How do community-based FLOSS projects organize their work?

A rational choice model of participant decisions

Participants choose between working to realize utility from the application or spending their free time elsewhere. The expected payoff of working depends on the expected utility of the outcome, conditioned by the expectation of successful completion of work.

\[ E(\text{Expected payoff}) = E(U_{\text{outcome}}) \times E(p \times (1-p)) \]

**Graphical Notation**

- **Participant**
- **Resource Environment**
- **Technologies of Production and Communication**
- **Evolving Patterns**
- **Structurational Co-evolution**

**Decision Model**

**Expectancy-Valance model of motivation**

**Assumptions**

1. Participants are good but not perfect judges of task complexity.
2. Participants only know their free time for the next turn.
3. Participants are motivated only by their own use of the software.
4. Participants only know their free time elsewhere.

**Background**

Research on motivations in FLOSS highlights the role of individual motivations, both extrinsic (e.g., working for useful software, scratching an itch) and intrinsic (e.g., learning or fun). The FLOSS environment implies, if anything, that the project itself has little or no power over the agents.

**Solution 1: Co Work**

- Reliance on others to achieve a payoff makes your link from performance to outcome dependent on their link from effort to performance.
- The model is based on a rational choice model grounded in the expectancy-valence model of motivation. Only the simplest model, which makes assumptions that make the task hardest for the model is presented here. Many of these assumptions are eventually relaxed allowing, for example, learning motivations to drive production without immediate payoff.

**Solution 2: Deferral as novel solution**

- Complex work is deferred (accepted as desirable but not attempted).
- Other, less complex work is undertaken as individual work.

**Deferral and a changing codebase, can make complex work easier**

**Theoretical Implications**

There is a debate in the Management literature regarding the determinants of interdependency; does it flow from task requirements, or is it an emergent property? This work adds a focus on the resource environment, arguing that volunteer work without up-front capital, together with a layerable task undertaken through loan media articulates well with low interdependency work.

**Conditions for FLOSS collaboration**

Ensure:
1. Ultra-low upfront investment
2. Individually motivating work
3. Task work is available, non-exhaustible and non-exhaustible
4. Instantiation and Distribution are non-instantaneous
5. Distribution is ultra-low cost and non-instantaneous
6. Task can be approached in layers
7. Task and communications are observable
8. Communication support temporal mode switching

**Adapted Adaptations**

Wikipedia: Highly similar: layerable, replaceable work, low-upfront investment, past work is non-exhaustible and non-exhaustible, visible work and communication. Instantiation and Distribution are non-instantaneous, but bandwidth costs can be high. Work appears largely individual.

Open Hardware

Effort to apply FLOSS principles to hardware. Hampered by slow instantiation and distribution costs. Work has focused on informational representations (e.g. blueprints) and formalization (e.g. FGPAAs). Policy Advocacy

Some urge a FLOSS approach to democratic input, such as calls for comment on legislation. Hampered by low layerability and in-direct, delayed payoffs (payoff is in impact on process, not immediate work).

Commercial Software Development

Efforts to adopt FLOSS to internal commercial environments (e.g. Inner Source) face issues with up-front investment and deadlines, undermining immediate payoff motivations and usefulness of deferral. Hybridization undermines some of the factors that make FLOSS work.

**Participant Observation**

- **BibDesk**: A community-based reference manager for BibTeX, running on OS X.

- **Archival Study**

- **Fire and Gain**: both community-based instant messaging clients, relatively successful in the study.

- **Organized all archives into Actions undertaken as part of Tasks (changes to shared outputs)***