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Chapter 9

User-Centered Approaches to Interaction Design

B.Tech CSBS
VII Semester

Handled by
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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."

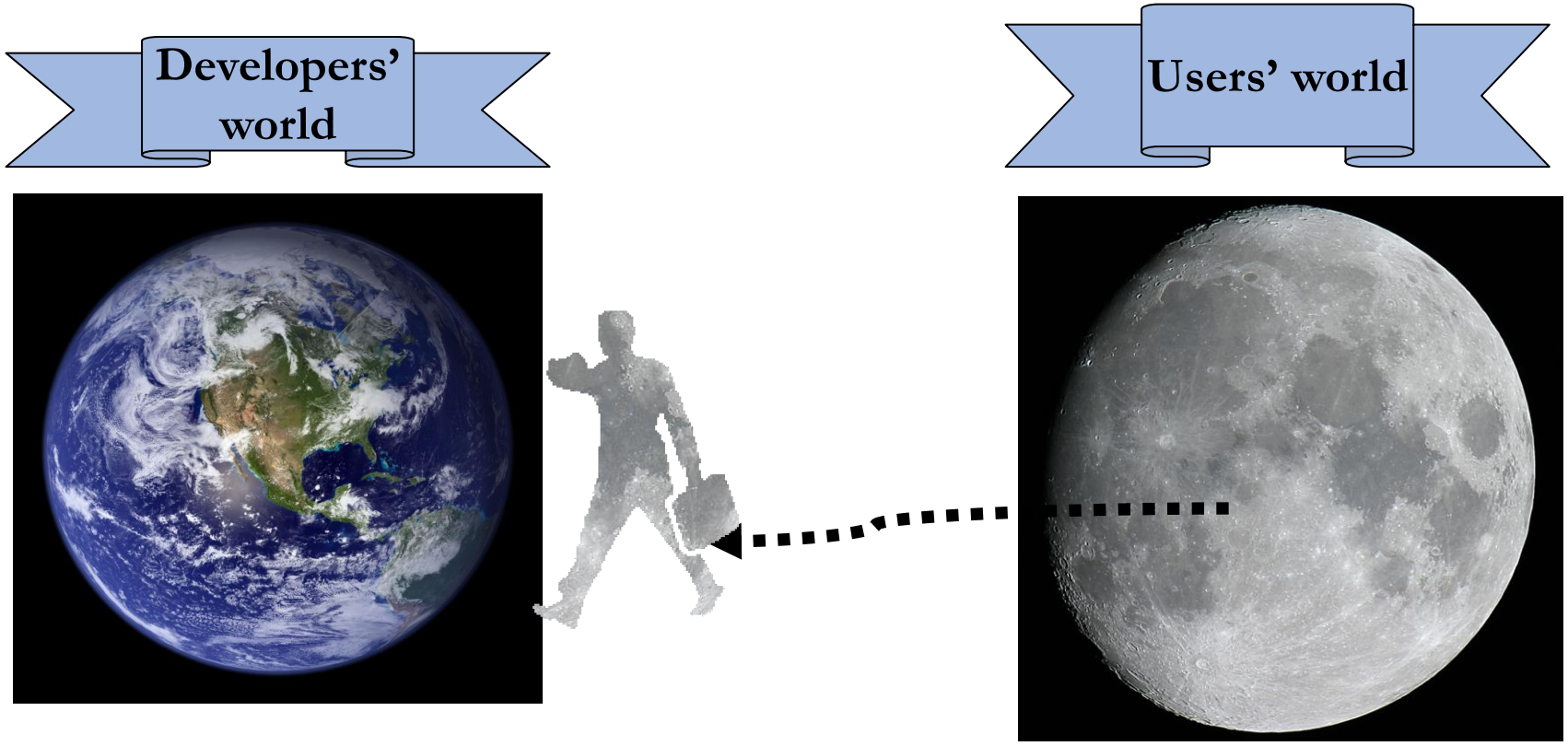
Mac Word 6.0
http://blogs.msdn.com/rick_schaut/archive/2004/02/26/80193.aspx

Degrees of involvement

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

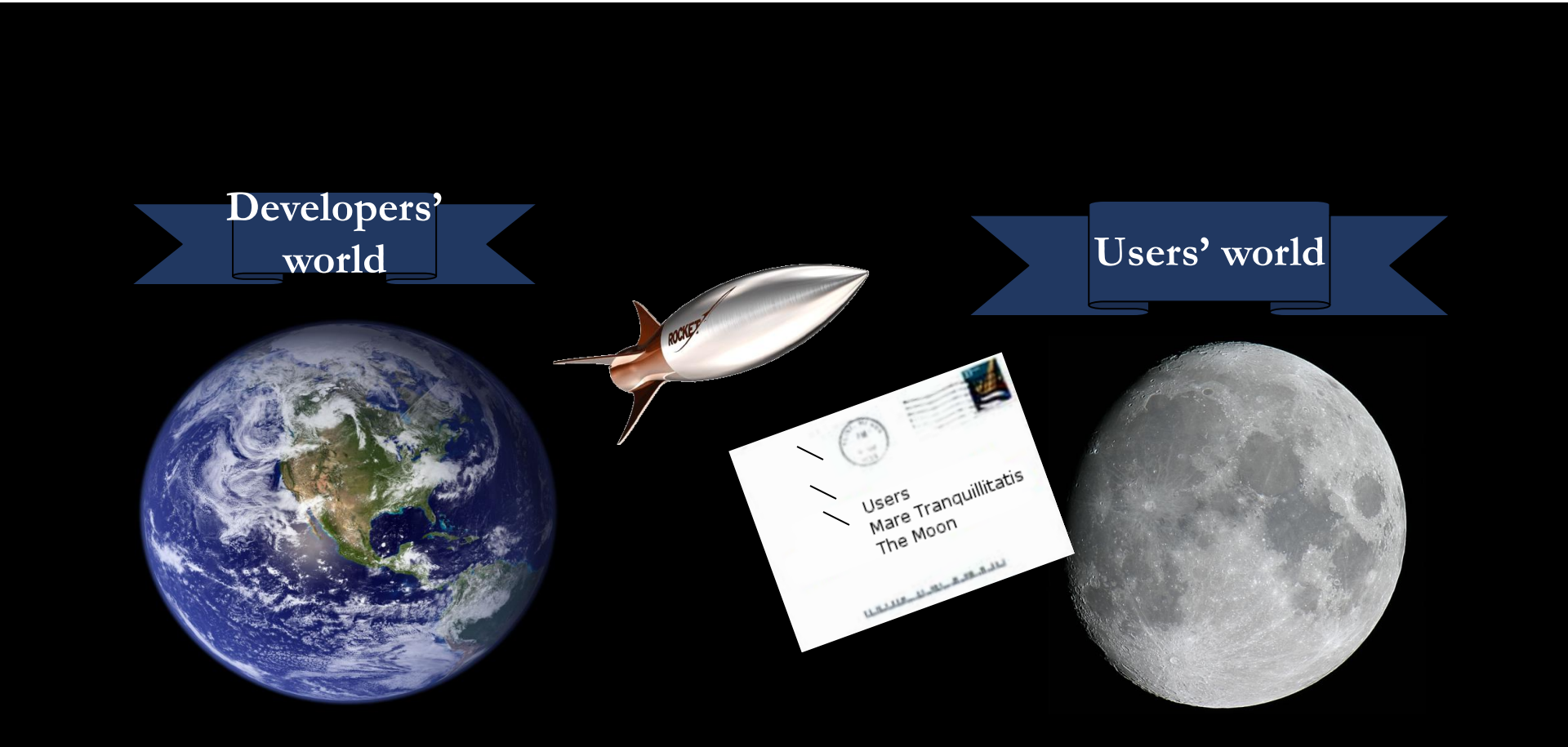
Full time involvement

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



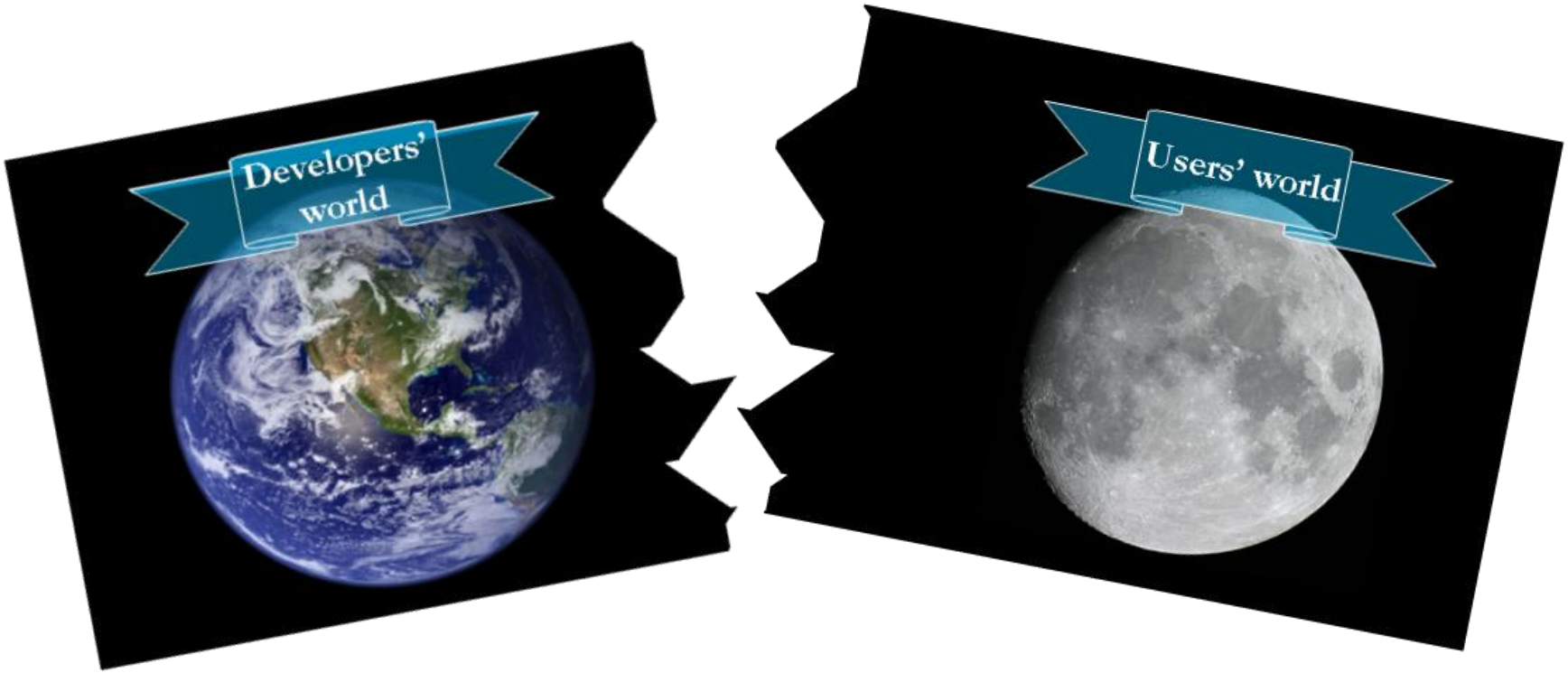
Keeping users informed

- **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**



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**

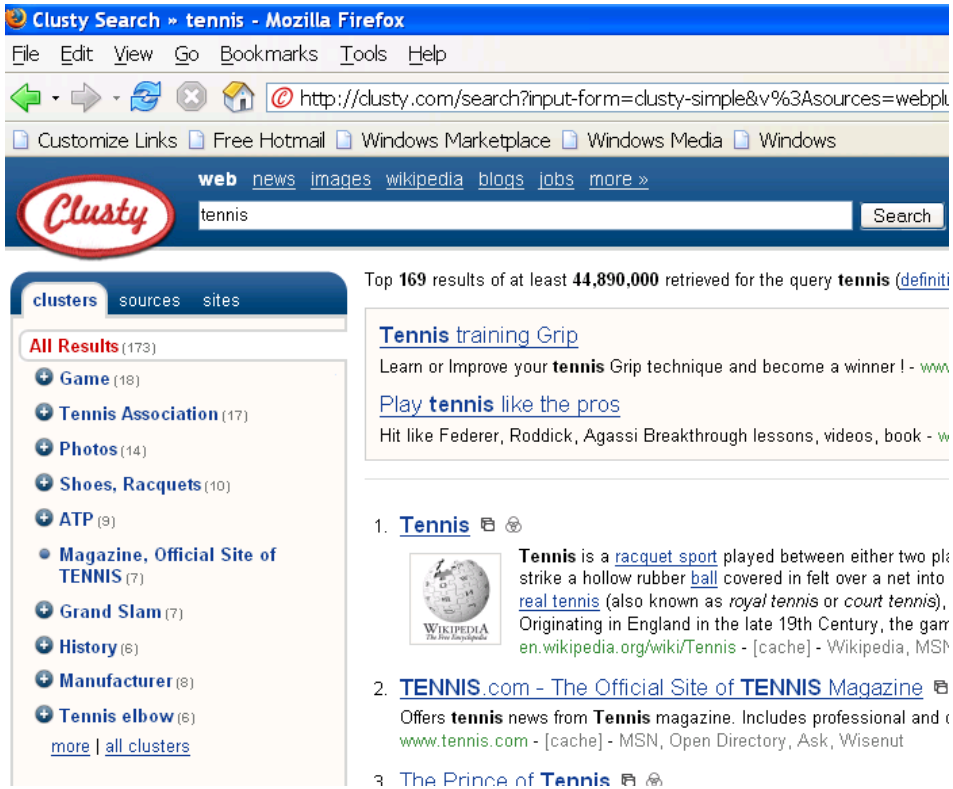
Focus on users and tasks

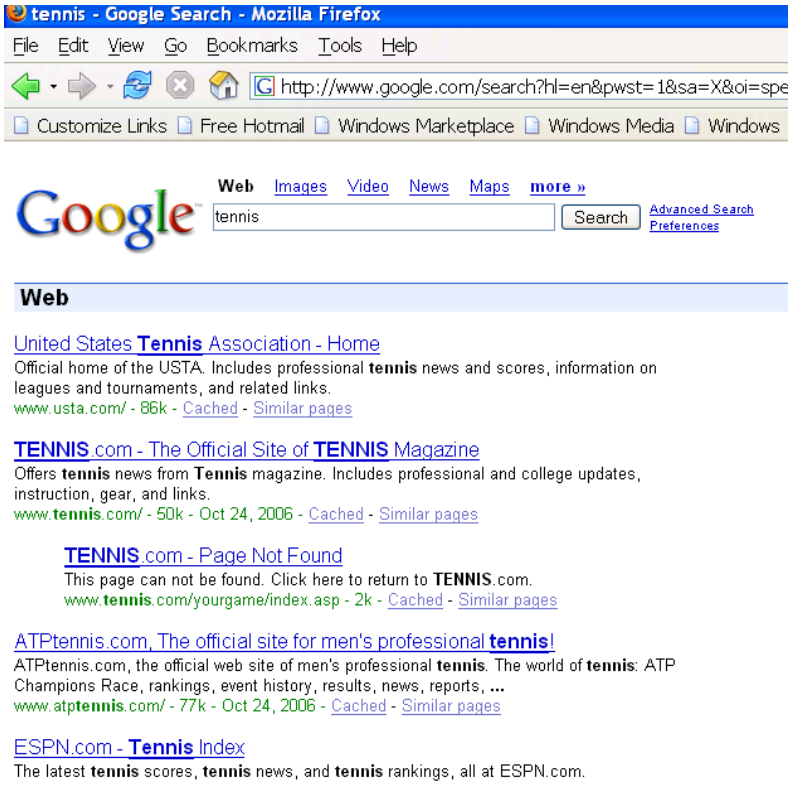
- **Users' tasks and goals are the driving force behind the development.**
  - **e.g. Windsock**

- **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.)



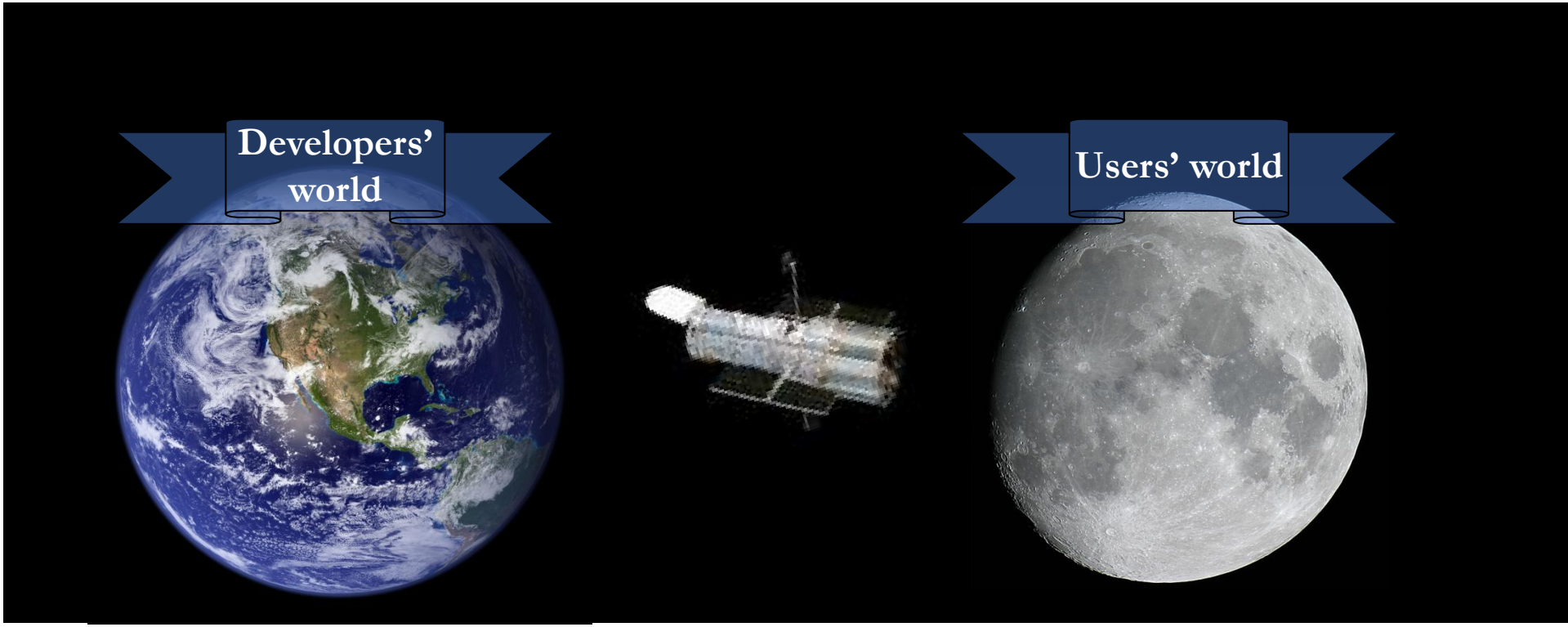


Recognition **Recall**

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.)

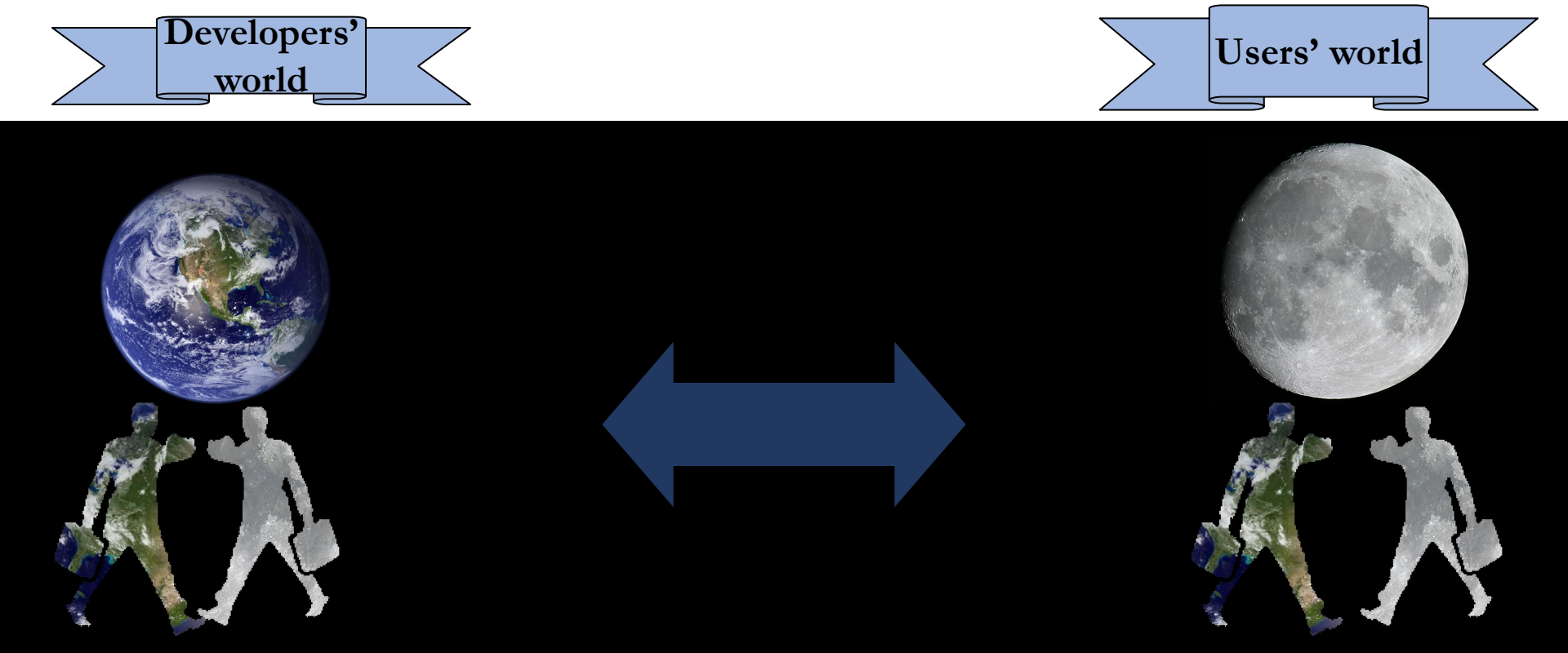
- Data collection
  - Observations and (optional) interviews guided by a very general research question
- Data analysis
  - Databases of field notes, artifacts, and interview data
  - Classification of the data collected
- Outcome
  - “Key linkage” that can focus the process of classifying observations

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.)

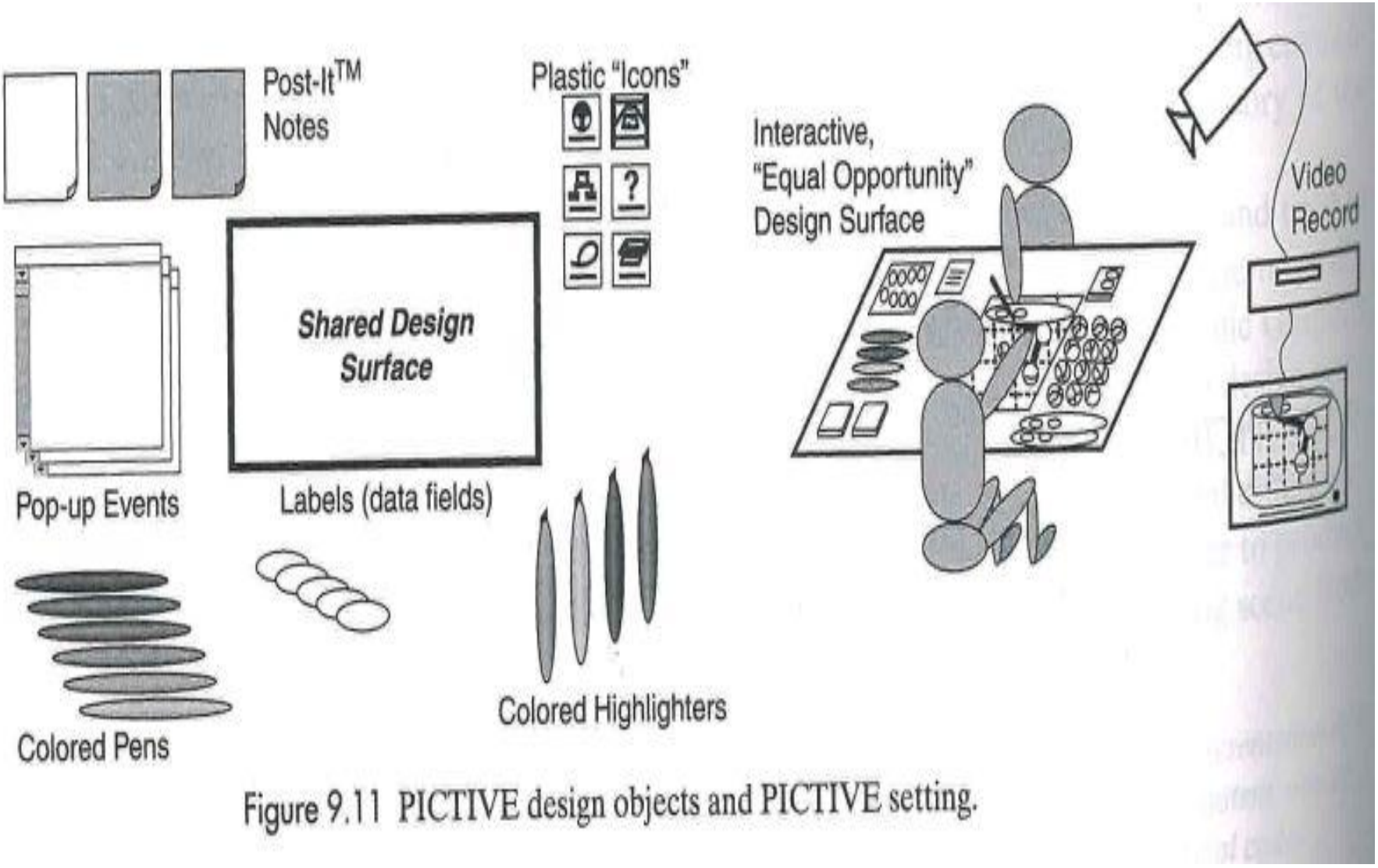


Figure 9.11 PICTIVE design objects and PICTIVE setting.

Participatory Design (Cont.)

CARD

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

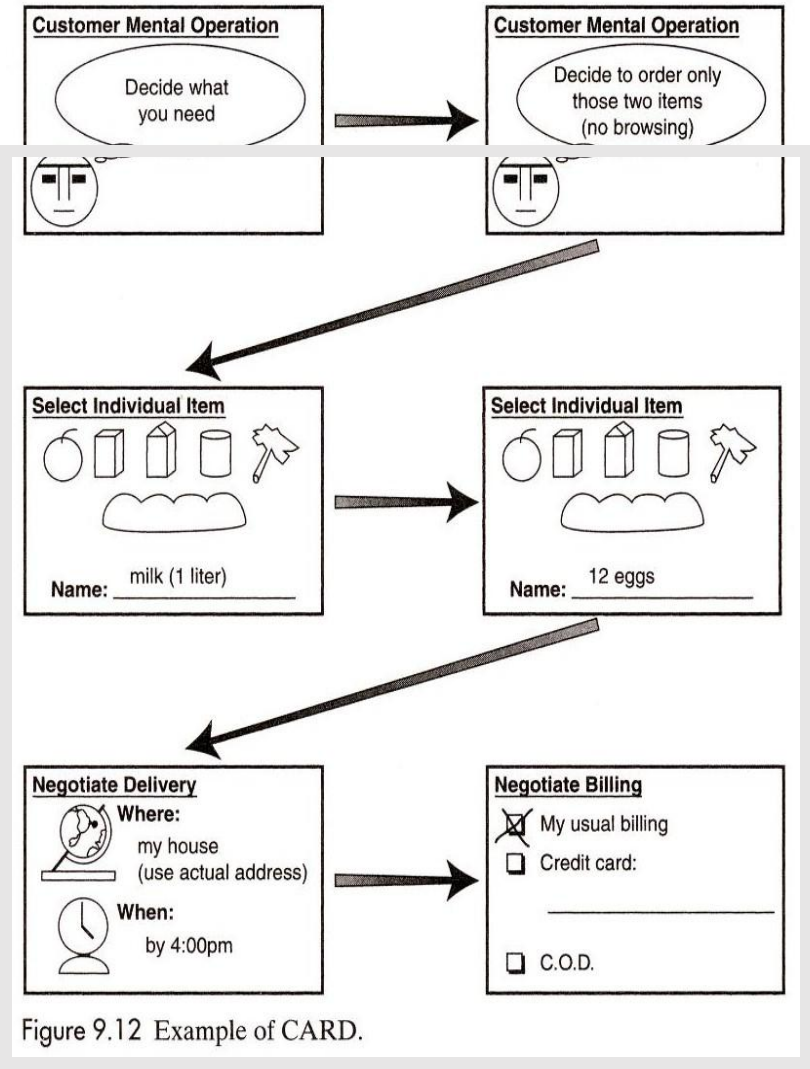


Figure 9.12 Example of CARD.

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**

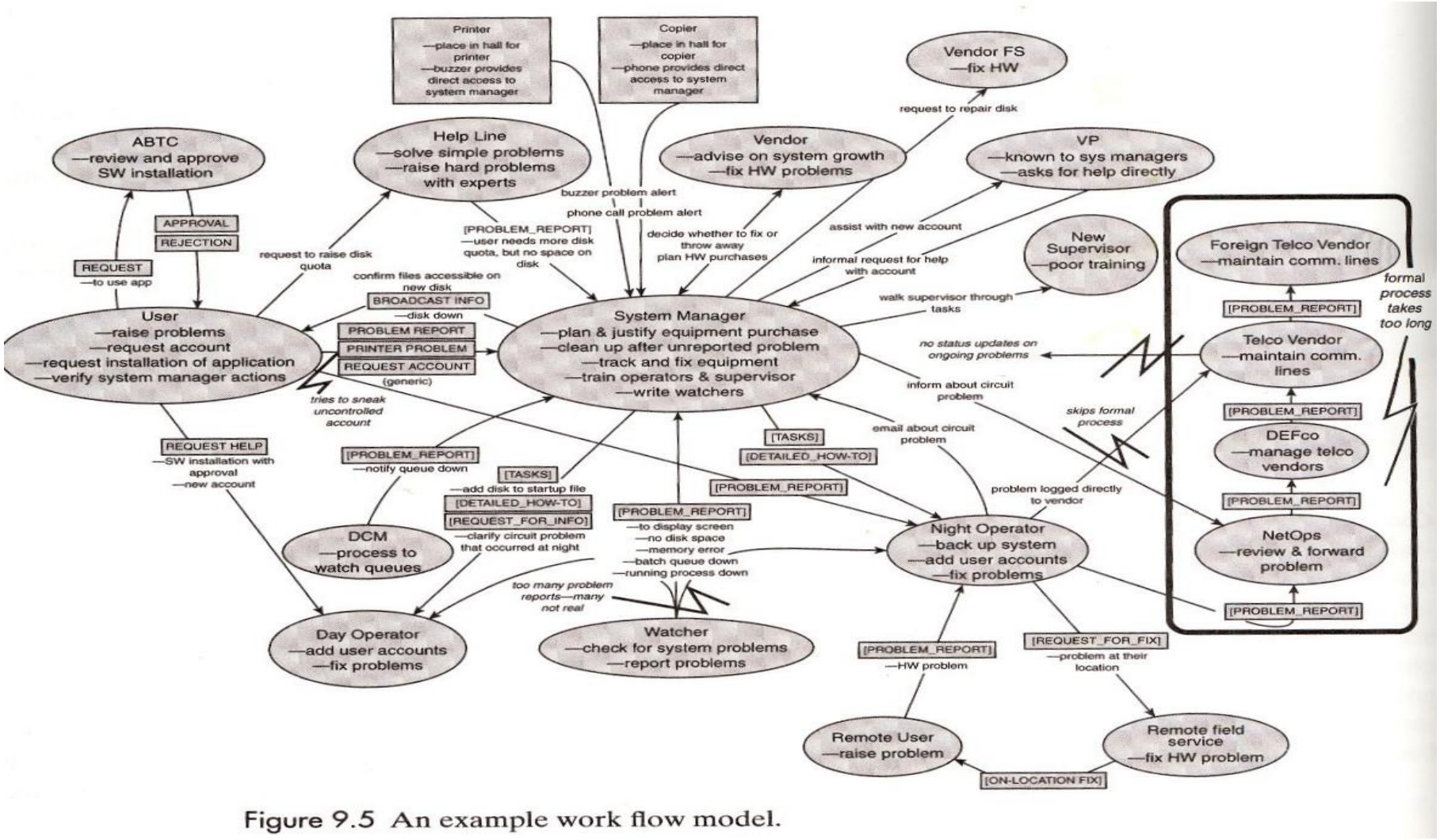


Figure 9.5 An example work flow model.

Work-modeling: Sequence model

The detailed work steps necessary to achieve a goal

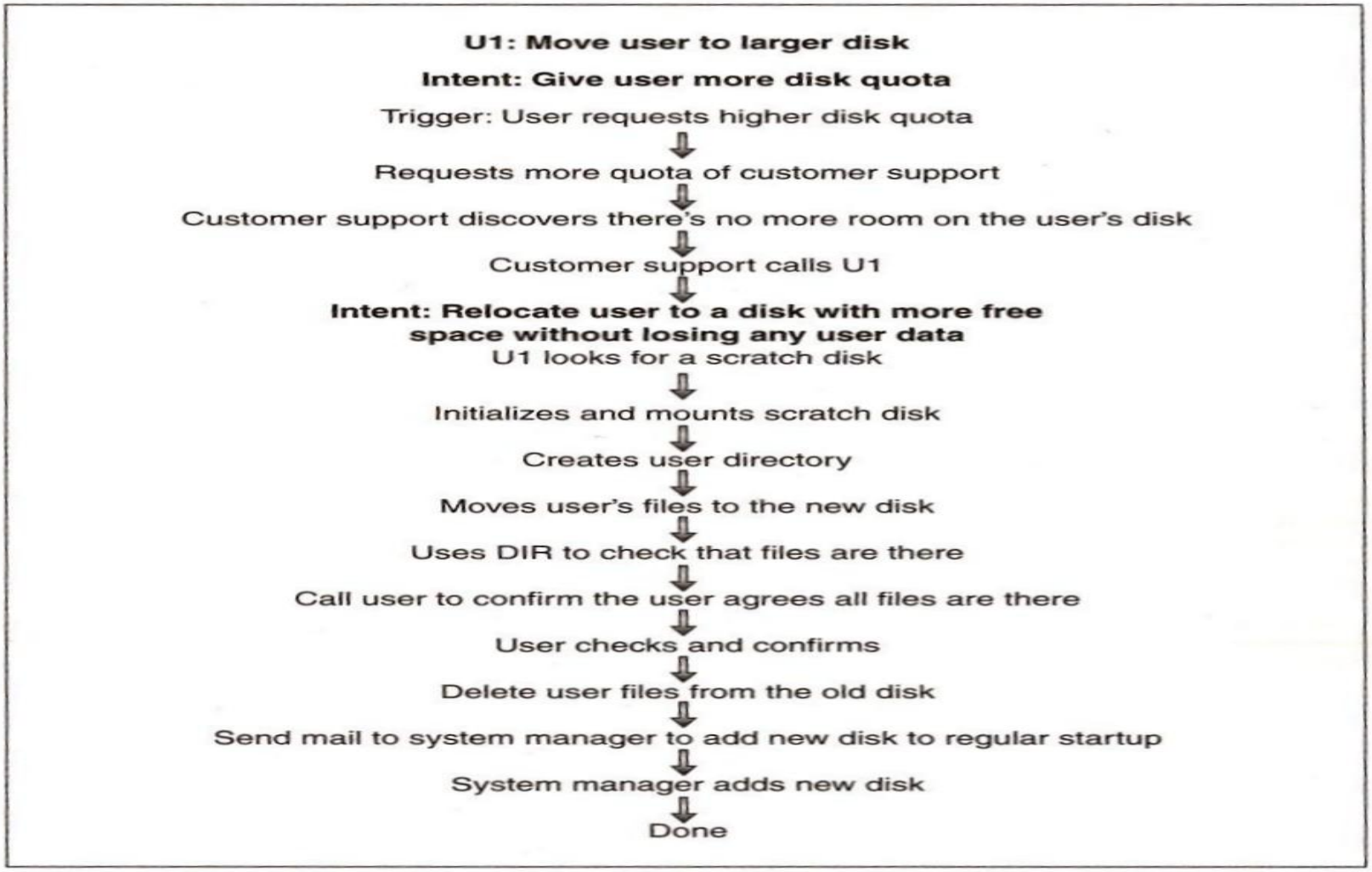


Figure 9.6 An example sequence model.

Work-modeling: Cultural model

- **Represents constraints caused by organizational culture**

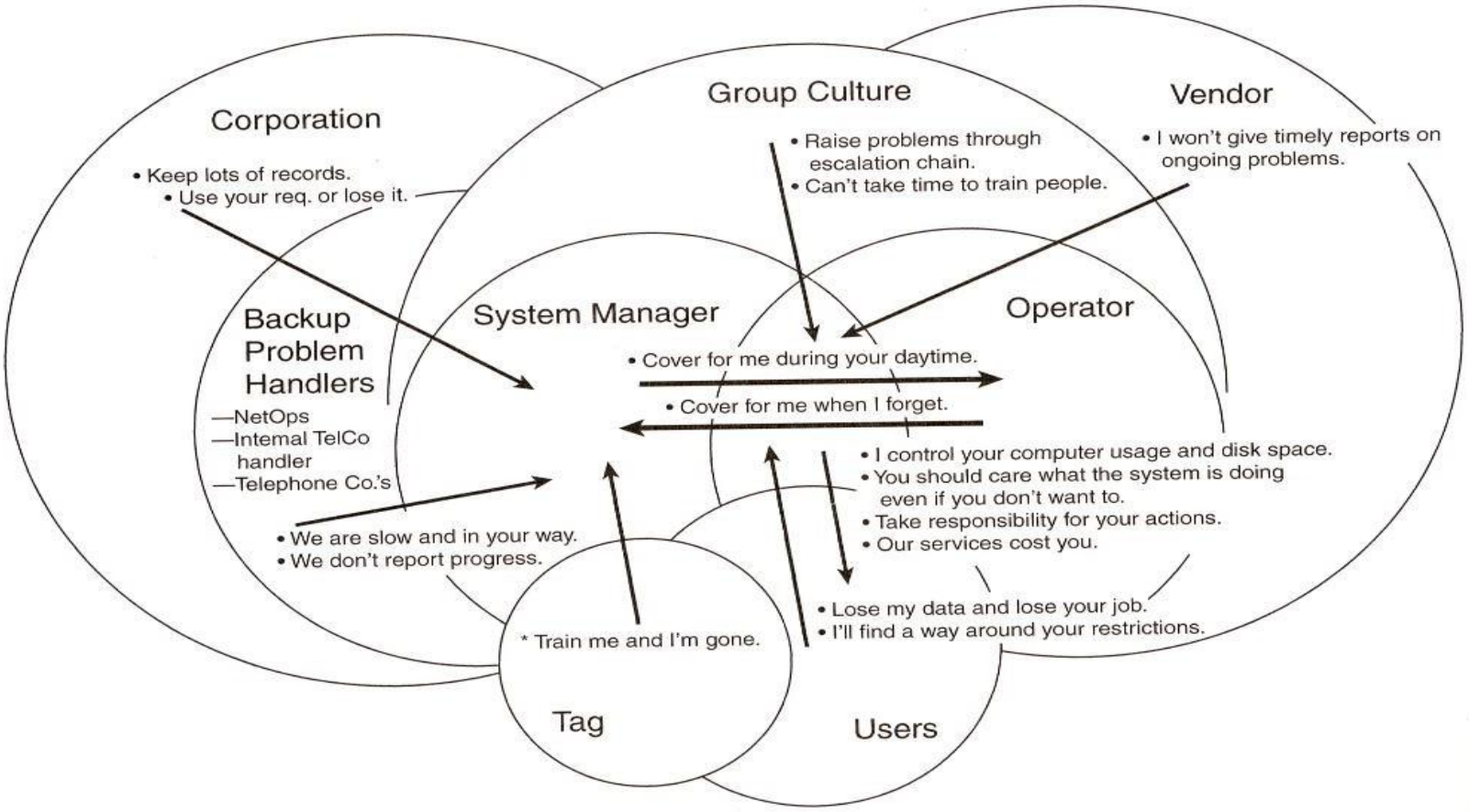


Figure 9.7 An example cultural model.

Work-modeling: Physical model

- Represents physical characteristics that may constrain work patterns

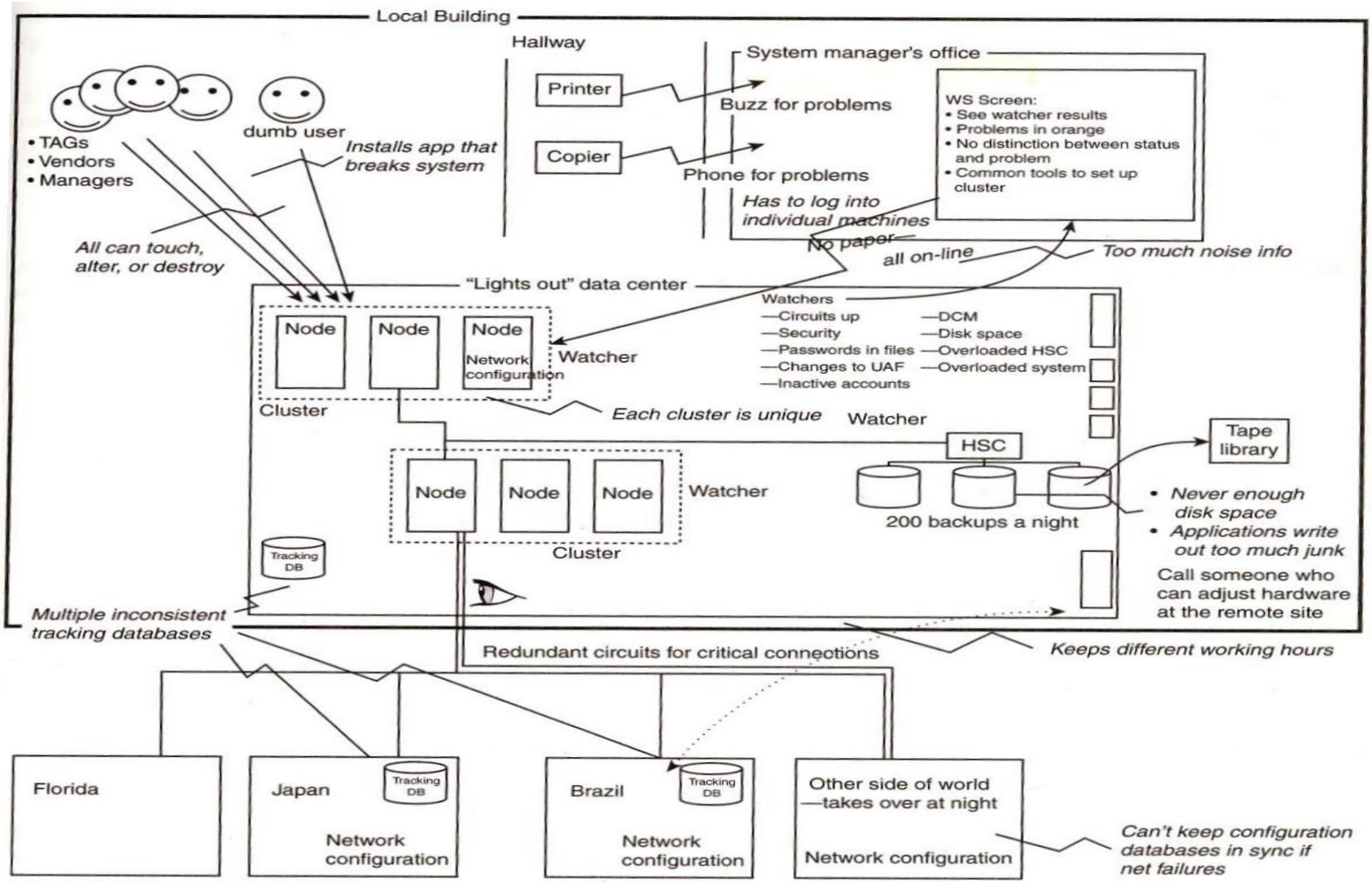


Figure 9.8 An example physical model.

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

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

Comparing the techniques presented (Cont.)

	Ethnography	***Contextual***	***Participatory***
Benefits	Wealth of information	Very specific structure	Keeps users' expectations in check
Drawbacks	■ 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
When to use	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**

THANK YOU