Supplementing Agile Practices with Decision Support Methods for Military Software Development

SEDA 2015
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Agile Development

- Disciplined process

- Empowerment
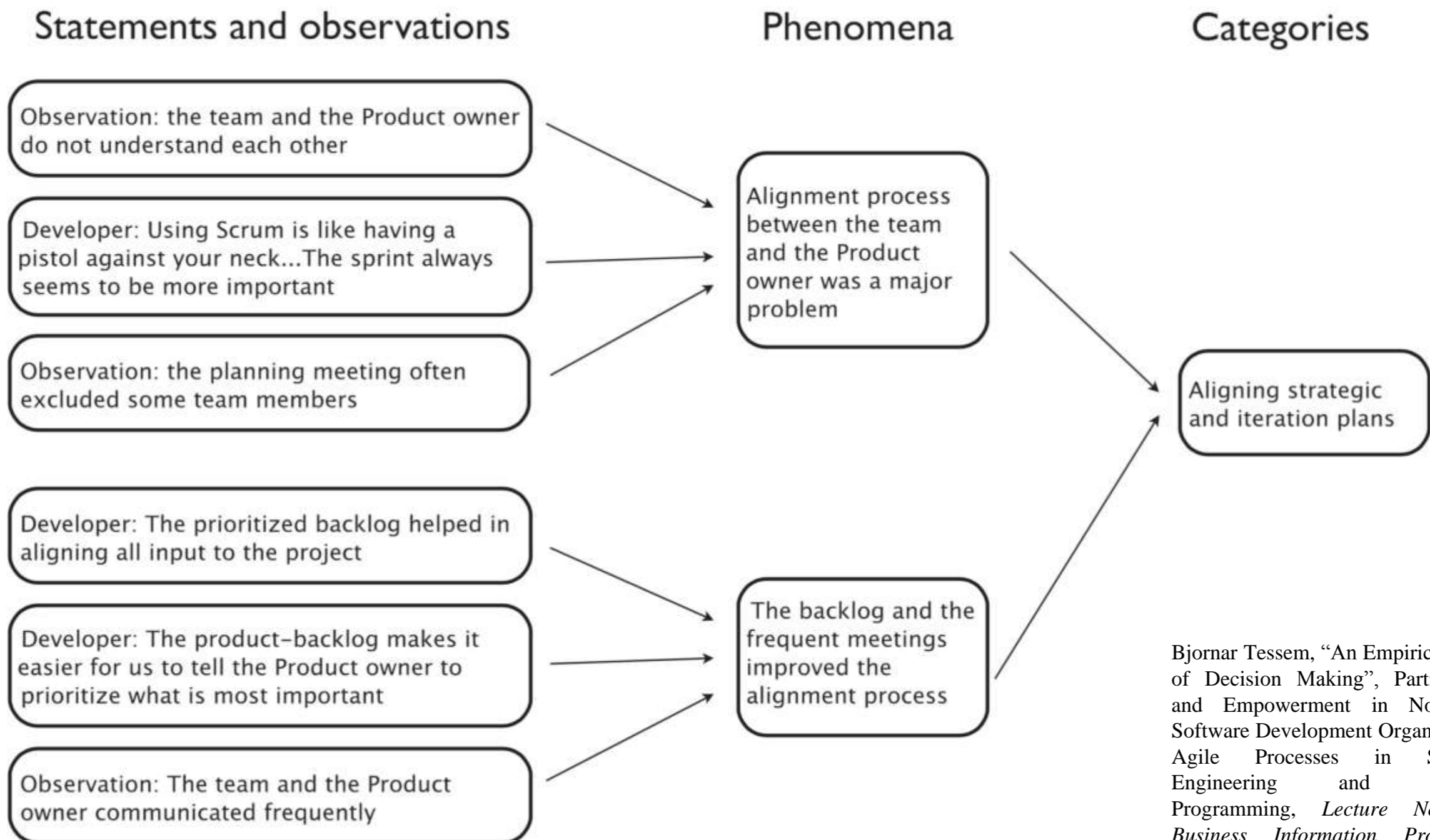
- Courage

- Autonomy

- Innovation

Decisions

Agile Processes

- Disciplined

- Unstructured

- Collaborative

Military

- Disciplined

- Structured

- Hierarchical

Issues from Decisions

Statements and observations

Observation: the team and the Product owner do not understand each other

Developer: Using Scrum is like having a pistol against your neck...The sprint always seems to be more important

Observation: the planning meeting often excluded some team members

Developer: The prioritized backlog helped in aligning all input to the project

Developer: The product–backlog makes it easier for us to tell the Product owner to prioritize what is most important

Observation: The team and the Product owner communicated frequently

Phenomena

Alignment process between the team and the Product owner was a major problem

The backlog and the frequent meetings improved the alignment process

Categories

Aligning strategic and iteration plans

Bjornar Tessem, "An Empirical Study of Decision Making", Participation and Empowerment in Norwegian Software Development Organizations, Agile Processes in Software Engineering and Extreme Programming, *Lecture Notes in Business Information Processing*, vol.77, 2011, pp. 253-265.

Analytic Hierarchy Process

- Decision support process

- Based on hierarchy of goals, subgoals and objectives

- Decision constructed by pairwise comparisons

- Intransitive comparisons supported (consistency level)

AHP Flow

- Define the goal

- Break down the purpose into supporting elements

- Insert actors into suitable levels

- Establish the bottom level for choice

- Examine the hierarchic levels forward and backward

AHP or ANP

- If complex interrelationships among factors exist, a hierarchy may not be obtainable

- In this case, we build a network instead of a hierarchy

- The Analytical Network Process can then be adopted

- The ANP is in general more complex than AHP and thus AHP is preferable whenever it can be used

Fundamentals

- AHP / ANP can be used at many levels

- Basic level: individual decisions

- Advanced level: group decisions

- Structured level: process-driven decisions

Basic AHP

- Task prioritization

- Solution alternative

- Design approach

- Choice of objective

Advanced AHP

- Resource allocation

- Conflict resolution

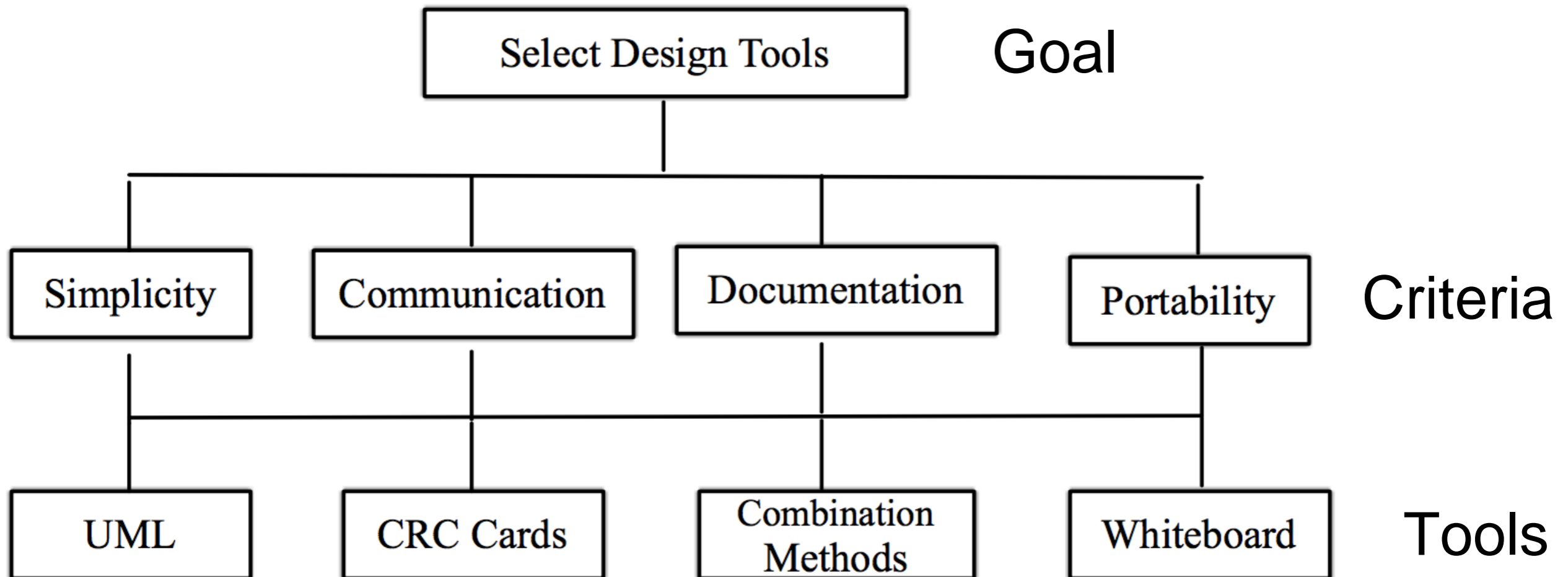- Multi-decision making (e.g., policy)

Structured AHP (XP)

- Planning Game

- Simple Design

- System Metaphor

- Pair Programming

- Refactoring

- Test-Driven Development

Levels of Application

- Strategic: process

- Tactical: project

- Operational: iteration

Example (strategic)

Cost/Benefit Analysis

Costs

- Training

- Many comparisons

- Setup time

Benefits

- High decision quality

- Lower stress

- Repeatability

Feasibility Study

Name	A	B	C
Application	Trouble Ticket System	Order Management System	HR Gift Card System
Programming language	JSF2 / EJB3	Java	C#
Iteration duration	2 months	2 weeks	1 month
Development process	Agile/Scrum	XP/Scrum	XP
Programmers experience	14 years	10 years	12 years

Feasibilty Results

- Qualitative

- Perceived improvement

- Higher morale

- Project completes faster - fewer conflicts

Conclusions

- Standard decision process

- Reconciliation of different views

- Higher development quality

- Standardized training

- Higher satisfaction

Caveats

- AHP, ANP are computationally intensive (square of number of criteria)

- Fitting decision process requires dedicated tailoring

- Training / execution must fit within the chain of command

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Thank you