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Chapter 9

User-Centered Approaches to Interaction Design

**B.Tech CSBS
VII Semester**

**Handled by
Smt.T.M.Latha**

Introduction

Interaction design tries to bridge between two worlds:

- 1. World of the software professionals**
- 2. World of the end-users**

- Each world has its own knowledge and practices**
- Each world has well-defined boundaries**
- Movement from one world to the other is known to be difficult**

“We can see this difficulty manifested in our elaborate methods for requirements analysis, design, and evaluation – and in the frequent failures to achieve products and services that meet users’ needs and/or are successful in the marketplace.”

-- Michael J. Muller,

Participatory Design: The Third Space in HCI

Introduction (Cont.)

Most of the traditional methods of communication between the two worlds are relatively one-directional:

- We analyze the requirements from the users
- We deliver a system to the users
- We collect usability data from the users

“Relatively few [methods] involve two-way discussions, and fewer still afford opportunities for the software professionals to be surprised – i.e., to learn something that we didn’t know we needed to know.”

-- Michael J. Muller, **Participatory Design: The Third Space in HCI**

Introduction (Cont.)

We might think
we know a lot
about the user's
environment, but
probably don't.

Solutions
should stay
down- to-Earth.



Developers'
world

We're
knowledgeable
about our
environment.

Solutions
should
reach for
the moon!



Users' world

Agenda

- Why involve users?
- Degrees of involvement
- User-centered approach
- Comparison of the primary field methods
 - Ethnography
 - Participatory design
 - **PICTIVE**
 - **CARD**
 - Contextual design
 - Work modeling
- Concluding Remarks

Why involve users?

- **Better understanding of user needs leads to a more appropriate and usable product.**
 - **Expectation management: “Better to exceed users’ expectations than to fall below them.”**
 - **Ownership: Users who are involved are more likely to feel a sense of ownership towards the product and be receptive towards it when it emerges**

Expectation management

Mac Word 6.0 Story

- “... the biggest complaint we kept hearing about Mac Word 6.0 was that it wasn’t “Mac-like.” So, we spent a lot of time drilling down into what people meant when they said it wasn’t “Mac-like.” ... It turns out that “Mac-like” meant Mac Word 5.0.”
- “... we failed to make the UI of Mac Word 6.0 behave like Mac Word 5.0. ... The end result was a UI that could only be described as clunky relative to Mac Word 5.0’s elegance.”

Mac Word 6.0

http://blogs.msdn.com/rick_schaut/archive/2004/02/26/80193.aspx

Degrees of involvement

- Full-time involvement
- Keeping users informed
- Not involving users

Developers'
world

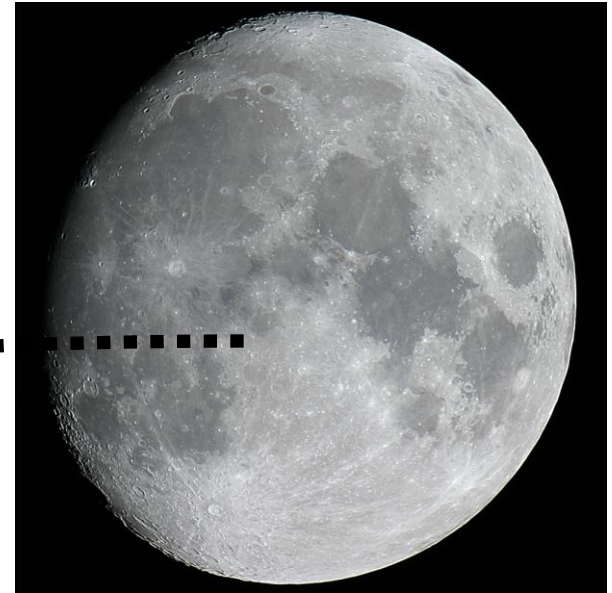
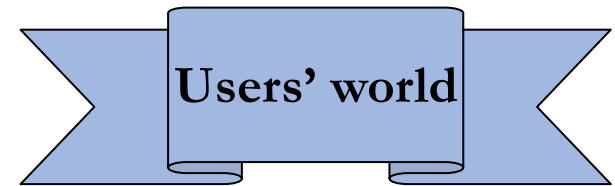


Users' world



Full time involvement

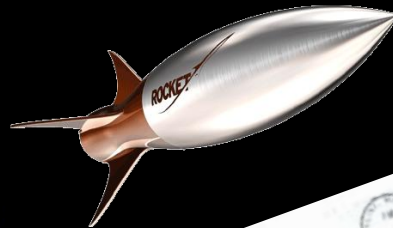
- **How**: Hire as part of the design team
- **Pro**: Very familiar with the system
- **Con**: Could lose touch with the user group



Keeping users informed

- **How:** Regular newsletters and communication channels, workshops and evaluation sessions
- **Pro:** Achieving some level of involvement even with several users
- **Con:** Changes are possible only from an already decided starting point

Developers'
world

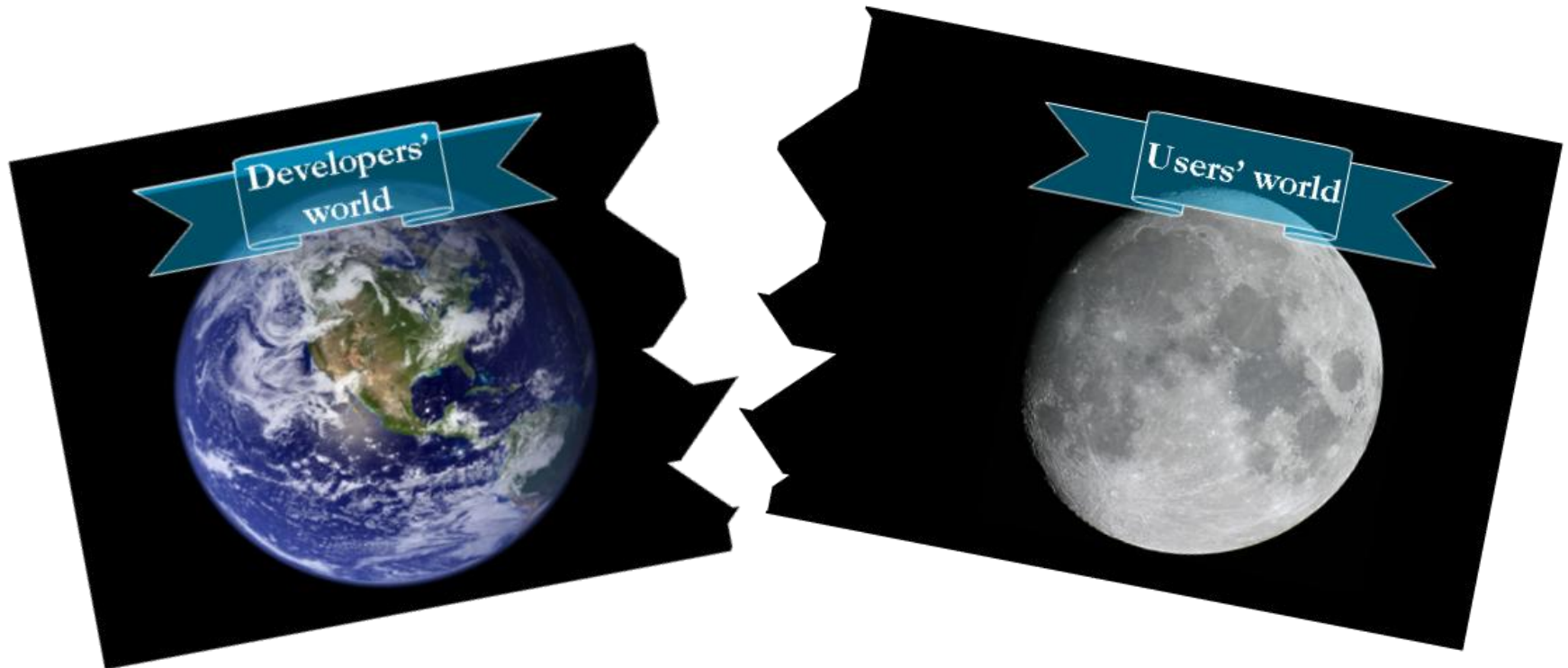


Users' world



Not involving users

- **Pro:** Allows for more development time that would otherwise be spent managing, organizing and controlling such involvement
- **Con:** Users will reject the product if it doesn't fit their needs

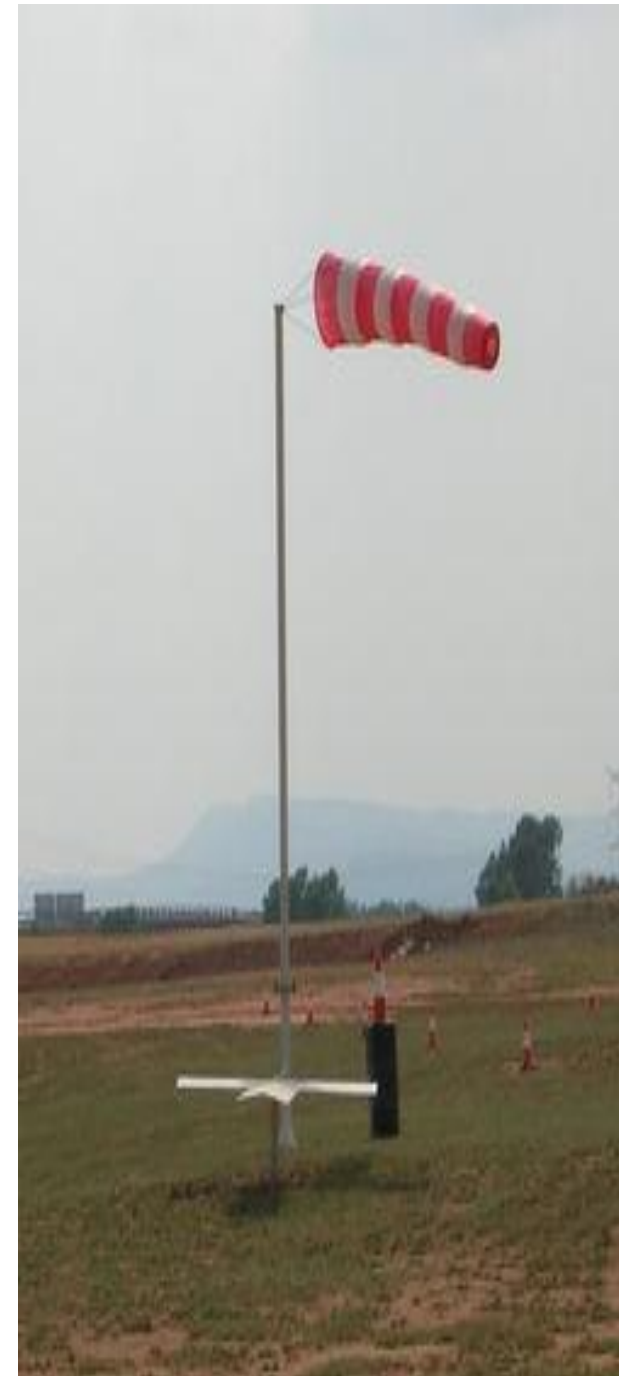


What is a user-centered approach?

- Development driven by real users and their goals, not just technology.
 - Makes the most of human skill
 - Directly relevant to the work in hand
 - Supports the user, doesn't constrain
- Gould and Lewis principles for a “useful and easy to use computer system”
 - Early focus on users and tasks
 - Empirical measurement
 - Iterative design

Focus on users and tasks

- Users' tasks and goals are the driving force behind the development.
 - e.g. Windsock
- Human limitations should be taken into account.
 - Recognition Vs. Recall
e.g. <http://clusty.com/> vs. <http://google.com/>



Focus on users and tasks (Cont.)

Clusty Search » tennis - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://clusty.com/search?input-form=clusty-simple&v%3Asources=webpl

Customize Links Free Hotmail Windows Marketplace Windows Media Windows

web news images wikipedia blogs jobs more »

tennis Search

clusters sources sites

All Results (173)

- Game (18)
- Tennis Association (17)
- Photos (14)
- Shoes, Racquets (10)
- ATP (9)
- Magazine, Official Site of TENNIS (7)
- Grand Slam (7)
- History (6)
- Manufacturer (6)
- Tennis elbow (6)

more | all clusters



Top 169 results of at least 44,890,000 retrieved for the query **tennis** (definiti


Tennis training Grip


Learn or Improve your **tennis** Grip technique and become a winner ! - [www](#)

Play tennis like the pros



Hit like Federer, Roddick, Agassi Breakthrough lessons, videos, book - [w](#)

1. **Tennis**  

 **Tennis** is a [racquet sport](#) played between either two pl strike a hollow rubber [ball](#) covered in felt over a net into [real tennis](#) (also known as *royal tennis* or *court tennis*), Originating in England in the late 19th Century, the garr [en.wikipedia.org/wiki/Tennis](#) - [cache] - Wikipedia, MSN

2. **TENNIS.com - The Official Site of TENNIS Magazine** 

Offers **tennis** news from **Tennis** magazine. Includes professional and c [www.tennis.com](#) - [cache] - MSN, Open Directory, Ask, Wisenut

3. **The Prince of Tennis**  

Recognition

tennis - Google Search - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.google.com/search?hl=en&pwst=1&sa=X&oi=spe

Customize Links Free Hotmail Windows Marketplace Windows Media Windows

Web Images Video News Maps more »

Google tennis Search [Advanced Search](#) [Preferences](#)

Web

[United States Tennis Association - Home](#)

Official home of the USTA. Includes professional **tennis** news and scores, information on leagues and tournaments, and related links.
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[TENNIS.com - The Official Site of TENNIS Magazine](#)

Offers **tennis** news from **Tennis** magazine. Includes professional and college updates, instruction, gear, and links.
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This page can not be found. Click here to return to **TENNIS.com**.
[www.tennis.com/yourgame/index.asp](#) - 2k - [Cached](#) - [Similar pages](#)

[ATPtennis.com, The official site for men's professional tennis!](#)

ATPtennis.com, the official web site of men's professional **tennis**. The world of **tennis**: ATP Champions Race, rankings, event history, results, news, reports, ...
[www.atptennis.com/](#) - 77k - Oct 24, 2006 - [Cached](#) - [Similar pages](#)

[ESPN.com - Tennis Index](#)

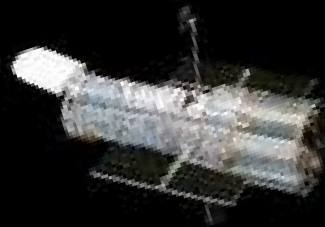
The latest **tennis** scores, **tennis** news, and **tennis** rankings, all at ESPN.com.

Recall

User centered approaches

Ethnography

- Long-term observation of users in their natural environments
- Gives lots of information about users, their habits, workplaces, and artifacts



Ethnography (Cont.)

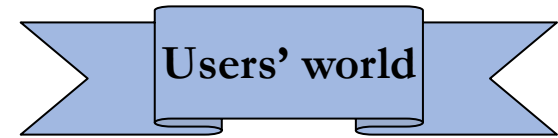
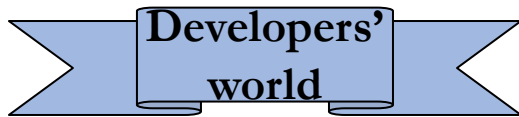
- Data collection
 - Observations and (optional) interviews guided by a very general research question
- Data analysis
 - Databases of field notes, artifacts, and interview data
 - Classification of the data collected
- Outcome
 - “Key linkage” that can focus the process of classifying observations

Ethnographic Interviewing

- **Alternative to standard ethnography**
- **Advantage: Much shorter time-span**
- **Disadvantage: Less information gathered**
- **Similarity: Usage is observed in the user's natural environment**
- **Difference: Broad questions are asked about use, in short interviews, instead of long-term observation**
- **When to use: When you need to quickly identify the context in which a product will be used**

Participatory Design

- Users are actively involved in development
- Should be used if you want to draw on existing artifacts
- Not suited for radical design changes



Participatory Design (Cont.)

- Data collection
 - Observations, interviews, collaborative design and cooperative prototyping guided by a well-defined research question
- Data analysis
 - Analyze artifacts at breakdowns
 - Analyze videos, interviews and prototypes collected from sessions with the users
- Outcome
 - Working with the users, the product has evolved from the existing artifact

Participatory Design (Cont.)

- Examples of paper-based prototyping techniques for participatory design

PICTIVE

- Some design components are prepared by the developers
- Pen, pencil, sticky notes, paper, etc., are used by the users
- Video recording devices are used to record what happens

Participatory Design (Cont.)

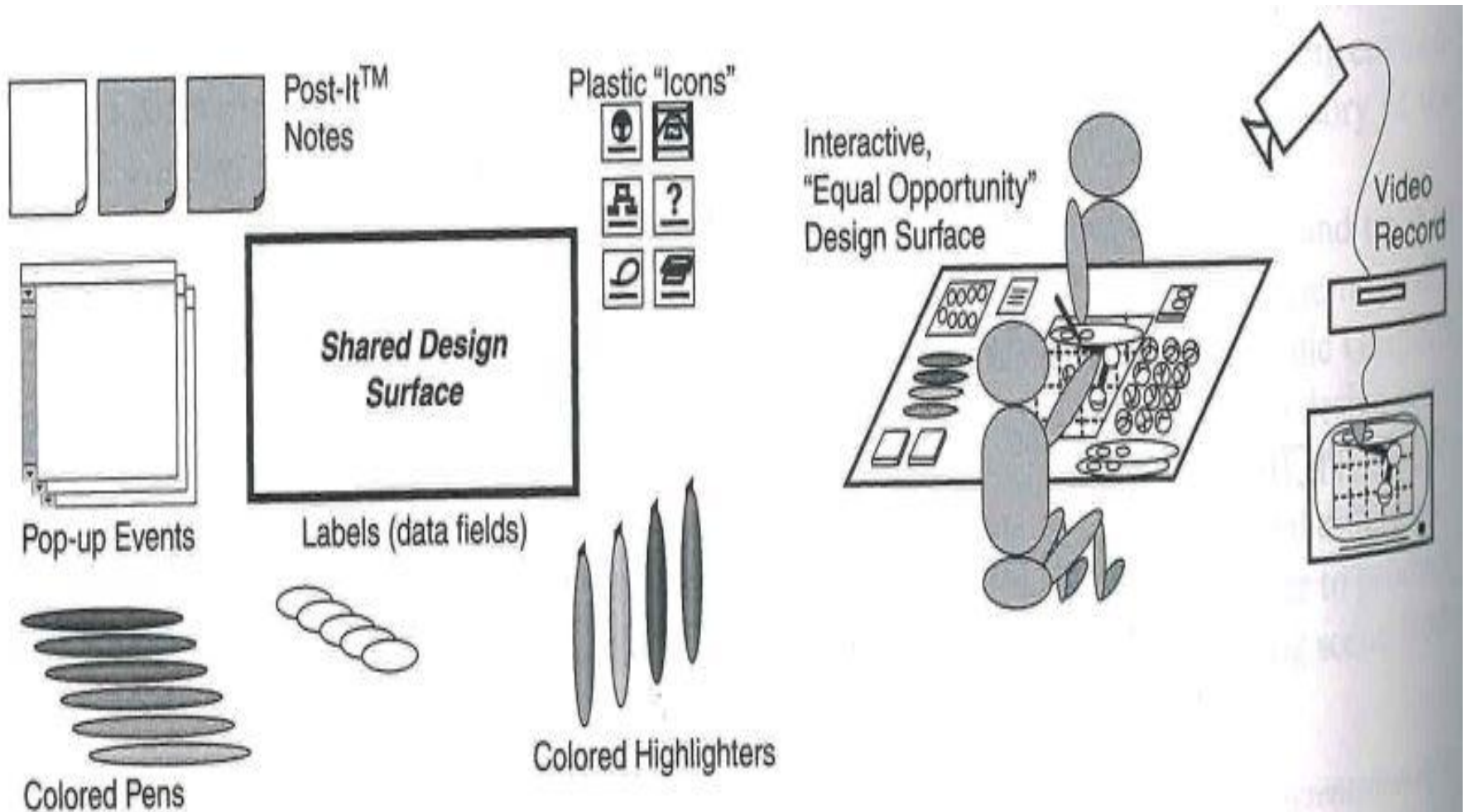
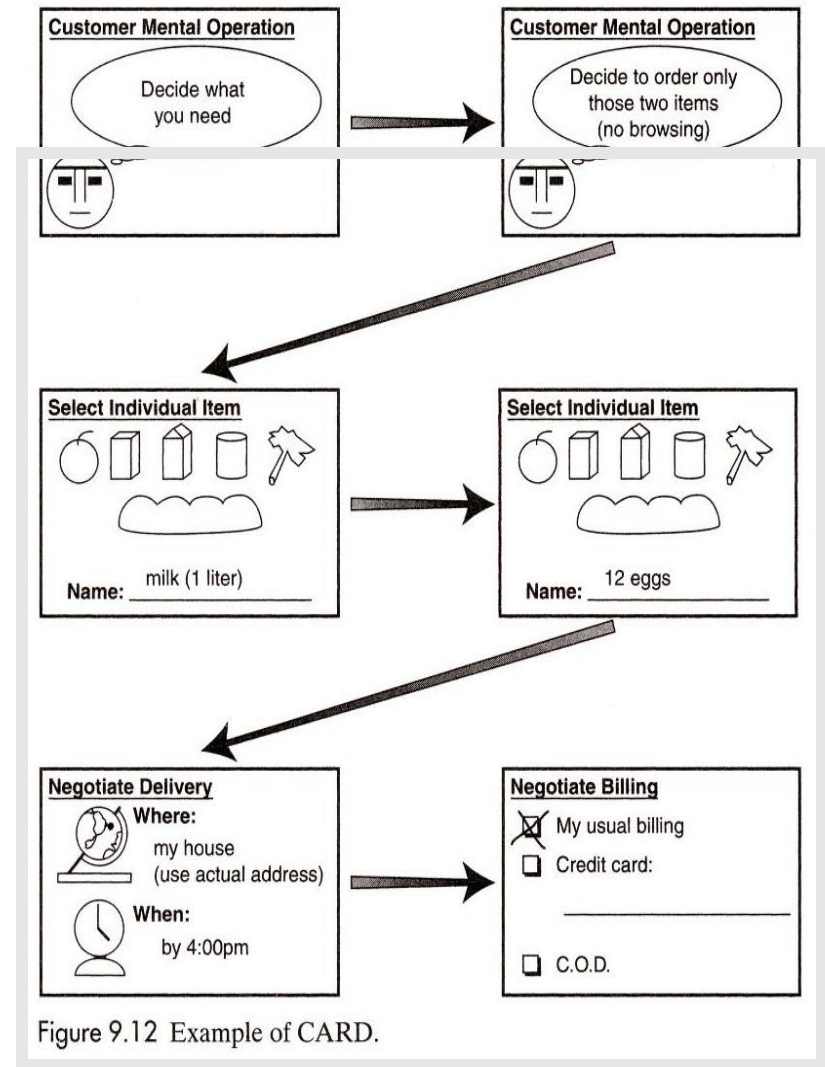


Figure 9.11 PICTIVE design objects and PICTIVE setting.

Participatory Design (Cont.)

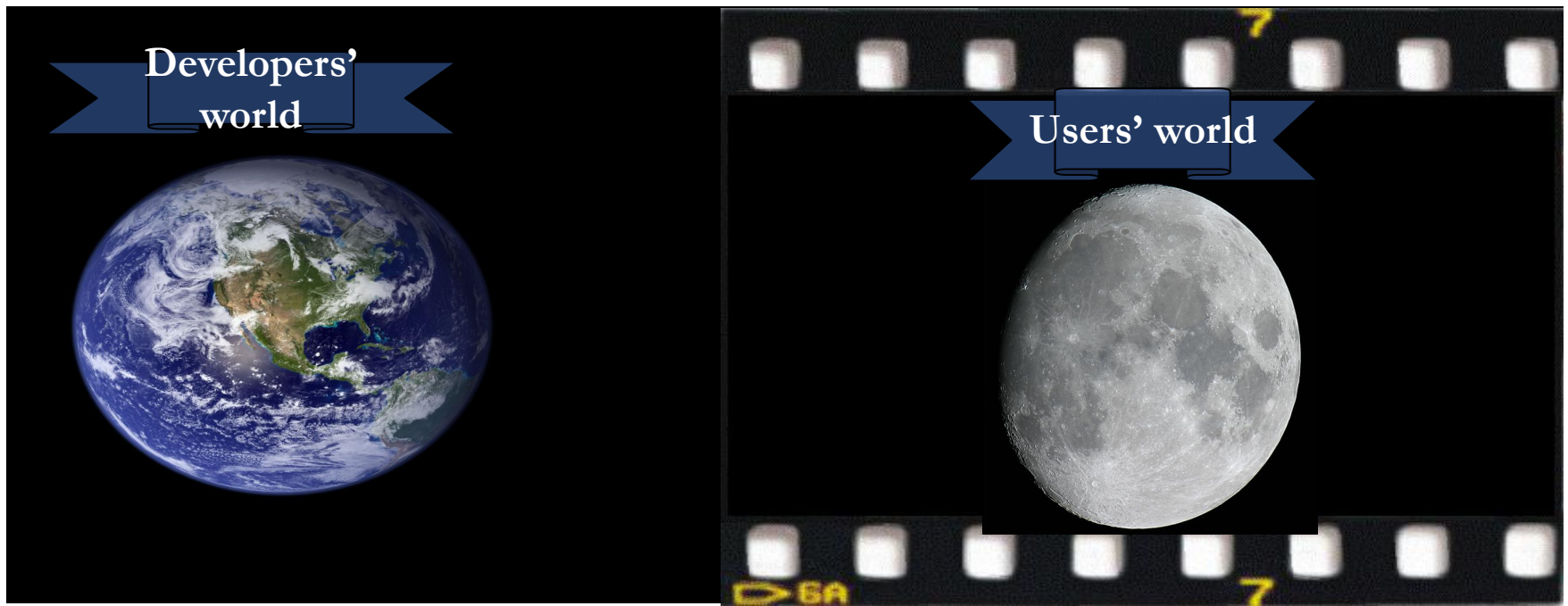
CARD

- The same principle as Pictive but with screen dumps
- The cards are used to explore workflow options with the user



Contextual Design

- Targeted observations and interviews by taking “snapshots”, assuming that users’ work is essentially static
- The designer is questioning behavior but not participating
- Well-suited for radical design solutions
- Possible to improperly “read” users



Contextual Design (Cont.)

- **Data collection**

- Observation, interviews and walkthroughs
- Clearly defined set of concerns rather than a research question
- Interviews are much more intense and focused than an ethnographic study

- **Data analysis**

- Observations abstracted into various models

- **Outcome**

- Essential work structure

Contextual Design (Cont.)

- **Work modeling**
 - **A lot of the information about the users' world is collected in the observer's head**
 - **Work modeling is essential to represent the knowledge collected**

Work-modeling: Work Flow

- Represents people and communication between them in order to achieve the work

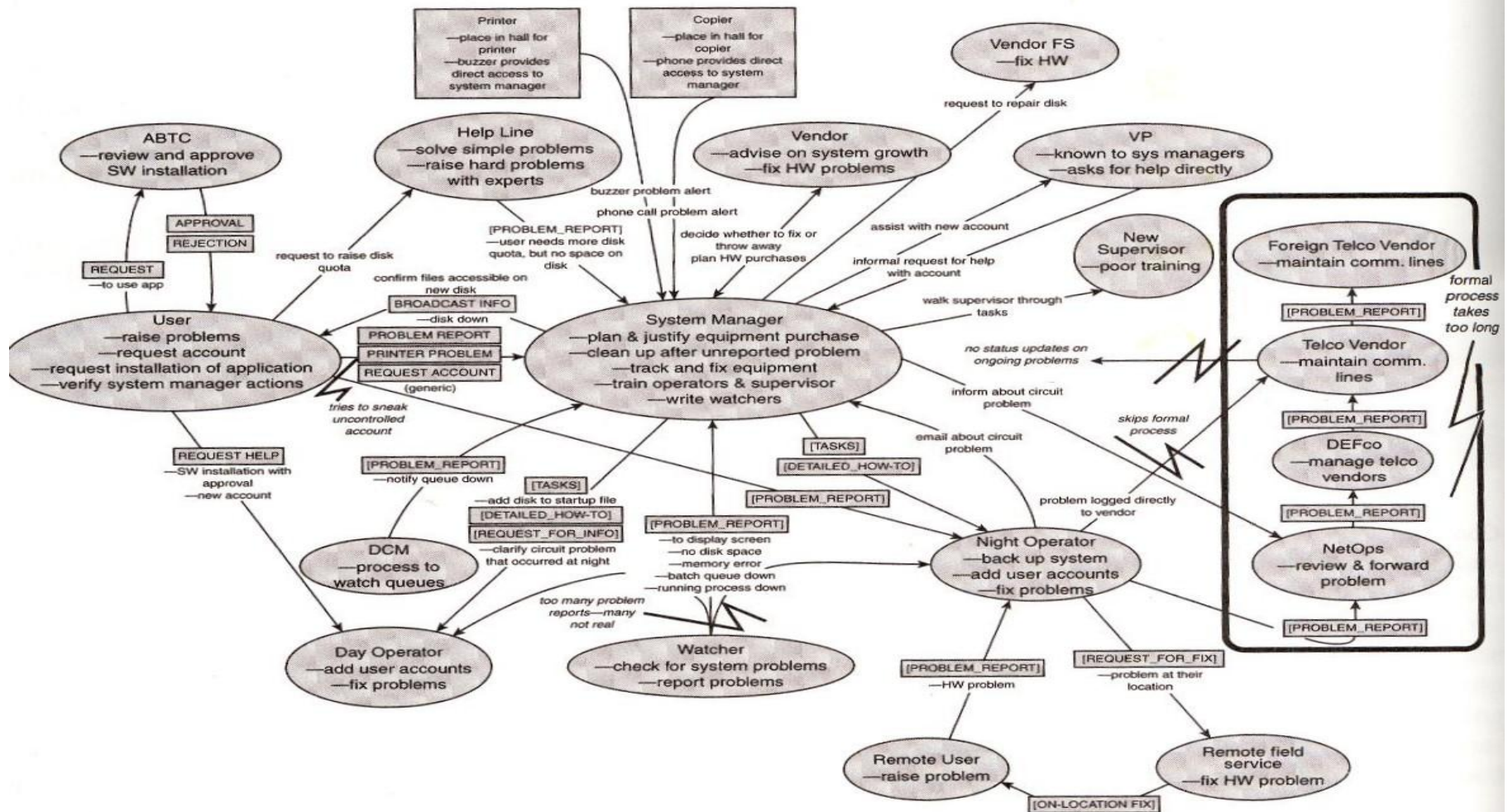


Figure 9.5 An example work flow model.

Work-modeling: Sequence model

The detailed work steps necessary to achieve a goal

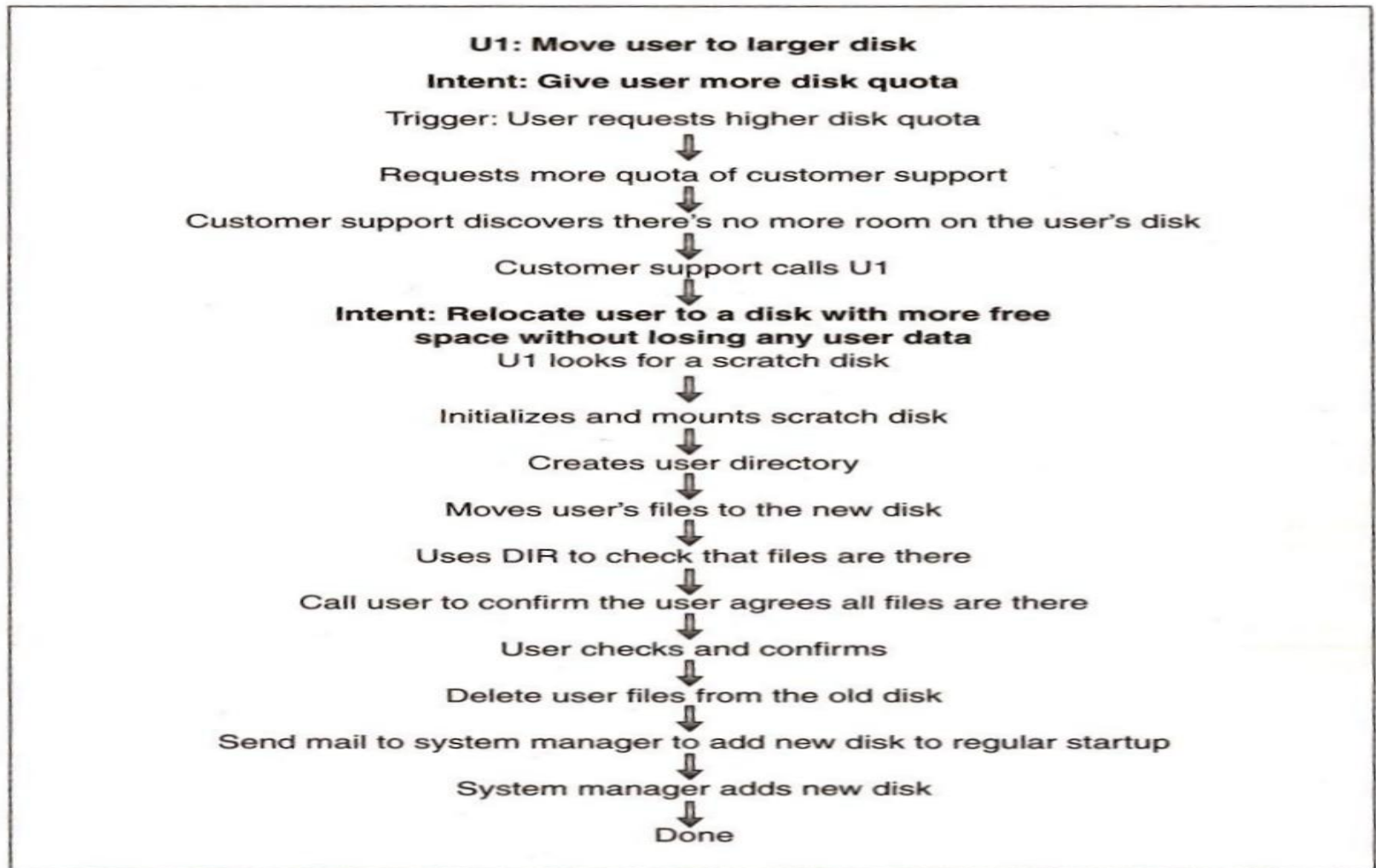


Figure 9.6 An example sequence model.

Work-modeling: Cultural model

- Represents constraints caused by organizational culture

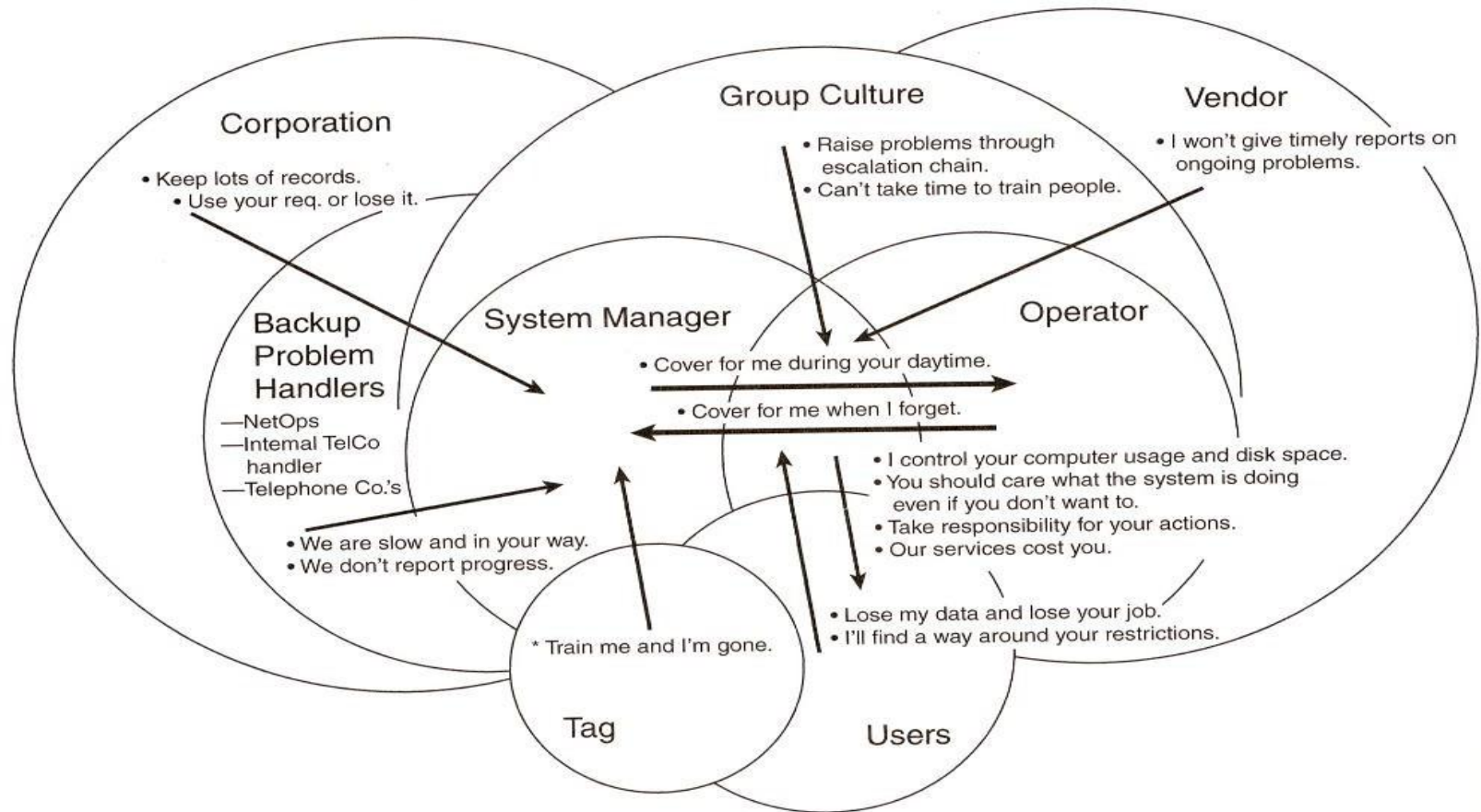


Figure 9.7 An example cultural model.

Work-modeling: Physical model

- Represents physical characteristics that may constrain work patterns

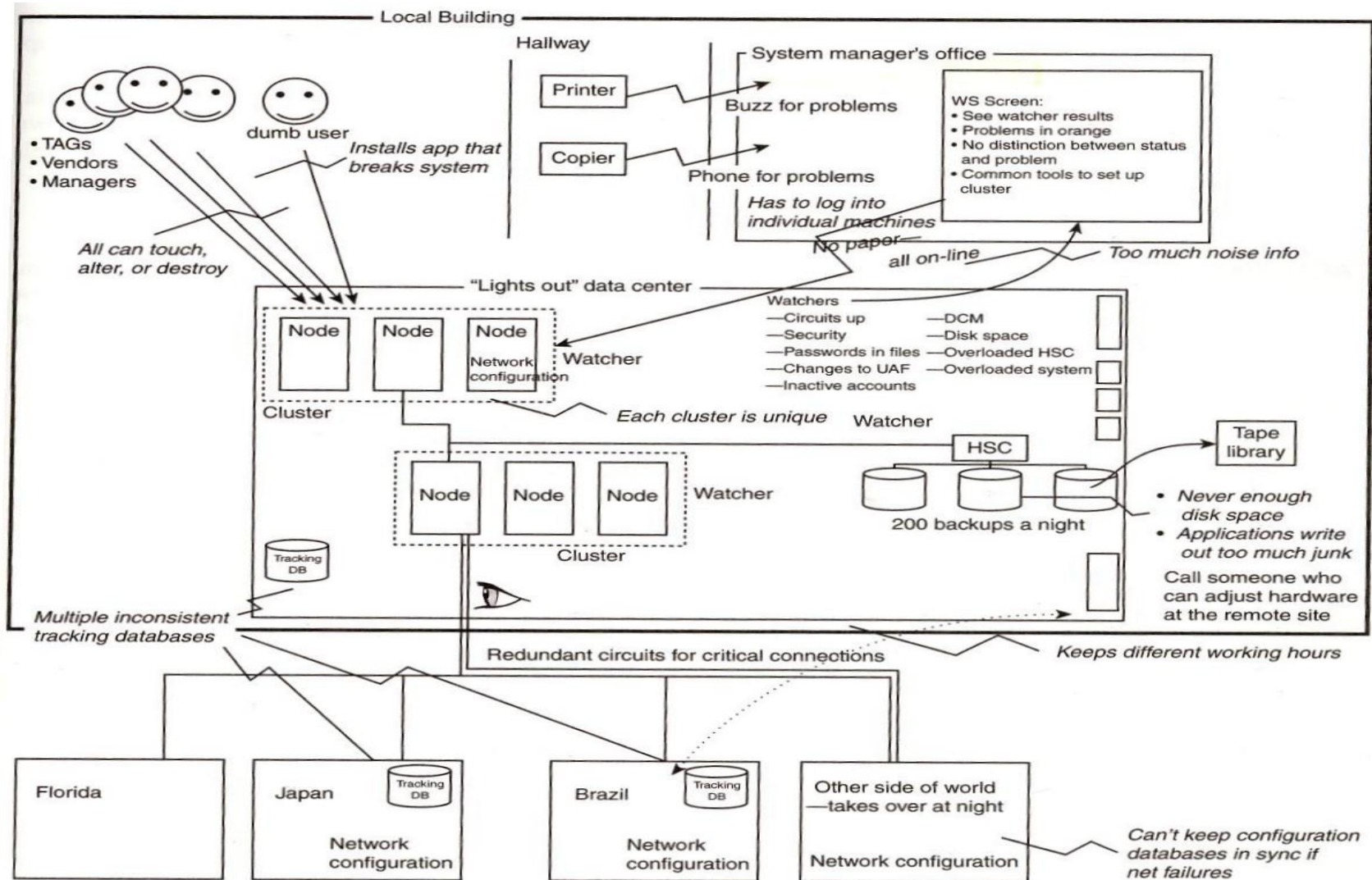


Figure 9.8 An example physical model.

Condensed Contextual Inquiry

- **Alternative to contextual design**
- **Advantage:** Shorter time span
- **Disadvantage:** Fewer concerns addressed
- **Similarity:** Interviews based on a clearly defined set of concerns
- **Difference:** Concerns are constrained to key issues
- **When to use:** Validate the effectiveness of an already released product to identify future improvements

Comparing the techniques presented

	<i>Ethnography</i>	<i>Contextual</i>	<i>Participatory</i>
<i>User involvement</i>	Low	Medium	High
<i>Role of designer</i>	Uncover findings about users' world	Sample the users' world	Being an equal partner with the user
<i>Length of study</i>	Extensive – several months	Short interviews	Short interviews

Comparing the techniques presented (Cont.)

	<i>Ethnography</i>	<i>Contextual</i>	<i>Participatory</i>
<i>Benefits</i>	Wealth of information	Very specific structure	Keeps users' expectations in check
<i>Drawbacks</i>	<ul style="list-style-type: none">■ Requires experience■ Hard to translate findings to design	Involves many diagrams and notations – might be complicated to create and understand	Users' thinking can be constrained to what they are used to
<i>When to use</i>	When there is sufficient time and no current solution	Innovative design	Whenever users are available and willing to take part in the design

Concluding remarks

- **All agree that involving users is beneficial to the project (expectation management, feeling of ownership)**
 - **The question is how and when**
- **User-centered approaches require gathering and interpreting much information about the user's world**
- **Ethnography is about detail, while design is about abstraction: they don't immediately comply**
- **PICTIVE and CARD are both participatory design techniques that empower users to take an active part in the design**
- **Contextual design is a method that provides models and techniques for gathering user data and representing it in a form suitable for practical design**



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