Experiences with the WinWin Groupware System

Alexander Egyed and Barry Boehm
{aegyed, boehm}@sunset.usc.edu
http://sunset.usc.edu

UCI Presentation
June 3rd, 1999

Outline
- Motivation for WinWin Approach
- Theory W and WinWin Elements
- WinWin Concept of Operation
- WinWin Spiral Model
- Real-World Library Projects
- Integrating Ethics

Motivation for WinWin

- Establishes objectives and procedures for integrated product teams (IPTs)
  - What should the IPT participants try to do?
  - How should they proceed?
  - How will they know when they’re done?
- The fundamental success condition
- Some common counterexamples

Theory W

The Fundamental Success Condition:

your project will succeed if and only if you make winners of all the critical stakeholders

- Usually: Users, customers, developers, maintainers
- Sometimes: Interfacers, testers, reusers, general public

=> It is the Foundation of the WinWin Negotiation Model

Win-Lose Evolves into Lose-Lose

<table>
<thead>
<tr>
<th>Proposed Solution</th>
<th>&quot;Winner&quot;</th>
<th>Loser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheap, Sloppy Product (&quot;Buyer knows best&quot;)</td>
<td>Developer &amp; Customer</td>
<td>User</td>
</tr>
<tr>
<td>Lots of bells and whistles (&quot;Cost-plus&quot;)</td>
<td>Developer &amp; User</td>
<td>Customer</td>
</tr>
<tr>
<td>Driving too hard a bargain (&quot;Best and Final offers&quot;)</td>
<td>Customer &amp; User</td>
<td>Developer</td>
</tr>
</tbody>
</table>
**Theory W Management Steps**

1. Identify success-critical stakeholders
2. Identify stakeholders’ win conditions
3. Identify win condition conflicts as issues
4. Negotiate top-level win-win agreements
   - Invent options for mutual gain
   - Explore option tradeoffs
   - Manage expectations
5. Embody win-win agreements into specs and plans
6. Elaborate steps 1-5 until product is fully developed
   - Confront, resolve new win-lose, lose-lose risk items

---

**Inventing Options for Mutual Gain**

- The four basic steps: Fisher and Ury

**Step I. Problem**
- What’s wrong?
- What are current symptoms?
- What are disliked facts contrasted with a preferred situation?

**Step II. Analysis**
- Diagnose the problem:
  - Sort symptoms into categories.
  - Suggest causes.
  - Observe what is lacking.
  - Note barriers to resolving problem.

**Step III. Approaches**
- What are possible strategies or prescriptions?
- What are some theoretical cures?
- Generate broad ideas about what might be done.

**Step IV. Action ideas**
- What might be done?
- What specific steps might be taken to deal with the problem?

---

**Win-Win, Win-Lose, and Lose-Lose**

**Situations:**

- Developer’s Win Space
  - Win-Win
  - Win-Lose
  - Lose-Lose
- User’s Win Space
  - Win-Win
  - Win-Lose

---

**Getting to WinWin**

**COCOMO F-16 Example:**

- Product developer can build in 12 months
- Product user wants in 12 months

**Steps:**
- Add Technology, Key People
- Prioritize Development Increments

---

**Outline**

- Motivation for WinWin Approach
- Theory W and WinWin Elements
- WinWin Concept of Operation
- WinWin Spiral Model
- Real-World Library Projects
- Integrating Ethics
WinWin Taxonomy Mapping to Requirements Description Outline

**DOMAIN TAXONOMY**

1. Interfaces
   1.1 Infrastructure (SIRSI, UCS, etc.)
   1.2 Media providers
2. Operational Modes
   2.1 Classes of Service (research, public)
   2.2 Training
   2.3 Graceful Degradation and Recovery
3. Capabilities
   3.1 Media Handled
   3.2 Media Operations
   3.3 Help
   3.4 Administration

**REQUIREMENTS**

5. Interface Requirements
   3. Required States and Modes
   4. Capability Requirements

Outline

- Motivation for WinWin Approach
- Theory W and WinWin Elements
- WinWin Concept of Operation
  - WinWin Spiral Model
- Real-World Library Projects
- Integrating Ethics
**LCO/LCA Milestone Elements**

<table>
<thead>
<tr>
<th>Milestone Element</th>
<th>Life Cycle Objectives (LCO)</th>
<th>Life Cycle Architecture (LCA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of Operational Concept</td>
<td>Top-level system objectives and scope</td>
<td>Project development framework and architecture</td>
</tr>
<tr>
<td>Definition of System Requirements</td>
<td>Elaboration of system objectives and scope by increment</td>
<td>Elaboration of operational concept by increment</td>
</tr>
<tr>
<td>Definition of System and Software Architecture</td>
<td>Definition of the system architecture and interfaces</td>
<td>Choice of architecture and elaboration by increment</td>
</tr>
<tr>
<td>Definition of Life-Cycle Plan</td>
<td>Identification of key TBDs for later increments</td>
<td>Architecture evolution parameters</td>
</tr>
<tr>
<td>Feasibility Rationale</td>
<td>Assurance of consistency among elements above</td>
<td>All major risks resolved or covered by risk management plan</td>
</tr>
</tbody>
</table>

**LCO/LCA Milestones in Detail**

**Outline**

- Motivation for WinWin Approach
- Theory W and WinWin Elements
- WinWin Concept of Operation
- WinWin Spiral Model
- Real-World Library Projects
- Integrating Ethics

**The Challenge**

- Roughly 15 Digital Library Applications a year
  - 2 sentence problem statements
  - Librarian clients
- Roughly 90 Graduate Students
  - 30% with industry experience
  - Largely unfamiliar with each other, Library ops.
- Develop LCA packages in 11 weeks
- Re-form teams from 30 continuing students
- Develop IOC packages in 12 more weeks
  - Including 1-week beta test

**1996-98 Library Projects**

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cinema-TV Moving Images¹</td>
<td>Architecture &amp; Fine Arts Databases</td>
</tr>
<tr>
<td>EDGAR Corporate Data</td>
<td>Bella Lewitzky Archives</td>
</tr>
<tr>
<td>Hancock Image Archive</td>
<td>Business School Working Papers²</td>
</tr>
<tr>
<td>Interactive TV Material</td>
<td>Inter-Library Loan</td>
</tr>
<tr>
<td>Korean-American Museum</td>
<td>Engineering Technical Reports³</td>
</tr>
<tr>
<td>Latin American Pamphlets¹</td>
<td>General Library FAQ’s</td>
</tr>
<tr>
<td>Digital Maps</td>
<td>Hancock Museum Virtual Tour¹</td>
</tr>
<tr>
<td>Medieval Manuscripts¹</td>
<td>Lion Feuchtwanger Archive</td>
</tr>
<tr>
<td>Planning Documents²</td>
<td>Network Consultation Support</td>
</tr>
<tr>
<td>Searchable Archives for Images²</td>
<td>Serial Publication</td>
</tr>
<tr>
<td>Stereoscopic Slides²</td>
<td>Statistical Charts</td>
</tr>
<tr>
<td>Technical Reports</td>
<td>Virtual Education Reference Assistant</td>
</tr>
</tbody>
</table>

¹ projects were continued for a second semester.
² projects were merged together and continued for a second semester.

**Digital Manuscript Project**
**Moving Image Archive Project**

**Milestones**
- WinWin Requirements Negotiation on October 21
- Life Cycle Objectives (LCO) on November 4
- Life Cycle Architecture (LCA) on December 4
- Revised Requirements, Plan, etc. on Feb 11
- Design Plan, Test Plan, Inspection Plan on March 18
- Test Report, Inspection Report on April 8
- Initial Operational Capabilities (IOC), etc. on April 22
- Further increments throughout the summer
- All deliverables completed on time; Library clients highly satisfied with results

**Stakeholder Win Conditions**

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Win conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developers (Students)</td>
<td>• Full range of software engineering skills</td>
</tr>
<tr>
<td></td>
<td>• Real-client project experience</td>
</tr>
<tr>
<td></td>
<td>• Advanced software technology experience</td>
</tr>
<tr>
<td>Customers (Librarians)</td>
<td>• Useful applications</td>
</tr>
<tr>
<td></td>
<td>• Advanced software technology understanding</td>
</tr>
<tr>
<td></td>
<td>• Moderate time requirements</td>
</tr>
<tr>
<td>Faculty and Staff</td>
<td>• Educate future software engineering leaders</td>
</tr>
<tr>
<td></td>
<td>• Better software engineering technology</td>
</tr>
<tr>
<td></td>
<td>• Applied on real-client projects</td>
</tr>
</tbody>
</table>

**Some Real-World Problems**
- Availability of Equipment (server), Tools, and COTS (SIRSI) packages.
- Fuzzy and Unstable Requirements.
- Librarians were not available all the time.
- Personnel turnover: The second non-core-CS course is always much smaller.
- Personnel conflicts.

**MBASE Model Integration: LCO Stage**

**Outline**
- Motivation for WinWin Approach
- Theory W and WinWin Elements
- WinWin Concept of Operation
- WinWin Spiral Model
- Real-World Library Projects
  - Metrics
  - Summary
- Integrating Ethics
Artifacts per Type

- Win conditions were the most common artifact type. There were more options than issues.
- 1996: More artifacts, particularly agreements, due to use of domain taxonomy as checklist.

Number of Artifacts

- All stakeholders within all teams did not participate equally during all 'phases' of the negotiation regardless of artifact type.

Most Artifacts per Team/Role

- Customers and users were more important during goal identification. Developers were more important during risk (issue) identification and resolution.

Creation/Revision Table

- Stakeholders participated mostly at the same time. However sessions were much more frequent in 1996, likely due to real-client involvement.

Duration to resolve Artifacts

- It took much more time to resolve artifacts in 1996.

Outline

- Motivation for WinWin Approach
- Theory W and WinWin Elements
- WinWin Concept of Operation
- WinWin Spiral Model
- Real-World Library Projects
  - Metrics
  - Summary
- Integrating Ethics
Project Critiques

Positive
Promoted more cooperativeness
Focused team on key issues
Reduced friction, equalized voices
Helped in distributed collaboration

Negative (being fixed)
Need more pre-WinWin homework
WinWin admin. overhead, bugs
Prototype concurrently with WinWin

WinWin Spiral Model Results
• Used to architect 31 digital library products
  - For USC Library
  - Using 6-person student teams
• Two spiral cycles using LCO and LCA milestones
  - Developed Ops Concept, Requirements, Architecture, Development Plan, Prototype, Rationale
  - Used WinWin tool, Arch. Review Boards
• Librarians excited by results
  - Committed to implementing top products
  - Convinced that Win-Win approach works

WinWin Benefits
• Gets key stakeholders involved
• Provides collaborative operational guidelines
• Provides criteria for evaluating success
• Reduces cycle time
  - Especially for distributed collaboration
• Complements other key front-end methods