Requirements Negotiation

CITS 3220
Software Requirements and Project Management
Week 4

School of Computer Science and Software Engineering
The University of Western Australia
Content

- Why Negotiation?
- A Research Experience
Errors

- Errors are difficult and expensive to fix.

- The cost of repairing defects rises exponentially the later they’re found in the software life cycle.
Well known reason for project failure (Hatton 2008)

1. Unrealistic or unarticulated project goals
2. Badly defined system requirements
3. Poor communication among customers, developers and users
4. Inaccurate estimates of needed resources
5. Poor reporting of the project’s status
6. Unmanaged risks
7. Use of immature technology
8. Inability to handle the project complexity
9. Sloppy development practices
10. Poor project management
11. Stakeholder politics
12. Commercial pressures
Dealing with stakeholders

- Stakeholders:
  - have their own perspective and perception
  - don’t always know what they want.
  - don’t always agree with each other
  - aren’t consistent in the information they give
Why Negotiation? (Hoh et al 2004)

- “How the requirements were negotiated is far more important than how the requirements were specified” (Tom De Marco, ICSE 96)

- “Negotiation is the best way to avoid “Death March” projects” (Ed Yourdon, ICSE 97)

- “Problems with reaching agreement were more critical to my projects’ success than such factors as tools, process maturity, and design methods” (Mark Weiser, ICSE 97)
Sadraei et al. (2007) looked at 28 projects across 16 firms in Australia.

Sectors included finance, pharmaceuticals, health and telecommunications.
Why Negotiation?
Findings: Effort Distribution

Average efforts invested in RE activities among all projects (Sadraei et al 2007)
Why negotiation?

- Negotiation is introduced to facilitate requirements elicitation and analysis.
- Encourages communication
- Aids in understanding
- Reveal conflict, solution exploration, collaborative resolution
- Improves agreement level
- Develop stakeholders’ satisfaction
- Improves requirements quality
Discussing a research

“Measuring the Stakeholders' Agreement Level in Negotiation through Experiment”

by Sabrina Ahmad

Two experiments done to measure the effectiveness of negotiation.
Two Experiments

- Experiment 1:
  - designed to demonstrate the *improvement in agreement* between the stakeholders.

- Experiment 2:
  - designed to demonstrate the *movement of agreement towards ideal result*.
Case study

- Course Unit Registration System
- A list of fifteen requirements provided
Role play experiments

- Participants play roles as system stakeholders
  - administrator
  - finance officer
  - lecturer
  - student

- Done in a classroom

- Each experiment took approximately an hour
A requirement

R13: Notify all students by email once the schedule have been processed

Before negotiation

\[ ICC = -1 \]

\[ 4 \quad 3 \quad 2 \quad 1 \quad 0 \]

\[ S1 \quad S2 \quad S3 \quad S4 \]

After negotiation

\[ ICC = 1 \]

\[ 4 \quad 3 \quad 2 \quad 1 \quad 0 \]

\[ S1 \quad S2 \]

\[ S3 \quad S4 \]

\[-1 < ICC < 1\]
Scale Reference

<table>
<thead>
<tr>
<th>Scale</th>
<th>Meaning</th>
</tr>
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<tbody>
<tr>
<td>4</td>
<td>Must have this</td>
</tr>
<tr>
<td>3</td>
<td>Should have this if at all possible</td>
</tr>
<tr>
<td>2</td>
<td>Could have this if it does not affect anything else</td>
</tr>
<tr>
<td>1</td>
<td>Won’t have this time but would like in the future</td>
</tr>
<tr>
<td>0</td>
<td>Will not have this</td>
</tr>
</tbody>
</table>

- ICC: Interclass Correlation Coefficient
  - 1: total agreement
  - -1: total disagreement
Observation Findings

- Encourage communication.
- Reasoning
- ‘Give and take’ approach.
- Middle ground.
- Persuasive.
- Negotiation exist, not simply free conversation.
The Results and Analysis

Agreement level before and after the Negotiation in Experiment 1
The Results and Analysis

Agreement level before and after the Negotiation in Experiment 2
The Results and Analysis

Number of Requirements Dropped and Affected in Experiment 1
(Total of 15 requirements)
Consensus produce good requirements?

- Assume that an ideal results exist. An ideal set of requirements are identified.

- Set as a benchmark and called a Gold Standard.

- **Gold Standard** criteria:
  - A core set of requirements with no external dependencies
  - Contains all the key requirements necessary for the system

- Experiment 2 is designed to measure progress towards this Goal Standard.
The Results and Analysis

The Agreement between the Requirements Identified by Each Group and the Gold Standard.
The Results and Analysis

Relationship between Kappa and Negotiation Effort
Cohen’s Kappa

- Kappa measures the agreement between
  - the goal standard
  and
  - the set of requirements obtained through negotiation
Conclusions

- Experiment 1 demonstrated that negotiation improves agreement level.

- Experiment 2 demonstrated that the consensus moved closer to the Gold Standard.

- The negotiation results were improved in proportion to the amount of effort spend.