Opportunities for Extending Activity Theory for Studying Collaborative Software Development

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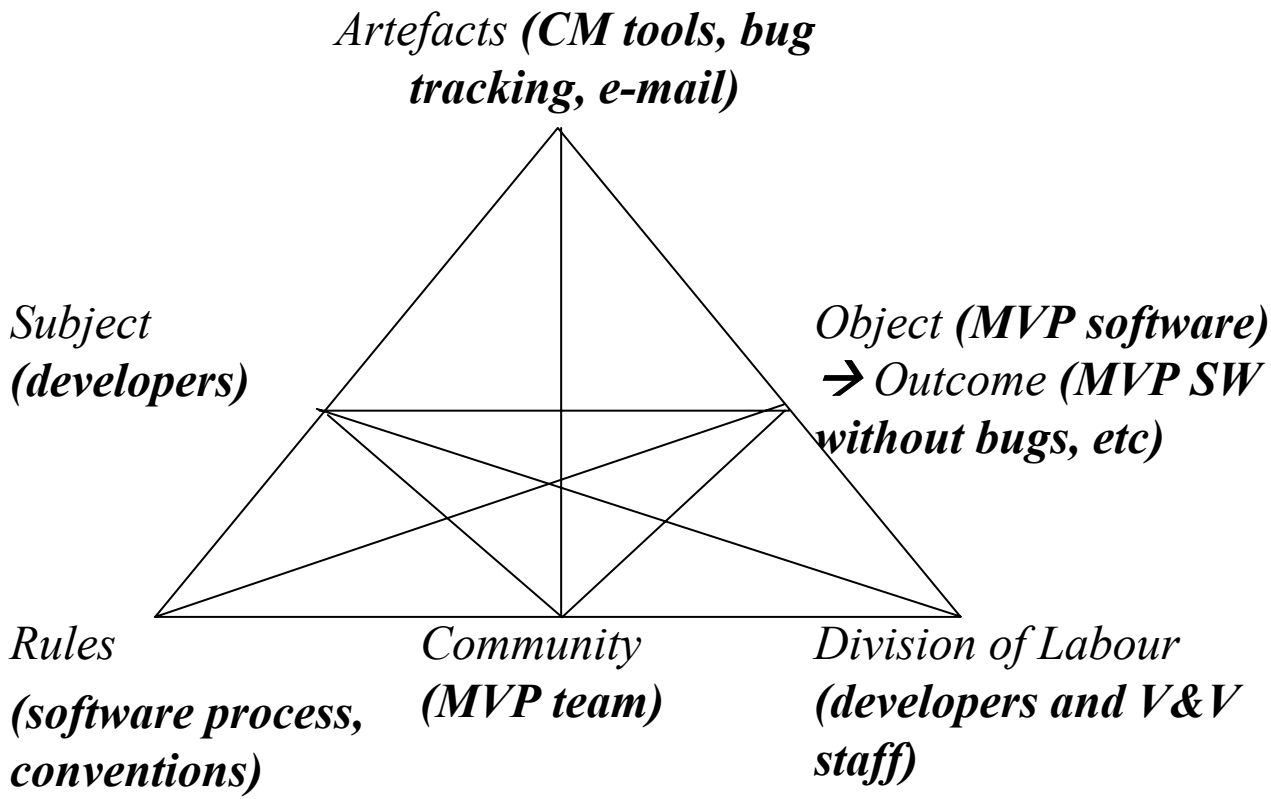
Orientation

- One author did a student internship in a sizable software organization.
  - "Sizable" = 1M lines of code; 10 subsystems; ~35 members
- The organization's objective was to evolve a software system ("MVP") and leave no "bugs."
- Even with good software tools and methods, problems impeded the ease of achieving the objective.
- As researchers, our objective was twofold
  - Make suggestions about tools and methods
  - Learn about methods to best analyze the situation and make suggestions

AT Analysis


Artefacts ***(CM tools, bug tracking, e-mail)***
Subject ***(developers)***
Object ***(MVP software)***
→ *Outcome* ***(MVP SW without bugs, etc)***
Rules ***(software process, conventions)***
Community ***(MVP team)***
Division of Labour ***(developers and V&V staff)***

Observed Tensions and Conflicts

- Between the object and the community
  - E.g., an individual's objective is a modified module or subsystem, but the modification could adversely affect a) the modules of others in the community and b) the overall object, a working system.
- Between rules and the community
  - E.g., one rule suggests that a developer should perform a specific action (check-in), but he or she does not want to perform that action out of concern for the effects of the action on the rest of the community.

Observations

- Recommendations to the organization
  - Be aware of workarounds and fixes
  - Augment current tools and methods with greater awareness
- Observations on using activity theory
  - An analysis or model evolves through iterations and stops when fidelity matches observations and experiences.
    - Is this stopping function sufficient?
    - Is the similarity to object-oriented modeling an advantage to adoption of activity theory by software organizations?
  - A single activity might be consistent when observed as a single instance, but might be a source of tension when there were multiple instances of that activity
    - Does this arise with finer granularity of study?
  - Activities, especially multiple instances, share many dependencies
    - Could techniques of dependency analysis in software testing be adopted to help activity theory analysts?
    - Would such an analysis identify potential hazards for organizations adopting new software tools or methods?
  - A detailed understanding of an organization's collaborative work may be developed
    - What are the effects of reflecting this information back to the organization?
    - What if software tools could dynamically reflect this information back to the organization?

Selected Observations for Discussion

- A single activity might be consistent when observed as a single instance, but might be a source of tension when there were multiple instances of that activity
  - Does this arise with finer granularity of study (e.g. software engineers working amongst themselves)?
- Activities, especially multiple instances, share many dependencies
  - Could software dependency analysis techniques identify potential hazards for organizations adopting new software tools or methods?
- A detailed understanding of an organization's collaborative work may be developed
  - What are the effects of reflecting this information back to the organization through interventions and computer visualizations?

A Final Question

- Why am I so fascinated by tensions and conflicts?
  - Because this is where human creativity takes place (and humanity revealed)????
  - Because this is where tools and methods may be improved?