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
  - 
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  -
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

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
- Unscaable
- 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!