The Emphasis on Team

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Overview

• Background Research
  ◦ Job Satisfaction
  ◦ Organizational Behaviors

• Trust
  ◦ Modeling Trust
  ◦ Measurements

• Non-Traditional Tools
  ◦ Productivity Games
  ◦ Social Networks

• Results
Job Satisfaction

- Helliwell and Huang
  - University of British Columbia
  - Social Capital, a.k.a. Trust

- Equivalence Classes
  - Increase in trust 10%
  - Increase in salary 56%
  - Enough time to finish one’s work 11% raise
  - Job tasks requiring a high level of skill 19% raise
  - A large variety of work 21% raise
Organizational Behaviors

- Organizational Citizenship Behaviors (OCB)
  - Discretionary
  - Not part of performance appraisals
- In-Role Behaviors (IRB)
  - Required job duties
- Examples of OCBs
  - Reporting that a door is broken
  - Cleaning up in the kitchen
- Difficulties in software development
  - Is quality an OCB or IRB?
  - Are timely data available for performance reviews?
Trust Models

- Simple Model of Trust and OCBs

1. How can we measure trust?
   1. traditional survey instrument
   2. actively measure though interactions

- Hypothesis I: High trust teams will exhibit more OCBs than typical teams.
- Hypothesis II: Trust factors exhibited by managers lead to higher trust teams moderated by individuals’ propensity to trust
Games

- Gamification as a means to measure soft attributes
- Use games to both measure and drive behaviors
- Termed “Productivity Games”
The Trust Game

- Experimental economics
  - player 1 gets a monetary award (e.g. $100)
  - player 1 can “invest” with player 2
    - if invested, amount is multiplied by N (e.g. 4)
    - otherwise bank the award
  - player 2 can choose to return some money
    - players bank their respective shares
- Game theory would suggest
  - player 2 has no reason to return anything
  - investing is a strictly stupid strategy
Social Network Games

- Trust Game is one of a larger group
- Humans v. Zombies
- Productivity Game
  - tests the product
  - provides some fun
  - gets team members to interact
Results

- Disclaimer: Names have been changed to protect the innocent.
- The following charts gauge workload and productivity for the test teams on a major project.
- A tale of two projects
  - It was the best of teams, it was the worst of teams …
  - Team S was a high trust team
  - Team K was overworked and stressed out
Development Workload

Features per Developer

Features Completed vs. Developers

- Team S
- Team K

R² = 0.97
R² (adj) = 0.96
Test Workload

The scatter plot shows the relationship between the number of features completed and the headcount for teams K and S. The line of best fit indicates a strong positive correlation, with $R^2 = 0.93$ and $R^2 (adj.) = 0.92$. Team K is represented by green triangles, and Team S by red squares.
Development v. Test

![Graph showing the relationship between Developers and Testers, with Team K and Team S marked, and R² = 1.00 and R² (adj) = 1.00.](image)
Quality

Bugs per Feature Completed

Total Code Bugs

Features Completed

Team K

Team S

$R^2 = 0.94$

$R^2$ (adj) = 0.92
Productivity

**Open Bug Rates**

- Team S

- All Teams

$R^2 = 0.96$

$R^2$ (adj.) = 0.95
Defects Trending

Weekly Open Trend from Beta to Present

Area under the curve is the estimated remaining defects had we kept testing.
Remaining Defects for All Teams
Remaining Defects

Remaining Bugs per Tester

R-Sq 77.9%
R-Sq(adj) 70.5%

Testers

Team S
Bottom Line Cost-Benefits

- Using features and development effort to predict test effort and comparing to actual headcount
- Team S is understaffed by about 50%

<table>
<thead>
<tr>
<th>Team</th>
<th>Head Count Delta</th>
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<tbody>
<tr>
<td>A</td>
<td>2.8%</td>
</tr>
<tr>
<td>K</td>
<td>4.8%</td>
</tr>
<tr>
<td>C</td>
<td>-0.2%</td>
</tr>
<tr>
<td>D</td>
<td>-2.0%</td>
</tr>
<tr>
<td>E</td>
<td>-1.8%</td>
</tr>
<tr>
<td>F</td>
<td>4.0%</td>
</tr>
<tr>
<td>S</td>
<td>-35.9%</td>
</tr>
</tbody>
</table>
Confounding Factors

- Work variety increases
  - RCA process
  - Team Inspections
- Increased skill levels
  - Utilized people more fully
- Given time to finish their work
  - Planning model meant we overestimated feature work by less than 10%
  - Improved efficiency resulted in better work-life balance
- Beware…correlations are not transitive
  - behaviors correlates to trust correlates to OCBs
Implications to TSP

- Job satisfaction as an outcome of team building
- Trust as a driver of satisfaction
- OCBs v. IRBs
- Are satisfaction factors what makes TSP so good?
Final Thoughts

- Behaviors are the important element not process
- Trust is a prime motivator... foster it
- TSP as a team building exercise in trust
- Future research
  - measure soft attributes of teamwork on TSP projects
  - measure distributed teams & ability to foster trust
Questions?

- Answers?
- Musings?
- Random Thoughts?
- Rants?
- Raves?
- Insane Mutterings?
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