TASK ANALYSIS, SKETCHING, AND AFFORDANCE

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ANNOUNCEMENTS

You handed in the first part of DESIGN 02, right?

PROG 01 due Friday midnight

Late assignment policy…3 slip days

Section — Figma

PROG 02 — Next week

FEED 01 — for balancing groups (next week)

Guess Lecture — 21 SEP
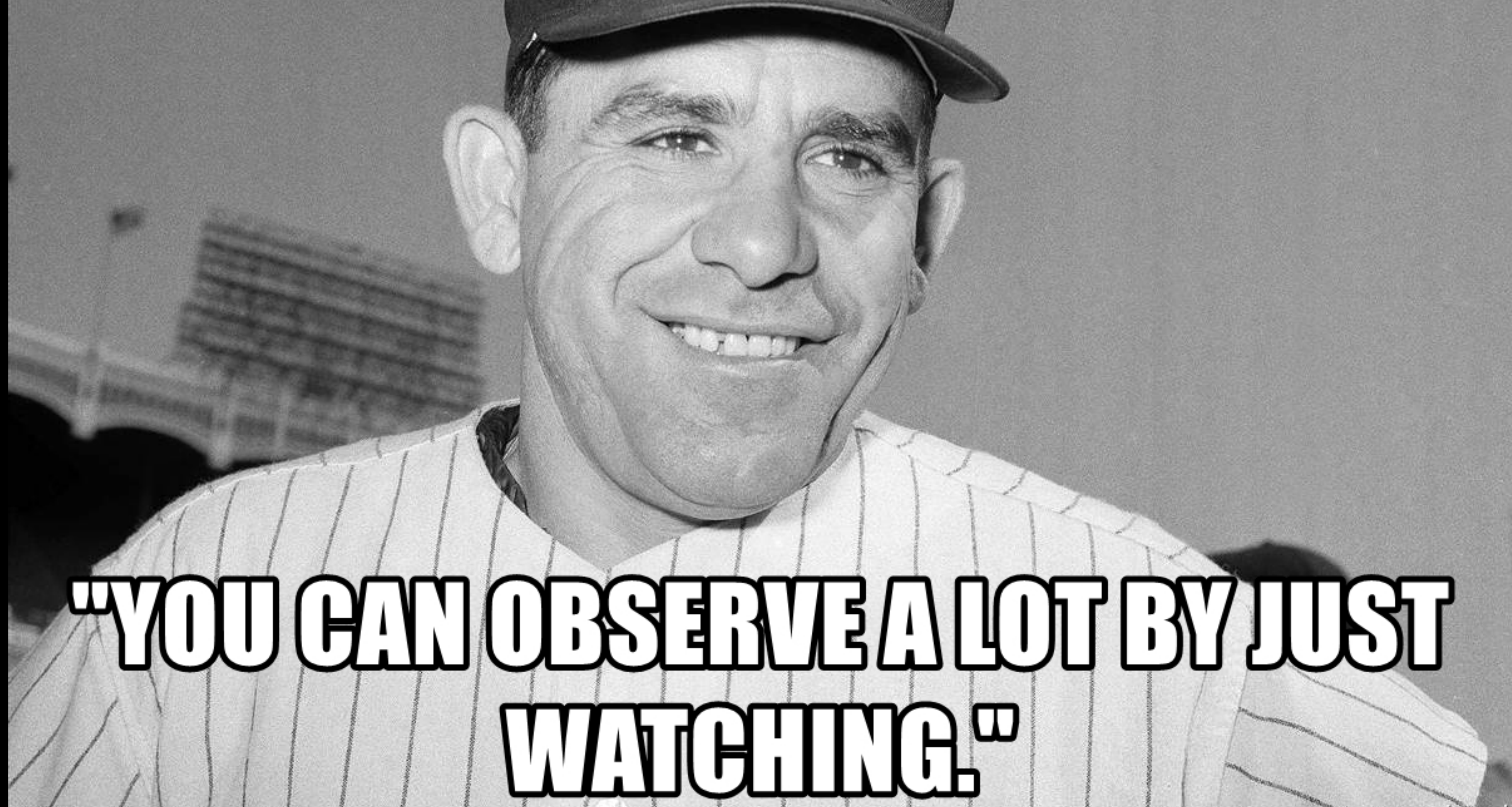

Dr. Pierce Gordon

21 Sept in Class

TASK ANALYSIS

YOGI BERRA QUOTE

"YOU CAN OBSERVE A LOT BY JUST WATCHING."

HOW DO I SETUP FOR CLASS?

MAIN POINTS OF TODAY'S LECTURE

Don't just trust your intuition to make design decisions

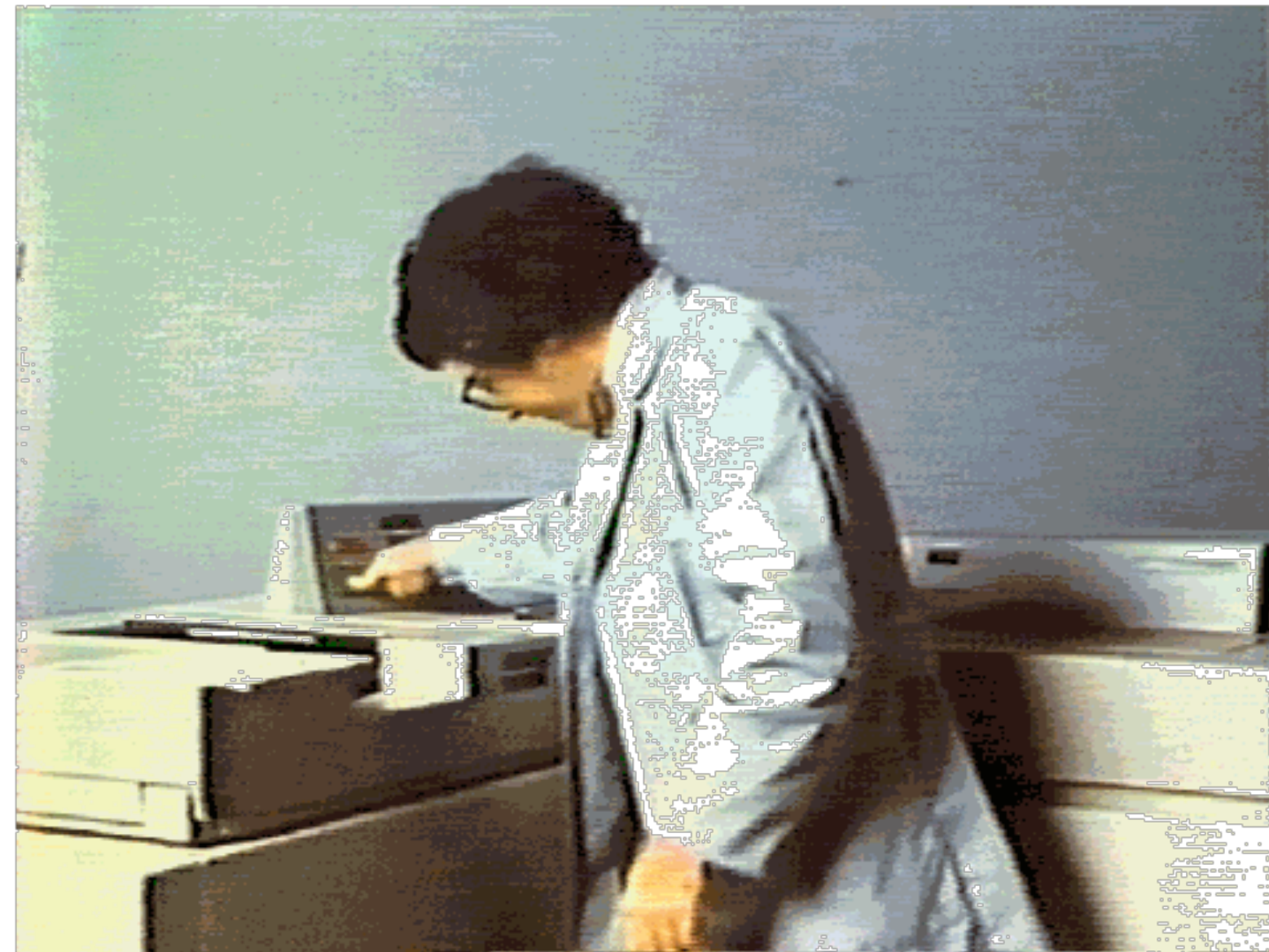Observe target users in context to inform your design

XEROX, CA. 1983...

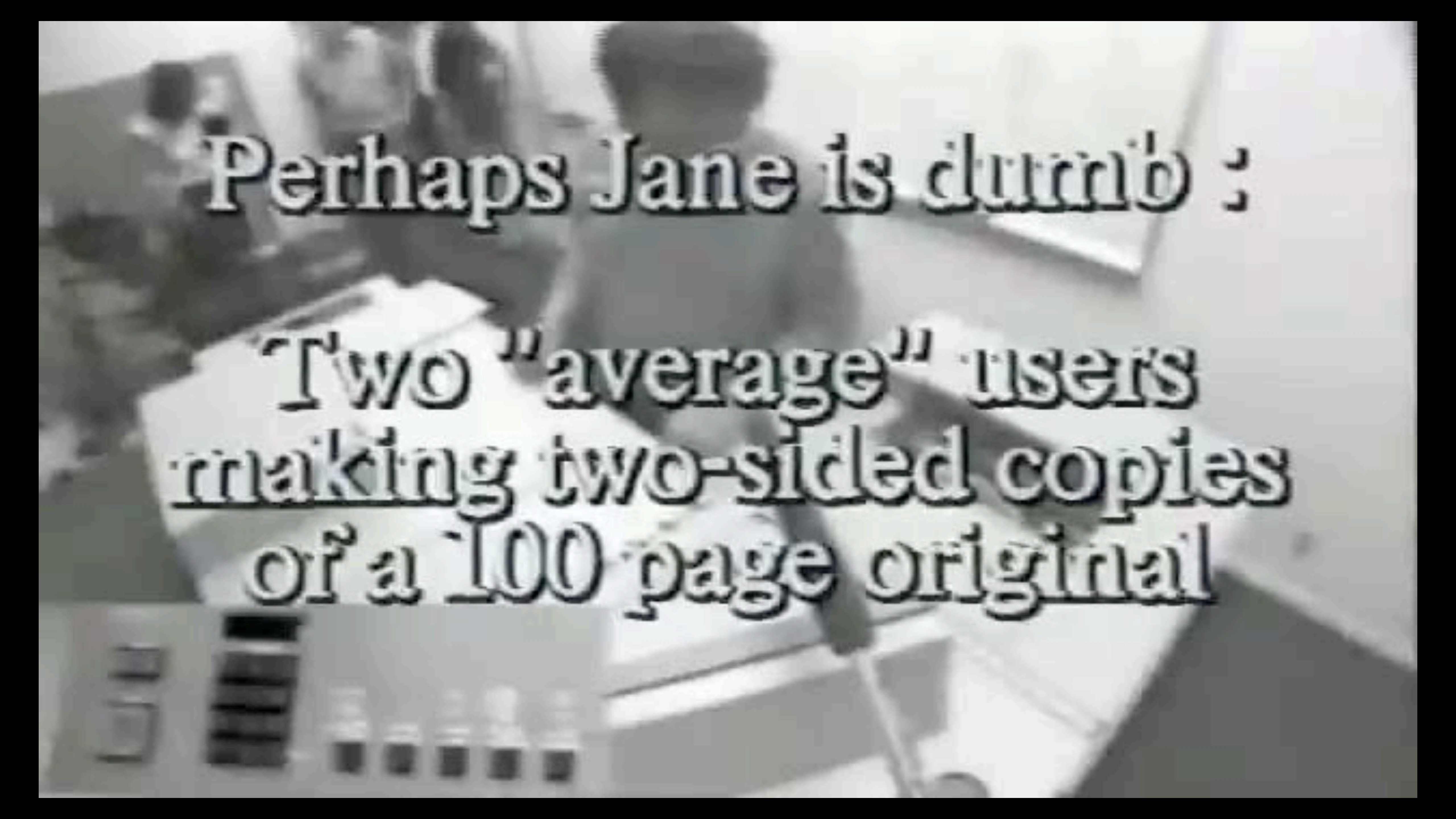Existing copiers judged as "too complicated" by customers.

But why?

Lucy Suchman
UC Berkeley grad in Anthropology at Xerox PARC suggests videotaping interactions.

Pushing the Green Button
(advertisement for the
8200 copier, c. 1983)

Perhaps Jane is dumb :

Two "average" users
making two-sided copies
of a 100 page original

ABOUT THOSE "AVERAGE" USERS...

Allen Newell

ACM Turing Award Winner

Ron Kaplan

Vice President and Distinguished Scientist at Nuance Communications

ACM Fellow, Chief Scientist at Powerset/Bing

Consulting Professor in the Linguistics Department at Stanford University

Observation showed that difficulties were not due to lack of sophistication of users, but due to problems "reading" (making sense of) an unfamiliar artifact.

MANY VARIETIES OF OBSERVATION TECHNIQUES

Ethnography / Ethnomethodology

Task Analysis

Contextual Inquiry

Cultural Probes

Diary Studies

Experience Sampling methods (ESM)

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Goal: Understand user's activities in context to inform (re-)design of information technology

TASK ANALYSIS

The listing of actions a user carries out in performing a task

For example, a person preparing an overhead projector for use would be seen to carry out the following actions

1. Plug in to main and switch on supply.

2. Locate on/off switch on projector

3. Discover which way to press the switch

4. Press the switch for power

5. Put on the slide and orientate correctly

6. Align the projector on the screen

7. Focus the slide

In HCI, task analysis is the recording of physical and perceptual actions of the user whilst executing the task.

GOALS OF TASK ANALYSIS

Verify that the set of actions employed by the user does accomplish the task.

Explicitly describe the procedure that the user actually employs since this may be different from the expected series of actions.

TASK ANALYSIS IS USED TO

predict the time taken to learn a new task and become a proficient user of the particular application / machine

reveal how difficult one method is to learn compared to another

predict the time taken for a proficient user to accomplish the set task - this can reflect whether the interface is good at supporting exploration. Is it quicker to simply explore by trial and error or attempt to find out through help?

predict the time taken for expert execution of the set task - how long does it take to become expert once a procedure has been discovered? This can be affected by the design of an interface.

To improve the delivery of information to the user. This involves identifying any problems with the delivery of information to the user and the consideration of possible solutions.

TASK ANALYSIS

Task decomposition
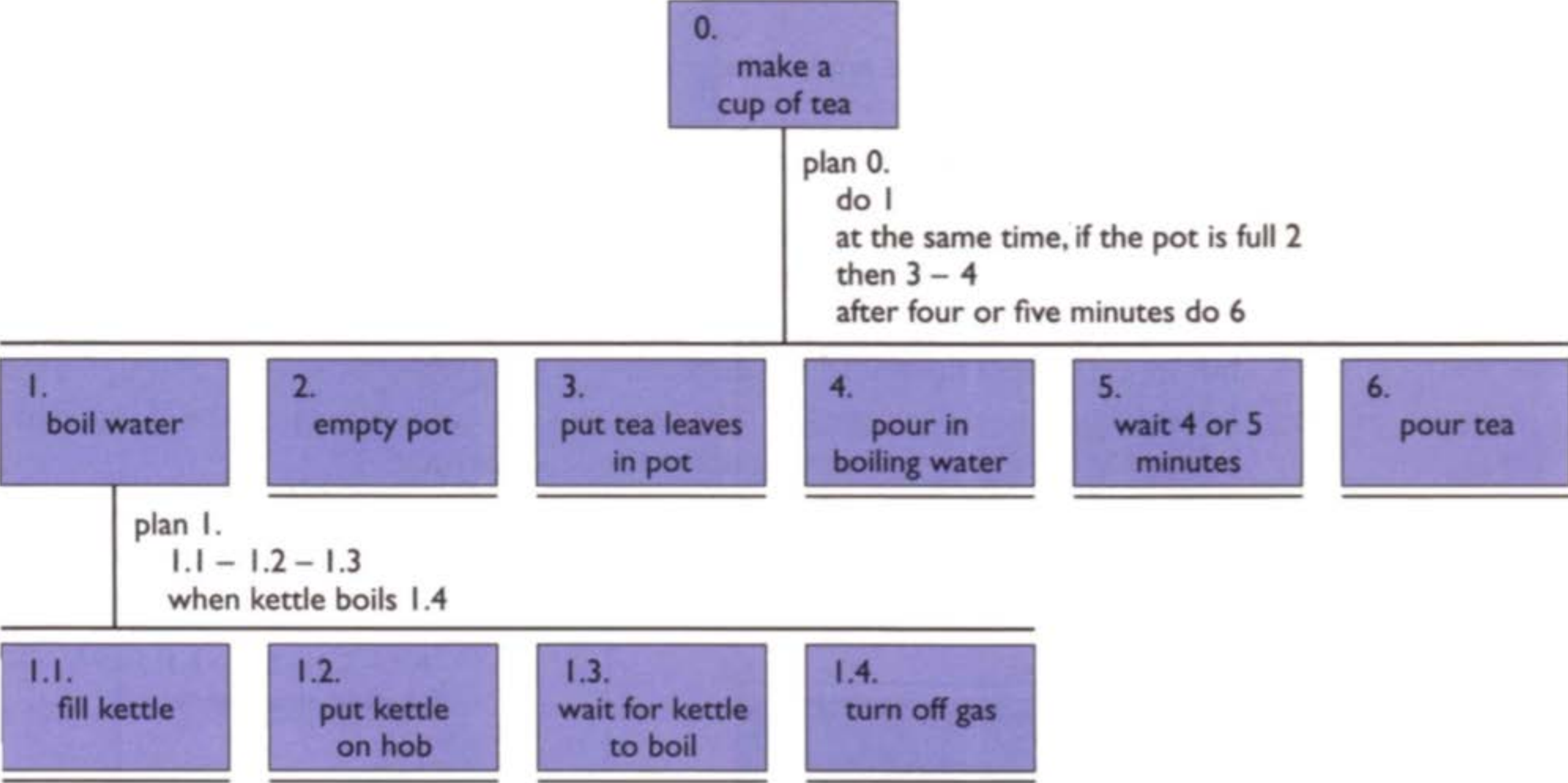
splitting tasks into (ordered) subtasks

Knowledge based techniques

what the user knows about the task and how it is organized
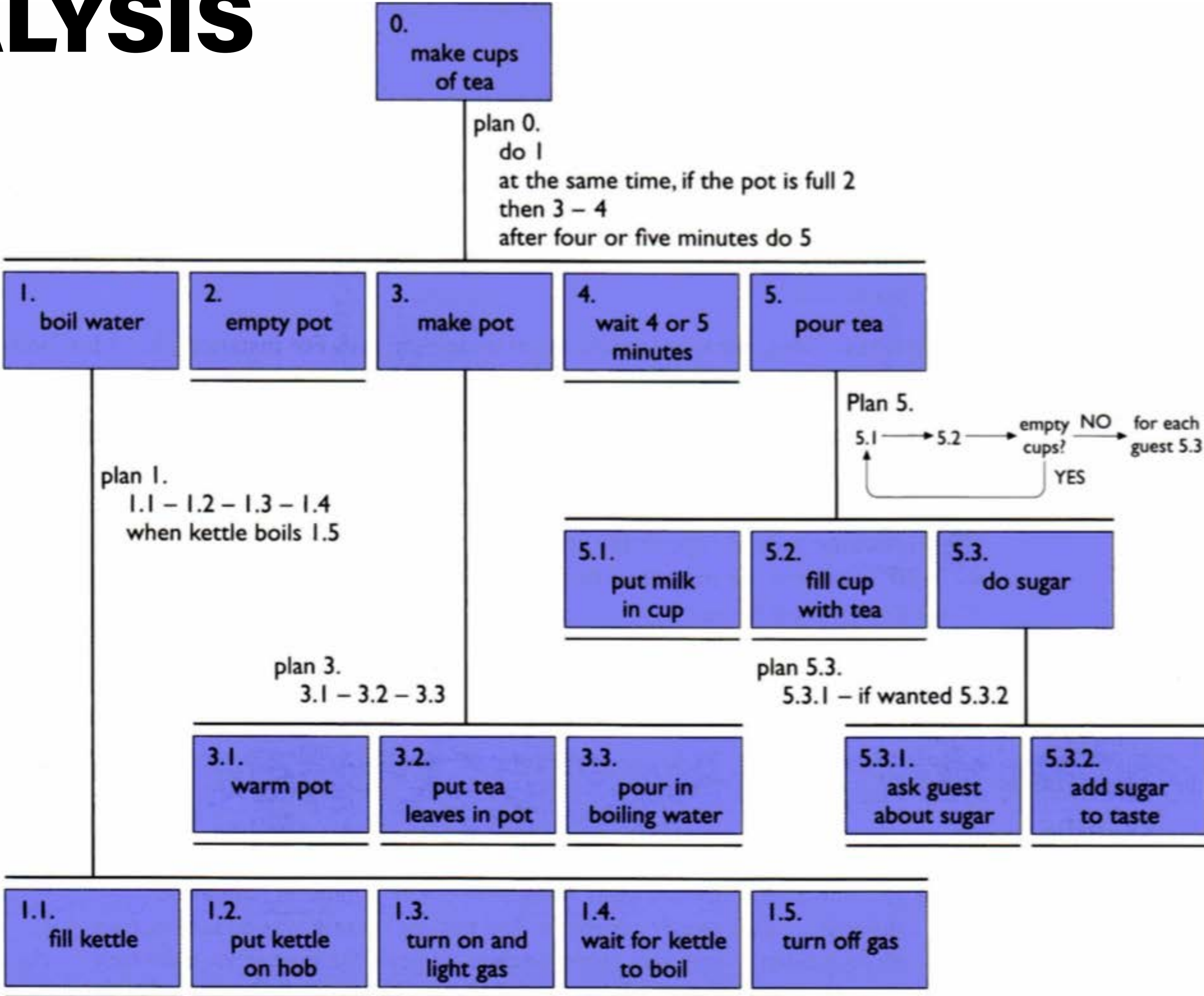
Object based analysis

relationship between objects, actions, and the people who perform them

TASK ANALYSIS

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TASK ANALYSIS: BART

BART TICKET MACHINE

Goals:

Buy new ticket

Add value to ticket

Pay with: Debit, Credit, Cash

PROBLEMS?

HOW TO IMPROVE DESIGN?

Understand users' tasks

Designers must think about …

Who are the users?

What tasks they would want to carry out?

Observe existing practices

Create scenarios of actual use

TASK ANALYSIS QUESTIONS

1. Who is going to use system?

2. What tasks do they now perform?

3. What tasks are desired?

4. How are the tasks learned?

5. Where are the tasks performed?

6. What's the relationship between user & data?

7. What other tools does the user have?

8. How do users communicate with each other?

9. How often are the tasks performed?

10. What are the time constraints on the tasks?

11. What happens when things go wrong?

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WHO IS GOING TO USE IT?

Identity

Need several typical users for broad product

Background/Skills

Knowledge users already have and rely on to perform task

Values, Likes/Dislikes

Personal characteristics

Education

Literacy

Physical traits, abilities/disabilities

Age

WHO (BART)?

Identity

Types of users

Background/Skills

Knowledge they use to perform task

WHO (BART)?

Identity

Tourists and visitors from elsewhere

Regular BART riders

Business people, students, disabled, elderly, etc.

Background/Skills

Have an ATM card or credit card?

Experience with other public transit?

WHO (BART)?

Personal characteristics

Education, Physical abilities, Age, etc

WHO (BART)?

Personal characteristics

Mostly educated, fluent in English (Spanish important, too)

Varying heights → don't make it too high or too low!

Mixture of ages, a few mobility challenged (e.g. wheelchairs).

Some bike users (make interface one-handed?)

WE JUST DID IT WRONG

Don't guess – Observe!

Go out and find who uses the artifact you are replacing or redesigning!

TALK TO THEM

Find some real users

Talk to them

Find out what they do now

How would your system fit in?

More on this a bit later

Are they too busy?

Buy their time

t-shirts, coffee mugs, etc.

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OLD AND NEW TASKS

Old

The way people do things now

New

The way you anticipate them doing things in future

Observe!

Pick the most important tasks

WHAT TASKS (BART)?

Old

Use cash, credit or debit to buy new ticket with $x stored on it

Add fare to existing ticket

New

Use cash, credit or debit to buy new ticket

Add fare to existing ticket

Get pricing information for destination

Buy "destination" tickets

Task level of detail can vary based on goals of analysis

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HOW ARE TASKS LEARNED?

What does the user need to know?

Do they need training?

Book/manual information

General knowledge / skills

Special instruction / training

Experience, level of education and literacy

8th grade is often reasonable in broad design contexts

LEARNING TASKS (BART)

What does the user need to know?

Walk up & use system

Can't assume much background/training

Do they need training?

Too time consuming

Experience, level of education and literacy

Must be simple & similar to existing systems

Vending machines

ATM machines

WHERE IS THE TASK PERFORMED?

Office, laboratory, point of sale, home?

Effects of environment on users?
Lighting, sound, comfort, interruptions, water

Social influence of environment
Rituals, sacred places

Effects of other people (bystanders)?
Rushing, safety, privacy

WHERE (BART)? TRAIN STATION

WHERE (BART)? TRAIN STATION

Loud

Voice I/O not a good idea

Privacy

Others can look over shoulder

PIN must be confidential

Don't confirm with sound

Lighting is dim

Make sure messages are readable

Rituals

Support causes, musicians,
reading the paper, mobile phones

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DATA RELATIONSHIPS

Personal data

Privacy

Always accessed at same machine?

Do users move between machines?

Common data

Handling and processing

Used concurrently?

Passed sequentially between users?

Remote access required?

Access to data restricted?

DATA RELATIONSHIPS (BART)

Personal data

Users may use any machine
Store info on BART card

Common data

Fare rules (e.g., how much for BART Plus)
Used concurrently

Access to data restricted?

Only you can use your ATM or credit card

No need for remote access

Maybe for accessing Clipper Card balance

OTHER TOOLS

Users work with collection of tools

Smartphone

Smartwatch

Home PC

Printed schedules

Maps

Signs

Can we use other tools to facilitate interaction?

OTHER TOOLS (BART)

Credit, debit cards (today)

E-wallet in phone or watch (ApplePay, Google Pay, Venmo)

Real-time train info on the web/phone

Could provide auditing for them?

Phone/Watch apps to for BART delay alerts?

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HOW DO USERS COMMUNICATE?

Who communicates with whom?

About what?

Follow lines of the organization? Against it?

Example: assistant to manager

Installation of computers changes communication between them

People would rather change their computer usage than their relationship

Not so relevant in context of BART

HOW OFTEN ARE THE TASKS PERFORMED?

Frequent users remember more details

Infrequent users may need more help

But don't make it tedious

Which function is performed

Most frequently? By which customers?

Optimize system for these tasks will improve perception of good performance

MAKE COMMON CASE FAST…UNCOMMON CASE POSSIBLE

FREQUENCY (BART)?

Varying frequency of customers

Some (most) take BART every day

Some take it only occasionally (depends on station!)

Varying frequency of tasks

Might do add fare or buy new ticket every day

Novices: Just one set of detailed instructions

Experienced Users: Provide overview of process

How to find out for sure?

Observe and interview customers!

TASK ANALYSIS QUESTIONS

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TIME CONSTRAINTS

What functions will customers be in a hurry for?

Which can wait?

Is there a timing relationship between tasks?

TIME CONSTRAINTS (BART)?

Customers will almost always be in a hurry

Lines form

Take less than 1 minute/transaction

Be able to do any task in any order

WHEN THINGS GO WRONG

How do people deal with

Errors?

Practical difficulties?

Catastrophes?

Is there a backup strategy?

WHEN THINGS GO WRONG (BART)

Confusion/errors on task

"Start over" button

Practical difficulty

Generated ticket with too much money. Now What?

Catastrophe

Machine eats card - swipe instead of insert?

Backup strategy

Use cash in regular machines (and provide ATM)

IDENTIFYING TASKS FOR YOUR DESIGN

Real tasks users have faced

Collect any necessary materials

Should provide reasonable coverage

Compare check list of functions to tasks

Mixture of simple & complex tasks

Easy task (common or introductory)

Moderate task

Difficult task (infrequent or for power users)

WHAT SHOULD TASKS LOOK LIKE?

Say **what** user wants to do, **not how** user would do it

Allows comparing different design alternatives

Often very specific

Forces us to fill out description with relevant details

Say who the users are (personas)

Design can really differ depending on the target user

Characteristics of the users (job, expertise, etc.)

Some describe a complete job

Forces us to consider how features work together

USING TASKS IN DESIGN

Rough out an interface design

Discard features that don't support your tasks

(or add a real task that exercises that feature)

Sketch major screens & functions (not too detailed)

SUMMARY

Task analysis

Understand users and their tasks

Real tasks with reasonable functionality coverage

Do your best to anticipate new tasks

USING TASKS IN DESIGN

Write up a description of the tasks

Produce scenarios covering each task

Rough out an interface design

USING TASKS IN DESIGN

Write up a description of tasks

Formally or informally

Run by users and rest of the design team

Get more information where needed

USING TASKS IN DESIGN

Produce scenarios covering each task

Remember...**Scenarios** are

- Short stories about people and activities using technology in context
- A representation of the designer's understanding of activities so that it can be discussed and verified
  - By other designers
  - By the people undertaking the activities

Task-based scenario example:

Jill is traveling to Seattle for her job next week and she wants to check on the amount she can be reimbursed for meals and other expenses.

SCENARIOS

- Forces consideration of practicalities - helps reflection on the context by describing 'actual' situations of use

- More or less detailed depending on the stage of the design, but it is important to capture the variation that is possible in people, goals, contexts, technologies and the details of activities, so a range of scenarios are needed

- Encourages fluidity in design: concrete (specific & detailed) but rough (therefore readily adaptable)

- Can be developed to describe many possible views/levels

- Used to describe 'work' activities – can involve users in their construction; doesn't get bogged down in key presses

- Provides an easily understandable bridge between researchers, designers, users and developers

SCENARIOS

Use everyday language

Include details about people and interaction

Relevant information about the user

Details of interaction sequence and presentation

Give names to the participants in a scenario to make the interaction seem more real

A concrete example of the system being used, not a generalized account of all the possible functions and alternative results

SCENARIO FOR ARTS AGENCY WEBSITE

Harriet, a local art event organizer, has a problem: she needs to find a great film for her December event. Getting into her psyche, Harriet is specifically looking for a film with a winter theme. She needs to attract a larger-than-average attendance to make up for a small failure at the last screening.

Harriet starts out on the home page and quickly conducts a search. She spends a little time searching and browsing, watches a clip here and there, and finally settles on a film that interests her. She reads some details about the film, including reviews from others, and bookmarks the artist for later screenings. Finally she puts the film in her basket and hires the artist during checkout. Harriet has successfully completed her goal — she found a wintry film for her December event.

SCENARIO FOR SYSTEM TO IDENTIFY PLANTS

Persona: Joe Brown is a 30 year old botanist that works at the Smithsonian Institution. He uses Microsoft Word in his daily work and a little bit of Excel, but isn't always comfortable using computers. He often carries a backpack and makes weekly trips to Argo Island to collect and identify leaf samples. He wears glasses.

Scenario: Joe starts up LeafView and sees the browsing view, which enables him to look around at various plants. He knows he needs to start collecting today, so he closes the laptop and walks along the path looking for a specific plant. He sees what might be the right plant and cuts a leaf off the stalk, placing it on the gray background of the laptop. He snaps a picture and places the leaf in a sample bag. When he opens the laptop, he sees the acquired leaf image and can decide to search based on the image, save the image, or cancel. He searches for the leaf and the top 15 images are returned. He wants to see a comparison, so he brings the comparison image alongside the results. He zooms in on the Catalpa bignonioides species, and decides that this is the correct selection, after reading the text and looking at the veins and edges. He presses the select button and LeafView shows the information that will be saved. He clicks the save button and continues working.

Jae is a South Korean interaction designer. This is her first time at ISEA - in fact, it's her first trip outside of Asia - and she wants to do and see as much as possible.

She picks up one of the small devices when she registers in Stockholm. She figures that she could use some help understanding the rules of this new social space.
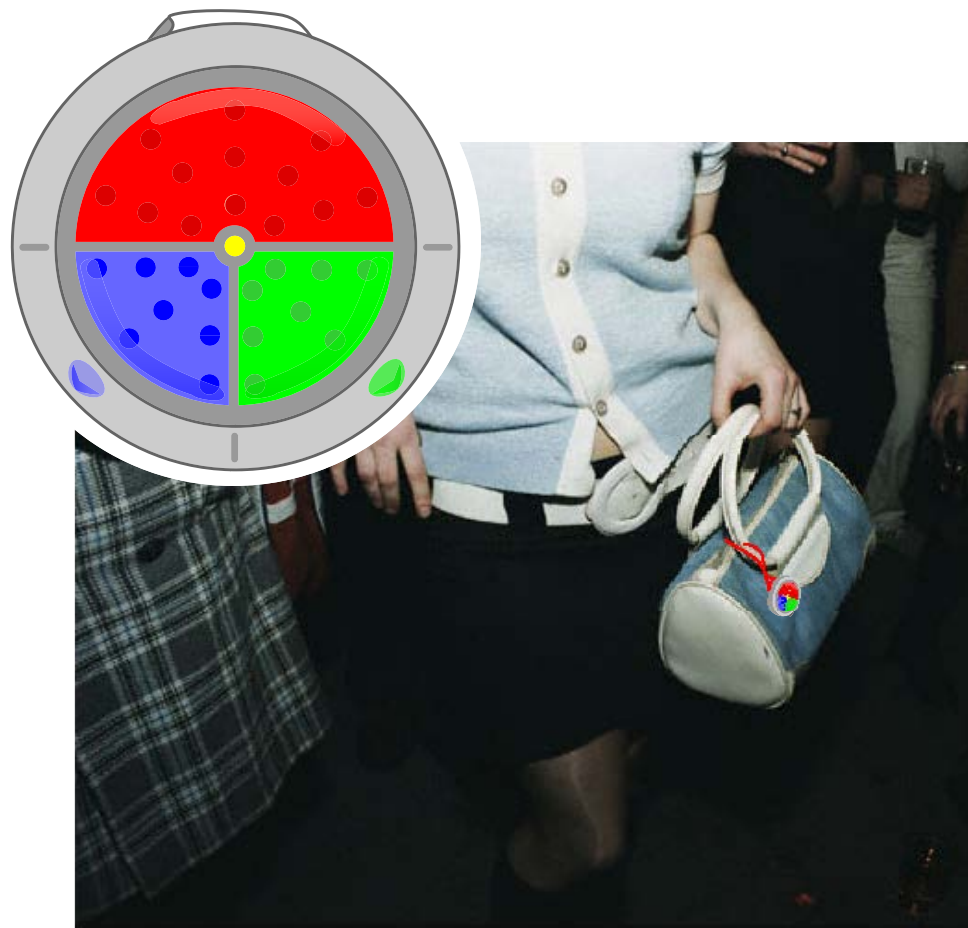
It looks a bit like a fashion accessory, so she decides to hang it from her purse strap. That way, she can look at it quickly. She also likes the idea that other people now know she's a part of the conference. The device's face is dark when she receives it, but she is told that it will start glowing once she has spent some time with the same people.

As she wanders around the ferry to Tallinn, she frequently glances down at the device dangling from her purse to see whether the it is glowing. It is brighter on the top deck than on the bottom, so she decides to stay up top. She wants to see everything ...but at the same time, it's been a long day and she's feeling a little unsure of herself. It's good to know that she's seen the people around her before, even if she doesn't know their names and can't even speak their languages.

At dinner, she notices that her device is glowing. She doesn't remember spending so much time with these people - but there's no other reason why it would glow so much. She decides that if she wants to do as much as possible at the conference, she should stick to the places where her device glows less. That way, she'll know she's seeing many new and different kinds of people and projects. But she pushes one of the "group" buttons on the device to make sure that she always knows if her new friends are near.

Katja is a German programmer. A DJ and singer in her spare time, she likes to surround herself with interesting people.

Since she's a musician, Katja decides to combine ISEA with Koneisto. On a whim, she registers for a familiar stranger device at the pre-event. *It might be interesting*, she thinks, *to see how many people are at both events. Or even how many people at ISEA like good dance music.*

At Koneisto, when a venue seems cool, she pushes one "group" button to add people in range to her personal "cool crowd" group. If she's near people she dislikes, she pushes the other button to add them to her "boring" group. *That way,* she thinks, *I'll know who to avoid.*

On the ferry to Stockholm, she notices that people in her "cool crowds" group had recently been somewhere near her. *Where are they?* she thinks. *If I can find people who like my kind of music, I'll have someone to hang out with tonight....*

But somehow, as she wanders around the boat, she keeps missing them.

She spends time at an art exhibition looking for the "cool people" that her device says are nearby. But she never manages to pick them out from the crowd.

I know that there's a better party out there, she thinks. *Why does this always happen to me?*

Alex, an American researcher, is having a bad week. His girlfriend just dumped him, his dog is dying, and his latest project has been defunded. The last thing he wants to do is talk about art. However, his ticket to Stockholm is non-refundable, so he can't cancel his trip to ISEA. In a way, he's happy to go. Maybe he'll find some inspiration. He just doesn't want to talk to anyone.

At his hotel, he has an idea: why not use the little device that he was told would find familiar people as a way to locate *unfamiliar* people? If he makes sure that it "recognizes" the usual people he sees at these conferences, then he can avoid them.

Avoiding the "usual people" is more difficult than Alex thought. He walks endlessly around the conference, frantically checking his little device. The devices he sees worn by many of the other conference goers tell him whether rooms are full of people who are intensely familiar to each other...or are marked by unfamiliarity.

After a day or so, his anxiety fades. He enjoys wandering through the crowds, watching people come and go. Finally, he heads for a place where many of the people seemed familiar to him - and to each other. He starts a conversation with a German programmer who seems familiar, then they go out for drinks. *It's a bit like a neighborhood,* he thinks.

ADVANTAGES OF USING SCENARIOS

Providing concrete scenarios of this type helps focus design around the real needs of the user.

They give a design team a better understanding of how the system will be used.

BREATHE