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The Information Systems Profession: A Maturity Model

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Abstract

The Information Systems profession cannot prosper in its current form with a 32% project success rate and continuing IS disasters such as HEATHCARE.GOV. The experience of other professions demonstrates that board certifications and state licensing is a potent contributor to maintaining quality and an orientation to the public good. This paper presents the next step on the road to statutory enhancements to IS professionalism. It is based on the work of the British and Canadian IT professions that are currently leading the way.

Keywords: Certification, Licensing, Professionalism, Accreditation, Assessment, Governance.

1. A MATURITY MODEL OF PROFESSIONALISM

The British Computer Society produced during 2006 a milestone report entitled "Report on the Study of Established Professions to Validate the IT Professionalism Model". They developed the following "general maturity model to provide a reference point against which a profession can be measured on its path to maturity" (BCS, page 24). Figure 1 is copy of their chart.

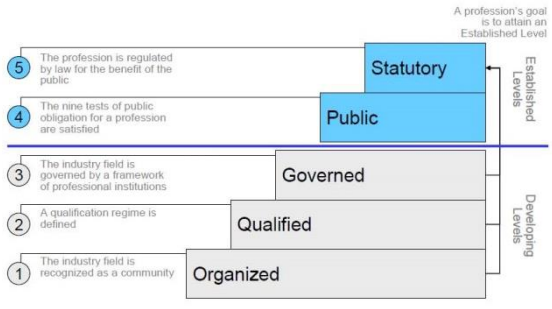

Figure 1: Professionalism Maturity Model

This paper presents where the US is and what we need to do to reach the Public level and be ready for board certifications and state licensing

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	Meets these Professional Obligations to the Public
Public (An established Profession)	1. controlled by a professional governing body, which: 2. sets adequate standards of education as a condition of entry 3. sets the ethical rules and professional standards 4. sets rules and standards that are designed for the benefit of the public and not for the private advantage of the members 5. can take disciplinary action to expel members 6. assures that professional level work is reserved to the profession by statute 7. assures fair and open competition in the practice of the profession 8. assures members are independent in thought and outlook 9. assures the profession gives leadership to the public it serves
	Governed by a Framework of Professional Societies
Governed	The major professional bodies collaborate on professional issues and aim to offer a single coordinated view to Government, industry and academia
	Qualification Regime is Defined
Qualified	A standard open assessment framework for professional qualifications is in place to determine individual competence against the required standards • Evidence and performance based assessment arrangements are in place to cover those roles – particularly at senior level • Representatives from the IT employer community as well as academia are actively involved in the assessment process • There is a clear personal responsibility and accountability on individual professionals which is recognized by employers, customers and the professionals themselves
	IS is Recognized as a Community
Organized	A common comprehensive competence architecture is in place which maps, knowledge, qualifications, skills, performance standards and experience requirements against a complete set of roles and, where possible, standard job specifications within the IS profession. • A continuous maintenance regime is in place to keep the architecture up to date, with the support of government and industry.

Figure 2: Short Term Goals of the Information Systems (IS) Profession

of IT professionals - the statutory level in the United States.

2. CURRENT STATUS OF IS PROFESSION

Figure 2 on the following page (BCS, 2006) presents the short-term goals needed to move the IT profession from our current status (level 1 and 2 in figure 1) to the Public level. The detailed status of each level is included in Appendix A. (BCS, page 25)

The Organized Level
Competence architectures available include CS and IS Bodies of Knowledge, Curriculum Standards at the AS, BS, and MS levels, and Job Descriptions (ACM, 2005)(ACM, 2002). Maintenance of these competence architectures is however ad hoc and needs to be coordinated by one professional organization that meets Obligation 1 at the Public Level, possibly ICCP, AIS, ACM, AITP, or IFIPS.

The Qualified Level
Assessment architectures exist for all the areas and levels of IT. However, as noted in the prior section, there is no coordinating professional organization that meets the first Obligation at the Public Level in Figure 2.

The closest match is probably ICCP which is attempting to provide competence testing and certifications in the CS and IS areas. CompTIA is providing certifications in the ICT area while ISACA is providing certifications in the IT audit area. The largest area, IT support and service, is fragmented and certified by numerous vendors.

As was the case in prior sections, maintenance of these assessment architectures is ad hoc and should be coordinated by a professional organization that meets Obligations 1 at the Public level.

The Governed Level
The major IT professional organizations possibly ICCP, AIS, ACM, AITP, and IFIPS should meet and develop an IT Constitution defining stakeholder roles and industry standards of practice, and establish an overview committee to assure continuity of professionalism development and maturity.

The Public Level
The IT industries (IS, CS, and ICT) already meet many of the nine requirements for becoming an established profession. Several, however, need significant effort. Comments on each of the nine follow.

1) Controlled by a Professional Governing Body

The meeting recommended at the Governed level should assign or create the governing body

for the IT Industries. This permanent committee must be funded and meet at least annually to coordinate all industry-level activities, including efforts to achieve statutory status for the profession.

2) Adequate standards of education as a requirement of entry

Education and experience requirements should be coordinated by the governing body for all IT industries' licenses and certifications. However only when licensure and certification requirements are adopted by almost all professionals and most employers who employ them, can users assure assignment of qualified persons to positions.

3. Set ethical rules and professional standards of practice

All of the major IT professions have quality ethical codes; however, there are no generally accepted Standards of Practice. A proposed standard is attached as appendix B (Rosenthal, 2013). Perhaps one of the first acts of a designated IT governing body would be to adapt such a standard as the ITIL industry has done (Arraj, 2013).

4. Set rules and standards designed for the benefit of the public

Independence from profit-oriented businesses should be maintained by all IT professional organizations to insure that their operations reflect the common good (BCS, page 41).

5. Can take disciplinary action to expel members

There should be a clear personal responsibility and accountability on individual professionals which is recognized by employers, customers and the professionals themselves. If this responsibility is violated, then the relevant professional society must take appropriate disciplinary actions (ICCP, Policy 4).

6. Assure that professional level work is reserved to the profession by statute

As required in similar high public impact IT professions such as medicine and engineering, it is vital that non-qualified persons not be able to force or influence professional actions and decisions vital to the quality and success of professional projects.

Prior to state licensing, perhaps the federal government could set rules to this effect, using its interstate business powers.

7. Assure fair and open competition in the practice of the profession

It is vital that all entry paths to the IT professions be competency based and devoid of any hint of discrimination.

8. Assure members are independent in thought and outlook

Mentoring programs staffed by senior qualified professionals should be implemented by all IT industries professional and educational organizations.

9. Insures that the profession gives leadership to the public it serves.

In the fields relevant to IT, qualified senior competent persons with excellent communication skills should be identified and made available for public and legislative activities.

3. STRUCTURE OF THE IT PROFESSION

Figure 3 presents the authors view of the structure of the current IT industry post 2010 (ACM, page 12). It reflects the emerging impact of personal networked systems and their support professionals.

At the Statutory and Public Levels, the entire IT industry should be considered to be a unit with the Public level rules shown in Figure 2 being applied. The Development and Service Levels should most likely be treated at the subsidiary CS, IS, ICT, IT Support, and IT Audit professions level.

4. PROPOSED ACTION PLAN

The authors suggest that ICCP with support of the ACM, AIS and AITP submit a grant proposal to the federal government for the funding needed to convene a congress to initiate the actions needed to

1) Move the IT profession to the Public Level. Appendix C contains a chart prepared by the Canadian Association of IT Professionals (CIPS) summarizing their vision of such an action plan. It might serve as a straw man for the congress's plan.

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2) Formalize the maintenance of CS, IS, and ICT standard curriculums. The IS curriculum has strayed from its job orientation (Rosenthal, 2013) and ICT needs a definition of scope and formal AS/BS/MS curricula (Longenecker, 2013).

3) Draft a straw man Board Certifications and State IT Licensing Initiative. The IEEE societies have already started such an initiative for Software Engineers (Thornton, 2011).

The British and Canadian IT professions are leading the way. Appendix D includes a detailed maturity model for the IT Professions (SFA Foundation, 2011). It is a complete straw-man for a US model.

It's time to begin an integrated dedicated move to true professionalism in the US using Board Certification and State Licensing procedures (Kleiner, 2006).

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Appendix A: Profession Maturity Level Characteristics

(BCS, page 25)

	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Definition	Activity in a particular field is practised in isolation and without clear identity.	The industry field is recognized as a community.	A qualifications regime is defined.	The industry field is governed by a framework of professional institutions.	The nine tests of public obligation for a profession are satisfied.	The profession is regulated by law for the protection of the public.
Characteristics	No common approaches. Disjointed. No communication. Individual best efforts.	Recognition of a practice in commercial life. Disparate specialized qualifications. No coherent approach. Malpractice not uncommon. No independent assessment of skills, experience or behaviour. Multiple professional institutions. Limited adoption.	Professional education linked from universities to chartered qualification regime. Professional institutions oversee the regime. Professional competence and core knowledge are understood. Those qualified are of known minimum capability.	Profession is well defined. Governance and code of conduct drive behaviour. Professional membership is the norm. Industry stakeholders value the professions. Business value of practitioners recognized at senior levels in organizations.	The profession serves society Social responsibility prevails over insularity in the behaviour of professionals. The profession provides leadership to society. Professionals practise with independence. Professionals practice for the client over competition and employer. Institution functions for representation and scrutiny are separated.	Some or all areas of the industry field are governed by professional institutions as defined by legislation. A defined set of roles and responsibilities are held wholly and exclusively within the profession.
Benefits		Understanding of the industry field by customers and employers. Transferability of skills.	Practitioners are independently assessed. Customer and employer expectations are more frequently met.	Independent governance. Single voice, backed by the whole community. Practitioners create more business value.	Society benefits from the quality and application of best practice.	The law operates to protect the public.
Examples		IT	Higher education academy (ILT)	HR Purchasing & Supply	Construction Accountancy (except Audit)	Law, Medicine Audit
	Steps to attain level 1 Common job roles across industry field. Industry suppliers develop qualifications. Best practices emerge and some are published.	Steps to attain level 2 Qualifications are brought together in a single open regime. Professional institutions operate the qualifications regime. Professional core body of knowledge is defined and commonly agreed. Training, skills and assessment programmes are defined for professional qualifications. Continuing Professional Development operates. Professionals stay abreast of best practice.	Steps to attain level 3 The institution framework is established by royal charter(s) takes the lead for the community. Code of conduct adopted and compliance policed. The institution framework offers a wide range of valued professional services. Professionals develop leadership, management and broader business skills to be taken seriously in business and the wider community.	Steps to attain level 4 The profession evolves to reflect the concerns of the public and society, and provides leadership. The institution and its professionals become advisors to society. The professional institution produces regular reports to the public. Practitioner independence (overrides employer, competition, etc) is promoted by the professional institution. Move from insular outlook to social responsibility The institution becomes the profession owner for society. Indemnity insurance is required by professionals. There is separation between the regulatory and representative roles.	Steps to attain level 5 Work within the industry field is reserved by statute. Appropriate training must be provided to support this obligation. Appropriate capabilities must be developed. Standards and discipline must be applied to ensure quality.	

Table 5: Profession Maturity Model – Level characteristics

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Appendix B: Professional Practice Standards

All management and professionals involved with information systems have a responsibility to their organization and to the public to comply with relevant Ethical Standards and with Codes of Practice and Ethics accepted by their fellow practitioners. This paper presents a set of Information Systems Professional Practice Standards that concern themselves with: (a) the professional knowledge and qualities, (b) the procedures to be performed, and (c) the judgments exercised by the Information Systems Professional in the planning, development, testing, operational monitoring and support of computer-based information systems.

A recommended set of such standards follow:

1. General Standards of Professional Practice

The general standards of professional practice are personal in nature and are concerned with the qualifications of the information systems professional and the quality of their performance and communications.

Practice Standard No. 1 - Proficiency

> **The development and support of information systems is to be performed by a person or persons having adequate technical training and proficiency.**

Practice Standard No. 2 - Independence

> **In all matters relating to the development and support of information systems, independence in mental attitude is to be maintained.**

Practice Standard No. 3 - Care

> **Due professional care is to be exercised in the development of information systems and in the preparation of communications and documentation.**

2. Standards of Professional Performance

The professional performance standards relate to development and operational support of cost/effective information systems that meet reasonable needs.

Practice Standard No. 4 - Planning

> **The work is to be adequately planned and assistants, if any, are to be properly supervised.**

Practice Standard No. 5 - Feasibility

> **There is to be a proper study and evaluation of proposed information systems to serve as a reasonable basis for judging that the resultant systems will be cost/effective and meet reasonable needs.**

Practice Standard No. 6 - Productivity

> **During the development and testing of information systems, generally accepted productivity and quality assurance tools and methods are to be used as applicable.**

Practice Standard No. 7 - Testing

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Prior to production operations, information systems shall be adequately tested and documented.

Adequate testing shall include the use of data and procedures that exercise and validate the proper functioning of specified normal and error procedures and conditions. Adequate documentation shall include user's operation guides or procedures, computer operations guides or procedures, and generally accepted program and system documentation.

3. Standards of Professional Communication

The communication standards relate to the reporting of all relevant matters to all significant stakeholders in an information system.

Practice Standard No. 8 - Reservations

Before designing or implementing an information system, all significant matters and any reservations regarding anticipated benefits, costs, or requirements are to be communicated to all significant stakeholders.

Practice Standard No. 9 - Significance

All significant matters relating to the design, development, operation, and cost of an information system, are to be communicated promptly to all significant stakeholders in an understandable fashion.

4. Application

These standards, to a great extent, are interrelated and interdependent. Moreover, the circumstances which are germane to a determination of whether one standard is met may apply equally to another. The concepts of relative quality of planning, testing, documentation, and performance underlie the application of all standards.

Adapted from:
Paul Rosenthal (2013). Proposed Information Systems Practice Standards Necessary for the Licensing of IS Professionals. The Business Forum, Beverly Hills, CA. http://www.bizforum.org/Journal/www_journalPHR011.htm

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Appendix C: The CIPS Vision for the IT Profession

	Today	IT professionals minimum capability is known	IT professionals create more business value	IT professionals' success rate increases	IT professionals are recognized and valued as a strategic element of business and the broader community
Business Benefits					10 years
Professional institution's role	Professional self-regulation and enforcement are defined by statute and association oversees qualification regime	Core Body of Knowledge exists and profession is well defined	Competency skills framework exists which further defines the profession Academia is linked to Core Body if Knowledge	Association has a leadership role and ensures profession serves society. Institution supervises unqualified professionals	Representation and regulation are separated
Personal Integrity	A *Code of Ethics* and *Standards of Conduct* exist and association members commit to it	Members' knowledge of ethics in IT is tested and confirmed	Personal integrity is enforced and disciplinary actions become public	Personal integrity is actively enforced and disciplinary actions become public	Personal integrity is actively enforced and disciplinary actions become public
Professional Status	Professional membership exists	Professional membership is recognized	Professional membership is recognized and preferred	Profession has recognized, valued and preferred status	Professional membership is the norm
Professional Development	A Continued Professional Development (CPD) scheme operates and is enforced	Re-certification is monitored and enforced	Ongoing (monitored and enforced) CPD is the industry norm	Ongoing (monitored and enforced) CPD is the industry norm	Ongoing (monitored and enforced) CPD is the industry norm

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Appendix D: UK Maturity Model