Participatory Design
Methods for C2 Systems
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Framework

- Engineers endeavor to develop useful, usable, understandable systems

- Users want useful, usable, understandable systems

What a match!!

- In-depth understanding of domain and practitioner is required for developing accurate, relevant training and support for net-centric environments
Gaining Understanding

Understanding the Practitioner

Scratch

Understanding the Domain

Exploring the current world

Exploring the future world

CTA Model

Design Seeds

Reiterate
Designing Tools for People

Linking Understanding and Usefulness

Patterns in Cognitive Systems  Abstracted Patterns

Abstract

Generative

Prototypes As Tools for Discovery

Participative

Design Seeds: Reusable Concepts And Techniques

Authentic

Adapted from D. Woods, 2001
Participatory Design

• An established, diverse research and practice area which has a goal of engaging researchers, designers, developers, practitioners and end-users in all of the various activities leading to the successful development and implementation of systems.

• Umbrella methodology which includes studies, theories, conferences and practices
Method 1: Elicitation by Critiquing (EBC)

Process of Novice Performing Domain Task

CTA Investigator Watches Expert as Evaluator Commenting on Novice Performance
Comparison of Elicitation Methods

Elicitation by Interview

CTA Investigator: Questions → Expert as Storyteller: Telling About → Past Cases, Experiences

Elicitation by Observation

CTA Investigator: Watches → Expert as Practitioner: Performing → Actual/Simulated Task

Elicitation by Critiquing

CTA Investigator: Watches → Expert as Evaluator: Commenting on Novice → Performing Actual/Simulated Task
Discussion of EBC

• Remember: Any method shapes the conditions of observation.

• Relationship to C2
  – Can be used in conjunction with Modeling & Simulation
  – Provides strong cue to focus
  – Participatory role
Method 2: Value Elicitation

What is Valued in Software Interface for a Complex, Analytic Domain?

1st Tier

Input (.35)
- Input Simplicity (.4)
  - Presentation (.3)
  - Engine Process (.25)
- Intuitive Feel (.4)
- Delivery (.3)

Processing (.3)
- Presentation (.3)
- User Control (.45)

Output (.35)
- Intuitive Feel (.3)
- Presentation (.35)

2nd Tier
10 Steps

1. Define Problem
2. Build Hierarchy
3. Identify Evaluation Measures
4. Establish Evaluation Functions
5. Weighting
6. Choose Alternatives to Evaluate
7. Score Alternatives
8. Deterministic Analysis
9. Sensitivity Analysis
10. Analyze Conclusions
What is Valued in Software Interface for a Complex, Analytic Domain?

Input (.35)
- Simplicity (.4)
- Assistance (.35)
  - Directed (.6)
  - Extent that they have directed input (1)
- Presentation (.3)
  - Intuitive Feel (.4)
- Forgiveness (.35)
- Efficiency (.3)
  - Interpretation (.4)

Processing

Output

Score:
0 - None/Little
.3 - Limited
.7 - Some
1 - Majority
Discussion on Value Elicitation

- Elicits from Practitioner
- Uncovers Hidden Objectives
- Improving Communication
- Guides Information Collection
- Facilitates Involvement in Multiple Stakeholder Decisions
- Guides Strategic Thinking
Conclusion

• Desired goal: Implemented systems that address real needs

• Participatory Design (PD): Involves all

• EBC and Value Elicitation methods support PD

• Outcome: *Acceptance when implemented*