Collaboration: Software Development, Learning

Agenda

- Motivations
- Collaboration in General
- Particular Tools & Comparison
- Things to Consider

Why Collaboration?

- Cooperation among students
- Combat Isolation
- Self help
- Low-cost help
- Promote Community
- Establish Social Network

- Example Problems [in school]
  - Difficult the state (the code / problem)
  - Ease coordination by removing collocation requirement
What is collaboration:

1. to work jointly with others or together especially in an intellectual endeavor
2. to cooperate with or willingly assist an enemy of one's country and especially an occupying force
3. to cooperate with an agency or instrumentality with which one is not immediately connected

“Anyone who has closely observed the practices of cognition is struck by the fact that the “mind” rarely works alone. The intelligences revealed through these practices are distributed – across minds, persons, and the symbolic and physical environment... Knowledge is commonly socially constructed, through collaborative efforts toward shared objectives or by dialogues and challenges brought about by differences in persons’ perspectives.”

(St. John, 1993) (from Williams, 2000)

Collaboration Aspects

- Cooperation – Definition and division of tasks
- Shared Information / Artifacts
- Possibility for defection
- Coordination – procedures (processes)
- Communication – exchange of ideas
- Negotiation – breakdowns, conflict
- Awareness – change, presence

(Easterbrook, 1996)

Characteristics of Collaboration

- Voluntary
- Mutual Goals
- Shared accountability
- Shared resources
- Shared responsibility [for participating in decision making]
- Community evolves from collaboration

Pair Programming

- "Paths of software engineering and organizational effectiveness":
  - Economics
  - Satisfaction — high!
  - Design Quality
  - Continuous Review
    - One programmer plays 'reviewer'
    - Suggests restrained collaboration?
  - Problem Solving
  - Learning
    - Shared problems & solutions
    - Expert Observation
  - Team Building and Communication
    - Staff and Project Management

Aspects of Collaborative Tools

- Synchronicity
  - Synchronous
  - Asynchronous
- Persistent — provides context, information store
- Public — shared knowledge
- External Links — Accessibility to ext. resources
- Cost
  - Cost of Social Protocol
  - Technical Prowess

Characteristics of Existing Tools

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Conclusion:
Questions to consider
- What degree of integration is necessary? (Herbsleb, Geographically Distributed Software)
- How to support development of community
- How to motivate experts to stay in the community? (Prevent defection) (Policy?)
- What is the role of anonymity?
- How to maintain high signal to noise