User Modeling –
Descriptive Cognitive Models

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Spring 2007

This material has been developed by Georgia Tech HCI faculty, and continues
to evolve. Contributors include Gregory Abowd, Al Badre, Jim Foley, Elizabeth
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Last revision: January 2007.

Agenda

• Other cognitive theories/models
  – Situated action
  – Activity theory
  – Distributed cognition
Cognitive/User Modeling

• Remember the Idea:
  
  . . . If we can build a model of how a user works, then we can predict how s/he will interact with the interface (before it is even built)

Last Time

• MHP, GOMS, CCT, KLM technique

• All model human as an information processing “machine”

• What’s missing?
(Social) Context

- Human information processor models all involve unaided individual
- In reality, people work with other people and other artifacts
- Other models of human cognition
  - Situation action
  - Activity theory
  - Distributed cognition

Situated Action

- Can someone describe it?
Situated Action

- Emergent property of moment-by-moment interactions
- Relation between persons and arenas
- Improvisation
- Detailed temporal accounts
- De-emphasizes rigid plans and rational problem solving

Situated Action

- Studies situated activity or practice
  - Activity grows out of the particulars of a situation
  - Improvisation is important

- Basic unit of analysis is “the activity of persons acting in a setting”

HCI Proponent: Lucy Suchman
Example

- Need 3/4 of 2/3 of cup of cottage cheese
  - Just has a simple measuring cup available
- Person solves problem by
  - Measuring 2/3 cup
  - Pouring out into a circle
  - Divide into quadrants
  - Take away one
- One time solution to one time problem

Situated Action Principles

- Structuring of an activity grows out of immediacy of the situation
- People engage in opportunistic, flexible ways to solve problems
- Formulaic plans
- Rational problem solving
Activity Theory

- Can anyone describe it?

Activity theory

- Subject, object, actions and operations
- Flexible in face of changing conditions
- Mediation by artifacts
- Transformative relationships
Activity Theory

- Unit of analysis is an activity
- Components:
  - Subject, object, actions, operations
  - Noun Held by subject, motivates activity “object of game”
  - Goal-directed processes “tasks”
  - How action is carried out

Activity Theory Principles

- Key idea: Notion of *mediation* by artifacts (objects)
- Our work is a computer-mediated activity
  - Starring role goes to activity
  - In “regular” HCI, stars are person and machine
- Context is not “out there”. It is generated by people in activities

HCI Proponent: Bonnie Nardi
Distributed Cognition

• Can anyone describe it?

Distributed Cognition

• Distributed collection of interacting people and artifacts

• Less emphasis on individual cognition & system goal

• Representations and transformations

• Collaboration
Distributed Cognition

- Unit of analysis is cognitive system composed of individuals and the artifacts they use

- Studies the coordination and cooperation between people and artifacts in a distributed process

HCI Proponent: Ed Hutchins

Distributed Cog. Principles

- Individual agents

- Distributed collection of interacting people and artifacts

- Functional system is what matters, not individual thoughts in people’s heads
Upcoming

- Evaluation
  - Experimental design
  - Data collection
  - Subjective measures
  - Data analysis

- Next Thursday: Project work day