


Modeling Users 2


Predicting thoughts and actions in context



Agenda

- Other cognitive theories
 - ❖ Situated action
 - ❖ Activity theory
 - ❖ Distributed cognition
- User profiles/models -> implications
- Project Part 2 - Design Alternatives


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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)


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Last Time

- MHP, GOMS, CCT, KLM technique
- All model human as an information processing "machine"
- What's missing?


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(Social) Context

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


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Situated Action (Suchman...)

- Emphasis on situated activity or *practice*
 - ❖ Basic unit of analysis is "the **activity** of persons acting in a **setting**"
 - Activity grows out of the particulars of a situation
 - Concreteness implies empirical approach
 - But an interpretive, not a behaviorist perspective
 - ❖ Situated action/cognition is action/cognition, but not rational or like symbolic A.I.
 - We don't "execute" pre-planned/scripted activities.
 - Plans are resources we use when engaging in improvised practice
 - Originally, a counter-theory to A.I. Planning (and B.P.R.)
 - Imaginative or pattern-driven thinking, not rational, goal-oriented thinking
 - If you **look** at routine activity carefully, it becomes non-routine and **creative**


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Example

- What's involved in responding to a business order?
 - E.g. toner supplies
 - ❖ Clerical "business process"
 - ❖ But do we add tax?
 - What if the order is coming from an ocean liner?
- One time solution to one time problem
 - ❖ We (designers) can generalize to help users cope with common situations
 - But we risk underestimating importance of specific cases
 - ❖ We (managers) can generalize to prescribe and optimize activities
 - But not only does nobody do things that way, maybe we don't know enough to tell them to

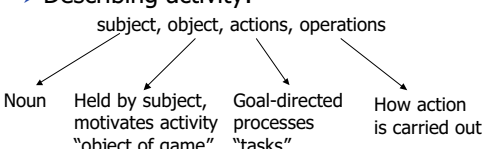
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Activity Theory (Vygotsky, Nardi)

- Unit of analysis is an activity
- Key idea: Notion of *mediation* by artifacts (objects)
 - ❖ We create tools, and tools create us
- Describing activity:


subject, object, actions, operations



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graph TD
    A[subject, object, actions, operations] --> B[Noun]
    A --> C[Held by subject, motivates activity "object of game"]
    A --> D[Goal-directed processes "tasks"]
    A --> E[How action is carried out]
          
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Activity Theory Principles


- Our work in HCI is study/development of *computer-mediated* activity
 - ❖ Starring role goes to activity
 - ❖ Whereas, in "regular" HCI, stars are person and machine
- Context is not "out there". It is generated by people in activities
 - ❖ Context = that which is woven through
 - ❖ Context ≠ that which surrounds

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Distributed Cognition (Hutchins)

- 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
 - ❖ People don't just use other people as tools for individual activity, the activity/cognition is inherently shared


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Distributed Cog. Principles

- Doers/thinkers/actors/cognizers are NOT individual agents
 - ❖ Distributed cognition is cognition of groups, not collective individual cognition
- Distributed collection of interacting people and artifacts
 - ❖ Artifacts are culturally evolved components of activities (e.g. navigation)
- Functional system is what matters, not individual thoughts "in" people's heads
 - ❖ External memories *are* memories, not memory prostheses


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Simpler User Modeling

- How do attributes of users (in their context) influence the design of user interfaces?
- Are there some design guidelines that we can derive from different attributes?

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User Profiles

- **Attributes:**
 - ❖ attitude, motivation, reading level, typing skill, education, system experience, task experience, computer literacy, frequency of use, training, color-blindness, handedness, gender,...

- Novice, intermediate, expert


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Motivation

<ul style="list-style-type: none"> ➤ User <ul style="list-style-type: none"> ❖ Low motivation, discretionary use ❖ Low motivation, mandatory ❖ High motivation, due to fear ❖ High motivation, due to interest 	<ul style="list-style-type: none"> ➤ Design goal <ul style="list-style-type: none"> ➔ ❖ Ease of learning ➔ ❖ Control, power ➔ ❖ Ease of learning, robustness, control ➔ ❖ Power, ease of use
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Knowledge & Experience

<ul style="list-style-type: none"> ➤ Experience ➤ <u>task</u> <u>system</u> <ul style="list-style-type: none"> ❖ low low ❖ high high ❖ low high ❖ high low 	<ul style="list-style-type: none"> ➤ Design goals <ul style="list-style-type: none"> ❖ Many syntactic and semantic prompts ❖ Efficient commands, concise syntax ❖ Semantic help facilities ❖ Lots of syntactic prompting
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Job & Task Implications

- Frequency of use
 - ❖ High - Ease of use
 - ❖ Low - Ease of learning & remembering
- Task implications
 - ❖ High - Ease of use
 - ❖ Low - Ease of learning
- System use
 - ❖ Mandatory - Ease of using
 - ❖ Discretionary - Ease of learning

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Project Part 2

- Explore the DESIGN SPACE
- Prepare three *different* designs
- "Informed Brainstorming"
 - ❖ Issues, positions/alternatives, arguments for and against, reasons for decisions, implications
- Resulting in Poster Session
 - ❖ Purpose is to get feedback from peers and others
 - ❖ Currently scheduled Oct. 7th

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