committee and are replaced each year. The questions about knowledge and technical issues appear in the exam; the exam collection includes professional profiles such as systems analyst, software design and development engineer, project manager, technical engineer for embedded systems. The Japanese exam system has been running for 35 years. Japan has recently established bilateral agreements with 9 Asian countries, including China, India, and Korea, dealing with these examinations.

Careerspace (www.career-space.com) represented another skills approach.

Prof. Motoei Azuma mentioned that while in some countries, professionalism may dominate formal university study, this is not the case in all the countries. He mentioned a paper in the STEP2003 proceedings that could be considered as an input to the study group. The paper discusses how Bloom’s taxonomy could be expanded to be more useful not only for education but also for industry. A new taxonomy that is more applicable to engineering is proposed at the end of this paper.

Some conclusions:

After considerable discussion, the group came to the conclusion that, given the variety of approaches and activities related to certification processes for software engineers, it might be possible to build consensus on the idea of a standard framework process for certification of professionals. Countries might use that framework as a basis to define their certification process and, subsequently to reach agreements with other countries on the basis of a common certification process framework.

With respect to the assessment of expertise, it was concluded that this could be done in very different ways in various countries and environments. The range of possibilities includes traditional exams, interviews, and career monitoring (e.g. positions attained, courses followed).

With respect to certification for specific jobs, it was concluded that a large variety of jobs will need certification; this includes IT jobs, engineering jobs, and some jobs that overlap both. For instance, the approaches taken in Japan and the UK are very broad, covering much of the IT industry, while the US and Australia focus on software engineers. The iSQI approach in Germany focuses only on subsets of software engineering jobs.

With respect to the qualifications required for certification, the group felt that there is a great difference between in the kind and level of the qualifications needed for certification in the various countries. It was also observed that some certifications schemes are designed to guarantee a minimum level of skills, while others are designed to certify professionals possessing the highest level of excellence.

Finally, the group realized that certification may be oriented towards skills, or toward knowledge areas. For instance, SCP has a link between knowledge areas and skills.

A Proposal to reach consensus

A consensus can be built initially about standardizing how to define, organise and perform the certification process. This may require the definition of issues such as:

- List of jobs
- Competence scheme
- Evaluation approach
- Topics: knowledge, skills, experience, attitude
- Appendix: lists of recommended jobs, skills, knowledge areas, competences

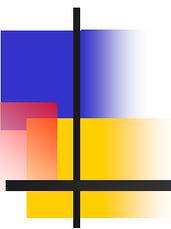
The objective can be to provide a framework that would allow countries to sign bilateral agreements (such as those that Japan now has with a number of ASEAN countries)

based on an agreed certification baseline and process. This may result in increased trade practices, in line with the ISO and IEC vision.

Action Items

JGS	28 Oct	Distribute draft minutes
SS	Dec 20th	Updated report and distribute for comments
all	Jan 20th	Provide comments to SS
SS	Feb 20th	Distribute informally to NBs

International Certification of Software Engineers



Study Group Interim Report
Stockholm, October 2004





Background



- JTC1/SC7 Resolution 794 established the study group and charged it to consider the following issues:
 - Task analysis (ISO/IEC 12207)
 - Test specification (ISO/IEC TR 19759)
 - Harmonization with ISO standards on personnel certification
 - Coordinated development with the IEEE Computer Society



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- Provisions enabling nations to write culturally appropriate examinations and to administer culturally appropriate certification programs
 - Provisions providing for portability and mutual recognition of certifications across national boundaries
 - Provisions respecting the status of individuals recognized by governments as “software engineers”
 - Criteria and operation of existing schemes in nations



Relevant standards



- ISO/DIS 9712
- ISO/DIS 18436
- ISO/DIS 17024
- National Organization for Competency Assurance (US)



Fundamental Principles of Certification



- Certification body
 - Defines, describes, and manages certification policies, processes, and procedures
 - Establishes certification scheme
 - Performs a job/practice analysis (with consultation of interested parties), leading to
 - A description of field and target population
 - A list of tasks performed by professionals
 - A list of certification requirements
 - A specification of the examination or other assessment scheme



- The certification body also
 - Considers the possible subcontracting of aspects of work
 - Establishes procedures for maintenance of certification
 - Establishes recertification requirements and procedures



Proposed Guidelines for SE Certification



- Professional organization responsibility for certification body (CB)
- CB develops and maintains certification scheme
- CB performs job and task analysis
 - Critical tasks and work activities, mapped to ISO/IEC 12207
 - Specification for examination or other assessment scheme, referenced to ISO/IEC 19759
 - Assures cultural appropriateness



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- CB creates and approves examination or other appropriate assessment scheme
 - CB manages certification activities
 - Record-keeping
 - Providing description of process
 - Administering application process
 - Monitoring maintenance of certification and recertification



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- The certification body must also
 - work to achieve portability and mutual recognition of certification
 - establish procedures for granting certification to those recognized as professional software engineers



Steps toward a final report



- Prepare final document
- Propose guidelines for software engineering certification that can be regarded as a “reference architecture”
- Approaches used for certification in different countries can be mapped to the guidelines



- Examples will include
 - IEEE Computer Society: CSDP
 - JITEC (Japan): Software Design and Development Examination
 - ISQI (Germany): certification program
 - SFIA, ISM (UK): IT job skills definition program



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- Recommendations for future work item