Asynchronous Decision-Making in Distributed Teams

Using asynchronous CSCW tools transforms some aspects of open source software development work from non-routine to standard procedure

Abstract

Extensive use of **CSCW applications can influence group decision-making practices.** Unlike previous research focused on the influence of synchronous ICTs, our study **examines how group decisions are made in asynchronous communication channels.**

Our inductive qualitative analysis of 360 decision episodes from 6 Free/Libre Open Source Software (FLOSS) projects revealed diversity in decision-making practices, which appears to be related to differences in task type. We also find that **standardization of procedures through CSCW tools transforms the nature of some software development work from non-routine to standard procedure.**

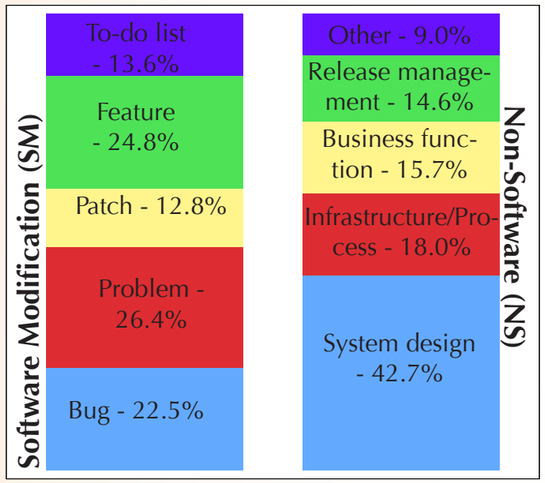
Methods

- Multiple case study methodology
  - Content analysis of decision-making discussions
- Data from developer email lists and forums, primary communication channels for projects
- Email messages coded for six FLOSS projects, varying in project success and product complexity
  - ERP: Compiere, WebERP, Apache OFBiz
  - IM: Gaim, aMSN, Fire
- Decision episode as unit of coding and analysis
  - Sequence of messages: trigger, discussion, decision announcement
- 360 episodes coded on:
  - number of messages per episode
  - duration of the episode (in days)
  - number of participants in episode

FLOSS Project Case Selection

Product Complexity	Intended Users	Project Success		
		More -> Less successful		
Low: IM client	Individuals	Gaim	aMSN	Fire
High: ERP SyStem	Companies	Compiere	Apache OFBiz	WebERP

Triggers of Decision Episodes

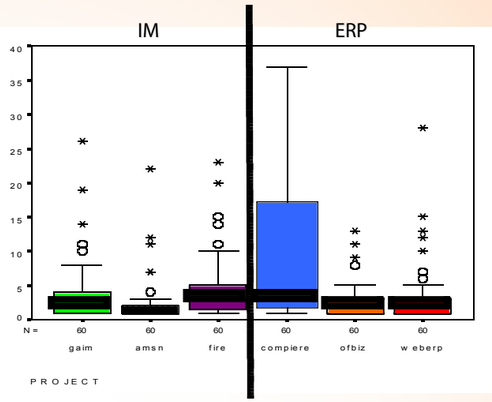


Comparison of Decision Episode Types

Item	Episode Type	Mean	Significance Level
Duration	SM	4.11	F=1.76; df=1; p=.19
	NS	5.21	
N Messages	SM	5.60	F=14.11; df=1; p<.01
	NS	8.21	
Density (messages / day)	SM	2.78	F=7.11; df=1; p<.01
	NS	3.99	
N Participants	SM	3.05	F=21.99; df=1; p<.01
	NS	4.15	

Non-software decisions typically require more effort from more participants to resolve than software modification decisions, which are more easily made independently by individuals.

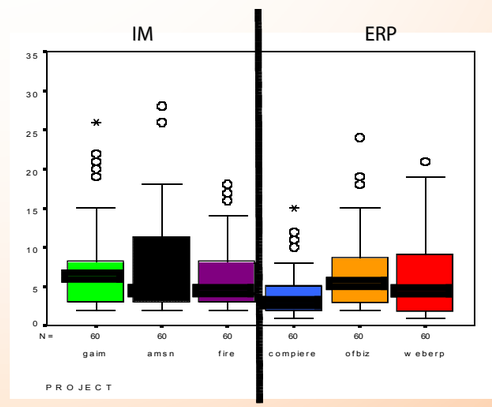
Duration of Decision Episodes (all)



The number of days or messages required to complete a decision process can vary significantly by project.

For example, Compiere required more time but fewer messages to reach a decision than any of the other projects. By contrast, aMSN's decisions were accomplished with more messages over fewer days than the other IM projects.

N Messages of Decision Episodes (all)



Key Findings

- **Two primary types of group decision-making episodes identified**: software modification (SM) and non-software (NS) episodes
  - SM episodes (72%) focus on daily technical decisions
  - NS episodes (28%) do not result in code changes, but may influence the project's future
- **Significant differences in participation patterns between SM and NS decisions**
  - SM decisions frequently made independently by individuals, evident in code changes
  - NS decisions are more complex, results are less immediate, and may have long-term effects
- **Use of modularity and version control technologies contribute to the transformation of some traditionally non-routine tasks into routine tasks**
  - Many daily technical decisions require little or no interaction; these exhibit low variety and high analyzability
- **Project characteristics and audiences may affect participation in decision-making**
  - Similar participation in SM episodes through standardized work procedures for both IM and ERP projects
  - Significant differences in participation between IM and ERP projects for NS episodes: IM projects more active in decision discussions than ERP teams

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