



User-centered approached to interaction design

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Outline

- Introduction
- Why is it important to involve users at all?
 - Degrees of involvement
- What is a user-centered approach?
- Understand users' work: applying ethnography in design
 - Coherence
 - Contextual Design
- Involving users in design: participatory design
 - PICTIVE
 - CARD



Introduction

- User-centered development
 - Find information about users and tasks to inform design
 - Use ethnography with success but have difficulties to interpret
 - User involvement in the development process
 - Through evaluation studies
 - Become co-designers



Why is it important to involve users at all

- Gain better understanding of users to develop a more appropriate and useable product
- Aspects irrelevant to functionality
 - Expectation management
 - Make sure users' views and expectations are realistic
 - Better to exceed users' expectations
 - Adequate and timely training help managing expectations
 - Ownership
 - More likely to be receptive



Degrees of involvement

- Two ends of the spectrum
 - Co-opted to the design team as major contributors
 - Kept informed through channels of communication
 - Compromise situation with large number users
- Individual circumstances affect realistic and appropriate
- Involving users in short projects
 - Web shopping application(3 weeks) : paper prototype
 - A video game publisher website(3 months): ten-day meeting
- How and when to involve users is a matter of dispute



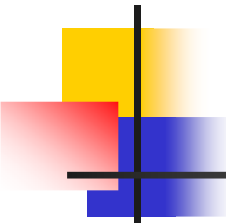
What is a user-centered approach

- Users and their goals are driving force
- Characteristics of interaction design
 - Early focus on users and tasks
 - cognitive, behavioral, anthropomorphic, attitudinal characteristics
 - Empirical measurement
 - Early : documents, later : simulations and prototypes
 - Iterative design
 - “design, test, measure, redesign”



What is a user-centered approach

- Early focus on users and tasks
 - User's tasks and goals are the driving force behind the development
 - Technology should not be the driving force
 - User's behavior and context of use are studied and the system is designed to support them
 - How people perform their tasks is significant
 - User's characteristics are captured and designed for
 - Characteristics associated with the job or particular task
 - Users are consulted throughout development from earliest phases to the latest and their input is seriously taken into account
 - Designers' respect
 - All design decisions are taken within the context of the users, their work, and their environment
 - Remain aware of the users



Understanding users' work: applying ethnography in design

- Originally from anthropology : writing the culture
 - Find order within an activity
 - Make implicit explicit
- Different ways associated with design
 - “Ethnography of” : study developers 、 workplace
 - “Ethnography for” : yields ethnographic studies
 - “Ethnography within” : integrate techniques associated with ethnography
- Ethnographic experience is not a data-collection exercise



Understanding users' work: applying ethnography in design

- Collect ethnographic data
 - Frame of reference arise from data
- Goals opposite between design and ethnography
 - Design is abstraction and ethnography is detail
- Framework helps structure the presentation of ethnographies
 - Coherence builds upon
- Train developers to collect ethnographic data
 - First-hand experience of situation

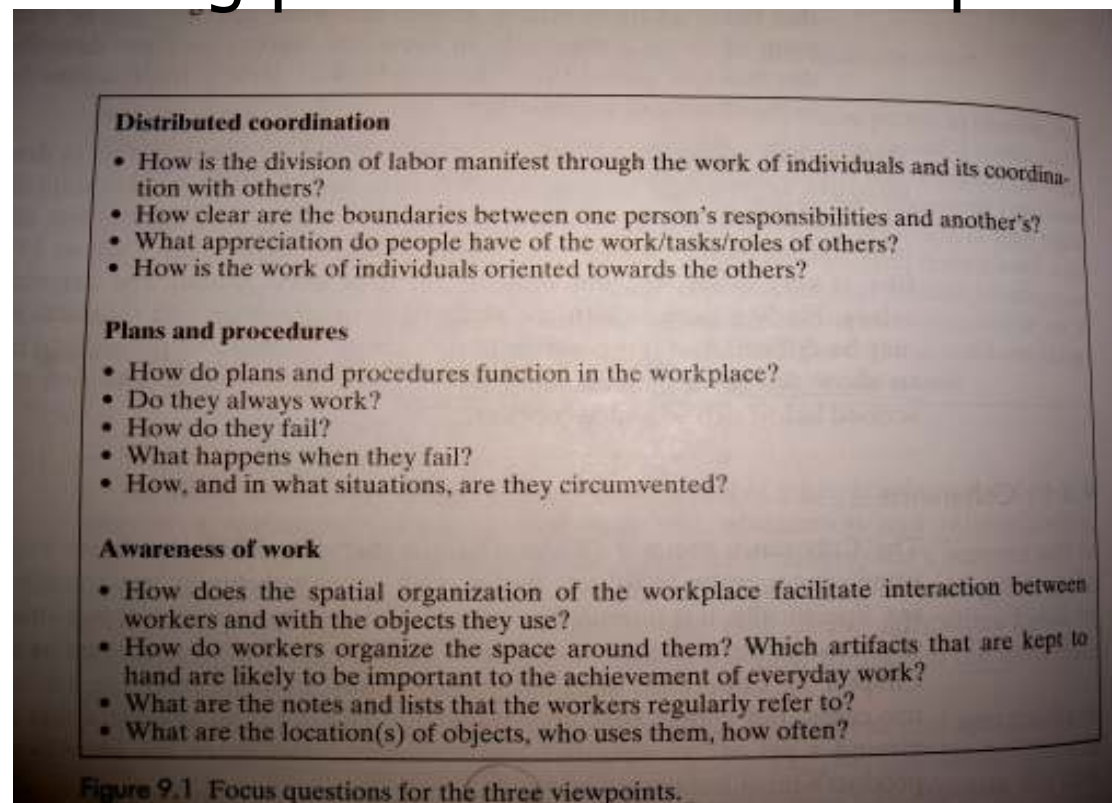


Coherence

- Combines ethnographic experiences with developments in requirements engineering
 - Present ethnographic data based around “viewpoints” and “concerns”
- Viewpoints
 - The distributed co-ordination
 - Means and mechanisms nature coordinated
 - The plans and procedures
 - Organizational support to work
 - The awareness of work
 - Keep aware of others’ work

Focus questions for the three viewpoints

- Guide the observer to particular aspects
 - Starting points to add other questions





Coherence

- Concerns
 - Represent criteria guide the requirements activity
 - Concerns determined if relevant to the viewpoint
- Four concerns from ethnographic experience
 - Paperwork and computer work
 - Embodiments of plans, mechanism for develop and share
 - Skill and the use of local knowledge
 - Refer to “workarounds” developed in organizations
 - Spatial and temporal organization
 - Workplace and areas where time is important
 - Organizational memory
 - Other ways to remember things

Elaboration questions for the four concerns

Paperwork and computer work

- How do forms and other artifacts on paper or screen act as embodiments of the process?
- To what extent do the paper and computer work make it clear to others what stage people are at in their work?
- How flexible is the technology at supporting the work process—is a particular process enforced, or are alternatives permitted?

Skill and the use of local knowledge

- What are the everyday skills employed by individuals and teams in order to get the work done?
- How is local knowledge used and made available, e.g., through the use of personalized checklists, asking experts, etc.?
- To what extent have standard procedures been adapted to take local factors into account?

Spatial and temporal organization

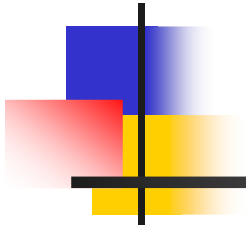
- How does the spatial organization of the workplace reflect how the work is performed?
- Which aspects of the work to be supported are time-dependent?
- Does any data have a “use-by-date”?
- How do workers make sure that they make use of the most up-to-date information?

Organizational memory

- How do people learn and remember how to perform their work?
- How well do formal records match the reality of how work is done?

Figure 9.2 Elaboration questions for the four concerns.

Q&A



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 - CARD
- Comparison
- Conclusion

Understanding users' work

- Ethnography
 - Find the order
 - Find facts users cannot
- Difficult to use the output of ethnography
 - Ethnographies of the Home

“After dinner, they moved to the location of the computer and began by asking the children about their use of the technology. Each family member was engaged in conversation about the technology...”

Framework for using ethnography in design

- Distributed co-ordination
 - Distributed nature of the tasks & activities, and the means and mechanisms by which they are co-ordinated
- Plans and procedures
 - organisational support for the work, such as workflow models and organisational charts, and how these are used to support the work
- Awareness of work
 - how people keep themselves aware of others' work

Coherence

- Offers appropriate questions to help address three dimensions(viewpoints) of the framework
- Examples for focus questions
 - Distributed Coordination
 - How is the division of labor manifest through the work of individuals and its co-ordination with others?
 - Plans and procedures
 - How do plans and procedures function in the workplace?
 - Awareness of work
 - What are the locations of objects, who uses them, how often?

Contextual Design

- Contextual Design
 - Developed by Hugh Beyer and Karen Holtzblatt in 1998
 - Developed to handle data collection and analysis from fieldwork for developing a software-based product
 - 7 parts
 - Contextual Inquiry
 - Work Modeling
 - Consolidation
 - Work Redesign
 - User Environment Design
 - Mockup and Test with Customers
 - Putting It into Practice

Contextual Design

- Contextual Inquiry
 - An approach to ethnography study
 - The designers works as an apprentice to the users
 - Contextual interview
 - at users' workplace (workstation)
 - 2 to 3 hours long
 - 4 main principles:
 - Context — see workplace & what happens
 - Partnership — user and developer collaborate
 - Interpretation — observations interpreted by user and developer together
 - Focus — project focus to help understand what to look for

Contextual Design

- Work Modeling
 - Model data collection in interpretation session
 - 5 aspects
 - Work flow model
 - the coordination, communication of the people in a work
 - Sequence model
 - the required steps to accomplish a goal
 - Artifact model
 - the physical 'things' created to do the work
 - Cultural model
 - constraints on the system caused by organizational culture
 - Physical model
 - physical structure of the work

Work Flow Model

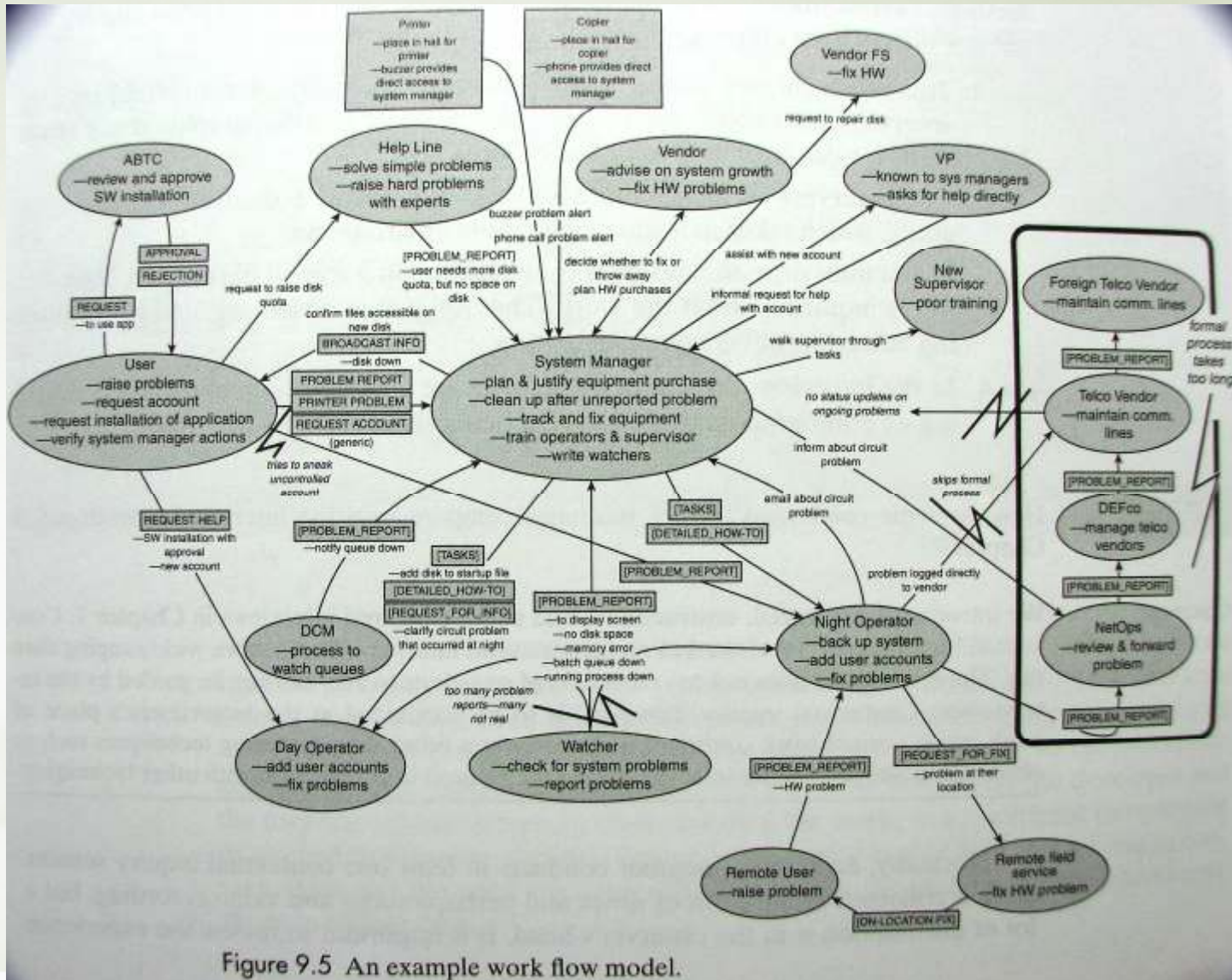


Figure 9.5 An example work flow model.

Sequence Model

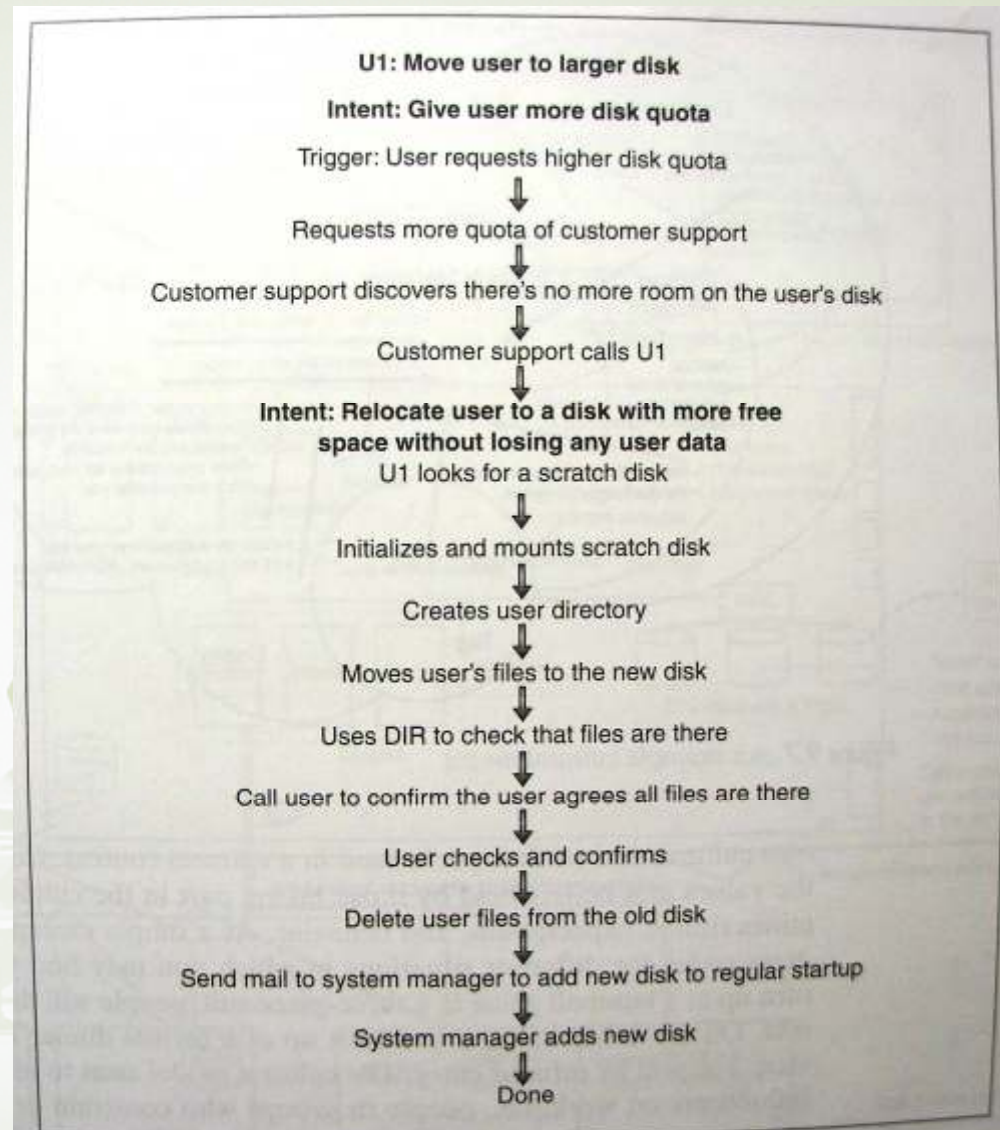


Figure 9.6 An example sequence model.

Cultural Model

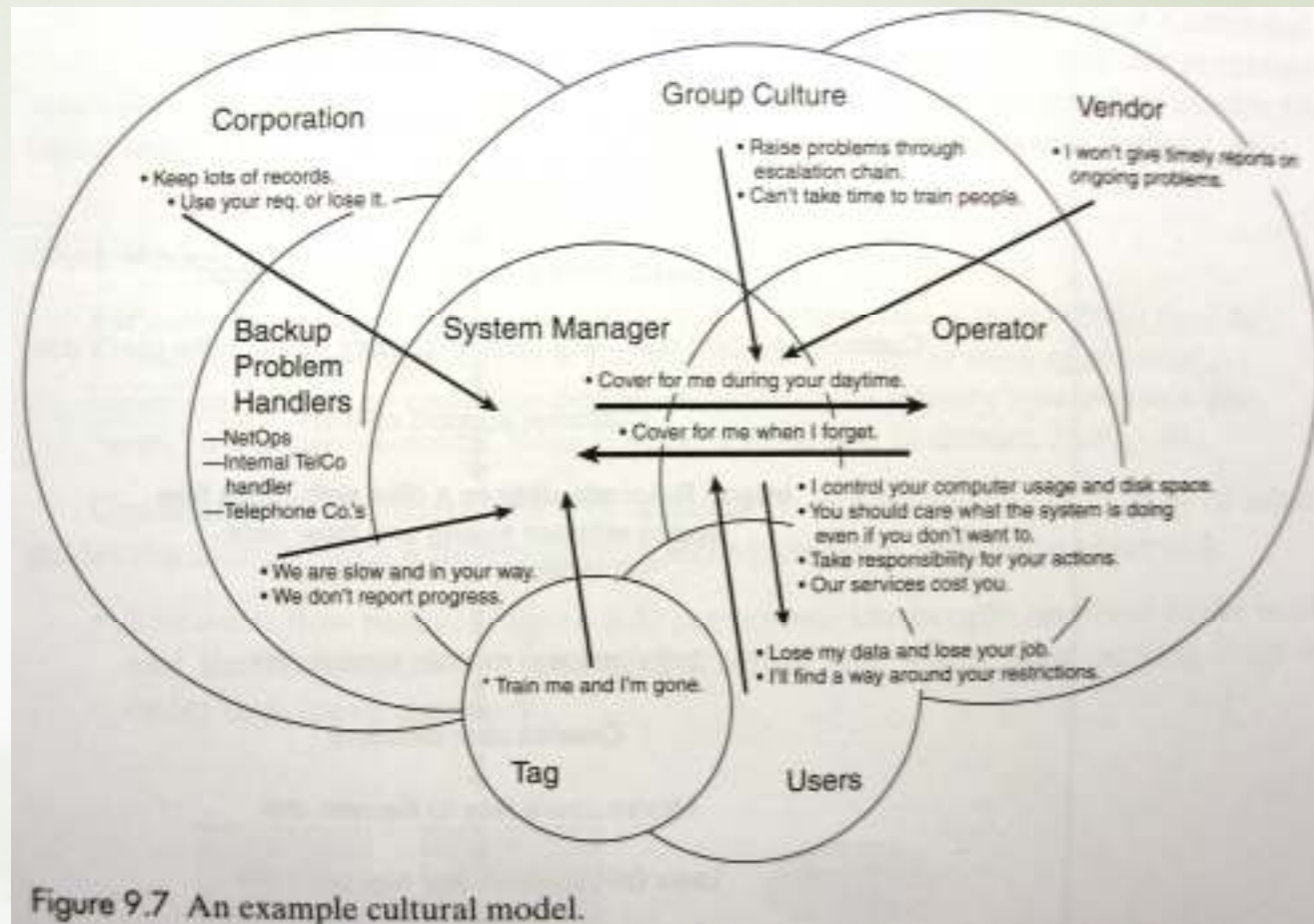


Figure 9.7 An example cultural model.

Physical Model

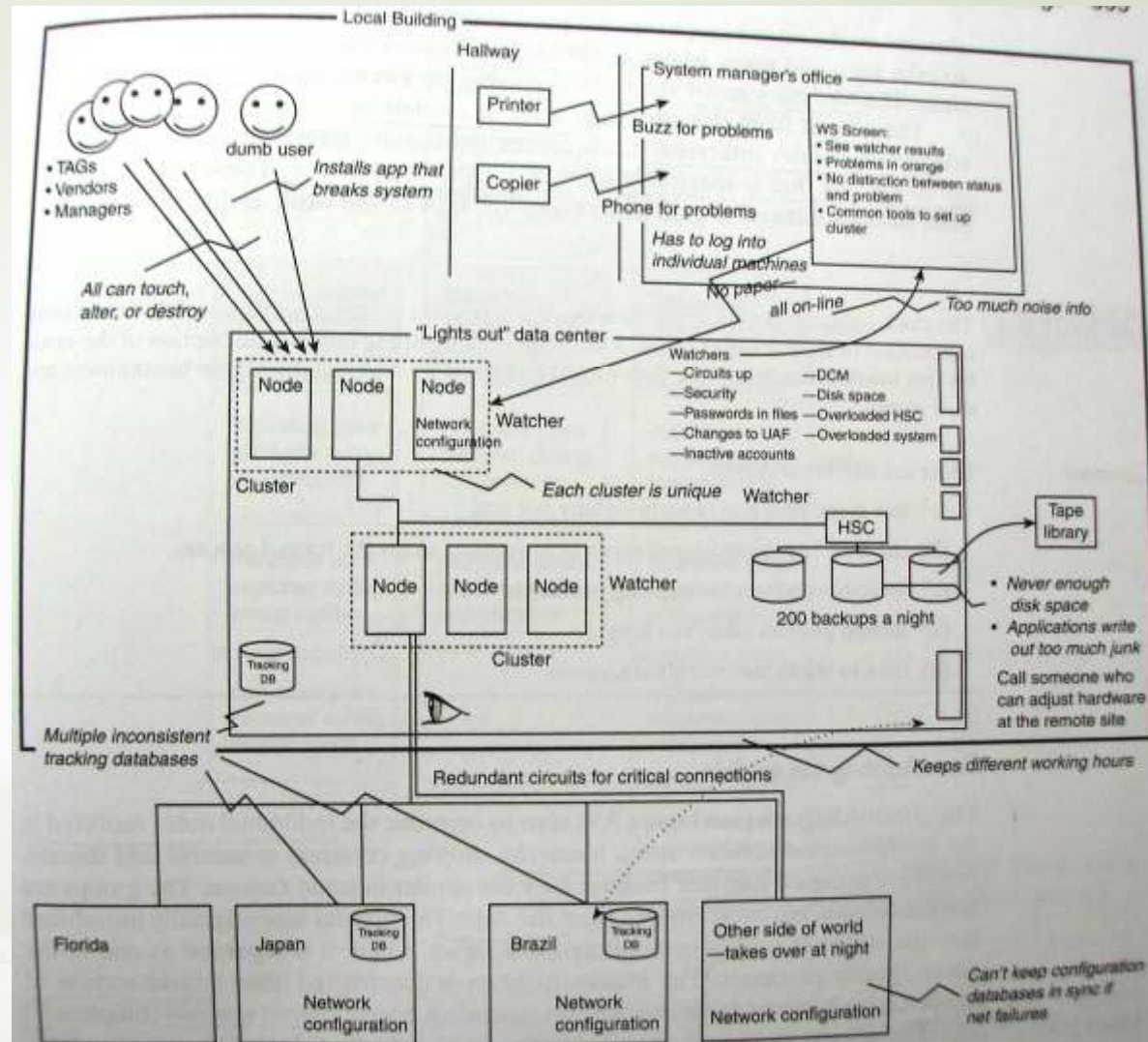


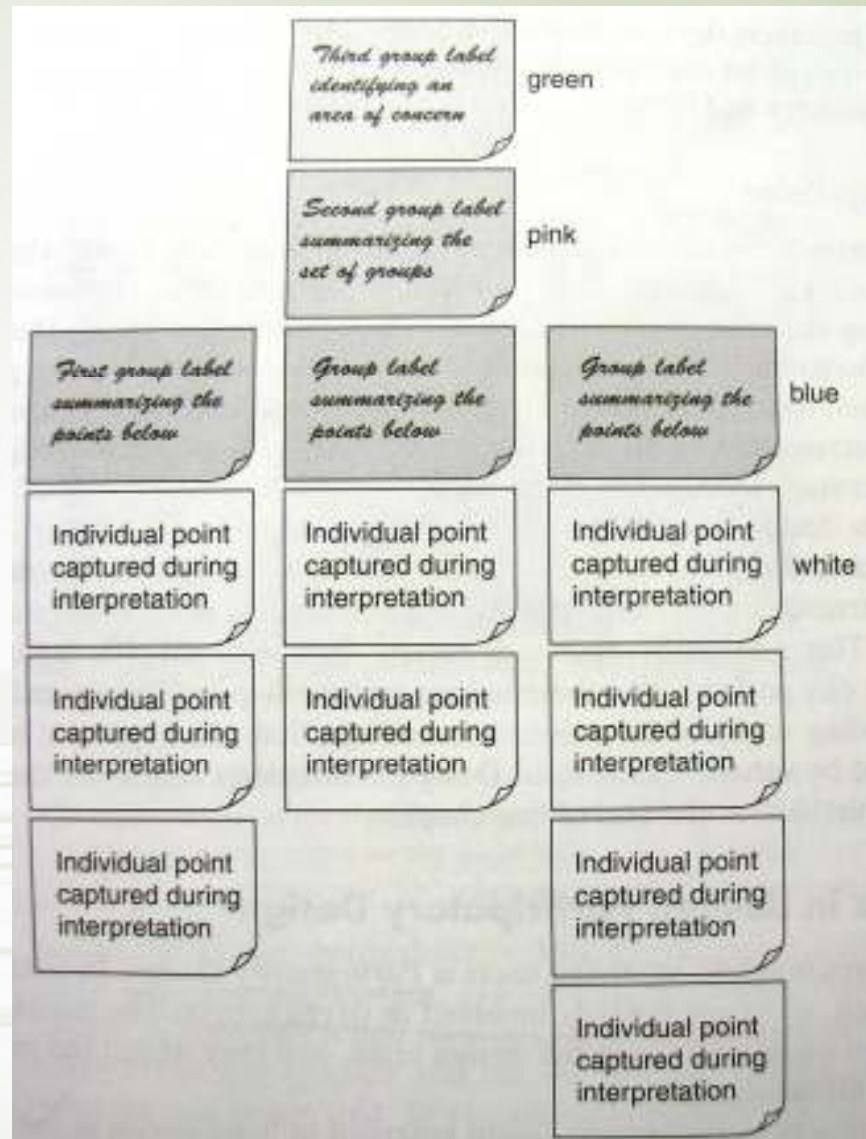
Figure 9.8 An example physical model.

Contextual Design

- Consolidating the models
 - Each contextual inquiry (one for each user/developer pair) results in a set of models
 - These need to be consolidated into one view of ‘the work’
 - Affinity diagram
 - Organizes interpretation session notes into common structures and themes
 - Categories arise from the data
 - Diagram is built through induction

Contextual Design

- The structure of an affinity diagram



Participatory Design

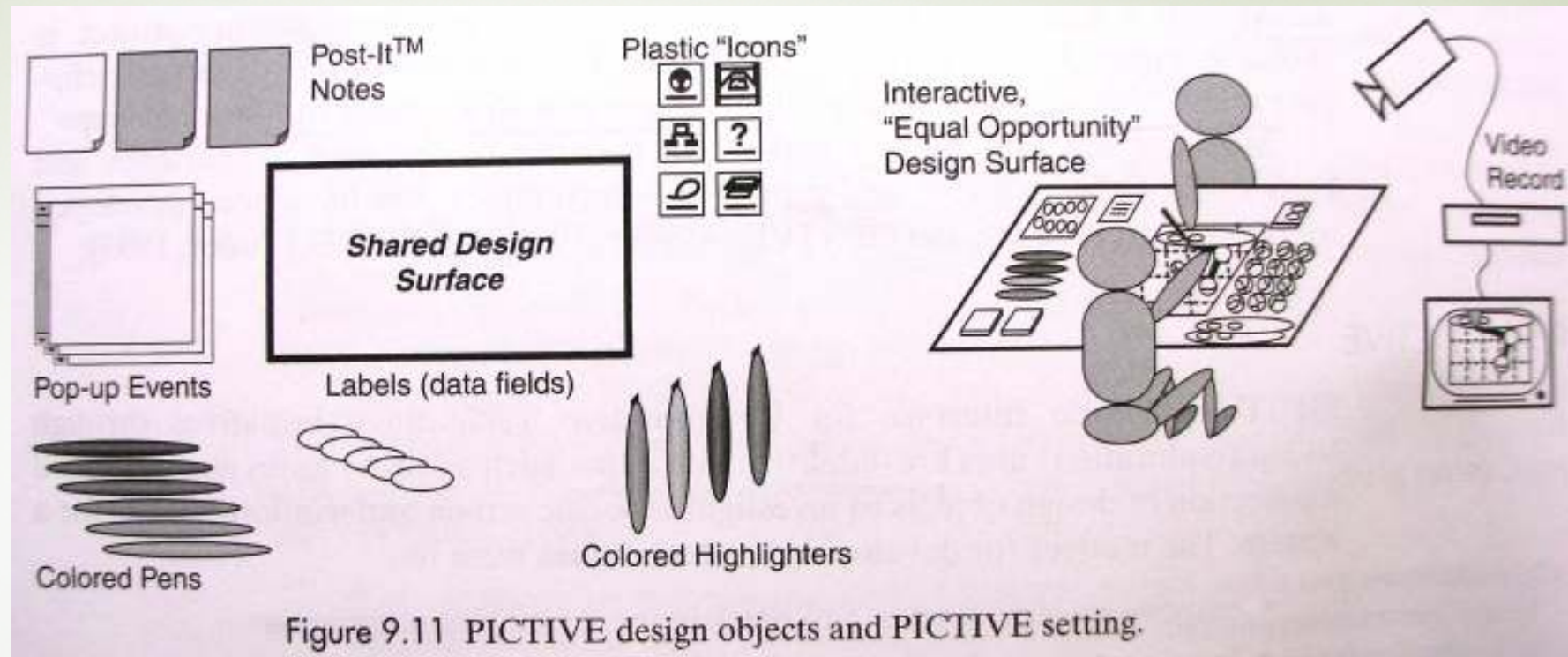
- Participatory Design
 - Users are actively involved in development
 - The idea emerged in Scandinavia in the late 1960s
 - 2 techniques
 - Plastic Interface for Collaborative Technology Initiatives through Video Exploration (PICTIVE)
 - Collaborative Analysis of Requirements and Design (CARD)



Participatory Design

- PICTIVE (Muller, 1991)
 - Empower users to act as full participants in the design process
 - Involve one-on-one collaboration or small group
 - Materials
 - Low-fidelity office items such as pens, paper, sticky notes
 - Collection of (plastic) design objects for screen and window layouts
 - Equipment
 - Shared design surface, e.g. table
 - Video recording equipment

Participatory Design - PICTIVE



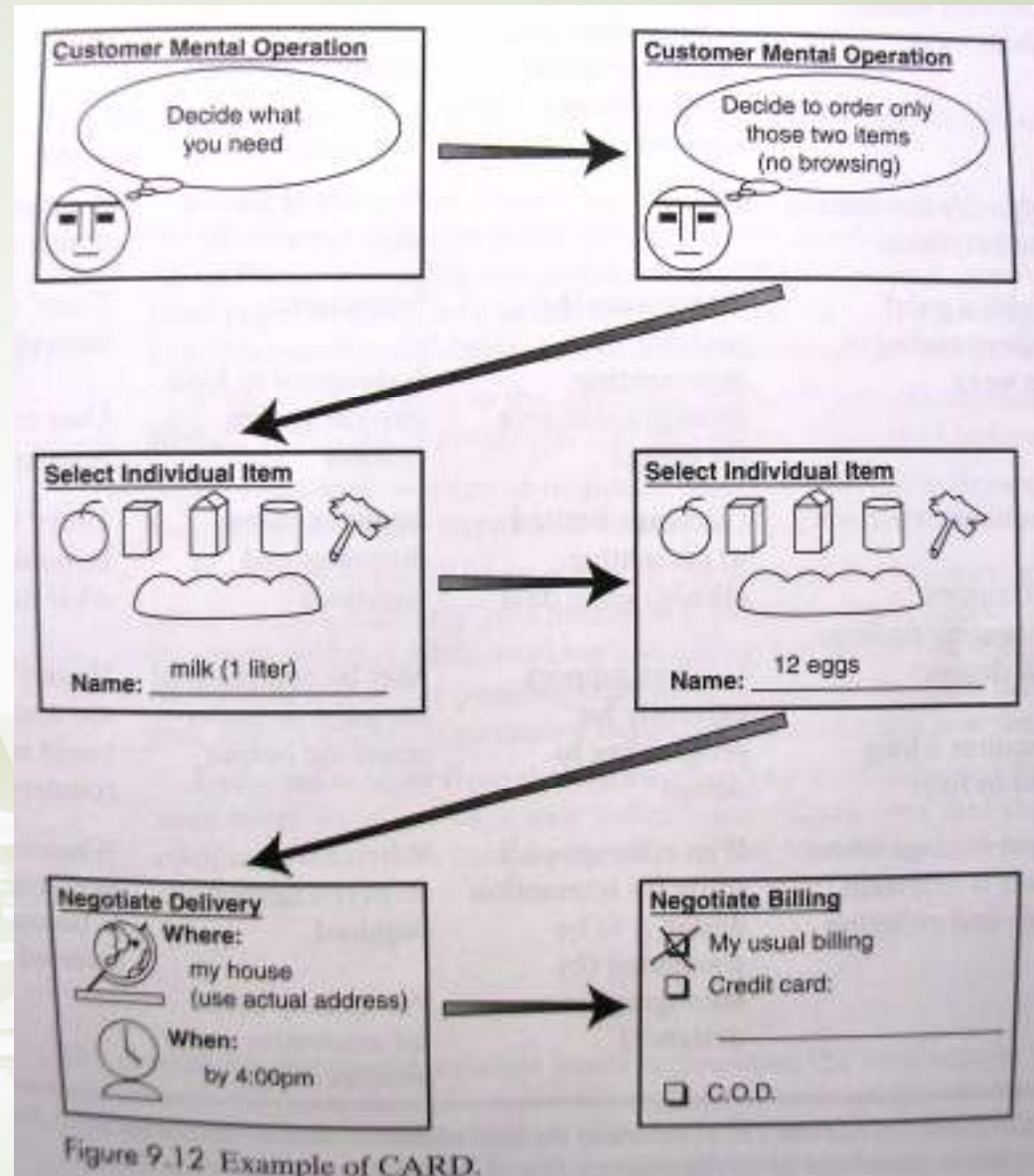
Participatory Design

- PICTIVE
 - Before session
 - Homework assignment for participants
 - A set of system components for developers
 - During session (video recording)
 - The stakeholders all introduce themselves
 - Brief tutorials about the different domains
 - Brainstorming the designs, using the design objects and the homework assignments
 - A walkthrough of the design and the decisions discussed.

Participatory Design

- CARD (Tudor, 1993)
 - Similar to PICTIVE, but explore work flow
 - use playing cards with pictures of components and screen dumps
 - Similar structure to the session as for PICTIVE
 - During the brainstorming part, playing cards are manipulated by the participants in order to show the work flow between computer screens or task decision points

Participatory Design - CARD



Comparison

	<i>ETHNOGRAPHY</i>	<i>COHERENCE</i>	<i>CONTEXTUAL DESIGN</i>	<i>PARTICIPATORY DESIGN</i>
<i>ACTIVE USER INVOLVEMENT</i>	Low level	Low level	Medium to low level	Equal partners, users can be very influential
<i>ROLE OF DESIGNER/ RESEARCHER</i>	Uncover findings about work	Collect and present ethnographic data according to the viewpoints and concerns	Steer discussion Interpret findings	Equal partners with users
<i>LENGTH OF STUDY</i>	Typically continuous	N/A	A series of 2-hour interviews	A series of 2-hour design sessions
<i>BENEFITS</i>	Yield a good understanding of the work	Overcomes the problem of respresenting ethnographic data for design	Systematic Is designed to feed into the design process	Users' sense of ownership is increased User contact is beneficial for designers
<i>DRAWBACKS</i>	Requires expertise Difficulties translating findings into design Requires a long lead-in time	Coverage limited to presenting ethnographic data Limited support currently for progressing to design	Involves many diagrams and notations May be complicated for users to understand the output	Users' thinking can be constrained by what they know If users are involved too much they get bored and it becomes counter-productive
<i>WHEN TO USE</i>	Most settings where there is sufficient time and expertise	If an ethnographic study for interaction design is to be conducted (by ethnographer or designer)	When a user-centered focus is required Particularly useful for innovative product design	Whenever users are available and willing to become actively involved in design

Conclusion

- User involvement helps users' expectation management and feelings of ownership
- 3 characteristics in user-centered approach: early focus on users, empirical measurement and iterative design
- Ethnography is useful for understanding work, but can be difficult to use in design
- Coherence and Contextual Design support the use of ethnographic data in design
- Participative design involves users taking an active part in design decisions
- CARD and PICTIVE are example techniques of participative design

Q & A

