Professionalism Issues in SE

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What Does IT Include?

- Electronic/Electrical/Computer Engineering
- Computer Science
- Software Engineering
- Knowledge Engineering
  - Data management/mining
- Artificial Intelligence
  -
  -
  -

What is Software Engineering?

- The cost-effective development of cost-effective software systems
- It's one thing to know how to program a computer to do X
- Quite a different thing to know how to do it so that programs are:
  - efficient (time and memory)
  - easy to use (by people and other programs)
  - easy to understand (clear, concise, correct)
  - easy to modify (well structured, and modularized)
  - robust (gracefully recovers from most errors)
  - developed on time, within budget

The Dispute Over SE

- Professional Engineering Associations
  - can prosecute companies and people for
    - improperly using “engineer” in job titles
    - practicing engineering without a P.Eng. licence
- P.Eng.s have deemed SE to be just one more among 80+ engineering branches
    - mining, chemical, civil, forestry, mechanical, etc.
- Engineering Associations claim that only P.Eng.s can adequately protect the public

The Dispute Over SE Cont'd

- Engineering Associations are changing provincial acts to make prosecutions easier
- Alberta Association (APEGGA) sued a CIPS member for using "engineer" in job title
  - they lost, appealed, and lost again
- Quebec engineers sued Microsoft for using "engineer" in their certification titles
  - they won, won the appeal, being appealed higher
- CCPE sued Memorial University for offering a degree in SE, mounted by its CS dept.
  - discontinued in favor of a panel to resolve the dispute

The Dispute Over SE Cont'd

- Panel unanimously recommended SE degree programs be jointly accredited
  - between CS and Engineering accred. boards
  - implementation efforts failed
  - 5 year moratorium on similar lawsuits expires in July 2005
  - a defacto race is on to accredit the most programs

The Trouble is:

SE was born and reared in Computer Science

- Most SE expertise is held by non-P.Eng.s
- The practice is still largely a craft
  - populated by software “houses” not “factories”
  - after 40 years, cheap labor is trumping automation!
- SE has universal scope
  - includes all other branches of engineering,
  - plus much more!
- SE is different in principle
  - the laws of physics and chemistry do not apply

Why SE is Fundamentally Different

	HARDWARE E.	SOFTWARE E.
Constraints on SYSTEM SPECIFICATION	Precise Well known Objective Can't Break LOWER RISK	Vague Unshared Subjective Always Changing HIGH RISK
Constraints on SYSTEM CONSTRUCTION	Different Media Transduction Expensive Slow Can't Rework Unscaleable HIGH RISK	Same Medium Translation Cheap Fast Reworkable Scaleable LOWER RISK

If Engineers Get Their Way

- Thousands of Canadian IT practitioners could lose their livelihoods
- Ironically, the public would be less protected because
  - critical expertise would be excluded
  - engineering students cannot receive the breadth and depth of SE education provided to CS students
- The emerging field of SE would be stunted because
  - practice standards would be introduced prematurely
  - engineering professors do little SE research

The SWEBOK

- Originally a joint effort between ACM and IEEE to identify “best practice” knowledge
- ACM quit because of IEEE’s focus on licensing:
  - “Licensing SEs as Professional Engineers would have little or no effect on the safety of the software produced.”
- My review of the SWEBOK was negative:
  - a hodgepodge of ad hoc techniques that lack organizing principles and unifying concepts.

SE is Not Ready for Practice
Standards

- The SE field is relatively new, still immature
  - productivity has actually declined since OO arrived
- Future practices will transcend current ones
  - automation and associated processes can shrink time and costs 10-100 fold, but being largely ignored
  - in desperation we import software from the 3rd world!
- Scientific studies are needed to identify which practices are best in what contexts
- Standards tend to turn people's brains off
  - forget common sense; "We have to go by the book."

Encourage Practice *Guidelines*

- CIPS (Dr. Fabian) proposes to publish a guide to existing SE practice standards:
  - CobiT, ISO/IEC15288, and ITIL
  - Practices target organizations, not practitioners
- Such a guide needs to explain the contexts and rationales for applying various practices
- A public database is needed to track results
  - to identify the good, the bad, and the ugly
  - to guide the evolution of better practices

Alternatives to Licensing

- Laissez faire
  - natural selection, survival of the fittest
- Certification and Accreditation
  - accredit educational programs
  - certify individuals
  - regular recertification to keep skills current
- Strengthen industrial & academic cooperation on SE professional practices

Discussion of The Issues

- What can/should be done?
- Next steps

Thank You!