

ICT PROFESSIONALISM Developments¹

Overview September 2007

Recent information concerning October 2007 – December 2008 has not yet been incorporated.

Please send any additional information to PC-IPROF-09@planet.nl and mention your name, organization and references to paragraph numbers and/or line numbers.

Thanks for your contribution.

8		
9	1. INTRODUCTION	1
10	2. PROFESSIONAL ORGANIZATIONS	2
11	2.1 BCS	2
12	2.2 CEPIS	2
13	2.3 USA	3
14	2.4 IFIP	3
15	3. Business and industry	3
16	3.1 CompTIA	3
17	3.2 eSCC	3
18	3.3 Career Space	3
19	4. Europe	4
20	4.1 Foresight	4
21	4.2 Conferences	4
22	4.3 Frameworks	5
23	5. Opportunities	6
24	5.1 Exchange	6
25	5.2 Frameworks for reference	7
26		

1. INTRODUCTION

Near the end of the previous century, ICT professionals, professional organizations, international organizations, business and industry, social partners and governments from all over the world showed a severe concern about shortages of qualified ICT personnel. Insufficient availability has been addressed as a gap or a mismatch between supply and demand of skilled and qualified ICT personnel, both in a quantitative and a qualitative way. A growing mobility of employees and students asks for tools to bring transparency in the jungle of ICT function and task descriptions, diplomas and certificates. Moreover, ICT awareness of citizens in general is indicated to be below an acceptable level for participation in an information society. The mismatch and lack of awareness are specified as serious factors in influencing future economic growth and development and participation of citizens in society.

Parties involved felt themselves responsible and started to contribute to initiatives to better understanding international ICT labour market issues. A lot of effort has already been put in projects, labour market research, taskforces, harmonization of diplomas and certification, conferences and declarations. In many cases parties are successfully cooperating in research studies, keeping each other informed about progress, views and operations.

Measures to get more and properly qualified ICT personnel on the right place require a long term strategy, supported by parties involved, including business and industry, social partners, education and training. Education and training in all its aspects, lifelong learning included, play a key role in

¹ The ICT professionalism document is based on a paper presented by Anneke Hacquebard during the ETLLE conference in Prague, 26 – 28 September 2007. It addressed aspects related to the work of IFIP Working Group 3.4 and IFIP Special Interest Group 3.8

ETLL: Education Training and Lifelong Learning

46 preparing people for a successful career in business and industry or other parts of society.
47 Contributions to improvement of mutual understanding of ICT subjects, tasks, knowledge, skills,
48 personal competence and certification need full attention. Development of “ICT skills frameworks” may
49 play an important role. “ICT competency profile” or “ICT skills framework” are commonly used generic
50 terms, including all types of descriptions of ICT skills and knowledge, on the level of practitioners or
51 professionals. Recently terminology is changing from ICT skills to e-skills. “Frameworks” indicate
52 broader structures and are not restricted to ICT skills or competence.

53 The large group of citizens, often addressed as users, can be split up in two main, not mutually
54 exclusive categories: usage of ICT at home and usage of ICT in a working environment. Outlines of
55 aspects mentioned in the next paragraphs, like better understanding and transparency of certificates,
56 the role of education and training, apply to users as well.

57 Global, regional and local economic developments influence the demand for ICT skilled personnel. It
58 turns out that tools to predict ICT skills demand are not yet mature.

59 Overlooking and summarizing some of the main running or recently finished initiatives of the last
60 seven years, with emphasis on European developments because of the authors’ place of residence, it
61 can be concluded that another two till five years will be needed before its outcomes and influences on
62 ICT workforce constitution and its impact on the ICT labour market can be evaluated.

63 Activities mentioned in the next paragraphs are just examples and could be supplemented by a great
64 many actions performed by international organizations such as UNESCO, OECD, EU agencies,
65 professional organizations and social partners from all over the world.

66 **2. PROFESSIONAL ORGANIZATIONS**

67 Professional organizations dedicated to ICT are involved in international developments as members of
68 e.g. CEPIS (Council of European Informatics Societies) or IFIP (International Federation for
69 Information Processing) and keep close contacts with governments, social partners, business and
70 industry. Several societies, such as ACM (Association for Computing Machinery), BCS (British
71 Computer Society), IEEE (Institute for Electrical and Electronics Engineers) have a broad international
72 membership file.

73 Professional organizations started worrying about lack of mutual understanding and labour market
74 issues, long before the turn of the century.

75 **2.1 BCS**

76 In 1988 the BCS and CEPIS started a task force Working on Professionalism “to study the issues of a
77 view to joint representation to the CEC (Council of European Communities) by the European societies
78 on education, training and qualification.” In 1992 the Task Force delivered EISS (European Informatics
79 Skills Structure) (CEPIS, 1992). BCS developed ISEB (Information Systems Examinations Board) and
80 participates in SFIA (Skills Framework for the Information Age). Based on EISS, BCS developed ISM
81 (Industry Standard Model) which is now incorporated in SFIAplus, an ICT skills, training and
82 development model reflecting industry needs (Site SFIAplus).

83 **2.2 CEPIS**

84 CEPIS addressed the user level as well as labour market and certification issues. In 1995 CEPIS
85 started a task force looking at the user level to develop the ECDL (European Computer Driving
86 Licence) to raise the level of computer skills. Outside Europe exactly the same program is offered as
87 ICDL (International Computer Driving Licence). ECDL/ICDL is currently active in 146 countries all over
88 the world (Site ECDL).

89

90 CEPIS participates, together with ECDL and seven European professional organisations in the
91 Harmonise Project. It is about reviewing qualification and certification schemes and aims clarifying the
92 underlying profiles, terminology and curricula (Site Harmonise Project).

93 In 2001 CEPIS initiated a labour market study in four European countries (Dixon, 2002b). In 2006
94 CEPIS participated in an ICT European market research project (see paragraph Foresight).

95 CEPIS was one of the initiators of and has been (co-)chairing the CEN/ISSS ICT Skills Workshop
96 (European Committee for Standardization / Information Society Standardization System) (see
97 paragraph CEN/ISSS: ICT-Skills Workshop).

98 **2.3 USA**

99 In the USA, ACM and IEEE, together with other professional organisations developed computing
100 curriculum guidelines for colleges and universities, published over the last forty years. Starting in 2001
101 a joint Computing Curricula series has been published (The Joint Task Force for Computing Curricula
102 2005).

103 **2.4 IFIP**

104 History files of IFIP show the subject of professionalism already in 1966. In 1987 IFIP adopted a
105 modular curriculum for information systems, developed by BCS (Buckingham et al., 1987)

106 IFIP showed its strong concern in 2002 by organizing the “IFIP OECD WITSA Joint Working
107 Conference: “Meeting Global IT Skills Needs – the Role of Professionalism” . About forty specialists
108 presented their view on the ICT skills gap and mismatch and discussed options for solutions. After
109 paying attention to the ICT professionalism issues during IFIP world conferences, especially in Chile in
110 2006, a IFIP Professional Practice Task Force produced a first report (Hughes, 2007). In September
111 2007 IFIP announced in a press release an international standard for IT Professionals. Parties
112 involved in developing the standard are ACS (Australian Computer Society), BCS, CIPS (chartered
113 professional association for Information Technology (IT) practitioners in Canada) and CSSA
114 (Computer Society of South Africa) (Microsoft Supports Plan For International Standard For IT
115 Professionals, 2007).

116 **3. Business and industry**

117 Multinationals and big companies try to solve ICT gap and mismatch problems merely internally as
118 they cannot wait until outcomes of international discussions, projects and effort will be available and
119 may bring some relief. HR management in many cases is moving from a job oriented to a task
120 oriented approach, a reason to move to corporate competency frameworks. Companies often
121 participate in international bodies, working on behalf of the members on labour market and skills
122 issues. To enable employees to gain the knowledge and skills required, the great software and
123 hardware suppliers developed vendor specific certificates. A listing of the Harmonise Project shows
124 about 55 parties on a global scale offering together more than 450 mostly product oriented certificates
125 (Site Harmonise Project).

126 **3.1 CompTIA**

127 CompTIA (Computing Technology Industry Association) has more than 22.000 member companies in
128 over 100 countries around the world. “It is committed to advancing the long-term success and growth
129 of the ICT industry by helping organizations maximize the benefits they receive from their investments
130 in technology; and by helping individuals to obtain the skills and credentials they need for productive
131 careers in IT” .

132 **3.2 eSCC**

133 The eSCC (e-Skills Certification Consortium) “aims to develop mechanisms leading to the
134 endorsement and/or recognition of industry and other non-formal certifications by public sector
135 authorities in the EU Member States” (Site eSCC).

136 **3.3 Career Space**

137 The Career Space consortium, founded about 1999 by seven ICT companies in Europe, started a
138 project with EU support to develop Generic Skills Profiles for the ICT Industry in Europe. The
139 consortium expressed its strong concern with the ICT skills gap and mismatch and intended to offer
140 young people an easy access to ICT job information. Eighteen job profiles were presented in a
141 brochure and on a website (Career Space Consortium, 2001b). To support universities, Curriculum

142 Guidelines were developed (Career Space Consortium, 2001a). The Career Space documents have
143 been evaluated in 2003 by the CEN/ISSS ICT-Skills Workshop of the Career Space work (CEN/ISSS
144 ICT-Skills Workshop of the Career Space work, 2004a) (CEN/ISSS ICT-Skills Workshop of the Career
145 Space work, 2004b).

146 **4. Europe**

147 In March 2000 the European Council set out the Lisbon Strategy (Lisbon Agenda or Lisbon Process),
148 an action and development plan for the European Union. A midterm review in 2005 resulted in a
149 simplification of programming. In the context of the revised strategy i2010 (A European Information
150 Society for 2010) was developed (Commission of the European Communities, 2005; Commission of
151 the European Communities, 2006a; Commission of the European Communities, 2007). This strategy
152 followed from two previous action plans, eEurope 2002 and eEurope 2005, which set out the steps to
153 be taken to promote ICT in Europe (Site eEurope 2002; Site eEurope 2005).

154 Summarized, in 2007 a long term e-skills strategy includes (Richier, 2007):

- 155 • Improving data availability
- 156 • Bridging “parallel universes”
- 157 • Multi-stakeholders partnerships
- 158 • Promoting e-learning solutions
- 159 • EU e-competence framework
- 160 • Promoting e-skills for all.

161 **4.1 Foresight**

162 Future development of the ICT labour market is addressed in research and reports, e.g.:

- 163 • Analysis of the Supply and Demand
164 An in-depth study into the supply and demand of e-skills (2004) within the European
165 Union, in relation to ICT Practitioner skills. It has been found that comparatively very little
166 consistent, reliable quantitative evidence is available in relation to clarifying the factual
167 situation of the supply and demand of e-skills at the European level. The report
168 recommends combined use of seven complementary indicators .
- 169 • Forecasting the Demand and the Supply
170 A white paper, based on a data survey in 31 countries, with emphasis on an expected
171 increasing shortage of people with networking skills (Kolding and Kroa, 2005).
- 172 • e-Skills Foresight Scenarios
173 The report distinguishes between three types of e- skills: ICT practitioner's skills, ICT
174 users' skills and e-business skills. It examines key trends that influence supply and
175 demand of each of the three types of e-skills, as well as the off-shoring of ICT work. It
176 examines, qualitatively and quantitatively, possible future developments. Ninety 'change
177 drivers' covering social, technological, economic, environmental, political and values-
178 related forces have been identified and examined (Dixon M. et.al., 2006b; Dixon M. et.al.,
179 2006a).

180 **4.2 Conferences**

181 Since the declaration of the Lisbon Agenda, EU Directorates General and EU Agencies have been
182 involved in supporting initiatives, starting processes, facilitating parties to exchange intentions, visions
183 and experiences to achieve goals stated by the European Commission.

184 As to ICT, three main conferences in succession acted as a platform for exchange and putting
185 together views, each ending with recommendations to the European Commission, Member States,
186 Social Partners and other parties.

- 187 • E-Skills summit
188 October, 2002, Copenhagen, Denmark, concluded with the E-Skills Summit Declaration
189 (European e-Skills Summit Declaration, 2002)
- 190 • European e-Skills Conference
191 Thessalonica, Greece, September 2004
192 Concluded with a final declaration and a report: E-Skills for Europe, Towards 2010 and
193 beyond, Synthesis report
- 194 • E-Skills Preparing a Long-Term Strategy
195 Thessalonica, Greece, October 2006, concluded with the European E-Skills declaration .
- 196 Too many to list are thematic international conferences about e-Learning, Lifelong Learning and other
197 topics, often on an annual or biennial schedule.

198 **4.3 Frameworks**

199 ICT professionals' tasks, addressed in different ways, have a lot in common. Differences are related to
200 companies' perspectives and goals in a variety of social, economic and cultural contexts. Existing
201 models and frameworks describing jobs, tasks, learning and training programs, learning outcomes,
202 are merely based on local or national needs, national regulations and a specific context. Because of
203 different starting points and environments, it turned out to be hard or impossible to link existing
204 frameworks. Business, industry, education and others are working on new frameworks or on a
205 renewal of existing frameworks, because of a rather common change from job descriptions to task
206 descriptions. It is at least inconvenient for employers and employees, students and teachers, not to be
207 able to get a clear insight in levels of performance of tasks, of educational levels, of diplomas and
208 certificates available in their international professional environment. Increasing international mobility of
209 employees and students urges for a solution connecting national and international ICT competency
210 profiles.

211 Common starting points, a shared view on common references, supported as much as possible by
212 international ICT communities, may contribute to convergence and better mutual understanding of ICT
213 professionalism in all its aspects. Tools, applications, web portals to be developed in the near future,
214 based on common starting points, preferably simple and easy to implement or to consult, suitable as a
215 reference and not knocking down existing frameworks may contribute in due course to a clear and
216 durable view on ICT professionalism.

217 **The European Qualifications Framework for lifelong learning**

218 The European Qualifications Framework (EQF) (Commission of the European Communities, 2006b)
219 encounters learners from the end of a learning process, at their learning outcomes. The EQF contains
220 a set of eight reference levels describing what a learner knows, understands and is able to do
221 regardless of the system where a particular qualification was acquired. The eight levels cover the
222 entire span of qualifications from those achieved at the end of compulsory education to those awarded
223 at the highest level of academic and professional or vocational education and training. The EQF
224 encompasses general and adult education, vocational education and training, as well as higher
225 education.

226 By looking at learning outcomes instead of learning input, it is expected that validation of formal and
227 informal learning will be achievable. Another advantage of taking in consideration only what has been
228 achieved at the end of the learning process may be the possibility to match labour market demand
229 with educational supply (Site EQF).

230 **Europass**

231 Europass is a set of documents to help people to make their skills and qualifications clearly and easily
232 understood in Europe. In December 2004 the EU decided upon a single Community framework for the
233 transparency of qualifications and competences (Europass) (Site Europass).

234 Europass consists of five documents:

- 235 • two documents, templates to be filled in by the person himself:
- 236 ○ Europass curriculum vitae
- 237 ○ Europass Language Passport to describe language skills

- 238
- three documents to be filled in and issued by competent organisations:
- 239
- Europass Certificate supplement for vocational education
- 240
- Europass Diploma Supplement for higher education
- 241
- Europass Mobility, a record of any organised period of time (Europass Mobility
- 242
- experience) spend in another European country for the purpose of learning or
- 243
- training.

244 **CEN/ISSS: ICT-Skills Workshop**

245 CEPIS, CEDEFOP (European Centre for the Development of Vocational Training) and ICT Industry
246 represented by the Career Space Consortium, prompted by the Career Space documents published in
247 2001 and growing awareness of ICT skills gap and mismatch problems, raised in 2003 the CEN/ISSS
248 Workshop on ICT Skills, directly linked to the EU Directorate General Enterprise and Industry.
249 CEN/ISSS is hosting a great many international workshops on a variety of subjects .

250 In 2007 the Workshop is on its third phase of operation.

- 251
- In its first phase (2003), it published two initial CEN/ISSS Workshop Agreements (CWA's):
- 252
- Generic ICT Skills Profiles for the ICT supply industry - a review (CEN/ISSS ICT-Skills
- 253
- Workshop of the Career Space work, 2004a)

254 ICT Curriculum Development Guidelines for the ICT supply industry - a review (CEN/ISSS ICT-Skills
255 Workshop of the Career Space work, 2004b).

256 The second phase (2005) the Workshop developed a view on ICT skills, knowledge and professional
257 attitude looking at existing models and running initiatives. The Workshop published:

- 258
- European ICT Skills Meta-Framework - State-of-the-Art review, clarification of the
- 259
- realities, and recommendations for next steps .

260 In its still running third phase, the Workshop's point of particular interest is an "e-Competence
261 Framework", to be proposed by a team of professionals. The framework's aim is to develop a common
262 tool for planning and developing ICT practitioner competences across Europe, providing ICT
263 competence definitions needed and applied by industry. The work of the third phase will include
264 cooperation and interaction with other projects:

- 265
- ICT Certification map, to gain and to strengthen broader recognition of ICT certification
- 266
- products across Europe and beyond.
- 267
- ICT User framework, developing a comprehensive European User e-Skills Framework
- 268
- and doing supportive work in view of LLL (Life Long Learning) in the ICT field.
- 269
- ICT Lane, ICT Qualifications framework, a shared European model for reading ICT
- 270
- qualifications across Europe, providing a common language for understanding ICT
- 271
- qualifications.
- 272
- European ICT Career Portal Study.
- 273
- Methodological study.

274 **5. Opportunities**

275 **5.1 Exchange**

276 Several companies and organizations developed proprietary skills frameworks on behalf of human
277 resources management. It is not realistic to presume that companies will be inclined to move to a
278 totally different skills framework e.g. by replacing their own tools and models by a European or Global
279 ICT skills framework. On the other hand the problem of exclusivity of a corporate approach to
280 approaches of other parties is recognized.

281 National organizations in some cases developed frameworks. Examples are SFIA (Skills Framework
282 for the Information Age) in the UK and AITTS (Advanced IT Training System) in Germany (The SFIA
283 Foundation, 2006; AITTS Partners, 2003). Differences in national educational systems and other
284 cultural barriers, turned out to make it hard to move frameworks from one country to another.

285 Overlooking available national frameworks, every framework has its value in the environment it was
286 developed for.

287 Differences in basic models and terminology used are obstacles preventing exchange of existing
288 frameworks. The basic model for a skills framework can be, for example, job based, task based,
289 competency based or process based. Elements from a job based model for instance, are not easily
290 transferred to a process based model and vice versa.

291 In solving the ICT skills gap and mismatch problem, one has to be realistic and practical and take it for
292 granted that organizations will not be able or willing to change their HR approaches and procedures
293 fundamentally. On the other hand, a step forward to better mutual understanding of ICT skills
294 frameworks has to be made.

295 **5.2 Frameworks for reference**

296 As a first incentive, development of an overall ICT skills framework, to be implemented on a global,
297 regional and local scale, serving the ICT community as a whole, a framework describing ICT
298 knowledge, skills and personal competency, seems to be a solution. From a theoretical point of view it
299 might be. From a realistic and practical point of view, one cannot neglect cultural, social, national and
300 corporate characteristics and investments done. Furthermore it will be hard, or even impossible, to
301 agree upon choices about a basic model and terminology to be used.

302 To move forward and taking into account these constraints, an indirect approach is likely to
303 be more promising. That means that internationally supported frameworks for reference can
304 be used to position existing frameworks. In maintaining existing frameworks, in rebuilding or
305 building new ones, a framework for reference can give something to hold on and serve as a
306 guideline. On the long run, while people and organizations are getting used to consulting
307 generally accepted frameworks for reference, serving as an umbrella, it may be expected
308 that converge between frameworks will grow.

309 **References**

- 310 AITTS Partners (2003) *The German Advanced IT Training System, Concepts And Results* (Bonn,
311 Federal Ministry for Education and Research).
- 312 Buckingham, R., R. Hirschheim, F. Land and C. Tuly, (1987) *Information Systems Curriculum: A Basis*
313 *for Course Design* (IFIP / BCS).
- 314 Career Space Consortium (2001a) *Career Space Curriculum Development Guidelines, Designing*
315 *Tomorrow's Education* (Office for official publications of the European Communities).
- 316 Career Space Consortium (2001b) *Generic ICT Skills Profiles, Future Skills for Tomorrows World*
317 (Office for official publications of the European Communities).
- 318 CEN/ISSS ICT-Skills Workshop of the Career Space work (2004a, March) *Generic ICT Skills Profiles*
319 *for the ICT Supply Industry - a Review*. CEN Workshop Agreement CWA 14925 (CEN, European
320 Committee for Standardization).
- 321 CEN/ISSS ICT-Skills Workshop of the Career Space work (2004b, May) *ICT Curriculum Development*
322 *Guidelines for the ICT Supply Industry - a Review*. CEN Workshop Agreement CWA 15005 (CEN,
323 European Committee for Standardization).
- 324 CEPIS (1992) *European Informatics Skills Structure, A Set of Performance Standards Covering All*
325 *Functional Areas of Work Carried Out by Professionals in Informatics* (Amsterdam, CEPIS).
- 326 Commission of the European Communities (2005, 1 June) *I2010 - A European Information Society for*
327 *Growth and Employment, Communication from the Commission to the European Parliament, the*
328 *Council, the European Economic and Social Committee and the Committee of the Regions*.
329 COM(2005) 229 final, {SEC(2005) 717} (Brussels).
- 330 Commission of the European Communities (2006a, 19 May) *I2010 - First Annual Report on the*
331 *European Information Society, Communication from the Commission to the European Parliament,*
332 *the Council, the European Economic and Social Committee and the Committee of the Regions*.
333 COM(2006) 215 final, {SEC(2006)604} (Brussels).
- 334 Commission of the European Communities (2006b, 5 September) *Proposal for a Recommendation of*
335 *the European Parliament and of the Council on the Establishment of the European Qualifications*
336 *Framework for Lifelong Learning*. COM(2006) 479 final, 2006/0163 (COD), {SEC(2006) 1093},
337 {SEC(2006) 1094} (Brussels).

338 Commission of the European Communities (2007, 3 March) *I2010 - Annual Information Society Report*
339 *2007, Communication from the Commission to the European Parliament, the Council, the*
340 *European Economic and Social Committee and the Committee of the Regions.* COM(2007) 146
341 final, {SEC(2007) 395},{Volumes 1, 2, 3} (Brussels).

342 Declaration, European E-Skills 2006 Conference (2006, 5 - 6 October) (Thessalonica, Greece).

343 Dixon M. et.al. (Consortium team) (2006a, December) *Annexes, Thinking Ahead on E-Skills for the*
344 *ICT Industry in Europe, Harnessing Our Strengths and Diversity for the World Stage.* The Study
345 Consortium was led by CEPIS, with support from PREST (University of Manchester), and
346 Eurochambres. (Council of European Professional Informatics Societies).

347 Dixon M. et.al. (Consortium team) (2006b, December) *Thinking Ahead on E-Skills for the ICT Industry*
348 *in Europe, Harnessing Our Strengths and Diversity for the World Stage.* The Study Consortium
349 was led by CEPIS, with support from PREST (University of Manchester), and Eurochambres.
350 (Council of European Professional Informatics Societies).

351 Dixon, M. (2002a, October 25th -27th) *Background to Conference Sessions, IFIP OECD WITSA Joint*
352 *Working Conference "Meeting Global IT Skills Needs - the Role of Professionalism"* (IFIP).

353 Dixon, M. (2002b, May) *Information Technology Practitioner Skills in Europe, Study of the Labour*
354 *Market Position, in Particular for Germany, Ireland, Sweden, and the United Kingdom* (Frankfurt,
355 CEPIS, Council of European Professional Informatics Societies).

356 Dixon, M. (2002c, October 25th -27th) *Summary Proceedings, IFIP OECD WITSA Joint Working*
357 *Conference "Meeting Global IT Skills Needs - the Role of Professionalism"* (IFIP).

358 Dixon, M. and Y. Beier, (2006, February) *European ICT Skills Meta-Framework - State-of-the-Art*
359 *Review, Clarification of the Realities, and Recommendations for Next Steps.* CEN Workshop
360 Agreement CWA 15515 (CEN, European Committee for Standardization).

361 European e-Skills Summit Declaration (2002, 16-18 October) (Copenhagen).

362 Final Declaration, European E-Skills 2004 Conference (2004, 20 - 21 September) (Thessalonica,
363 Greece).

364 Frinking, E. et.al (2005, September) *Analysis of the Supply and Demand.* Prepared for the European
365 Commission And the European e-Skills Forum (Rand Europe).

366 Hughes, C. (Chairman) (2007) *First Report of the IFIP Professional Practice Task Force* (IFIP).

367 Kolding, M. and V. Kroa, (2005, September) *Networking Skills in Europe: Will an Increasing Shortage*
368 *Hamper Competitiveness in the Global Market? AN IDC WHITE PAPER, Ed. (Cisco Systems).*

369 Microsoft Supports Plan For International Standard For IT Professionals (2007, 12 September) (IFIP).

370 Richier, A. (2007, 23 March, Rome) *Towards a Long Term e-Skills Strategy in Europe, Presentation*
371 *(European Commission, DG Enterprise and Industry).*

372 Site CEN/ISSS,
373 http://www.cenorm/businessdomains/businessdomains/iss/about_iss/workshops+list.asp.

374 Site CompTIA, <http://www.comptia.org>.

375 Site ECDL, www.ecdl.com.

376 Site eEurope 2002, http://ec.europa.eu/information_society/eeurope/2002/index_en.htm.

377 Site eEurope 2005, http://ec.europa.eu/information_society/eeurope/2005/index_en.htm.

378 Site EQF, http://ec.europa.eu/education/policies/educ/eqf/index_en.html.

379 Site eSCC, <http://www.e-scc.org>; <http://www.comptia.org>.

380 Site Europass, <http://europass.cedefop.europa.eu>.

381 Site Harmonise Project, <http://www.cepis-harmonise.org>.

382 Site SFIAplus, <http://www.sfiaplus.org>.

383 The European e-Skills Forum (2004, September) *E-Skills for Europe: Towards 2010 and Beyond,*
384 *Synthesis Report* (European Commission, Enterprise and Industry Directorate-General).

385 The Joint Task Force for Computing Curricula 2005 (2005, 30 September) *Computing Curricula 2005,*
386 *The Overview Report, Covering Undergraduate Degree Programs in Computer Engineering,*
387 *Computer Science, Information Systems, Information Technology, Software Engineering.* A
388 cooperative project of The Association for Computing Machinery (ACM), The Association for
389 Information Systems (AIS), The Computer Society (IEEE-CS). Computing Curricula Series.

390 The SFIA Foundation (2006) *Framework Reference SFIA, Skill Definitions in Categories,*
391 *Subcategories and Skills.* version 3 (The SFIA Foundation).

392