

Software Process: a roadmap

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Goals of the presentation

- Propose some reflections on the state of the art in software process research.
- Identify possible research directions for the future.

Contents of the presentation

- Some quick comments on the history and areas of concern of software process research
- Failures and successes
- The road ahead

Disclaimer

- My very personal opinion.
- Just a few general comments that can fit in a short presentation.
- I'll try to be provocative.
- See: A. Fuggetta. Software Process: a roadmap. In A. Finkelstein, ed. *Future of Software Engineering*. 22nd International Conference on Software Engineering (ICSE 2000), June 2000, Limerick (Ireland), ACM Press.

The starting point

- There is some evidence that better processes are instrumental to deliver better products.
- This has motivated research devoted to study, improve, automate processes.
- Indeed, we should question this assumption.
 - w Is it always the case?
- Anyway, let's see the most important achievements.

The notion of process

- Developing software is not just a matter of buying tools.
- Areas of concern:
 - w Development technology.
 - w Methods and techniques.
 - w Organizational behaviour and social sciences.
 - w Marketing and economy.
- Increasing importance of the interplay of organizational, cultural, technological, and economic factors.

Process modeling and support

- Languages and environments for
 - w Process understanding
 - w Process design
 - w Training and education (on processes)
 - w Simulation and optimization
 - w Process support

Process improvement

- Models to evaluate the maturity of a software process:
 - w CMM, ISO 9000, MBA
- Methods to guide the process improvement activity:
 - w IDEAL
 - w SPICE

Metrics and empirical studies

- Definition of metrics and metrics selection techniques.
- Empirical methods: how to carry out experiments.
- Empirical results: “X is better than Y”.

Processes, eventually!

- Best practices. Two examples:
 - w Personal Software Process.
 - w Unified Software Process.

Summing up ...

- Certainly, relevant achievements.
- However, there are also several problems.
- It is necessary to assess and evaluate what has been done so far.

SW processes are processes too

- Certainly, software processes have their specific characteristics and facets.
- Nevertheless, they are “processes” with strong similarities with many other engineering processes.
- Sometimes we have reinvented the wheel and not reused existing experiences.

PML/PSEE must be re-thought

- Modeling languages are often too complex to support effective process description.
- Also, sometimes we want to support what can't be supported.
- Existing technology is too complex, intrusive, and pervasive.

Empirical studies are a means not an end

- Sometimes, empirical studies are just statistical exercises.
- Fishing for results.
- What about
 - w Significance?
 - w External validity?

Software process improvement is process improvement too

- We have often considered SPI just from an engineering viewpoint.
- We have almost ignored economic, organizational, and strategic factor.
- In addition, existing approaches are focus on process improvement of stable and structured processes/companies.

w F. Cattaneo, A. Fuggetta, and D. Sciuto. Pursuing coherence in SPI. To appear on *Software Process Improvement and Practice*.

Looking for research directions

- Incremental modeling and support.
- Inconsistency management.
- Non-intrusiveness of process support.
- Process management from different viewpoints.
- Enlarge the scope of process improvement.

Enlarge the scope of SPI

- Three main directions:
 - w Take into account non-engineering issues.
 - w Exploit techniques, methods, and approaches developed in other disciplines.
 - w Consider highly-dynamic, non-classical software companies.

Conclusions

- Software is the key constituents of modern products and services.
- Software process research is central.
- However, we need to rethink the way we do research in software process.