Independent Accreditation for Software Engineering Programs?

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Abstract

Professional Societies in IT and accreditation bodies of Engineering and Computer Science may be in dispute while international recognition of professionals is necessary. Can a possibly independent accreditation body aligned with proposed IFIP Standard on IT Professionalism, help Software Engineering Profession?

We consider accreditation of educational programs to be an obstacle to the creation of Software Engineering (SwE) as a profession. In the US, at least, the ACM’s recent withdrawal from the SWEBOK and particularly from the consideration of the Licensing of Software Engineers might be seen as evidence of the rift between “Engineering” and “Computer Science” advocates over the accreditation of Software Engineering (SwE) Programs. We propose that, an unbiased and standardized approach administered on a global scale will offer a rationale alternative to local divisions. Further such a solution will meet the need to recognize information technology (IT) professionals on a commonly accepted worldwide basis. The central dilemma motivating this issue is that IT application systems developers and practitioners have embraced the Software Engineering ‘title’ for years since the seminal 1968 NATO conference that first characterized it. But the fact is that application domains in SwE practice have not been restricted since that time to real-time embedded systems. In the industry, application domains in SwE practice and related (informal) job classifications cover a much wider range than formal competencies typically embodied in the traditional knowledge areas of CS. In fact jobs types cover the work from traditional engineering and programming to those of management of projects and IT. Computer World and similar mass publications are full of Ads presenting job opportunities for Software Engineers (in an estimated 70% of the cases these job descriptions clearly do not ask for nor do they expect engineers to apply). So one of the obvious questions that arises from that dissonance between the title and actual knowledge is what’s going on at the universities?

Historically, in the US, undergraduate SwE Programs emerged inside CS Departments. Some graduate SwE programs appeared even before ’91 ACM/IEEE-CS undergraduate program recommendations for the SwE option. In worldwide practice SwE programs are encompassing most of the CS and Information Systems.

We would like to consider the question of weather exclusivity in claims to ownership and a “my way or no way” attitude (which is recognizable in the behavior of both the IEEE-CS and the ACM, as well as among some of the Professors) hinders the development of a profession. Instead we feel that a positive and rational position may require a broader consideration. Neither IEEE-CS nor the ACM have so far taken into account the broad range of professional and academic purposes that might represent a legitimate ‘place under the sun’ for all viable IT focused Software Engineering programs. This is evidenced by the
opposition to the expectation that there will be professional engineering licensure involved, other signs of intolerance like not acknowledging variety of professional and academic purposes nor viable programs without expectations of engineering licensure (which does not preclude an independent type of professional licensing). Among accreditation bodies the trend in the US at least in ABET (Engineering) and AACSB (Business) is toward mission and outcome driven assessments and acceptance of naturally occurring diversity among programs. Why then, is that SwE is subject to turf appropriations? What are the expectations of CBET (CS) regarding Software Engineering as a profession?

SwE isn’t simply another form of Engineering, nor is it just a fancy name for Computer Programming. Beside, CS and CE, IS/CIS and modern Systems Engineering also have overlapping claims on SwE domain. At a minimum SwE competency goes beyond mere ability to use computers to do programming. It includes (without a shadow of a doubt) many of a highly advanced sub disciplines, such as: requirements (including formalized specifications), design (including architecture), verification (including testing), and programming in the large (project and process organization and management including measurements, configuration management etc.). But all this and similar topics do not limit, or delineate application domain expertise rightfully expected of practicing software/IT professionals. SwE has practical orientation and as such cannot be separated from its application domains. There is no real consensus on application domains but SEI SE BOK lists six. Interestingly very little ‘belongs’ to CS. The Databases and HCI has been primarily a Business interest, Real-time systems and Simulation mostly Engineering, while Numerical ‘Computations’ traditionally Applied Mathematics rather than CS per se. All that leaves Operating Systems and Compilers undisputedly in the CS application domain. The other tools of the trade used for Software Systems Development are components of the SwE domain.

One way out of getting some closure on this perceived turf battle may be by the ‘appointment’ of a new ‘boss’, in the form of a third party entity. The mere possibility of an independent accreditation agency may secure the necessary cooperation of professional societies and accreditation bodies. Insisting on the acquisition of a common body of SwE knowledge and domain application preparation and experience should pass the muster on its merits alone. We propose a worldwide educational credential that directly addresses the need of IT professionals, in various SwE domains of interests, and that embraces the proposed IFIP Standard for Professional Practice in IT. This would be also a valuable catch all option for all those programs excluded by the CS or CE programs in Engineering with engineering type licensure expectations. Licensure still may be pursued whenever appropriate and/or desirable.

Over the past five years we had been involved with a number of empirical reviews of SwE and related programs. Essentially we found that most SE programs are under CS, that they do not vary much in scope and that related programs had been historically homegrown wherever opportunity showed itself. Among hard software engineering programs in schools of engineering there is little disagreement on what constitute a curriculum, most CS based programs are less enthusiastic about traditional engineering core. Other related programs are not as uniform except that most follow IS (data) orientation, most numerous with CIS designation (offered by various schools and departments). Paradoxically, there is a growing sense among IT educators and IT professionals alike that IS/CIS programs are ‘left out’ exactly at the time when information intensive systems (data mining, knowledge systems, GIS, distributed systems etc.) are gaining momentum. We intend to discuss possible consequences and, if necessary, operationalization of ‘Independent Software Engineering Accreditation’ concept and eventually a real, independent, accreditation body.