

# User Modeling – Descriptive Cognitive Models

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## 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**”



## Example

- Need  $\frac{3}{4}$  of  $\frac{2}{3}$  of cup of cottage cheese
  - Just has a simple measuring cup available
- Person solves problem by
  - Measuring  $\frac{2}{3}$  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?



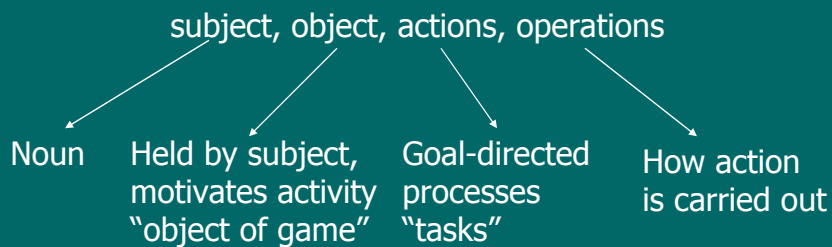
## Activity theory

- 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:



## 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

like activity

- 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

