End-User Software Engineering: Report from the 2007 Dagstuhl

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Theme:
End-User Software Engineering

- It all started with End-User Programming (creating new programs).
- But what about the rest of the software lifecycle?
  - What about testing? Debugging? Maintaining? Reusing? Designing? Working with requirements? Specification? Sharing/collaborating?
- End-user software engineering includes the entire software lifecycle
  - Not just “create”.

Set-up: EUSE vs. SE

- How is EUSE different than SE?
  - 1. The people don't have the same values and motivations as professionals.
  - 2. The research has strong foundations in HCI to suit above + lack of training.
  - 3. Has unique languages/environments with constraints not faced in traditional SE (eg, "unsafe" language constructs, immediate visual feedback after every edit, …).

Purposes

- 1. Connections/brainstorming:
  - About specific research ideas. (One-on-one.)
- 2. Learn:
  - Become more familiar with state of current research in EUSE.
- 3. Begin to understand:
  - Analyze/drill down.
  - Synthesize up.
- Here: focusing on 2 and 3.

Learned: Who Does EUP/EUSE When?

- Noticed: Imprecise thinking about EUPs.
  - Big differences -- Segal's scientists vs. Scaffidi's InfoWeek readers vs. accountant vs. your dad…
  - …vs. your mom (gender differences!).
  - Sometimes scenario matters -- is it a role not a person?
    - "Me" doing a spreadsheet motivated/behave differently from "me" doing Lisp programming.
  - Outcome: must be careful to state <u>which</u> subgroup of the EUPs being addressed.

About Requirements and Design

- Requirements, specs:
  - Assertions are possible by EUPs (eg, ranges).
- EUPs' design notations, processes:
  - Provisional notations, notations from the domain.
  - Usually iterative, sometimes emergent.
- But sometimes EUPs design in collaboration with professional software engineers.
  - Sometimes requires use of semi-formal SE notations.

About Reuse

- Sometimes design starts with reuse.
- Reuse types:
  - By composition, by modification, by just finding and running, by adapting examples, by using templates, by copy/paste, just borrowing ideas, …
- How to foster “reuse communities”?
  - MathWorks’ MatLab prime example of exploring this question.
- Possible gender differences in willingness to reuse, participate in reuse communities, …

Are There Errors?

- Gaining confidence about the correctness, suitability, dependability, value, etc. of their programs.
- Spectrum of ways: entirely informal to entirely precise.
- Technologies: program analysis, aids to help user understand and narrow and problem-solve
- Problems: Getting users to understand their assumptions and problems is hard!

Approaches to "Are There Errors"

- Automated analysis is at the root of many of these:
  - Statistical anomaly detection.
  - Dataflow analysis, constraint satisfaction, abstract interpretation, type systems.
- Systematic testing: User/system together work through the program.
  - Eg: WYSIWYT.
- People make mistakes: (say it's right when it's wrong).

Getting the Errors Out: Debugging

- Debugging is often the reason people give up.
- Supports for debugging.
  - Eg: Automated suggestions for program changes (GoalDebug).
  - Eg: Supporting “why” questions (WhyLine).

EUSE in the Large

- Interactions with others' systems, the web, privacy, security decisions
- Conflicting goals: one size fits one? Vs. one size plays nicely with all?
- Current EUP models too naïve, too much noise?
- Goals/challenges: create useful abstractions, more work on credibility relevance

Evaluation

- To understand more about EUSE
- Types:
  - Various sorts of controlled studies, but also collaboration with industries, action research, case studies, …
- Subject matters:
  - Barriers, hypothesized theories, tool evaluation, social factors, artifacts, algorithms, what they think about, role of context, design space, practices, individual differences…

How to Find Out More

- Ask people who were there
  - <show of hands>
- Proceedings (Real Soon Now):
  - At EUSES Consortium site.
    http://eusesconsortium.org
- Listen to Susan and Andy
  - Emerging survey paper reflecting these findings and more.